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THE UNIVERSITY OF THE SOUTH PACIFIC

EU PacTVET

European Union Pacific Technical and Vocational Education and Training on Sustainable Energy and Climate Change Adaptation Project

Cook Islands Training Needs and Gap Analysis

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Acknowledgment

Organising a successful stakeholders consultation in a country is a complex exercise and requires an excellent knowledge of the country, in particular the 'who does what', and a broad communication and exchange network with the stakeholders. I was very fortunate to have the support of the USP EU-GCCA In-Country Coordinator in the Cook Islands, Vaine Wichman, and the National Council of Women's Taputu Mariri who arranged the logistics for this workshop and contacted the main stakeholders beforehand. The success of this workshop is the result of their work. I must also thank the National Council of Women and USP Cook Islands campus for their unfailing support with administrative and organizational tasks. Thanks also go to Ana Tiraa, Director of Climate Change (Office of the Prime Minister), Owen Lewis, Manager of the Cook Islands Tertiary Training Institute, and Peter Tierney, Manager of the Development Coordination Division (Ministry of Finance and Economic Management) for their guidance and support.

However, the key to the success of this consultation was really down to the involvement and the enthusiasm of the participants. Once again, I was very fortunate with the level of engagement of the different participants and their interest in the project. The atmosphere of cooperation between the different stakeholders was reassuring and an essential element in the identification of training needs and the best way to address them in the country. I would thus acknowledge the participants of the consultation workshop and give them many thanks for their hard work and support.

1. Background

The 10th European Development Fund European Union Pacific Technical and Vocational Education and Training on Sustainable Energy and Climate Change Adaptation (European Union PacTVET) project is component three within the broader regional Adapting to Climate Change and Sustainable Energy (ACSE) programme.

The project builds on the recognition that energy security and climate change are major issues that are currently hindering the social, environmental and economic development of Pacific - African Caribbean and Pacific (P-ACP) countries.

1.1 EU PacTVET Objectives

The general objective of this project is to enhance sustainable livelihoods in P-ACPs. Sustainable livelihoods are a high priority for Pacific Island communities and governments alike. They are central to current development policy including resource management and conservation but also in emerging policy to meet threats such as climate change. The project aims to enhance Pacific regional and national capacity and technical expertise to respond to climate change adaptation (CCA) and sustainable energy (SE) challenges.

The project is being implemented by the Secretariat of the Pacific Community (SPC) in partnership with the University of the South Pacific (USP) over a period of 53 months from August 2014 with an overall budget of EUR 6.1 million. It will achieve the following results:

1. Assess national training needs in SE and CCA and existing informal and formal TVET training courses and training and education providers are identified and strengthened
2. Develop and implement benchmarks, competency standards and courses on Training of Trainers (ToT) and create a pool of national trainers
3. Develop and establish training courses and support facilities within TVET institutions
4. Strengthen networking in SE and CCA

The project is being implemented in a sequential approach. Result 1 activities will provide a more detailed/clearer understanding of countries' needs and their requirements from the project. The activities under Results 2 and 3 will be then be tailored to the country needs. This report feeds into result area 1.

1.2 Location

The EU PacTVET project will be implemented in the Pacific region comprising of 15 Pacific ACP countries: Cook Islands, Federated States of Micronesia (FSM), Fiji, Kiribati, Nauru, Niue, Palau, Papua New Guinea, Republic of Marshall Islands (RMI), Samoa, Solomon Islands, Timor-Leste, Tonga, Tuvalu and Vanuatu.

Climate change is affecting the livelihoods of the P-ACP communities causing varying degrees of adversity depending on location.

1.3 Context

References: -
http://www.mfem.gov.ck/population-and-social-statistics/vital-stats-pop-est
Isaka M. Mofor L. Wade H. (2013). Pacifi c Lighthouses Renewable energy opportunities and challenges in the Pacific Islands region – Cool Islands. IRENA
Cook Islands Statistical Office (http://www.mfem.gov.ck/)

Current total global greenhouse gas (GHG) emissions stand at 42.6 gigatonnes of CO2 (GgtCO2). Of this global GHG emission, Pacific Island countries emit less than 0.03% yet they are amongst the most vulnerable to adverse effects of climate change - the first to be exposed and the least able to respond (Climate Analysis Indicators, World Resources Institute, 2014). Hence there is a moral obligation for the island countries to start implementing measures to not only mitigate GHG but also adapt to climate imposed environmental change, and prepare for future adaptation measures. At the national level, the Cook Islands' annual GHG emission is insignificant on a global scale.

In spite of efforts to reduce Pacific-African Caribbean and Pacific (P-ACP) countries reliance on fossil fuels and improve energy security almost all Pacific Island countries remain highly dependent on imported petroleum products for energy generation and transportation, which are the two major petroleum consumption sectors in the region.

With the Pacific Island countries facing challenges posed by climate change and energy security, sustainable energy and climate change adaptation are undeniably ranked above all other sectors in regional priorities, as evident through regionally endorsed frameworks, such as the wider Pacific Plan and the more specific Pacific Islands Framework Action on Climate Change (PIFACC) and the Framework Action on Energy Security in the Pacific (FAESP) and individual national policies.

Efforts in addressing energy security and climate change adaptation challenges are ongoing through various regional and national projects. On climate change mitigation, there were some familiar projects such as the Pacific Islands Greenhouse Gas Abatement through Renewable Energy Project (PIGGAREP) that addresses mitigation and Pacific Adaptation to Climate Change (PACC) that focused on climate change adaptation. The PIGGAREP was focussing on complementing PICs initiatives in promoting the widespread use of renewable energy in the regions and PACC focused on three thematic areas, namely, "Food security"; "Water Security" and "Coastal Management" - assisting communities to implement activities that help them in these three areas. Additionally the University of the South Pacific's European Union Global Climate Change Alliance project has been active in all 15 P-ACPs enabling climate change adaptation by formal and informal education, direct community engagement and applied research. Sustainability of such projects is very important. Now that these projects are coming to their end, it is important that knowledge and skills being acquired and/or hardware that were put in place continue to function and

be beneficial to the targeted beneficiaries. Not only on the renewable energy side, but on overall energy services, where there needs to be awareness and improvements to energy efficiency and conservation and what measures needs to be taken to use energy in a sustainable manner as compared to energy misuse and wastage.

The Cook Islands consist of 15 islands totalling 240 km2 of land (13% of which is under permanent cultivation) and an EEZ of around 1.8 million Km2. Population estimates vary enormously, currently the resident population of the Cook Islands is estimated to be around 15,000 people (Cook Islands Statistics Office, 2015), 85% of whom live in Rarotonga. 45% of the population are under the age of 24 years. The population has been declining for a long time due to emigration to New Zealand and Australia. It is therefore essential that EU PacTVET initiatives engages with youth as well as communities. Employment statistics for 2011 show that just under 7,000 people were in paid employment.

Internet use is estimated to be less than 7% of the population, while 66% have mobile phones. Internet services in the Cook Islands are prohibitively expensive for most people. However, many people have access at work. Tourism provides the economic base for the Cook Islands, contributing up to approximately 70% of the country's GDP (estimated to be approximately US$15,000 per capita). Agriculture, fishing, fruit processing, clothing and handicrafts are the remaining economic activities. About 75% of outer island households engage in fishing, 29% in Rarotonga. The northern group of islands is sparsely populated and the southern group grows bananas, taro and cassava. Fifteen years ago agriculture provided about 15% of GDP but this had reduced to only 2.7% in 2010. The economy of Rarotonga is largely based on trade and service, with tourism being the economic mainstay. Trade deficits are offset by aid from New Zealand.

Sustainable development in the Cook Islands is integrated and well-coordinated. The table below outlines some of the assistance available:

National Development Programmes	Community Development Programmes	Business Development Programmes
• Agriculture in the Cook Islands • Budget Support Programme (EU) • Climate Change • Cook Islands Technical Assistance Fund (CITAF) • Global Environment Facility (GEF) • Health Programmes • New Zealand & Australia Harmonised Programme • People's Republic of China Grant Fund • Renewable Energy Southern Group Renewable Energy • ADB Technical Assistance Fund and Concessional Loan Support • Water and Sanitation Programme • Cook Islands Infrastructure	• Overview of Small Grants available • UNESCO Participation Programme • Pacific Fund (France) • German Small scale projects • India Grant Fund • Japan Grassroots Human Security Project Fund • Social Impact Fund • Rarotonga School Fire Appeal • Disaster Response and Risk Management • Volunteer Services Abroad • Direct Aid Program - Australia	• Private Sector Development • Access and Benefit Sharing • Cook Islands Tourism -Destination Development Initiatives • Trade and development • Pacific Business Mentoring Programme

Cook Islands Development Coordination:
(http://www.mfem.gov.ck/development/development-programmes)

It should be noted that a disaster risk reduction and CCA learning needs assessment was carried out in 2013. This was conducted in order to assist the Office of Prime Minister (OPM) in the delivery of their national project - "Strengthening the Resilience of our Islands and our Communities to Climate Change" (SRIC-CC). This is dedicated to strengthening the capacity of key players at the national level to assist with enhancing climate and related resilience at the island and community levels in the Pa Enua.

One of the SRIC-CC objectives is to assist national players to make informed decisions and create innovative solutions to reduce the impacts of disasters in our Pa Enua, and help communities in the Pa Enua adapt to the effects of climate change. (Technical Assistance to Assess National Learning Needs In Order to Achieve Key Objectives of the SRIC-CC Programme Cook Islands, 2013.)

The purpose of the in-country-mission was to:

- Identify present and future market demand in the Cook Islands;
- Map existing training supply in the Cook Islands;
- List priorities for future project activities – including selection of partner TVET institutions.

USPCI ICT Centre

2. Schedule of Consultation Events

Site visits and interviews were held with key staff members at the Cook Islands Tertiary Training Institute and the Development Coordination Division, Ministry of Finance and Economic Planning (10th June, 2015).

The stakeholder consultation was held in conjunction with the Disaster Risk Management and Climate Change Platform (DRMCC Platform) meeting. This team meets generally on a quarterly basis and is an important grouping of all agencies (NGO and GO) that have a stake in CC in the Cooks. There is a set agenda and venue (the Cook Islands National Council of Women's Office - CINCW). The agenda generally receives updates and future work from key projects on climate change in country – SPC/EU/GCCA, USP/EU/GCCA, UN-SRIC, Office of the PM Climate Change Division, and other smaller programs including ensuring the alignment of work with national and planning frameworks. Taking part in this meeting was an essential part of introducing the EU PacTVET project into national climate change interventions. Additionally, as with all regional interventions in the country, the Cooks is conscious of ensuring the EU PacTVET project intervention are specifically relevant to the Cooks and implementable.

Additionally, Director of Climate Change advised that a Cooks Islands climate change training analysis report was completed in 2014 and may provide baselines for the EU PacTVET project.

The DRMCC platform meetings are open to everyone – all stakeholders engaged in climate change activities. For example, focal personnel from the following agencies – Office of PM/Climate Change Division, Renewable Energy Division and Policy Division, CINCW, House of Ariki, USP, Min of Health, Min of Education, Environment Services, NGOs (environmental and women), Infrastructure Cooks, Waste Management, Pa Enua Governments, Agriculture, Marine Resources, ADB and UN reps, the UN/SRIC project, and the CI Red Cross. The USP EUGCCA projects management committee is reflected in the presence of the following agencies above – OPM/CC, USP, Are Ariki, CINCW, Environment Services, and Pa Enua as all these are members of the USP EUGCCA National Project Advisory Committee.

Participating in the DRMCC Platform meeting provided the following context for the EU PacTVET project:

The Cooks has been one of the progressive PICs in CC, with a national policy in place which is being proactively and diligently implemented – along with related regional policies.

It is evident that interventions in country should be customised to ensure consistency with what has begun or is already in place in country. There should be no "re-inventing of the wheel" and synergies between existing interventions must be identified and acted upon.

Depopulation in the Cooks is severe and it has always been an important trait to consider. Interventions must take account of local needs and optimise the presence of expertise in the Cooks to implement project activities.

The consultation template used for other in-country consultations was considered too long and was re-structured to match local requirements. Due to very limited government capacity, it was considered unreasonable for them to commit to 3 full days so stakeholder presentations were not given.

2.1. Project Outline Presentation

An outline of the EU-PACTVET was made, with emphasis on the following aspects of the project:

a. Rationale - current scenario with regard to sustainable energy (SE) and climate change adaptation (CCA) in the P-ACPs and the issues. At a national level there is dependency on fossil fuel for power production and transportation. On the climate change side, the P-ACPs are more vulnerable to climate change, but have the least capacity to respond to these.
b. How the EU PacTVET project intends to responded to these issues by focussing on building the capacity based on country needs - recognising skills acquisition by benchmarking and defining country-requested competencies and accreditation.
c. The Key Result Area (KRA). Each of the 4 EU PacTVET KRAs were outlined and it was made know to the stakeholders that one of the activities under KRA 1 is this in-country consultative workshop and one-on-one consultations for the training needs and gaps analysis (TNGA). Activities that need to be conducted in the hope of achieving each of these KRAs were briefly outlined.
d. How the project is partnering with the Fiji Higher Education Commission with regard to competency development in the areas of CCA and SE.
e. How the project is partnering with USP and the Board of Educational Quality Assessment (formally SPBEQ) on accreditation of qualifications.
f. A brief overview of the budget. This was to give the stakeholders an outline of the allocation from the €6.1 million.
g. And finally, it was emphasised that the consultations are important to aid the stakeholders in identifying national needs to frame future EU PacTVET activities.

2.2. Stakeholders' Functions Outlines.

Day 1:
The Project outline was followed by brief introduction from each of the stakeholders. Stakeholder presentations were not given due to time constraints.

Participating Stakeholders:

Firstly, thank the stakeholders for their commitment to the EU PacTVET project and for their insight and input into the needs and gap analysis process. Their enthusiasm and willingness to share their knowledge and experience to ensure the Cook Islands participates fully in the project was much appreciated. Their comprehension and identification of the various issues

impacting CCA and SE TVET education in the Cook Islands will form the basis of future project activities.

1.Teresa Manarangi-Trott, Chamber of Commerce
2.Lydia Sijp Emergency Management EMCI / Secretary, Cook Islands Civil Society Organisation CICSO
3.Tevaerangi Tatuava – National Coordinator, Cook Islands Child Welfare Association CICWA
4.Taputukura Mariri ¬– Cook Islands National Council of Women CINCW
5.Ruta Pokura – Director, Gender and Development Division, Ministry of Internal Affairs INTAFF
6. Tuaine Maunga – Cook Island Workers Association CIWA
7. Ana Tiraa - Director, Climate Change, Office of the Prime Minister OPM
8. Celine Dyer – Climate Change Coordinator, Office of the Prime Minister
9. Sonny Tatuava, Ministry of Marine Resources
10. Don Beer, President, Cook Islands Fishing Association CIFA
11. Owen Lewis, Director, Cook Islands Tertiary Training Institute CITTI
12. Peter Tierney – Director, Development Coordination Division (Ministry of Finance and Economic Management)
13. Tupopongi Marsters, Gender and Development Division, Ministry of Internal Affairs
14. Dr Teina Rongo, Advisor for Climate Change, CC, OPM
15. Mr Teariki Rongo, Project Manager Pearl Support Division, Ministry of Marine Resources.
16. Imogen Ingram, Koutu Nui (Traditional Island Leaders)

Cook Islands Chamber of Commerce
(website: http://www.cookislandschamber.org/)

Is a voluntary organisation of individuals and businesses who represent private sector interests in the Cook Islands. They join together to advance the commercial, financial, industrial and civic interests of the islands. Aligned with the strategic focus of PIPSO (Pacific Islands Private Sector Organisation), key objectives under include:

A. Strengthening Business capacities;
B. Encouraging Product innovation;
C. Increasing Business Competitiveness and Visibility;
D. Capturing and building Markets.

Cook Islands Tertiary Training Institute (CITTI)
(Source: Cook Islands Government 2014 Department of Education Statistical Report)

“The Cook Islands Tertiary Training Institute has been created to provide quality vocational services for the Cook Islands. Its goal is to achieve the aims of the Cook Islands Government to lift the skills level of the population through expanding post-school training options, increasing the range of qualifications on offer, connecting training more directly to the

needs of local industry and focusing on the training needs of young people and the Sister Islands."

Early focus has been on:

- Teaching staff undertaking professional development including the achievement of relevant teaching, assessment and moderation qualifications
- Developing excellent programmes which are relevant and accessible
- Developing and implementing a Cook Islands Apprenticeship programme
- Developing external relationships with industry groups
- Consulting and maintaining dialogue with high schools
- Increasing student support services and providing literacy support to all students
- Improving the students' physical learning environment
- Expanding the use of e-learning technologies in the teaching environment.

<u>Additional Staff members consulted during a site visit to the Cook Islands Tertiary Training Institute:</u>

- Mike Goldstein – Head of Faculty – Hospitality
- Alistair Anderson – Head of Faculty – Trade
- David Samuel – Tutor
- Sam Timoko – Tutor

Additional representation on the DRMCC Platform:

Renewable Energy Development Division ("REDD"). Based within the Prime Minister's Office, REDD is charged with promoting awareness of the country's renewable energy policy drive and targets, planning of the Renewable Electricity Chart and its implementation plan, and coordinating the Renewable Energy Committee.

National Renewable Energy Committee (NREC). The National Renewable Energy Committee, chaired by the Prime Minister, has the role of leading and directing project initiatives arising from the Renewable Energy Chart as well as vetting the deployment of various renewable energy technologies in the country.

Day 1:
A plenary session followed the presentation on "Training Needs and Gaps Analysis". The Plenary Session's topic is "*Creating National and Regional capacity and technical expertise to respond to CCA and SE challenges"*
Day 2:
An actual Training Needs and Gaps Analysis was done after the plenary session discussion. Discussion of the Plenary Session and the TNGA are outlined in Section 5.

A plenary Session: Topic, "*Creating National and Regional capacity and technical expertise to respond to CCA and SE challenges*"

3. Consultation Methodologies

In trying to maximise output various methods of consultation were employed in this in-country mission. Determining which methodology to use depend on various factors ranging from availability, distance and timing. The following are the methods employed to capture the required data during the in-country mission:

3.1. Consultative Workshop/Meeting (TNGA)

A consultative workshop is a consultation with stakeholders in a venue where the agendum for discussion or consultation is done for all at once. This was the methodology employed for the first two days during this in-country mission. This methodology was employed because it used the forum to draw ideas and consolidates them.

3.2. One-to-one Consultations (Interview)

In a situation where stakeholders cannot make it to the consultative gatherings, due to other commitments, a one-to-one or face-to-face meeting or interviews are done. This was also employed where for a number of stakeholders who could not attend the consultative workshop.

3.3. Internet – Online

This was used for searching for further information or publication of Reports or Policies. Not only that but to confirm or double-check on information given.

3.4. Literature Review

This forms the basis for evaluative report of information found in the literature related to technical, vocational education and training with the subject of sustainable energy and climate change as the content. Various literatures were consulted, within the education, energy and climate change sectors, on policy frameworks and national action plans or development strategic plans. Most Policy frameworks (regional and national) were reviewed and those were used as the basis for consolidating future SE and CCA demands or needs in country.

3.5 Limitations

The mission was carried out in Rarotonga and did not make provision for travel to any of the outer islands.

Not all invited stakeholders attended the consultation and it was not possible to visit all stakeholder in the time allowed for the mission.

Obtainable literature surrounding policy documents and strategies was out-of-date.

It was not possible to engage all stakeholders in the time given for the consultation.

4. Status Quo - Relevant National Policies and Frameworks and Sectoral Review

All national policy frameworks and their associated action plans set out principles and suggested initiatives designed to guide and support the development and implementation of national activities consistent with the these policy frameworks' visions and goals.

The Forum Leader's endorsement of the Pacific Islands Framework for Action on Climate Change in 2005 and the Framework for Action on Energy Security in The Pacific (FAESP) in 2010, demonstrated that sustainable energy and climate change adaptation are therefore top priorities for Pacific Island governments.

4.1. Education Sector

The Cook Islands Education Act2 2009 & 2012 and the Cook Islands Education Master Plan 2008-2023 are relevant to primary, secondary and higher education, and provides administration guidelines, regulations on teacher registration and qualification accreditation and a qualifications framework. It also provides guidance on education in general, with an emphasis on—

a) lifelong learning, namely learning at any time during a person's life; and

b) strength in Cook Islands Maori language, culture, perspectives and aspirations, in order to provide a firm foundation for engaging with the wider world; and

c) equitable access to quality learning, through a range of programmes that meet their individual needs and celebrate their individual talents; and

d) a high level of community involvement in determining quality educational outcomes; and

e) the right of everyone who is involved in the education system, including students, to be treated with dignity, respect and understanding.

Throughout a great deal of emphasis is placed on Cook Islands culture and language. Education within the Cook Islands must give learners a solid understanding of their culture and a sense of identity which leads to a respect for cultural diversity and contributes to social justice and tolerance of world views that are different from their own. (Akonoanga Maori, Education Management Policy).

All these points will guide the EU PacTVET remit – additionally, the focus on culture was strongly emphasised at the in-country consultation – in all CCA and SE topics discussed. Other issues of relevance form the 2009 Act include: "tertiary education (also known as vocational training), which is formal education that is offered as a progression from secondary education; and "community education (also known as adult education or continuing education), which is education for the up-skilling of participants."

The Cook Islands Education Act deals with the approval of a National Qualifications Framework. Additionally, the Pacific Register of Qualifications and Standards (PRQS) is a regional database of all quality assured qualifications and standards offered in each Pacific Island country. All qualifications registered in the PRQS will have been initially registered in

the national qualifications framework or register of the relevant country. The PRQS development covers the fifteen Pacific Island Forum countries comprising Cook Islands, Federated States of Micronesia, Fiji, Kiribati, Nauru, Niue, Marshall Islands, Palau, Papua New Guinea, Samoa, Solomon Islands, Tonga, Tuvalu and Vanuatu plus Tokelau. As the world continues to merge into a global village through technological advances, migration and labour mobility, it is crucial that the PRQS provides a framework that enhances the recognition of Pacific qualifications that facilitate the portability of learning and mobility of the Pacific labour force. The PQRS framework aligns with those of Australia and New Zealand. Additionally, the Cook Islands have a policy on Quality and Relevance of Learning and Teaching. Also of relevance to the EU PacTVET project here are the following cluses: establishing links with international educational institutions to draw from their experience in the development of the system for higher education; (this will be covered in EU PacTVET result area 4) and guiding the development of new and emerging vocations to meet the requirements of an ever-changing economy.

The Cook Islands Curriculum (Te Kopapa Kura Api'I o te Kuki Airani) is the official policy for learning, teaching, and assessment in Cook Islands schools. It does specifically to climate change in the Science Curriculum. The Worldwide Fund for Nature's educational material called Te Kaveinga Ora and the National Environment Services' Environment Education package for teachers are considered to be valuable resources for local learning and capacity development. However, as pointed out by the Ministry of Education, more needs to be done to ensure the learning messages cascade down to curricula development for schools.The Tertiary Education Strategy (Building the Skills of Cook Islanders throughout their lives: a strategy for skill development) now provides the basis for development of the tertiary education sector. Successful programmes have been implemented in Pukapuka and Aitutaki. City & Guilds accreditation for a range of hospitality as well as hair and beauty qualifications has been secured. Additionally, there are significant recent increases in the number of Cook Islanders undertaking formal and informal skill development and qualifications through CITTI in-country. (Ministry of Education ANNUAL REPORT TO THE PUBLIC SERVICE COMMISSIONER, 2013-14). It has also been noted that recent achievement re student engagement are down to increasing the scope of subjects available to students therefore improving interest and engagement, better student results and strengthened pastoral, careers and guidance programmes.

4.2. Energy Sector

Energy consumption in Cook Islands is predominantly reliant on imported fossil fuels, which roughly accounts for over 90% of the country's energy consumption (10% is provided by biomass for cooking), and the majority of the country's electricity generation (Cook Islands Country Profile 2009).

"In 2009, around 12.7 million litres of diesel, 4.2 million litres of petrol, and 9.7 million litres of kerosene were imported into the country. The recorded fuel import bill stood in the

vicinity of USD 57.8 million dollars with a current GDP of USD 209.8 million dollars. Petroleum fuels are supplied to Cook Islands by Mobil, Pacific Energy and Total. Triad purchases fuel from Pacific Energy for distribution within the country. Petroleum products are mainly imported from Australia and Singapore via Fiji, using local coastal tankers, to bulk storage in Rarotonga. Diesel fuel for electricity generation accounted for 7.2 million litres in 2009.

Most of the kerosene and petrol imported is used for air and land transport respectively. With regard to the power sector, around 97% of households in Cook Islands are connected to the electricity with 100% grid connection in Rarotonga. Aitutaki, Mangaia and Atiu are other islands in Cook Islands that also have access to 24-hour electricity. The rest of the islands have access to small scale power. Power production and distribution in Rarotonga is managed by Te Aponga Uira O Tumu te Varovaro (TAU). The TAU Act of 1991 (amended 1999) established it as a commercially-operated government- owned utility. It is charged with generating and distributing electricity for Rarotonga. TAu's operation is governed by this act and the Cook Islands Investment Corporation (CIIC) Act of 1998 which allow TAU to operate with private sector participation from diesel and renewable (solar PV and wind) power generators. On the other islands, the utility companies are managed by local government. In 2009, TAU generated 27.7 GWh of electricity in Rarotonga, of which 24.6 GWh was sold, thus recording an estimated 12% distribution loss.

Electricity production from renewable energy sources in Cook Islands is mainly from small scale solar power. Mangaia Island had a 40kW wind system (now defunct) with Pukapuka and Nassau having a number of small solar home systems. In 2009 the contribution of these small renewable energy systems to electricity generation was not significant." (Cook Islands Country Energy Security Indicator Profile, 2009).

However, over the past 5 years there has been an increased used of renewables – particularly solar in the outer islands. It is therefore evident that there is a need for solar energy technicians to support this technology. For example there is currently an ADB renewables project running that has converted the Northern group to a solar-battery hybrid system that will supplies close to 100% of their energy needs, with diesel as a backup. The second phase of this project will focus on Aitutaki and Rarotonga, which have higher power demands. Power systems there will be upgraded to increase levels of renewable energy penetration, and integrate grid stabilisation technology to pave the way for installation of further renewably generated electricity into the grid.

The GOOD NEWS is in January 2013, the Government of the Cook Islands submitted a Nationally Appropriate Mitigation Action (NAMA) seeking support for implementation to pursue the objective of achieving electricity from 100% renewable sources by 2020. Which indicates that there will be a rapid expansion of renewable technologies in the Cooks. 50% of inhabited islands are now 100% renewable.

The Cook Islands are currently dependent on imported diesel fuel that costs households an average of 25% of their income to power their energy needs (Cook Islands Statistical Office, HIES). However, energy demand in the country is growing despite energy efficiency measures already in place. To implement the NAMA, the developing training programmes has been highlighted as a key issue.

The Cook Islands NAMA was incorporated in the Prototype Registry to record NAMAs seeking international support. The Prototype was set up by the UN Framework Convention on Climate Change (UNFCCC) Secretariat pursuant to the decision adopted by the 16th session of the Conference of the Parties (COP 16) to establish a NAMA Registry as a means to facilitate matching developing countries' NAMAs with finance, technology and capacity-building needs. (International Institute for Sustainable Energy: http://climate-l.iisd.org/news/cook-islands-submits-renewable-energy-nama/).

Solar water heaters are well established and are found in nearly all new housing and commercial buildings. Various solar photovoltaic installations for lighting, radio, water pumping, fish freezing and refrigeration on the outer islands but most have suffered from the lack of funds for post-installation support.

Past energy efficiency activities have comprised studies of energy-saving potentials and the provision of policy and advisory assistance, and have generally lacked a tangible implementation focus relating to capacity building and catalysing the introduction of EE appliances and equipment (http://www.reeep.org/policy-database). There have also been few efforts to stimulate the sector using subsidies for EE technologies. There is potential for rational use of energy in both the electricity and the liquid fuel sectors. Capacity building for the use of EE equipment and developing and implementing EE provisions on construction of new buildings via applicable building codes could be an area for EU PacTVET interventions. The majority of household appliances in the Cook Islands are imported from Australia/New Zealand. Most household appliances (refrigerators, freezers and washing machines, etc) carry AUS/NZ energy labels and comply with AUS/NZ MEPS. Data on star ratings of household appliances show that most carry 3-star rating (Cook Islands Statistics Office, 2012).

4.3 Climate Change

From the predictions on continual sea level rise; increase in temperature and increasing ocean acidification, there would be new and additional challenges. This will require additional efforts and resources in building the Cook Islands capacity to be able to face these challenges, hence building the capacities of TVETs to be able to deliver to the rural communities the relevant knowledge and skills to be well equipped to face the challenges of the predicted effects of climate change and natural disasters is crucial. Although the Cook Islands has historically experienced few major disasters, the effects of climate change on the

frequency and magnitude of disasters around the world has served as a catalyst to increase its preparedness for future disasters, especially as a Pacific microstate prone to cyclones and storms. Since 2005 the Cook Islands government has been taking measures to strengthen its national disaster risk management framework, passing a Disaster Risk Management Act (DRM Act) in 2007 and developing a Disaster Risk Management National Arrangement (DRM Arrangement) in 2009. Accounts of experiences arising from Cyclone Pat in 2010 demonstrate however that the implementation of the disaster risk management framework in the Cook Islands still has a way to go.

This is also pointed out in the Cook Islands Joint National Action Plan for Disaster Risk Management and Climate Change Adaptation (JNAP) 2011- 2015 "One of the challenges is bringing disaster risk management and climate change adaptation to the forefront of our planning. Unfortunately, many agencies do still not view DRM and CCA as a priority with the result that they often get pushed to the bottom of the priority list. What is required is a drastic mind shift away from waiting until a disaster happens and acting retrospectively, to becoming proactive in doing what we can to prevent natural and man -made hazards from becoming disasters. If total prevention is not possible, our actions will at least serve to reduce the impact of a disaster if it does happen."

It was suggested that EU PacTVET could provide recognised qualifications in disaster response would provide a professional aspect to the training currently offered. It was concluded that all training should be aligned toward the overall "professionalization" of disaster response and management, including an identifiable career paths with sequential learning stages. (This is in agreement with the findings of Analysis of Disaster Response Training in the Pacific Island Region Provisional Version September 2012, United Nations Office for the Coordination of Humanitarian Affairs, Regional Office for the Pacific, September 2012).

A strategic outcome of the Cook Islands JNAP (2012) is: Strengthened capacity for managing all aspects of DRM and CCA at all levels. Additionally the JNAP states that "Of national concern is the growing number of young adults and school leavers without formal education qualifications and lacking the necessary skills for the local job market." Under the JNAP, the Hyogo Framework for DRM identifies five key priorities for action: Priority 3 - Use knowledge, innovation and education to build a culture of safety and resilience at all levels.

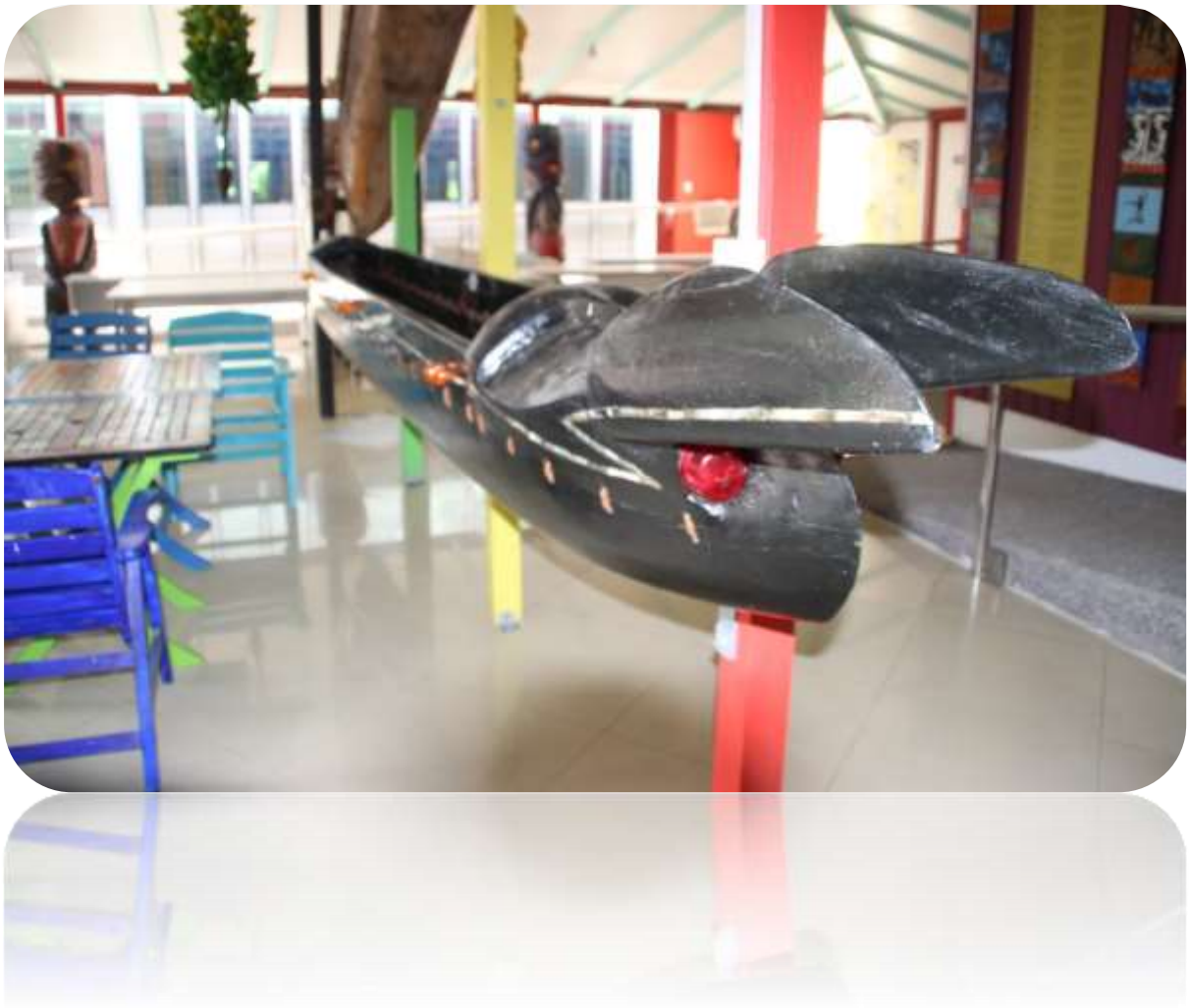
The recently endorsed Climate & Disaster Compatible Development Policy 2013-2016 recognises that "disasters and climate change are development challenges that cannot be viewed independently of the Cook Islands' economic, social, environmental and cultural process." The policy also calls for "Knowledge Based Action" and EU PacTVET relevant strategic outcomes include:

- Reduced greenhouse gasses
- Reduced Reliance on Fossil Fuels
- Improved energy security

- Enhanced coordination and strengthened implementation through integrated institutional and implementing arrangements across communities and sectors

EU PacTVET revenant outputs of this policy include:

1. Implement climate change and disaster risk assessment and management measures that strengthen infrastructure and safeguard essential services, natural ecosystems, economic development and livelihood systems in key sectors
2. Access and build bodies of knowledge that research and promote traditional knowledge and coping mechanisms alongside scientific investigations and evidence to drive decision making and actions
3. Bolster the conservation and management of biodiversity and eco-systems through integrated holistic approaches



5. Consultation Analysis

5.1 Training Needs and Gaps Analysis (TNGA) - Plenary

The TNGA was preceded by the DRMCC Platform meeting and a Plenary Session where participants gave their view on the topic, "*Creating National and Regional capacity and technical expertise to respond to CCA and SE challenges – what are the constraints"*

- Prior to DRMCC Platform and REDD, donor-funded energy projects tended inconsistent and uncoordinated with one another, resulting many different types of installations presenting difficulties with maintenance and spare parts. There are also issues as not enough people in the outer islands are trained to maintain installed equipment. Additionally, installed technologies need to be basic and reliable as getting spare parts to outer islands is a lengthy and expensive process. It is therefore important, particularly for solar in the outer islands, that all the systems have a consistent and standardised design, with as many components as possible standardised for all islands.
- Technology changes have tended to be donor driven and reactive so it has been difficult to predict future markets for skills. However, now efforts in CCA and SE are coordinated through DRMCC Platform and REDD it has been pointed out that there will be an increased demand for solar system design, installation, operation and maintenance.
- In order to engage youth, the role of education in the process of job creation needs to be emphasised.
- Small business set-up is difficult for people in communities – especially in areas outside Rarotonga and outer islands – there is now help with training on basic enterprise and business management.
- Integration of renewables, particularly solar, to the grid can result in instability and reduced power. Systems need to be designed and managed – skills are needed to do this.
- No training facilities in Pa Enua – expensive to travel to outer islands where there are limited training facilities.
- Ad-hoc training given to and by NGO's leads to no qualification and has no status.
- Not having a TVET training / qualification in CCA or SE; lack of career pathways and opportunities.
- Lack of a comprehensive training needs analysis – especially at government level.
- Lack of emphasis on traditional knowledge.
- Gaps identified in current project management training were specific to CCA and DRR projects and included: proposal writing and project planning, accessing funds – CC & DRR finance, logistical frameworks, CC and DRR budgeting at national and sector levels, integrated management of natural resources (land and marine), using assessment toolkits.

5.1.1 General findings from the Plenary session and links to existing initiatives:

DRM: With respect to disaster response training (including training on post-disaster assessment), the participants were very interested in getting DRM and disaster relief training built into competencies and qualifications. If people in communities were equipped with these skills already it would negate the wait for assessors to visit communities post disaster and disaster responses could be faster. Recognised qualifications in disaster response would provide a professional aspect to the training currently offered. It was concluded that all training should be aligned toward the overall "professionalization" of disaster response and management, including an identifiable career paths with sequential learning stages. (This is in agreement with the findings of Analysis of Disaster Response Training in the Pacific Island Region Provisional Version September 2012, United Nations Office for the Coordination of Humanitarian Affairs, Regional Office for the Pacific, September 2012).

Data analysis: The Government of the Cook Islands has an increasing desire to ensure and continually improved evidence-based decision making. In line with this goal, the Ministry of Finance and Economic Management's (MFEM) Cook Islands Statistics Office (CISO) has undertaken to design, implement, and monitor a National Strategy for the Development of Statistics (NSDS). With the assistance of the Partnership in Statistics for Development in the 21st Century (PARIS21), a work programme is currently underway which includes an assessment of data and capacity need across four sectors – Sustainable Economic Development, Sustainable Human and Social Development, Sustainable Natural Resources Environmental Management and Governance. (Assessment of the Current Status of the National Statistical System of the Cook Islands Sustainable Human and Social Development Sector, 2014).

EU PacTVET could support these actions by providing training on data collection and analysis for natural resource management (GIS) and SE planning. This would also be relevant for the "Knowledge Based Action" outlined in the Climate & Disaster Compatible Development Policy 2013-2016.

Knowledge and skills for project management: The "Strengthening the Resilience of our Islands and our Communities to Climate Change" (SRIC-CC) programme began in 2012 as a five-year programme to strengthen the capacity of key national players to assist with enhancing climate and related resilience at the island and community levels in the Pa Enua. The SRIC-CC Programme Management Unit (PMU) believes that one of the best tools to assist our Pa Enua in this way is to build relevant knowledge and skills.

Crucial components of the SRIC-CC programme include 'learning by doing' approaches and strategic knowledge management to help ensure that Cook Islanders increase their knowledge of climate change, including its likely impacts on the Pa Enua. It also aims to increase the understanding and application of a range of measures to enhance resilience to maintain food and water security, good health and coastal systems. On the institutional side

it aims to raise the communities' awareness of the importance of undertaking development and other planning that integrates climate risks.

The Adaptation Fund (AF) Proposal for SRIC-CC identified, among other matters, the urgent need for Learning and Teaching Advisor based in the Ministry of Education. This person would focus on national activities related to education for sustainable development (ESD), including supporting climate change and disaster risk management education programmes in the Pa Enua.

The recently completed Joint National Action Plan (JNAP) for Disaster Risk Management (DRM) and Climate Change Adaptation (CCA) provided the base for two supporting actions, namely:

- To provide vocational guidance in DRM and CCA to high schools and other interested institutions; and
- Strengthening the incorporation of DRM and CCA into the school curriculum.

EU PacTVET activities could assist with both these areas.

Ensuring local delivery of training and education should be a EU PacTVET priority. Participants requested in-country training, whether as part of programme/project delivery, or for technical, communication or awareness-raising.

Disaster Risk Management and Climate Change Platform acts as the institutional focal point for information exchange and coordinating whole-of-government and whole-of-country initiatives related to CCA and DRM. However, it is not a decision making body. The recent Functional Review undertaken for the Public Service Commissioner included recommendations to broaden the focus of the DRMCC Platform and the new Climate Change Coordination Unit in the Office of the Prime Minister to include training and education. The JNAP also establishes institutional arrangements.

Aligning the implementation of the JNAP with the SRIC-CC programme will enhance knowledge, skills and experience through planned activities that include:-

Issues outlined by the Technical Assistance to Assess National Learning Needs In Order to Achieve Key Objectives of the SRIC-CC Programme Cook Islands, 2013	Cook Islands structures now in place
A national dialogue of all stakeholders to agree on ways to improve joint DRM programming;	This could be achieved through the DRMCCP by facilitating coordination of existing structures.
Capacity building of the Office of Prime Minister to monitor and facilitate coordination and partnerships (including communication flow and sharing of resources)	The Development Coordination Division should facilitate coordination and partnerships.
Establishment and strengthening of a central agency to coordinate climate change activities	The Development Coordination Division and the Climate Change Division (OPM) should be the agencies which jointly provide coordination.
Strengthening of institutional arrangements for decision making (e.g. climate change team/council)	The NSDC, Infrastructure committee and CAC should provide this role
Assessing the technical capacity and needs of development planning agencies to effectively enforce the DRM and CCA provisions within their regulation	EU PacTVET is planning to develop a new qualification based on project management for the DRM/CCA sector – a capacity assessment here would make any delivered intervention specific to national needs
Strengthening the technical capacity of the Agriculture Department, Tourism Corporation, NES, Ministry of Infrastructure and Planning and Public Health and other responsible agencies to systematically apply disaster risk assessment and vulnerability assessments measures and tools in development planning and decision making processes.	As part of the EU PacTVET project, skill sets could be developed for a qualification in Project Management or Resilience Practitioner
Conducting appropriate awareness programmes for developers including property and infrastructure developers on DRM and CCA requirements of the regulations.	As part of the EU PacTVET project, skill sets could be developed for a qualification in Project Management or Resilience Practitioner

As part of the EU PacTVET project, skill sets could be developed for a qualification in Project Management or Resilience Practitioner at appropriate levels on the Cook Islands Qualification Framework. Appropriate skill sets can be developed for used at community level (using USP EUGCCA training in vulnerability and adaptations assessment and community planning as an example), through to government capacity building. Examples of subject areas for skill set development could include: assessment toolkits, GIS, cost-benefit analysis, environmental impact assessment, monitoring and evaluation, accountability, project design (community consultation), financing initiatives, etc, etc… Further skillsets could be developed around capacity assessment. In order to achieve useful results with the EU PacTVET project it is essential that all stakeholders remain engaged with the project so that they can provide further advice on future activities – particularly in reference to competency development in the project management area.

Since skill sets will be aligned to the national qualifications framework, courses can be delivered through wither the USP Campus or the Cook Islands Tertiary Training Institute and

build towards the same qualification as this would allow mutual recognition of qualifications.

The "Technical Assistance to Assess National Learning Needs In Order to Achieve Key Objectives of the SRIC-CC Programme Cook Islands, 2013"grouped training and education needs in relation to climate change and disaster risk reduction into seven (7) strategic business areas, as follows:

- Programming and Project Management;
- Policy Development and Implementation;
- Law Making and Enforcement;
- Education;
- Data Analysis and Management;
- Technical Assessment & development; and,
- Specific technical knowledge transfer.

The Technical Assistance to Assess National Learning Needs In Order to Achieve Key Objectives of the SRIC-CC Programme Cook Islands, 2013 will be used to formulate any training in the strategic areas above – with particular reference to the summary of the outcomes of the research and needs assessment.

Stakeholders agreed that the Cook Islands Tertiary Training Institute (CITTI) should be the basis of continuing education. USP can support the CITTI and also provide on line courses in subject areas such as Project Management. The CITTI are open to discussions around the issues of regional accreditation.

5.2 Training Needs and Gaps Analysis (TNGA) – Group Work

5.2.1 Sectors identified for priority action

Sector	Topics Identified	Proposed Action* - Future Demand
Food Security	•Agricultural productivity •Business skills training (i.e. costing and pricing, business analysis and planning, marketing plan creating, enterprise operations and management) •Marketing training (i.e. product display, merchandising, customer service and sales techniques, retail training) •Supplier identification •Safe product handling and storage •Butchery, slaughtering and meat inspection •Food safety •Farming machinery operation and maintenance Agricultural waste management: •Animal husbandry and sanitation •Organic farming; setting up a nursery; composting Traditional and cultural knowledge to be fully integrated in all areas identified.	Improving food security should be integrated into hospitality/tourism/ catering – Looking at local food supply chains (agriculture and marine) "go local" and environmental responsibility should be built into the tourism and hospitality courses on offer at the CITTI. Also a focus on water and food safety and preparation of local produce. Some civil society training is offered in these areas. CITTI already delivers a Certificate in Advanced Food Safety Animal waste management – possibly a new course on biogas as part of CITTI's continuing education courses
Water Security	Plumbing and drainage to prevent flooding GLAAS project – various initiatives	A role for Utilities training or integrate into CITTI National Certificate in Plumbing, Gasfitting and Drainlaying (Introduction) (Level 2).
Fisheries/Marine	Training in project management and resource management (marine and terrestrial – ecosystem services') were highlighted as key areas for EU PacTVET. Boat Masters; Instructor level diving certification; fish handling and processing, sea safety and aquaculture; sustainable fishing	Need qualifications on resource management and project management - identify core competencies/ foundation skills - develop a "project management qualification" / "Resilience Practitioner" (See outline in section 5.1)
Infrastructure & Transportation	Loss of traditional maritime and boat building skills was a major concern.	Marine transportation – traditional skills are being lost, so capturing these with competencies and skill sets would be desirable and useful for tourist trade.
Governance	Training in project management (See outline in section 5.1)	Develop courses accessible to people already in employment – link to project management.

Sector	Topic – Linkages to Current Training	Proposed Action* - Future Demand
DRM	Needs to be a "profession" where people are trained and have a qualification. Training on assessment Tool Kits for communities and practitioners	Develop new qualifications Embed people qualified to carry out post disaster assessment in every community. Training in this area would be very beneficial This could form a course for a new qualification or be offered as a continuing education course at CITTI/USP
Sustainable energy	Training on solar PV maintenance is required in outer islands. Solar PV installation and design is needed to increase use of renewables. Utilities – want linesmen training which is important for post disaster recovery. Energy efficiency – awareness and training. Refrigeration and air conditioning.	Develop accredited training schemes for solar installations (design, installation, operation & maintenance) to be delivered through CITTI. Integrate some aspects into the existing National Certificate in Electrical Engineering and provide ToT for existing staff SPC can provide input building on their existing PELS and NorthREP projects – competencies to be built around national needs and ToT provided – integrate into CITTI or deliver on-line. Identified as necessary for tourist industry – can be developed and delivered at CITTI.
Tourism	Traditional skills for handicrafts & marine transportation	Competency development around traditional skills – skill sets developed and new qualifications. Could be offered as continuing education courses or new qualifications
Financial	Disaster risk reduction considerations in infrastructure & land development. Risk assessments & management incorporated through private sector services	Competency development around these issues – integration of course into CITTI Cook Islands Introductory Certificate in Business Administration & Computing
Identified cross-cutting training topics		
Project management	Basic project management skills were highlighted for every sector. Examples given for general project management include: communication, grant application writing, sourcing funding, climate science, SE concepts, mapping (GIS, spatial planning), networking, using assessment toolkits. "Specialities" could include resource management (terrestrial & marine ecosystem services), climate science, regulations and enforcement, planning, environmental impact assessment. Project Management – USP Cook Islands hosts a Graduate Certificate in Project Management in conjunction with AUT University. Some nationally relevant CCA and SE subject areas could be integrated into this course.	
Data gathering and analysis	General courses on data gathering and analysis have also been requested for all identified sectors, along with training on environmental impacts and cost benefit analysis.	
Traditional knowledge	Traditional knowledge was highlighted for every sector – sectoral skills specific to Cook Islands should be developed as competencies and embedded in skill-sets.	
Attitudes	Relevance (to development needs), ownership, responsibility, accountability, professionalism.	

* All EU PacTVET activities should integrate with existing programmes in order for them to be sustainable since there have been issues with past ad hoc training. Ad-hoc training has tended to be project-based and has not led to qualifications or trade relevant skill sets.

Immediate & future training needs were identified as: solar PV (design, installation, maintenance, procurement); climate resilient agriculture (including TK); project management (Cost benefit analysis and environmental impact assessment); energy efficiency; traditional skills for handicrafts and marine transportation.

5.3 The Training Supply and TVET Providers

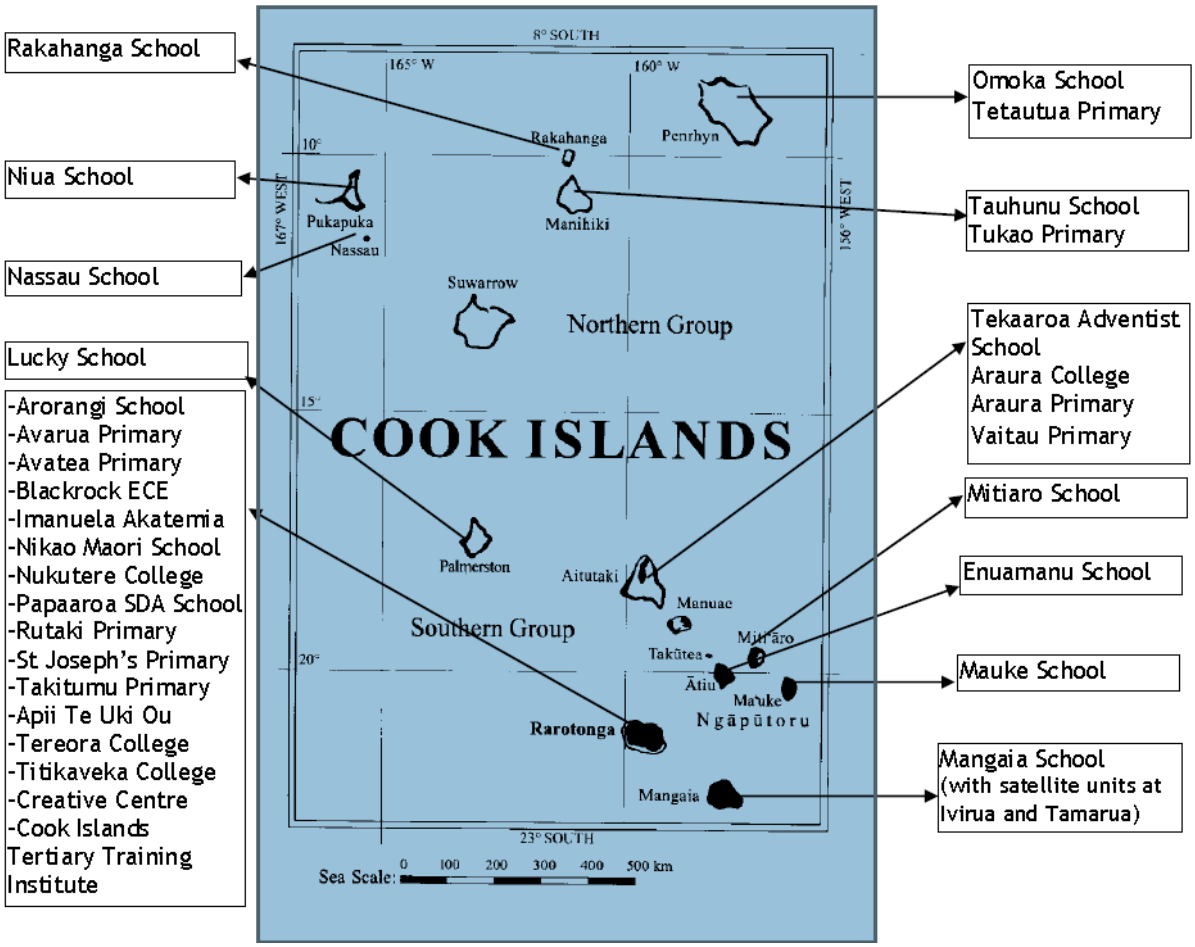
This section outlines the various educational, tertiary and Technical and Vocational Education and Training Institutions in the Cook Islands along with the courses and awards they provide.

STRUCTURE OF THE EDUCATION SYSTEM

(Government of the Cook Islands, 2014 Ministry of Education Statistical Report).

Education in the Cook Islands is mainly provided by government institutions. There are 32 providers including 1 stand-alone Early Childhood Education (ECE) Centre, 11 Primary Schools (10 of which have ECE Centres attached), 4 Secondary Schools, 15 Area Schools1 (all with ECE Centres) and a Tertiary institute and a USP Campus in Rarotonga.

The geographical spread of these providers is shown on the map below:



Source: http://www.education.gov.ck/?page_id=771

5.3.1 Non-formal Training

The Government, the USP Campus, the GEF Small Grant Coordinator, NGOs, private sector , development partners and expert groups have delivered training in a variety of areas from community to governmental level. A wide variety of courses have been carried out across the Cook Islands – including courses on solar installation and maintenance; gender issues (National Council of Women); climate change awareness (USP EUGCCA project); water management and security, etc. Additionally, the CITTI offers non-formal continuing education courses under the following groupings: Hospitality; Language and Culture; Health and Well Being; Agriculture; Trade and Technology; Arts and Crafts.

For the Cook Islands, training delivered through ad-hoc project delivery or general training events has resulted in little longer term sustainable capacity.

Some of the areas that were the focus of prior training and education have also been identified by participants in this needs and gap analysis – including the following:

- Vulnerability capacity assessment;
- Processes and tools associated with vulnerability and adaptation assessment;
- Integrated modelling and vulnerability assessments for policy and adaptation planning;
- Identifying the barriers to renewable energy use;
- Global, regional and national long-term observing systems
- Greenhouse gases inventory assessment;
- International negotiations;
- Disaster risk management (various topics related to this);
- Applied geoscience for local technicians;
- Regional and in-country training in GIS and remote sensing

(Volume 2 of the OPM DRR and CCA Learning Needs Assessment, 2013 provides a more comprehensive assessment of previous ad-hock training).

Potential capacity to assist with the delivery of future training and education has been identified by the Technical Assistance to Assess National Learning Needs In Order to Achieve Key Objectives of the SRIC-CC Programme Cook Islands, 2013 as the following:

- Ministry of Foreign Affairs & Immigration (MFAI)
  - have Negotiators trained through CC workshops and regional meetings able to transfer knowledge;
- Ministry of Infrastructure and Planning (MOIP)
  - Trained staff and strong outreach in each island – able to assist delivery of training;
  - Staff have delivered GIS training in 2011-2012 through the SLM Project;
- Ministry of Agriculture (MOA)
  - Potential to use field staff as trainers on crop tolerance and resilience building;
- Crown Law Office

- Specialist in Environment Law – with potential to deliver specialised training;

- Punanga Tauturu Inc.
  - Potential to provide training and counselling/advocacy services related to trauma resulting from disasters and recovery efforts;
- Islands Sustainability Alliance Cook Islands (ISACI)
  - Potential to deliver issue/topic specific training related to impacts;
- Members of the Koutu Nui
  - Potential for traditional leaders to receive and provide training on traditional, culturally specific information;
- Ministry of Education
  - Teachers and advisory staff have potential to develop and deliver material to communities, however, must take account of existing teaching load;
- University of the South Pacific – CI Campus
  - Can potentially deliver all their non-formal courses through the CI campus
  - USP has potential and track record of delivering training in range of subject areas and levels including training in the Pa Enua, has capacity to develop CI Pa Enua specific course materials and provide trainers;
- Te Ipukarea Society (TIS)
  - TIS potential to provide training, education and awareness through its membership
- Cook Islands Tourism Corporation
  - Tourism industry council responsible for accreditation and potential for education and awareness for tourism industry providers on CC related measures in operating business/accreditation scheme;
- New Zealand High Commission
  - Potential to adapt and provide advice on CC and use of project screening tools on mainstreaming cross cutting issues such as CC;
- Cook Islands Tertiary Training Institute
  - Able to assist with course development and delivery, accreditation, quality assurance and training partnerships and career pathway advice;
  - Recent Photovoltaic system design training delivered by Global Sustainable Energy Solutions (Australia) a good model to build on in responding to industry need for renewable energy design skills and expertise.
- Titikaveka Growers Association (TGA)
  - Provides a successful Soil School training series: initial, advanced and master classes;
  - Supported initially by the SLM project and consultants from Australia.

However, since only USP and CITTI are “registered training providers” it is unlikely that the majority of these organistions will be able to offer anything other than ad-hoc training in the near future. Despite the past efforts, since “ad-hoc” training is usually project based and not embedded in the education sector, high turnover rate of staff across government has meant that capacity has not been built or maintained to the point where reliance on external assistance can be reduced. There has not been the monitoring of the effectiveness

or impact of past training. Additionally, since there is no evaluation, the quality of past training cannot be verified.

The Cook Islands Engineering Association (CIEA) was launched in 2013. It has approximately 30 members, including civil engineers, electrical engineers, project managers and land surveyors. The Association is a recognized national chapter of the South Pacific Engineers Association (SPEA) which includes countries in the region such as Samoa, Tonga and Papua New Guinea and Fiji. On a national level it could help with competency development and trade testing.

The Global Analysis and Assessment of Sanitation and Drinking-Water (GLAAS) is a UN-Water initiative implemented by the World Health Organization (WHO) which is about to be initiated in the Cook Islands. GLAAS responds to the need for more information, as expressed by Member States, including information on the use of sanitation and drinking-water services, the nature of government policies and institutions and their impact, investments in terms of financial and human resources, the volume and targeting of national and foreign assistance WASH funds and the relative influence of all these factors on performance. EU PacTVET could fit in with future training requirements here and has investigated working with the WASH programmes in other countries.

5.3.2 Formal Training

USP:

www.uap.ac.fj

The University of the South Pacific is the premier institution of higher learning for the Pacific region, uniquely placed in a region of extraordinary physical, social and economic diversity. Established in 1968, USP is one of only two universities of its type in the world. It is jointly owned by the governments of 12 member countries: Cook Islands, Fiji, Kiribati, Marshall Islands, Nauru, Niue, Solomon Islands, Tokelau, Tonga, Tuvalu, Vanuatu and Samoa. The University has campuses in all member countries. The main campus, Laucala, is in Fiji. The Alafua Campus in Samoa is where the School of Agriculture and Food Technology is situated, and the Emalus Campus in Vanuatu is the location for the School of Law. The academic Schools, Institutes and Centres at the University of the South Pacific are organised into three faculties: the Faculty of Arts, Law and Education; the Faculty of Business and Economics; and the Faculty of Science, Technology and Environment. Each faculty comprises of a number of schools which offer a wide range of academic programmes and courses at the undergraduate and postgraduate levels.

The University also offers programmes through distance and flexible learning in a variety of modes and technologies throughout USP's 14 campuses.

Advanced communication technologies through USPNet are used to reach distance and flexible learning students.

The University has set a high standard for quality in its research. Major research commitments include business management, teacher education, Pacific studies, marine studies, agriculture, science and technology.

USP is a self-accrediting university registered with the Fiji Higher Education Commission.
All courses offered by USP as blended or on-line can be offered at the Cook Islands Campus. Students are currently studying courses from all levels from foundation to PhD level in-country. Details of courses offered at USP can be found here: http://www.usp.ac.fj/fileadmin/scripts/OtherReport/Prospectus_2015/Prospectus_2015/index.html#/30

Full programmes delivered in regional campuses include MBA, Bachelor of Commerce, Diploma in Early Childhood Education, Bed Primary, B Ed ECE, Masters in Education, PGDip International Affairs, PGDip Climate Change. Project Management – USPCI hosts a Graduate Certificate in Project Management in conjunction with AUT University.

Cook Islands Tertiary Training Institute (CITTI):

http://www.citti.edu.ck

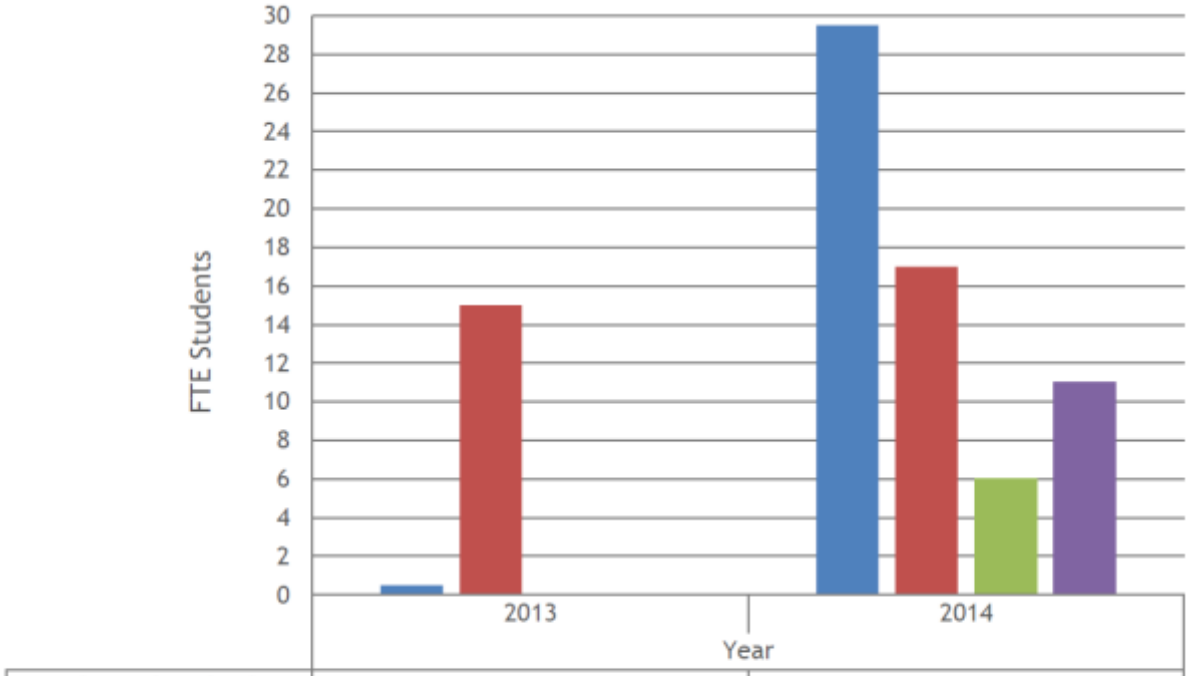
Since 2013 there has been strong growth in the provision of both full time vocational courses, including apprenticeships, and continuing education courses. Industry Advisory Boards have been established and brokers have been appointed on several sister islands. All relevant staff have completed an Adult Education Training programme with the Southern Institute of Technology in New Zealand.

In 2013 there were four fulltime hospitality and services programmes and in 2014 the number of courses increased to 6 including an apprenticeship programme involving 11 students.

In 2014 there were also three fulltime trades courses, two of which are delivered in Aitutaki. CITTI have run 21 different continuing education courses in 2014 with an average of 12 students for each course. The courses have been delivered in Rarotonga, Mangaia and Pukapuka and have covered traditional, food and beverage, trades and IT skills.

In 2014 the first intake of 11 fulltime students is undertaking the three year Diploma in Nursing course run in collaboration with the Ministry of Health.

National Tertiary Enrolments Students in Full Time Education – Years 2013 and 2014



	2013	2014
Trades and Technology	0.5	29.5
Hospitality and Services	15	17
Hair and Beauty	0	6
Nursing	0	11

Formal/accredited courses on offer at CITTI

Programme	Accreditation	Entry requirements
Diploma in Food and Beverage Services	City & Guilds level 1. (NZQA level 3)	NCEA Level 1
New Zealand Certificate in Retail	NZQA level 3	
Diploma in Hair & Beauty (Beauty Therapy)	City & Guilds level 1. (NZQA level 3)	NCEA Level 1
Diploma in Men's & Women's Hairdressing	City & Guilds Level 2 (equivalent to NZQA Level 4)	NCEA Level 1
Diploma in Men's & Women's Hairdressing	City & Guilds Level 2 (equivalent to NZQA Level 4)	NCEA Level 1
Award in Professional Bartending (Cocktails with Free Pouring)	City & Guilds Level 2	NCEA Level 1
Certificate in International Barista Award	City & Guilds Level 2 (equivalent to NZQA Level 4)	NCEA Level 1
Diploma in Food Preparation & Cooking	City & Guilds Level 1 (equivalent to NZQA Level 3)	NCEA Level 1
Automotive and Engineering Workshop Skills	National	NCEA Level 1 or experience
Building and Construction Skills	National	NCEA Level 1 or experience
CITTI Certificate in Applied Practical Skills	CITTI	None
National Certificate in Plumbing, Gasfitting and Drainlaying (Introduction)	(Level 2)	NCEA Level 1 or experience
National Certificate in Building, Construction and Allied Trades Skills in conjunction with BCITO	National Accreditation Stage 1 (Pre- Building Trade Certificate) Stage 2 (Building Trade Certificate)	NCEA Level 1 or experience
National Certificate in Motor Industry	National accreditation	NCEA Level 1 or experience
National Certificate in Electrical Engineering	National accreditation (Electrician for Registration)	NCEA Level 1 or experience
Diploma in Nursing	Ministry of Health	NCEA Level 3

Short courses offered by CITTI include the following from Trades and Tech:
Fix my small engine; Build furniture; Photography; Web design; Promoting on social media; basic computing; Smartphone photography; Smartphone for beginners; Ipad for beginners.

CITTI short courses from Hospitality & Tourism include:
Introduction to hospitality and management; Art on a plate for industry chefs; Cook Islands Introductory Certificate in Business Management; International Patisserie; Customer Service; Short order cooling for industry chefs; Certification in Advanced Food Safety.

CITTI agriculturally related short courses under its continuing education programme include: Landscaping – A main feature into the garden; Pruning trees and shrubs; Grafting and marcotting trees and shrubs; Organic gardening, principles and practices.

CITTI arts and crafts continuing education courses include: KIKAU AKAMANEA DECORATIVE WEAVING; TIVAIVAI TATAURA; IRI OINI WEAVING FOOD & FISHING BASKETS; TIVAIVAI – MANU TA-TAURA – WALL HANGING; TAPAKAU WEAVING KIKAU MATS; KUMIHIMO; PARE UKARAU KIKAU HAT; TAPORA WEAVING FOOD BASKET

CITTI language and culture continuing education courses include: URA; BASIC MAORI; TUMANAVA; BASIC FRENCH; UKARERE (Ukulele).

CITTI health and wellbeing continuing education courses include: Practical parenting; AKARI RAPAKAU aromatherapy for the family; Make me beautiful; Hair style and management; Basic counselling skills for personal and professional use.

5.4 Present and Future Market Demand

In consultation with the stakeholders in the list of workforce training needs and priority sectors for skill development were captured. The different types of skills (knowledge-based; skills based on ability or aptitude and those skills developed throughout lifetime and experience) required to be able to adapt to the adverse effects of Climate Change and use energy in a sustainable way are summarized in the following table. Once areas for skills development are selected an in-depth analysis that is course-specific must be conducted, where each course contents must be analysed in terms of current offerings in country and how these can be added to and supported or if a new course or skill set needs to be developed and implemented.

Type of Skills	Description		
	Sustainable Energy	*Climate Change Adaptation*	
Knowledge-based *Knowledge of specific subjects, procedures, and information necessary to perform particular tasks Such knowledge-based skills are acquired through education, training, and on-the-job experience*	• Linesman • Building/Construction best practice skills • Solar PV system design skills • Solar PV system installation skills • Solar PV systems O&M skills • Energy Auditing & efficiency skills • Knowledge of different types of renewable energy resources and technologies • Biogas system design, installation, operation and maintenance skills • Traditional marine transportation skills • Refrigeration and air conditioning	1. CC Adaptation assessment, toolkit user skills. 2. Disaster risk reduction (DRR) skills. 3. Disaster response skills 4. Ecosystem services and resource management (terrestrial and marine)skills 5. Climate science and meteorological services skills 6. Agriculture and food security ▪ Crop resilience knowledge-based skills ▪ Soil adaptability knowledge-skills. ▪ Crop seasonal cycles knowledge-based skills ▪ Knowledge-based skill on best crops for certain ecosystem – example: Low lying atoll islands, mountains, grassland. ▪ Crop/food preservation skills – traditional skills ▪ Pest/weed control skills ▪ Knowledge-based and implementation skills on agro-forestry ▪ General food handling and hygiene skills	7. Fisheries and food security & marine ▪ Basic marine conservation skills, aquaculture ▪ Project management related to marine ▪ Boat Master ▪ Traditional maritime skills ▪ Instructor level diving certification ▪ Fish handling and processing ▪ Sea safety 8. GIS and spatial planning skills 9. Water security ▪ Plumbing ▪ Water collection and preservation skills ▪ GLAAS project 10. Tourism – handicrafts and traditional skills
Transferable/Functional Skills *These are actions taken to perform a task, transferable to different work functions and industries and the skills are based on ability and aptitude*	• Communication Skills • Analyzing skills • Public Speaking skills • Organizing skills • Writing skills • Promotional skills • Coaching & Mentoring skills • Leadership skills • Knowledge management skills	• Project Management skills ▪ Project design skills ▪ Community engagement skills ▪ Audit/ accountability skills ▪ Monitoring and evaluation skills ▪ Sourcing funding skills ▪ Networking skills ▪ Planning and time management skill ▪ EIA and CBA	• Business skills ▪ costing and pricing, ▪ business analysis and planning, ▪ marketing plan creating, ▪ enterprise operations and management ▪ Product development, value-adding, and branding skills
Personal Traits/Attitude *Traits or personality characteristics that contribute to performing work. Such skills are developed in childhood and through life experience*	• Safety skills • Interpersonal skills • Succession Planning skills • Resource Sharing skills • Language awareness skills • Diplomatic Skills • Result-oriented skills • Independence skills		

5.4.1 Present Market Demand

The list below is based on the OPM DRR and CCA Learning Needs Assessment (2013) and findings from the in-country consultation – aligned to the "Key Business Areas" identified in the 2013 assessment.

Law Making & Enforcement:

- Land Use Planning Policy & Systems development
- Disaster Risk Management Legislation & planning
- Environmental Impact Assessment
- Integrated water resources management

Data Analysis & Management:

- GIS and use of GPS
- Data collation, administration & management of databases, primary data analysis.
- Data collection, database development, analysis & mapping, use of GIS for decision-making.
- Research & systematic observation, analytical capacity for climate change monitoring.
- General courses on data gathering and analysis have also been requested for all identified sectors, along with training on environmental impacts and cost benefit analysis.

Technical Expertise:

- Traditional and cultural knowledge to be fully integrated in all areas identified.
- Renewable energy technology – choices, whole of life costs, maintenance planning, strategic impact assessment
- Energy efficiency assessment: methods, tools & guidelines
- Energy auditing
- Training on solar PV maintenance is required in outer islands.
- Solar PV installation and design is needed to increase use of renewables
- Refrigeration and air conditioning
- Utilities – want linesmen training which is important for post disaster recovery
- Vulnerability assessments – Atlas for all Pa Enua, consistent approaches
- Disaster risk reduction considerations in infrastructure & land development
- Risk assessments & management incorporated through private sector services
- Early Warning systems: dissemination of warning information
- Agriculture – food security – Business skills training (i.e. costing and pricing, business analysis and planning, marketing plan creating, enterprise operations and management; Marketing training (i.e. product display, merchandising, customer service and sales techniques, retail training), Supplier identification; Safe product handling and storage; Butchery, slaughtering and meat inspection; Food safety; Farming machinery operation and maintenance
- Agricultural waste management: Animal husbandry and sanitation; Organic farming; setting up a nursery; composting
- Alternative crop & livelihoods management
- Sustainable Land Management –Soil School extension, waterways health & coastal ecosystems
- Climate change and health impacts – developing responses, e.g. improved effluent disposal

- Traditional skills for handicrafts & marine transportation

Systems & Decision-making;

- GIS & better resource inventory, use of multi-criteria & objective based planning, classification systems
- Land use planning systems – methods, approaches, ecosystem & catchment based
- Environmental impact assessment and strategic environmental assessments
- State of the Environment reporting – stocktakes, monitoring, baselines, indicators & rapid assessment methods. Environmental accounting & auditing

Specific Technical knowledge transfer:

- Beach profiling & wave run-up modelling
- Coastal processes assessments – lagoon hydrologic & hydraulic pressures, circulation processes
- Catchment management – water hydrologic & hydraulic assessments, various scales, models, approaches & guidelines, water security measures
- Water quality management – water quality testing, waste water treatment options, soils and hydro-geo analysis for effluent disposal
- Hydro-geological science and marine geology – processes, land to coast interactions, land based sources of pollution

Project management:

- Basic project management skills were highlighted for every sector. Examples given for general project management include: communication, grant application writing, sourcing funding, climate science, SE concepts, mapping (GIS, spatial planning), networking, using assessment toolkits. “Specialities” could include resource management (terrestrial & marine ecosystem services), climate science, regulations and enforcement, planning, environmental impact assessment.

5.5 Suggested priorities for future EU PacTVET activities

Sustainable energy:

Gap/Skill Needed	Level	Training type/ intervention	Who	Content/Competencies
Linesman	Trade Test	Technical	Utility	Linesman
Building/Construction Best Practices	National Qual	Integrate in existing courses	CITTI with USP & SPC support	Building codes, environmental best practices
ToT for Solar PV system design skills Solar PV system installation skills Solar PV systems O&M skills	Advanced	Technical training for existing CITTI staff	EU PacTVET supported	Trained to international industry standards (grid connected and stand-alone systems)
Solar PV system design Solar PV system installation Solar PV systems O&M	Basic to advanced	Course design and implementation	Courses offered at CITTI	Content based on international standards for grid connected and stand-alone systems
Energy auditing and efficiency	Basic to advanced	Course design and implementation	Courses offered at CITTI	Energy audit Rational use of energy Labelling and appliance standards
Biogas system design, installation, operation and maintenance	Basic	Course design and implementation	Courses offered by NGO sector	Safety, installation, operation and maintenance, feedstock mixing, animal husbandry, use of digestate
Traditional marine transportation skills	Basic to advanced	Course design and implementation	Courses offered at CITTI	Wood carving and carpentry, sale making, navigation, timber selection and sustainable harvesting

Participants identified all these priorities, however those identified as immediate priorities are in red text

Climate change:

Gap/Skill Needed	Level	Training type/ intervention	Who	Content/Competencies
ToT for climate change identified needs	Advanced	Technical training for existing CITTI staff	EU PacTVET supported	Various – to be determined
CC Adaptation assessment	Basic to advanced	Course design and implementation	CITTI with USP & SPC support	V&A toolkits, community planning, GIS, community engagement
Ecosystem services and resource management (terrestrial and marine)	Associate Degree & Certificate of Achievement	Integrate in existing courses at CITTI	CITTI with USP & SPC support	Various – to be determined
Disaster risk reduction and disaster response	Basic to advanced	TOT and Course design and implementation	Courses offered at CITTI and in NGO sector	Various – to be determined
Climate science and meteorological services	Basic to advanced	ToT & Course design and implementation	Courses offered at CITTI, USP support	Basic climate science, competencies based on International Meteorological Service standards – World Met Org support
Agriculture and food security	Basic to advanced	Course design and implementation – integration into existing CITTI programmes	Courses offered by NGO sector and CITTI	Crop resilience knowledge-based skills; Soil adaptability knowledge-skills; Crop seasonal cycles knowledge-based skills; Crop/food preservation skills – traditional skills; Pest/weed control skills; Knowledge-based and implementation skills on agro-forestry; General food handling and hygiene skills
Fisheries and food security	Basic to advanced	Course design and implementation – integration into existing CITTI programmes	Courses offered by NGO sector and CITTI	Sea-food processing and preservation; Knowledge-based skills on traditional sustainable fishing methods
GIS and special planning	Basic to advanced	Course design/ implementation – integration into existing CITTI programmes	CITTI with support from USP	GIS, Software use, planning, analysis, mapping

Participants identified all these priorities, however those identified as immediate priorities are in red text

Gap/Skill Needed	Level	Training type/ intervention	Who	Content/Competencies
Water security	Associate Degree & Certificate of Achievement	Course design and implementation - Integrate in existing courses at CITTI	CITTI with USP & SPC support – GLAAS project input	Plumbing; Water collection and preservation skills; Water purification and testing skills; Watershed management; Enforcement of regulations

Transferable skills:

Gap/Skill Needed	Level	Training type/ intervention	Who	Content/Competencies
Project Management	Basic-Advanced	Course design and implementation - Integrate in existing courses at CITTI	CITTI with USP & SPC support	Project design skills; Community engagement; Audit/ accountability; Monitoring and evaluation; Sourcing funding; Networking skills; Planning and time management skills
Business skills	Basic to Advanced	Course design and implementation - Integrate in existing courses at CITTI	CITTI with USP & SPC support – can be offered in NGO sector	Costing and pricing; business analysis and planning; marketing plan creating; enterprise operations and management; product development, value-adding, and branding skills
Data analysis	Basic to advanced	Course design and implementation - Integrate in existing courses at CITTI	CITTI with USP & SPC support – can be offered in NGO sector	Types of data, sources of data, questionnaire design, research skills, data analysis, data entry, basic statistics

Participants identified all these priorities, however those identified as immediate priorities are in red text

6. Consultation Outcome

Present and future marked demand for TVET in the Cook Islands has been identified and existing training supply mapped. The priorities for future project activities will need to be narrowed at the Regional Inception Meeting.

Current TVET and tertiary education generally in the Cook Islands has been highlighted as not fulfilling the countries development needs – with particular reference to the 2013 OPM needs and gap assessment and in regard to new policies and strategies. The EU PacTVET project has the potential to fill these gaps.

By providing a "skill-set" approach to CCA and SE training EU PacTVET could go some way to providing educational linkages to economic priorities and job creation – especially in the areas of renewable energies such as solar and in project management and DRM as funding for projects in these areas is set to continue.

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European Union Pacific Technical and Vocational Education and
Training on Sustainable Energy and Climate Change Adaptation Project

TRAINING Providers

Table TP1 provides information on the only training institute identified. They did respond by e-mail but the survey form was not completed. They are very interested in being involved and are already thinking about the human resources required.

Table TP1: Institutes Identified in Cook Islands

Name of Institute	Contact People	Position	E-mail	Phone
Cook Islands Tertiary Training Institute	Owen Lewis	Director	owen.lewis@citti.edu.ck	
CITTI Faculty of Trades and Technology	Alister Anderson	Head of Faculty	alister.anderson@citti.edu.ck	21471

GSES conducted a training course at CITTI in 2013 and although the survey was completed because they have an electrical section, GSES believes that CITTI would be suitable to conduct future training courses as shown in Table TP2.

Table TP2: Capabilities of CITTI

Does TVET have any department that could conduct any of the following types of courses	Yes or No?
Renewable Energy Technologies?	
Grid Connect PV Systems?	Yes
Off Grid PV Systems?	Yes
Solar Hot water?	??
Wind Power Systems?	??
Hydropower?	
Micro-Hydro Power?	
Biomass?	
Biogas?	
Geothermal	

Others technologies?	
Energy Efficiency?	??
Refrigeration?	??
Air-conditioning?	??
Electrical wiring?	Yes
Efficient land and water transport systems?	
Energy sector planning and management?	

Based on the experience of the project team and the survey response, 3 training courses were identified as having been conducted in the last 5 years. Details are provided in Appendix 2. All of the courses were 'one-off': one course being a 2-week PV grid connect design and install course funded by NZ MFAT; another course trained utility staff in household energy auditing for an appliance labelling project while the other course was also for energy auditing for the Asian Development Bank (ADB) and Global Environment Fund (GEF) Pacific Energy Efficiency Program (PEEP).

The grid connect PV course was conducted by GSES, a company which is a Registered Training Organisation in Australia. Those who passed are eligible to apply for industry certification under the Pacific Power Association (PPA) and Sustainable Energy Association of Pacific Islands (SEIAPI) certification and accreditation program.

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European Union Pacific Technical and Vocational Education and Training on Sustainable Energy and Climate Change Adaptation Project

Fiji Training Needs and Gap Analysis

Prepared by Viliame Sakiti – TVET Consultant

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BACKGROUND

The European Union Pacific Technical and Vocational Education and Training on Sustainable Energy and Climate Change Adaptation (PacTVET) project falls under component three within the broader Adapting to Climate Change and Sustainable Energy (ACSE) programme. The Project builds on the recognition that energy security and climate change are major issues that are currently hindering the social, environmental and economic development of Pacific African Caribbean and Pacific (P-ACP) countries. Many P-ACP countries continue to remain entirely dependent on imported petroleum products despite efforts to reduce their reliance on fossil fuels and improved energy security, thus this project builds its objectives around the need to reduce reliance on the use of fossil fuels. The P-ACP region ranks amongst the highest in term of fuel prices and electricity tariffs and coupled with the inefficiencies in power generation and consumption. Despite efforts in promoting renewable energy opportunities within the region, about 70% of the populations still do not have access to electricity. About 70% of the region's imported fuel consumption is towards transportation alone.

The Pacific region is among the most vulnerable to climate change. These countries are hardest hit by the adverse effect of climate change while they have little to contribute to the cause i.e. producing less than 0.03% of the current global greenhouse gas emissions – they also have the least capacity to react and adapt to changes in climate. The lack of local and regional capacity and expertise which results in the absence of sustainable training programmes and the absence of trained staff and well-resourced and equipped training institutions to deliver on the required training programmes remains key barriers to improving P-ACP countries' energy security status and resilience to climate change impacts.

The significance of capacity building on sustainable energy and climate change to the sustainable development of the P-ACP countries can be seen by the endorsement by the Forum Leaders on the Framework for Action on Energy Security in the Pacific (FAESP) and the Pacific Islands Framework Action on Climate Change (PIFFAC). Both frameworks have themes on Capacity Building, Training and Awareness with outcomes of:

- Increased awareness and understanding of sustainable energy and climate change issues among communities and other stakeholders.
- Strengthened capacity to monitor and assess impacts of sustainable energy and climate change.
- Strengthened capacity to identify, design and implement effective sustainable energy and climate change measures.

The project is being implemented by the Secretariat of the Pacific Community (SPC) in partnership with the University of the South Pacific (USP) over a period of 53 months and is being funded by the European Union. The general objective of the project is to enhance

sustainable livelihoods in PACPs which is being identified as a high priority for P-ACP communities and governments alike. The purpose of the project is to enhance and/or create P-ACP's regional and national capacity and technical expertise to respond to climate change adaptation (CCA) and sustainable energy (SE) challenges.

The importance of setting the training needs/gaps must be upheld since it sets the baseline for the development of or tailoring of each P-ACP counties' sustainable energy training requirements. Each P-ACP country could have unique factor(s) that need to be made known so that the objective and the purpose of the project can be realized in each of the P-ACP countries

Project Objectives

Working with the PMU, specialist consultants and in-country coordinators would assist with the delivery, conduct, collation and analysis of a regional training needs and gap assessment i.e. assessing national training needs on issues relating to SE & CCA in all P-ACP countries. This will involve, but is not necessarily limited to:

- Conducting a Needs and Gap Analysis review covering both training supply and demand for the CCA and SE sectors in all PACP's, using existing documentation, reports, studies to gather new and up to date information;
- Consulting with TVET institutions and education providers, trade and industry bodies, as well as governments on workforce training needs and priority sectors for skill development;
- Investigating TVET qualification frameworks across the region, curricula and accreditation guidelines in each country and identification of training delivery modes (including working with other projects and practitioners to ensure that efforts are not duplicated)
- Analyze the conditions required for success of accreditation strategies (including recognition of prior learning and industry requirements).
- Devise a series of scenarios (national level) for future project activities – including an evidence-based assessment for selection of partner TVET institutions. Assessment of TVET institutions should be based on analysis of capacity and gaps and opportunities in current TVET offerings
- Consultation with TVET institutions and education providers
- The assessment of TVET institutions should also be used to deliver a strategy for developing a regional pool of assessors and trainers.
- Scenarios developed should be gender inclusive and have a specific gender and equal opportunities component (including access for disabled).
- Work with the PMU, in-country coordinators, and project partners, to facilitate and assist with the development of benchmarks, competency standards and courses on Training of Trainers (TOT)

- Develop benchmarks, competency standards and unit descriptors working with national qualification boards and IACs to incorporate into national TVET qualification frameworks and/or develop new national/regional qualifications;
- Develop accreditation strategy, including training a pool of accreditors;
- Develop pathways and links between TVET, further and tertiary education to provide opportunities for national capacity development.

Geography & Climate of Fiji

Fiji is a tropical archipelago located between Melanesia and Polynesia. The Fiji islands are situated 3,000 km east of Australia in the Pacific Ocean at 16-20°S latitude and 178°E-178°W longitude. Fiji comprises of over 300 named islands, which take up an ocean area of some 650,000 km² and a total land area of 18,274 km² (Evenhius & Bickel, 2005). There are two large islands, Viti Levu (10,388 km²) and Vanua Levu (5,535 km²), two mid-sized islands, Taveuni (434km²) and Kadavu (408km²), and many smaller islands, 97 of which are inhabited (Parham, 1972; Evenhius & Bickel, 2005). The highest peak in Fiji, Mt. Victoria reaches 1324m a.s.l.

Fiji has an oceanic climate with mean temperatures ranging between 22ºC (July) - 26ºC (January) (Ash, 1992). The high mountain ranges in Viti Levu causes a strong orographic effect where the windward (i.e. south-eastern) sides of the island are typically wetter and cloudier than the drier and sunnier leeward (north-western) sides. The seasonality in Fiji is divided into the warm and wet months (November – April) and the cooler and drier months (May- October). The warm wet season can be interrupted by tropical cyclones resulting in pronounced flooding within river valleys (Sarnat & Economo, 2012).

Geologic History of Fiji

Viti Levu is the largest and oldest island of the Fijian archipelago and is supposed to be the source from which the inhabitants of other islands resulted (Sarnat & Moreau, 2011). Viti Levu comprises the oldest rocks of the archipelago, and is supposed to be a relic of the ancient Vitiaz Arc that formed on the Australian plate margin in the Late Eocene to Early Oligocene (Rodda, 1994; Hall, 2002). Viti Levu's appearance above sea level happened in the early Miocene, 25–20 Ma (Whelan *et al.*, 1985), and serves as the earliest age estimation for Fijian terrestrial lineages. All of the subsequent colonization events are inferred to have transpired after Viti Levu's initial emergence 20-25 Mya, but, before the islands significant uplift 5 Mya (Whelan *et al.*, 1985). Miocene island-hopping through the western Melanesian islands may possibly have been aided by the fragmenting Vitiaz Arc, which formed a nearly continuous chain of archipelagos extending from New Guinea to Fiji (Hall, 2002).

SUMMARY OF CONSULTATION EVENTS

Consultation Meeting Objectives

As the PACTVET is about the Education, Climate Change and Sustainable Energy sectors, there was a need for an effective coordination at the national level to network with other relevant associations and workers in the country to empower TVET based training. In July2015, there was an in-country consultative workshop conducted to develop the training needs and gap analysis in which the activity was intended to gather specific inputs from local stakeholders on the priority needs on both SE and CCA. SE included areas such as refrigeration, renewable energy technology installation, motor mechanic, electrical wiring, sustainable sea transport, etc. CCA also included food security (agriculture, fisheries); disaster risk reduction; vulnerability and adaptation assessment; water security; forestry and project management. It was very important that the PACTVET activities complemented past, current and future activities on TVET and including national projects related to Climate Change and Sustainable Energy (ACSE) programme. The EU-PACTVET Team invited local stakeholders and experts (individuals and organizations to actively participate in disclosing any past or current activities and projects related closely to TVET SE and CCA being carried out at their institutions or organizations in which they were given at least ten to fifteen minutes to present and share their findings in the in-country consultative workshop which was held on the 1st – 3rd of July 2015. The consultative meeting coordinating team recognized the participant's contributions during the three days' workshop to be very important as the nature of their work is oriented towards Sustainable Energy and Climate Change Adaptation (CCA) and would positively implicate the implementation of this regional project.

3- Days Meeting

The Fiji National Stakeholders Consultative Workshop was scheduled on the 1st – 3rd of July this year from Wednesday to Friday and was welcomed by Professor Elizabeth Holland, the Director for Pacific Centre of Environment for Sustainable Development (PACE-SD). The meeting was officially opened by the Honorable Minister for Education; Dr. Mahendra Reddy who apart from acknowledging the initiatives of the project also highlighted the need to revitalize legislations, relevant stakeholders roles and bridging the gaps to provide contextual CCA and SE training to meet our collective needs. Following his speech was the brief from our sponsor of the project from the EU Head of Cooperation, Renato Mele who outlined the need to significantly commit to this PACTVET $6+ million project in to order successively achieve the outputs as planned. PacTVET Team Leader, Dr. Sarah Hemstock also provided a short brief of the project specifying the two phases of the 53 month project explaining the current phase where the project is conducting gaps and needs analysis while phase two will build on achievements of key results 2, 3 and 4 activities tailored to individual country needs. Furthermore, the team is working together with the Fiji Higher Education Commission to achieve competency based standards to support the design of training

programmes and create unit standards. The consultations program schedule can be found in Appendix 1.

Participants Presentation Summary

Education Sector

- *Mrs Viori Uluiratu Odro (Ministry Of Education)*:-
  Mentioned the role of TVET Education in the Ministry has continued to reform their syllabus to accommodate global educational initiative such as CCA and SE, the curriculum has integrated these initiatives into subject areas of Home Economics, Agriculture, Industrial Arts, Office Technology and Vocational Education, basically, years 9, 10, 11, years 12 will be in 2016 and year 13 will be in 2017. Climate Change has also been integrated into these subjects based on the different subtopics of each level. Year 12 subjects such as economics, automotive engineering, and cookery also introduced at Vocational level as a subset of TVET mainstream education.

- *Hasmuk Patel (USP- PACTAFE):-*
  Elaborated on the significant role of up-skilling and reskilling of skill based training and qualifications offered by their PACTAFE institution for relevant industry most suitable for post-secondary and matures students already in the workforce.

- *Dr. Atu Raturi (USP - Renewable Energy Program):-*
  Dr. Raturi provided a comprehensive update on the current status of CCA and SE globally where more than 7 million people around the world are geared towards engaging in sustainable energy work, bioenergy, geothermal, hydro, solar and wind power. He also described how the university has continued to provide opportunities in the capacity development in SE at all levels which is part of their key areas that need work under the USP Strategic Plan (2013-18). Priority Areas and Strategic themes have been developed with Post Graduate Diploma in Renewable Energy, Masters in Renewable Energy and Ph.D. in Renewable Energy whereas undergraduate courses in renewable energy are compulsory for all engineering students. The testing and characterization of LED lights, electric vehicles, wave energy, tidal power biofuel, ethanol from cassava, biofuel testing lab (cert lab) IAS. USP- KOICA Renewable Energy Project are some of the highlights of their student's initiatives.

- *Mr. Sumeet Naidu (EDULINK):-*
  LEAP Project Life Long learning in Energy Security Access and Efficiency Programme funded by European Union, divided into 6 Packages. USPs main role-work package 2 and 3 to develop application courses for energy practical. Carry

out needs analysis activities in 2014, Kick off meeting in the Mauritius conducted 2 workshops. Need for training in EASE Piloting modules and course outline of courses will be developed in Mauritius next Year.

- *Mr. Paula Tuivanuayalewa (FNU- PICO Hydro Electric Power Systems for Rural Dwellers in Fiji):-*
  Mr. Paula described energy to be needed in all walks of life. Objectives are to find ways of implementing a PICO hydro power systems that can create 5Kw of energy in rural areas. New ways in implementing the technology (some places have enough height while some have low lying hills) that can be used in implementing these hydro in low lying areas. Old generators has been used to make a Pico hydro system where the engine has been replaced by a small hydro system which is able to produce 840 watts. PV Project in Vabea village in Kadavu (Feb 2015) are potentially producing 2.4 KW which is sufficient to provide enough energy to power their community school. Apart from the successful implementation of the project, there still exist the need to provide training maintenance in order to sustain the equipment's and keep the systems viable.

- *Mr. Alipate Kau (FNU – Refrigeration & Air-condition Department)*
  The solar refrigeration and air conditioning projects coordinated at FNU funded by JICA were one of the successful energy projects that interested many stakeholders such as Fisheries department, rural communities and individual entrepreneurs. According to him, FNU has established a few solar projects within the rural parts of Fiji as initiatives of the university.

- *Mr. Prasanna Waichal (FNU- Electriclal & Electronics)*
  FNU Diploma in Renewable Energy Technology is being coordinated by Mr. Waichal who also develops locally made technology, parts of his projects consists of solar powered investments for Traffic Light System based in Honiara and monitored by his students. Flettner rotar based model ship- cutting diesel usage by 20%, low cost water purifier Rural Water supply systems, rail transportation can be used to cut down to a truck carriage ratio of 1:10. Future Plans have a dedicated workshop to produce local facilities. Developing local and Regional technology at affordable cost. To foster regional entrepreneurship and economic development through industry involvement and tech transfers.

- *Mr. Cyril Ratchman (FNU – Coastal Engineering)*
  Some coastal habitats in Fiji as described by Mr. Ratchman's in his presentation have shown elements of coastal erosions which highly needs coastal engineering conceptual systems to sustain our coastal zones. Apart from the typical coastal

protection structures mainly used in Fiji, other structures and systems can be introduced to serve as a breaker for sea level rise. One of these includes the FNU project at Galoa, Navua, alongside the southern coastal of Viti Levu was the study site. Research findings identified shoreline retreat and wave reflection. Parameters, celerity, wave depth and direction will allow engineers to develop more efficient methods to control sea level rise with future insights of the consequences related to it.

- *Mrs. Yunyun Gomaria (FNU Spatial Town & Country Planning)*
  According to Mrs. Gomaria, Natural and Human Causes of Climate Change and also influenced by Spatial Planning through the used for building and land. Sustainable Development in Environment Equity and Central development needs are Island Specific Spatial Plan that can be solutions to sustainable problems as in Agropolian- based on Agriculture whereas Minapolitan – based on fisheries (neighborhood development by the communities) capacity building of the people. She concluded by emphasizing on sharing the same visions and missions for the planning for SD and CC. We should be able to adapt and have the different kind of activities giving people many choices for living and planning with spatial development.

- *Dr. Raul Alamban (FNU- Department of Agricultural Engineering)*
  Consultations with farmers to use technology that can efficiently battle the problems of livestock related to Climate Change. Consultations with various agri-industrial sectors. Major Issues and Concerns have formulated key interventions to improve technology and include the Private Sector. All developments and decisions frameworks that are made, environment and stakeholder influence are taken into account.

- *Mr. Saimoni Matawalu (FNU- Electrical Department)*
  Standards used in Electrical Wiring. Some people who do wiring in certain Projects are the middle triangle hierarchy people that do hands on work. Feasible and sustainable hands on electrical engineering on the field. All projects done by FNU are sustained and maintained. The Engineering Flaws in village projects are not recognized because of lack of knowledge by the local people and local engineers.

- *Mr. Joji Marau (FNU – School of Mechanical Engineering)*
  Outrigger Fijian canoe in Suva harbor. The project aims to reduce the use of fossil fuels and promote a more sustainable method of sea transport which requires returning to traditional canoes to safely and with low cost take us from point A to point B. Partnerships with NGOs and the Uto ni Yalo will help create hybrid

canoes to improve the design for more efficient transportation as well as revitalizing the traditional canoe building. The newly built Drua is the second model of its kind to the first Drua invented in 1913. The next Drua in plan aims to cater for about 200 people.

- *Dr. Dellena Alagcan (FNU – Department of Agricultural Science)*
  CBP- uses kitchen waste high in starch content to make up enough energy that can be used to cook 2 meals for 5-6 persons. Removal of CO2 and CH4 from slurry. CBP is much smaller and effective than Conventional Biogas Systems.
  Setup is at Samabula Campus. Blue Flame generated from the Gas. Training Needs Analysis Enable to identify gaps in training Areas In order to meet requirements – could be an Administrative Problems and non-wastage of Resources in training. Evaluate and implement training effectively to close off the training gaps. Conduct Field Evaluation. 75% Current Knowledge and skills training when there is a need for 90%. The gap is filled by tailoring the skills in training. Indicators for the need of safety- accidents, waste in industries, high frequencies of equipment repair due to wear and tear, high rate of evaluation report. Low rating of evaluation Reports.

Climate Change Division

- *Mr. Mansa Katonivualiku (Ministry of Foreign Affairs)*
  Mr. Manasa deliberated on emphasizing Fiji's responses to Climate Change- UNFCCC Kyoto Protocol CC Policy Framework, pivoting on the National Climate Change Policy established in 2012 revitalizing it to be a holistically developed guide. In the framework, 8 objectives addressing Climate Change issues through Education, Adaptation, Mitigation, Finance, Awareness raising, Data Analysis, Mainstreaming and International Pacific Region Participation to ensure that the policies (2012-2016) are followed accordingly. However, there still exist gaps in the policy which relates to adaptation and response but clear articulation of relocation as adaptation as a response is absent. Fiji still needs to work on the coordination of responses. (Who is doing what in response to CC?), Climate Finance is another essential aspect which is geared towards Green Climate funding describing how it can be accessed, the process needed to undertake is very tedious hence not undertaken because finance institutions cannot give direct funding but through UNIE's National Implementing Entity that can directly access Climate Change Funding. Monitoring procedures are not fully established based on Information and data that needs to be shared, there is less accessibility to these. Adaptation- Vulnerability and Adaptation Assessments should be a thorough consultation process which is needed in place. Mitigation- iNDC and **CDM** (market driven mechanism) Emission reduction from developing countries

can be **sold** to developed countries to meet their GHG reduction mark as per the Kyoto Protocol.

- *Daniel Gareck CCCPIR (SPC/GIZ)*
  Mr. Gareck presented a Glossary of I-Taukei terms related to Climate Change which in Fijian can be interpreted as Vosaqali Ni Vei Draki Veisau. These visual guides consist of key devices to raise awareness on Climate Change to the community including flip charts and teacher guides and training of trainers manual. The guides which included possible student learning outcomes, was done in 2014, as a Facilitator Guide, Learner Guide and Learner Workbook (Certificate level 1 Programme developed on Climate Change- 7 Units). The guides were ready to be used for the Vanuatu Project.

- *Dr. Kirstie Meheux (Disaster Risk Management SPC)*
  Dr. Kirstie emphasized on capacity building at the National Level focusing on National Trainer Capacity for Disaster Risk Management through SPC. Such courses in Emergency Operations Center involving decisions during emergency situation. Exercise Management- what to do in an actual course of a disaster. Raining for instructors. GIS for DRM. For beginners and Advanced. Post Disaster Needs Assessments. Calculating the cost of disasters. Emergency responses Team Training of Trainers- Agencies have the same standard of understanding on how to react to different management. Risk informed decision making for Urban planners.Take the tech work Rm, Economics and dev training to meet the needs of practitioners in the field.Projects – develop a competency Framework for Emergency Management in Pacific Island Countries for territories. (Good feedback but needs accreditation) 13 different key functions that SPC offers.
    USP- EV424 FNU_ PG Certificate in DRM SINU- Solomon Islands National University.

- *Ms Vika Rogers (Department of Environment)*
  Ozone Depleting Substances Regulations (2010) ODS are banned in Fiji- (2003-2009) Valid Licensing needed to Import and Export. CCl4, Halon, CH3CCl3 phased out in the period between 2003 and 2010. ODS Phase out Programme is linked to other sectors of the country (tourism, education) Because of the ODS phase out has caused an extensive change in GHG's. (CO2) Because of ODS phase out, industries have formed better resources that are more environmentally friendly) Capacity Building in Training Curriculums in FNU and DOE. Enforcement Officers Training.

- *Ms Sainimere Veitata Waqalevu (USP- PACE-SD)*

  15 countries are involved with USP. Community engagement work with 44 communities in the 15 countries. Enhancing water food security. Trainings carried out (7 steps taken to implement these projects). From NPAC Formation to M&E Plan. The 4 year plan has ended and is now being monitored. Community representatives are trained to carry out the projects that have been carried out. 1813 Climate Ambassadors

  Locally Managed Climate Change Network Across the Region. Have all the stakeholders and Community have a platform in which they can share experiences, Communities can have a development plan which can then be mainstreamed into the government's policies.

Energy Sector

- *Mr. Inia Saula (Fiji Department of Energy*)

  Mineral fuel accounts for 1/3 of our imports. Fiji's energy situation is characterized by a higher demand in imported fuel. 2007 census-89% of Fiji's population has access to modern form of energy access. Transport sector is the main use of imported fuel in Fiji and the Pacific Island. Fuel consumption data is getting difficult to attain. Transport power and household sector needs an improvement in terms of household sector. The objectives revolve around forming ways to use and distribute sustainable energy. Grid based power supply, fuel and biofuel, green energy (key areas identified) Fiji SE4 for all Report.SE4 target- baseline target from now till 2040. 90% -2015 target (access to modern energy services)Renewable energy share in electrical generation -81% target Renewable energy share in total energy consumption- 18% Target. The Green growth framework have short term and long term targets and the policies have been aligned in the Energy sector to meet this target. The Demand Supply Curve till is very directly related to an increase in demand as the ears increase. ***Priority policy statements*** have comprise of comprehensive audits, data collection and investigations, cost control on renewable energy capacities and capabilities.

- *Mr. Anare Matakiviti (IUCN – Fiji)*

  Institutional response to climate change and sustainable energy, Main focus of work- value and constructive nature Effective and equitable governance of nature's use. Deploying nature based solutions to global challenges in climate food development. Regional members of IUCN are comprised of 8 members. Activities of IUCN in Fiji. Valuing and conserving Nature- MACBIO (implementing 36 MPA's in Fiji) developing a thorough understanding of water and wetland). Also some work in participation of *National Policy making*- part in development in NBSAP review. Also participated in the Green Growth Framework. Energy Ecosystem and Sustainable Livelihoods Initiative. Co fund international

conference in USP. Establishment in developing a sustainable transport hub Wind hydro and solar works have been done as an initiative to work with RE. *Tavua Solar PV Streetlights Demonstration.* Lifecycle Fiji Demonstration. NTF Grid connected Solar Power Demonstration. Household Biogas Demonstration Naboro Biogas Plant and Bolting Facility. Are of work for IUCN- Society, Economy, and Environment. *Consequences*- Risk and uncertainties in the future- What do we need to do? Need to look at the model of development where the focus is mainly of Economy. Where the growth is measured by GDP and less focus on Society and The Environment. *Green Growth Economy*- Environment is considered in the Economic Growth Calculation. Naboro Biogas Plant- Problem (700 pigs and increasing) 300 KG of waste from the Kitchen hence killing the river ecosystem (all the freshwater pig has gone) In order to feed the pigs they are cutting mangroves and buying LPG for cooking for the prisoners. Unhealthy work environment. Solution- Build a biogas plant. Can generate 40 to 50 cubic meters of biogas. That is similar to 16-20Kg of LPG. Bottling this would ensure a reduction in cutting buying LPG. The waste water that goes into the creek is clean and hence restores the freshwater creek. Skills needed to ensure management of the Project: Designing and constructing, operate and maintain, manage the project, Commercial aspects (training) Linkages to the Biogas plant on the economy. Potential Climate Change Impacts on the Biogas project the economic value of the ecosystems, Knowledge products and communication. Upskilling is needed in the correction services, Naboro Prison Personnel, Facilitators. The consequence are very positive on the whole 3 aspects of the sustainable development Framework which focuses on the Environment, Economy and the Society.

- *SPC Energy Program (Pacific Regional Data Repository)*
  Data captured which is available to the public which involves registering. The data sent in is fine-tuned and published however the raw material is also found. Added feature portals will be set in place in phase 2. Email feature. Sharing of interfaces.
  Sharing of information need to be open. In this sense MOU's and agreements are been taken into consideration for capacity building activities- Grid connected, grid PV, Petroleum, SST, Cost Benefit Analysis (Training and input) cost Benefit as part of Projects eg. Tuvalu TVET-biogas Solar PV in Solomon, FSM- Energy efficiency in schools eg. Institutional development in the form of capacity building. *Non sector specific*- there are general areas such as concept note and full proposal development. Policy development process, Cost Benefit Analysis, Excel for data Analysis (data analyses that might be needed for Policy Development)

- *Ministry of Youth & Sports*
  Youths-15-35 year's 308411-youth (36%) Most programmes are non- formal in nature and are done in communities. Challenges- monitoring the programmes that the youth are involved in.Funding for Climate Change Initiatives within the Ministry. Sustaining traditional ways of building vakas, DRM training, Strengthening Partnerships with relevant partners involved in Climate Change Initiatives.

- *Dr. Richard Wah (FHEC)*
  Register all higher Education Institutions Problem :(certificate attained are not registered). Certificate(s) can be at the same academic level as PG's and Doctorates Level (10) Any new courses above level 7 will need to be approved by FHEC. National Qualifications- made up of institutions, industry Competencies required? 2 or 3 day training can be bound and compiled into units that can form generic and core units. Unit Standards- statements of competencies that the students must achieve to qualify. Competency based Using Independent Assessors- Teacher teachers- commission trains independent Officers- measure the students to see if they meet competency level Research in what is done Internationally (Our standards are set one step higher above Australian and NZ Standards) Scoping, need to preset profiles, ideas before setting up a framework. ISAC formation in the urban, rural, coastal areas to bring in people. Certification- what institutions gives accreditation- FHEC gives Licensing Bodies- give license What kind of training the technicians need What certificate level are required to fill basic competency level What are the kind of upskilling needed prior skilled people How good is the knowledge, competencies, values and attributes and entrepreneurial skills? Need to know the Higher Education Qualification Framework for each individual countries in order to develop the new TVET programme PRQS- Traditional and Indigenous Skills is not developed in the country. Qualification Recognition- Accrediting Agency- Qualification Standards must be met for any new programme. *Regional TVET Forum*- Research needs to be focused to ensure that resources are put in the right places to get fruitful outputs. PacTVET- courses or programme? Who else delivers? Will they be competency based? Will they carry credits? New programme needs to build from the FQF, will there be jobs available? Trade Agreements and Labor migration http://prqs.spbea.org.fj

Group Discussion Findings

The participants of the first two days meeting were grouped into the three main categories, the Energy, Climate Change and Education. Each group was tasked to:

- Identify existing projects or activities carried out relevant to their area of expertise
- Derive possible competency skills relating to each project

Energy Group

This group identified both renewable and efficiency energy projects such as:

1. Renewable
    - Solar (on/off grid) PV lights
    - Solar refrigeration
    - Hydro power
    - Wind power
    - Biomass/biogas
    - Geothermal

2. Energy Efficiency
    - Sea transportation
    - Traditional construction
    - Land transportation
    - Refrigeration & Air Con Auditing
    - Licensing and regulations

Climate Change 2 Groups

1. Food security, Disaster Risk Management and Environment
    - **Food security:** occupation includes land use management or soil specialist.
    - **DRM:** occupation provided is emergency response volunteer which requires team work, good communication skills, good risk identification (certificate level)
    - **Environment**: environment impact assessment technical officer. Requires good communication skills
2. Integrated Farming
    - Agriculture (ecological farming)
    - Begin with certificate one to introduce the basics in communities.
    - Planning and management
    - Forestry, Silviculture

Comments: Include Carbon foot print as knowledge required, Eco-farming includes reforestation. Discussion took into consideration interior vs coastal areas during thus need generic standards. Include competency to solve problems as part of attributes.

Education Group

Approach to consider is gap analysis is not appropriate for Fiji at the moment therefore we need to start with latest. FHEC will endorse standards and national qualifications. 3 major players in developing of the national qualifications:

- Industry
- Providers
- FHEC/ISACS.

The industry needs to identify what is required from graduates so that the other two players can start working to avoid the mismatch. Provides 60% of ISACS core membership. Development of unit standards. Driving at competency that the industry needs to elaborate on. Start from the end product and that is identifying what is needed from graduates to revise in educational terms.

Comments: certificate 4 levels, a minimum of 40 to 120 credit points is the normal but 196 credit points were mentioned and needed justification. FQF: 196, 1960 notion hours (assessment) of learning to demonstrate the competency required. There has to be a paradigm shift. Outcome based. Shift from content to competent because some students take time to become competent.

CURRENT STATUS & TRENDS OF ENERGY, CLIMATE CHANGE & TVET IN FIJI

Energy Sector

The government's vision for Fiji's energy sector, as set out in the *Roadmap for Democracy and Sustainable Socio-Economic Development 2009-2014*, is for a resource efficient, cost effective, and environmentally sustainable energy sector. This should ensure that communities have secure access to affordable and reliable energy supplies.

The primary objective of this National Energy Policy is to achieve:

- **Affordable energy for all:** Ensure that all Fijians have access to affordable and reliable modern energy services.

The secondary objectives of this National Energy Policy are to achieve:

- **Sustainable energy supplies:** Establish environmentally sound and sustainable systems for energy production, procurement, transportation, distribution and end-use.
- **Reduced import costs:** Encourage the efficient use of energy and the use of indigenous energy sources to reduce the financial burden of energy imports on Fiji.

Although this is unlikely to change in the foreseeable future, there is still a need to reduce Fiji's reliance on imported fuels as much as possible. This will improve Fiji's macro-economic stability by making it less vulnerable to volatile international fuel prices and high import payments. Fiji's two other main sources of energy are biomass/wood for cooking in rural areas and hydropower generated electricity.

Fiji's energy demand is driven by household consumption of electricity and transport fuels and by the need of its major industries, in particular agriculture and forestry, tourism, and mining. Demand has increased over the past decade and is likely to continue increasing, although the rate will depend significantly on the effect of future political developments on Fiji's economic growth.

With the majority of Fiji's population living on the two main islands of Viti Levu and Vanua Levu and Fiji being endowed with significant renewable resources (the extent of which is not fully known), grid-based power supply has arguably the most potential to make Fiji's energy sector more efficient, cost effective, and environmentally sustainable. Over 50% of Fiji's electricity is already generated from hydropower, but there are still likely a number of medium size undeveloped hydro sites and significant unexplored geothermal, solar, and wind resources. There has not been any private investment in Fiji's power sector, but this will need to change if future investment needs are to be met.

The majority of the population has access to modern forms of energy in the last two decades through rural electrification initiatives. However approximately 10% of the population is still without access to electricity and Fiji is still struggling to provide remote areas with access to electricity in a sustainable manner.

The transport sector is the main user of imported fuel in Fiji which has obligated the government to elevate attempts to reduce petroleum imports through the use of bio-fuels, but research and development both locally and abroad has shown that its economic viability is uncertain at best, and is therefore unlikely to make the sort of impact once hoped. The transport sector needs to increase its emphasis on reducing the cost of energy consumption, but gains will take time and are unlikely to be dramatic unless there is a technological breakthrough. The Energy Department had already established substantial initiatives around Fiji with energy projects:

- Masi Village Micro-Hydro Project in Serua and at Korolevu Village in Navosa.
- Monitoring station will be installed in Naruwai Village in Bua.
- Wave energy potential sites in Muani village, Kadavu and Vuna village in Taveuni.
- The Wind Programme at Dakuilomaloma Village, Vanuabalavu, Lau and Nabouwalu Government Station, Bua. Wind Data table, (refer to Appendix 3)
- The hydro program was setup at Navakasali, Bua Korolevu, Navosa, Delaivione, Taveuni, Vunisea, Macuata and Nukuloa, Gau

- Biogas Technology is another contributing to energy and food security, waste management, reduction in deforestation, the total numbers of biogas plants currently working are Waidalice, Tailevu Waila, Naitasiri and Benau, Savusavu
- The solar water pumps installed at Tavea Island in Bua and Mali District School, in Mali Island, Macuata. Currently, they are enjoying the supply of fresh water for drinking and cooking from these boreholes. Before implementation the communities had contributed 10% of the total cost while DOE contributed the remaining 90%.
- Koro Island solar lightings installed at the Jetty in Lomaiviti which is approximately 18km from the jetty, it is only fitted with stand-alone systems to provide adequate lighting to the general public.
- Modular Biofuel Plants: dried Copra purchased from locals, copra crusher, oil Expeller, filtration, protein Meal, diesel Storage Tank 1000L, coconut oil tank 1000L, reactor tank 1000L – the coconut oil and diesel is mixed to produce renewable diesel.

The population in Fiji recorded since mid-last year amounted to a little more than 900,000 people; out of this population about 92% have access to electricity, which drives the government of the day to continue to strengthen the initiatives laid out in its policies. Fiji's national energy policy has four strategic areas covering energy planning, energy security, power sector reform and renewable energy. The power sector reform includes establishment of Renewable Energy Service Companies (RESCOs) and increased funding for the Rural Electrification Programme (REP).

Renewable Energy

Fiji has progressively developed a thriving market for grid connected PV systems aimed at large commercial energy users spearheaded by prominent companies such as CBS Power Solutions and Sunergize Group. The feed-in tariff offered by the FEA is less than the amount that customers are charged at retail, and less than the amount that would be required to 'finance' a solar farm via a PPA. Hence, it is important that the PV system's generation profile matches the load profiles for the sites they are installed on. This is a limiting factor for the growth of grid-connected PV among residential customers and small businesses:54 kilowatt-peak (kWp) installation at the University of the South Pacific in Suva that was part of a renewable energy project funded by the Korea International Cooperation Agency (KOICA), 110 kW at Denarau, 6 kW at Lautoka, FEA- 10 kWp currently out of service, 1,500 grid-connected household-scale solar installations by December 2015, 30,000 grid-connected household-scale solar installations by December 2018 (20% of household and institutional customers).

The Fiji Department of Energy (DOE) have been aggressively expanding the installation of mini grids powered by solar and diesel generators; as well as installing PV solar home system through establishing RESCO companies to increase electrification rates amongst Fiji's rural communities.

The Sustainable Energy for All report provided the following table on rural electrification in Fiji (Table 1).

Number		Capacity KW	Total KW
Solar Systems 100	2400	0.1	240
Solar Systems 270	700	0.27	189
Mini Hydro	1	100	100
Mini Hydro	1	30	30
Biofuel 20/80	4	30	120
Diesel Units	500	22.3	14071
FEA Grid Extensions	1500	n.a.	n.a

Table 1: Number and capacity of various rural generation technologies

Source: *DoE master list of rural projects, 2013*

As the diesel systems frequently experience break downs and fuel supply shortages, DoE aims to shift more towards solar electrification

Solar water heating

Solar water heaters are widely used throughout Fiji by private residences and hotels, resorts and businesses.

Wind power

Fiji has one major windfarm site, a 10MW windfarm consisting of 37x 275kW turbines near Sigatoka on Viti Levu. The Fiji Electricity Authority has been carrying out wind resource measurements at 8 different sites around the country. As such, there is potential for expansion of this industry, though FEA does not anticipate commissioning any new windfarms between 2013 and 2017 (Sustainable Energy Solutions, 2015).

Hydropower

Hydropower currently accounts for over 60% of all electricity generation in Fiji, with 85MW of installed capacity, with a further 57MW planned between 2013 and 2017 on Viti Levu (Sustainable Energy Solutions, 2015).

Micro-Hydro Power

The installed capacity of micro/mini hydro is around 1000 kW, 80% of which is accounted for by the FEA's Wainikeu system in Vanua Levu.

Micro-hydro (under 100 kW) and mini-hydro (100– 1 500 kW) potential has been studied by the FDOE at sites near communities not served by the FEA. Surveys have been conducted at 38 of these smaller sites on six islands showing a total of 3.2 MW of likely capacity that may be technically and economically feasible, while 20 more sites totalling about 0.4 MW still require extra monitoring ((Sustainable Energy Solutions, 2015).

Bioenergy (biomass/biogas)

Fuelwood was used as the primary cooking fuel by 20% of the Fijian population in 2007. Larger biogas and biomas projects are planned for Fiji. This includes an additional 100MW of biomass combustion plant on Viti Levu and 10MW of Biogasification generation on Vanua Levu. Sugar and Cassava crops are also new in the market to be used for the production of transport and manufacturing fuels. Fiji Sugar Corporation in Lautoka is currently working on Sugar cane by-products as biofuel.

New inclusion in Agro-forestry bio-mass fuel projects involves production of key species like *Glyricidia and Acacia.* – Both are short rotation fuel wood species that contains very high calorific content of oil at a very young age which is best suited for bio-mass products. It has high rate of leaf decomposition, ability to tolerate frequent harvesting with less mortality, easy establishment with vegetative propagation and easy handling due to uniform size of branching and multiple use (multiple fodder, green fertilizer). Care must be taken during its yielding stage as it is an invasive plant which could disturb habitats. Therefore, harvesting should be done before flowers and reproductive structures are formed to prevent further invasions into our native forests. In addition, bimba bamboos are the latest product in the agro-forest market confirmed to also contain substantial amount of oil best used for fuel wood.

In 2010, the FDOE contracted Niu Industries, a producer of small modular coconut oil mills, to install three such mills on the islands of Koro, Rotuma and Cicia. Also in 2012, an additional six plants in the Lau and Lomaiviti islands of Fiji were installed by the FDOE.

Current installed capacity at the Fiji Sugar Company is 4 MW at Ba, 3 MW at Rakiraki, 5 MW at Lautoka and 4 MW at Labasa. DoE bio-fuel programme was designed to produce CNO locally, DoE has plans to introduce dual fuel kits for the generators supplied with CNO. If successful this retrofit has the potential to increase CNO use to 90% of total fuel use.

Geothermal

There are 8MW of geothermal plant being planned for commissioning by FEA between 2013 and 2017.

Energy Efficiency

The Fiji government has promoted efficient use and generation of energy as part of its energy policy. This is rolled out through awareness raising and education on energy efficiency; through energy auditing and energy labelling. The department of energy carries out energy audits and the service has also grown amongst the private sector.

Sustainable Sea Transportation

The goal of our fossil fuel free energy production initiative is to help reduce the overall dependency on fossil fuel, gas or coal. This can be accomplished by providing solutions for renewable energy production and storage that can be integrated into the current electricity and fuel infrastructure. Due to the geographical locations in Fiji, many remote dwellers

suffers from high fuel and consequently high electricity prices driving stakeholders aggressively to tap into alternative renewable energy productions within the next 5 – 10 years. Through government's and stakeholders investments, initiatives have developed strategically to develop platforms that can assist in their transition from fossil fuels to renewable energy resources.

Fiji has been blessed with the revival of this long lost indigenous knowledge system by locals who have recently advocated the revitalisation of traditional canoes for sporting activities and tourism industry, however, it has been identified lately as one of the cheapest solutions in finding alternative means of sustaining sea transportation. Similar to other Pacific Island countries, Fiji comprises of more than 300 islands, having a land mass area of more than 18,000 km², finding itself the ideal context of investing in traditional canoes as means of transportation to neighbouring islands.

Currently, locals use boats for inter-island transportation, for their daily chores including farming, fishing and for their business activities, in doing this, they use fiberglass, wooden and aluminum boats of different sizes powered with outboard motors ranging from 15 to 60 horse power which averagely costs about $90 of gasoline per week. Considering community's livelihood for living sustainably, and the high fluctuation of fuel prices many communities especially in rural and remote areas would be experiencing financial constraints to meet up with their daily needs. The introduction and revitalizing of traditional canoes would be a fair justification and ideal solutions to the growing problems.

Major Projects

A. Pacific Power Solution

The focus of this project is to use petroleum fuel more efficiently and reduce the utilization of petroleum consumption and increasing in the use of renewable energy.

B. WASH Program - Program Area 1: Water, Sanitation and Hygiene (WASH)

Activities focused on produce WASH educational resources, deliver sustained WASH training in communities and schools, support communities in construction and maintenance of simple water supply and sanitation options, improve means of testing water quality and link results to action.

Climate Change Sector

Pacific Centre of Environment and Sustainable Development (PACE-SD USP)

PaCE-SD's areas of expertise lie in environment, climate change and sustainable development. Within these broad areas, focus is mainly towards:

- Environmental impact assessment and sustainable environmental assessment
- Disaster risk management
- Climate change modeling and analysis
- Climate change vulnerability and adaptation
- Waste management and minimization
- Watershed and natural resource management
  (source: PaCE-SD, USP website, 2015)

Currently projects being administered through PACE-SD include:

- PacTVET project jointly with SPC
- Global Climate Change Alliance capacity building, community engagement and applied research (EU-GCCA)
- Future Climate Leaders and Pacific Emerging Environment Leaders Collaboration (AusAID)
- Coastal Community Adaptation Project (USAID)
- Coordination and Support Action Project (EU-ECOPAS)
- Climate Change Game (GIZ)
- Climate Services (US Embassy)

The centre is renowned to be the hub of facilitating higher education courses ranging from levels 8-10 which starts of at Postgraduate Certificate. Climate change related courses are most suitable to be offered from this centre especially the ones planned to be facilitated at regional level.

Department of Environment

The Department of the Environment (DoE) is the main governing body dealing with environment and biodiversity issues in Fiji. It is the national focal point for the United Nations Convention on Biological Diversity (CBD). The DoE is responsible for implementing the National Biodiversity Strategy Action Plan and the Environmental Management Act. It is one of the main partners of the GIZ (Deutsche Gesellschaft für Internationale Zusammenarbeit) and the Secretariat for the Pacific Community's (SPC) regional REDD+ project.

Department of Forestry

The Department of Forest is the second to Fisheries in its Ministry which has eight (8) functional divisions, the Silvi-Culture Research Department is one of the eight that coordinates works associated with forest protection as a strategy to mitigate and adapt to

Climate change and disaster risks, Ecosystem-based management and Entrepreneurship. The Carbon sinks that absorbs and stores carbons in trees to reduce concentrations in the atmosphere, Reforestation & afforestation programs within degraded systems and mangroves are also part of their essential scopes promoted within communities as mitigation actions, EIAs, developing national policies for protection of reserves for the conservation of rare and endangered species, protection of watersheds, ridge-to-reefs, Seawater desalination plants, protection of watersheds, access benefit sharing regulations and identifying new fuel wood species through research practises have become their revitalised targets. The roles include:

- Implementation of forest policy 2007
- Administer forest legislation
- Ensure conservation, sustainable utilization and management of forest resources
- Approve and issue forest related license
- Provide training, extension services and research
- Coordination with key stakeholders including forest resource owners
  (source: Ministry of Fisheries & Forests website, 2015)

The Department of Forest provides specialized trainings to their staff at their training division close to their Silviculture research station based at Colo-i-Suva on advocating the protection of pristine forests to provide essential ecosystem services, carbon storage and emissions offsetting. Protecting tropical forests therefore not only has a double-cooling effect, by reducing carbon emissions and maintaining high levels of evaporation from the canopy, but also is vital for the continued provision of essential life-sustaining services. These services are essential for the well-being of people and the planet, however they remain undervalued and therefore cannot compete with the more immediate gains delivered from converting forests into commodities. Ecosystem services operate from local to global scales and are not confined within national borders; all people are therefore reliant on them and it is in our collective interest to ensure their sustained provisioning into the future. The inclusion of REDD+ Initiative to Fiji allows for:

- Reducing emissions from deforestations
- Reducing emissions from forest degradation
- Conservation of carbon stocks
- Sustainable management of forests
- Enhancement of forest carbon stocks

(source: Fiji REDD+ Policy, 2013)

Ministry of Foreign Affairs

The major objective of the Ministry of Foreign Affairs is the provision of policy advice to the Government regarding the formulation and implementation of its foreign policies. The

ministry plays an important role in areas such as the negotiation and administration of foreign development assistance and climate change. Out of their 6 policy goals, 4 goals are targeted towards addressing issues related to climate change which are:

- To promote the integration of climate change issues in national planning budgeting and implementation process
- To provide guidance to government responses to climate change issues
- To guide sectors to develop climate change adaptation and mitigation strategies
- To support request to regional and international agencies to provide resource and assistance in addressing national climate change issues.
  (Source: Fiji Climate Change Policy, 2012)

The main objectives that governs their policies outline above are to mainstream, collect, store and share data, raise awareness, provide education and training, adaptation and mitigation stages, financing and regional/international participation.

In combating climate change issues regionally and linking international relations, the Ministry is faced with drawbacks that need collective participation from related stakeholders such as:

- Awareness of climate change science background to communities
- Coordination of responses and reporting - climate proofing of all essential services and infrastructure
- Climate finance – access and hurdles to access by traditional implementing entities and rapidly institute local partners.
- Monitoring and evaluation
- Information and data storage
- Adaptation for vulnerable assessment
- Mitigation phases
- Technology upgrading to provide accurate data.
  (Source: Ministry of Foreign Affairs website, 2015)

Secretariat of the Pacific Regional Environment Program (SPREP)

The SPREP is another organization established in Fiji which addresses issues of the environment for the Pacific island people who depend on their natural environment for their sustenance and livelihoods. These vital resources and ecosystems are under ever-increasing pressure as our islands strive to address their economic aspirations and meet the needs of their growing populations. The Secretariat of the Pacific Regional Environment Programme (SPREP) has been charged by the governments and administrations of the Pacific region with the protection and sustainable development of the region's environment. SPREP's members are American Samoa, Australia, Commonwealth of the Northern Mariana

Islands, Cook Islands, Federated States of Micronesia, Fiji, France, French Polynesia, Guam, Kiribati, Marshall Islands, Nauru, New Caledonia, New Zealand, Niue, Palau, Papua New Guinea, Samoa, Solomon Islands, Tokelau, Tonga, Tuvalu, United Kingdom, United States of America, Vanuatu and Wallis and Futuna.

SPREP's activities are guided by its Strategic Action Plan 2011-2015. Develop through extensive consultations with members, secretariat programme staff and partner organizations, the plan establishes four strategic priorities:

- Climate Change;
- Biodiversity and Ecosystem Management;
- Waste Management and Pollution Control
- Environmental Monitoring and Governance

(Source: SPREP website, 2015)

Secretariat of the Pacific Commission

The Secretariat of the Pacific Community (SPC) is one of the leading comprehensive organization formerly called the South Pacific Commission, founded in Australia in 1947 under the Canberra Agreement by the six 'participating governments' that then administered territories in the Pacific: Australia, France, New Zealand, the Netherlands, the United Kingdom and the United States of America. They established the organization to restore stability to a region that had experienced the turbulence of the Second World War, to assist in administering their dependent territories and to benefit the people of the Pacific. Today 22 pacific island countries are members and territories are members of the SPC organization.

One of SPC's main visions is to conceptualize climate change issues by providing a secure resilience prosperous Pacific community whose people are educated and healthy and manage their resources in an economically and environmentally and socially sustainable. SPC is committed in helping pacific island countries and territories (PICTS) address the risk posed by climate variability and climate change. The Pacific region has for centuries been vulnerable to natural climate hazards such as floods, droughts and cyclones, consequently, climate change resulting from greenhouse gases continue to pose additional risks to the region increasing air and sea surface temperatures. SPC is working to help PICTS to respond to the risks and impacts of climate variability and climate change through its sectorial work and its whole of organizational approach. Strategies are in place to:

- Strengthen Pacific island communities to respond effectively to climate change
- Climate change integrated into SPC programmes and operations
- Strengthen partnerships at regional and international levels.

SPC are also coordinating several climate change projects through to 2015 that are funded by external partners; these include:

- Coping with Climate Change in the Pacific Island Region (CCCPIR) Implemented in partnership with Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) on behalf of the German Federal Ministry for Economic Cooperation and Development (BMZ)
- Global Climate Change Alliance: Pacific Small Island States (GCCA: PSIS) Implemented by SPC and funded by the European Union (EU)
- International Climate Change Adaptation Initiative: Building resilience in fisheries, agriculture and health Implemented by SPC and funded by the Australian Agency for International Development (AusAID)
- Vegetation and Land Cover Mapping and Improving Food Security for Building Resilience to a Changing Climate in Pacific Island Communities Implemented by SPC and funded by the United States Agency for International Development (USAID).

  (Source: SPC website, 2015)

Education Sector

USP – Faculty of Science Technology & Environment

The University of the South Pacific - FSTE is an intellectual centre for excellence in Science, Technology and Environment for Pacific based research, consultancy and educational provision. It is made up of 5 schools; Geography-Earth Science and Environment, Marine, Biological & Chemical Science, Mathematics & Computing, Engineering & Physics with two prestigious institutes; Marine Resources and Applied Science. Courses ranging from Certificate levels to Doctorate which start from Level 4 to 10 according to FQF. The courses offered at the FSTE ties well in line with the EU PACTVET objectives of setting up to offer courses in Biodiversity at Diploma and Degree levels based on the existing programs currently offered with the facilities and qualified staff to teach available.
The link below gives the breakdown of the courses: http://www.usp.ac.fj/index.php?id=10948 .

Fiji National University (FNU)

FNU was formally established in 2010, but has a long history of relevant education dating back to the origins of its component Colleges, through institutions that were established according to national needs and aspirations as these developed.

The former Fiji Institute of Technology (FIT) is now part of the FNU College of Engineering, Science and Technology and is the University's Samabula Campus offering TVET courses

ranging from Levels 3 – 7 (according to the Fiji Qualification Framework - FHEC) in Architectural & Civil Construction, Automotive, Mechanical, Electrical, Agricultural Engineering and Maritime including a few sustainable energy related course such as Renewable Energy, Refrigeration and Air conditioning. Apart from courses offered, most of the respective trades have carried out projects related to Solar PV (On & Off Grid), Solar Refrigeration, Hydro Power, Hydrogen Powered Automobiles, Biogas and Biomass from waste products, traditional construction of buildings and canoes, electrical rewiring, Spatial Town Planning and Coastal Engineering for Disaster Risk Management.

The National Training and Productivity Centre, established in 1973 by the Fiji National Training Act to benchmark training and qualifications in technical and trade areas based on the needs of local industries and is comparable with overseas qualifications offering up-skilling and reskilling training programs in Solar PV, refrigeration and electrical courses targeting a highly skilled workforce.

The merger of FNU has progressively proven its competent participation in striving to become the premier university in providing quality TVET education locally and widening its scope to the Pacific region establishing relations in Tonga, Tuvalu, the Solomon's and Vanuatu. Ideally, based on the university's facilitation programs, the EU PACTVET project could aim to setup baseline courses at Levels 3-5 especially for SE.

CONSULTATION METHODOLOGIES

An integrated and inclusive consultative approach was undertaken in the light of Fiji's current development performance and the increasingly demands in search of solutions to Climate Change adaptations and Sustainable Energy alternatives. This Fiji In-country report compilation resulted from the consultations and outcomes of four processes, namely:

- Consultative Workshop Meeting (Training Needs & Gap Analysis)
- A series of EU PACTVET roundtable meetings
- Desktop literature survey
- Personal communications through email, telephone and office visitation

Consultative Workshop Meeting (TNGA)

A one off consultative workshop with stakeholders was held at the USP-ICT Lecture Theatre to extract, process and consolidate professional ideas which convened on the 1st - 3rd July 2015 which invited representatives from all local national stakeholder groups. The purpose of the workshop meeting was to seek and refine stakeholder's professional contributions towards capturing training needs and gaps that exists in Fiji obligated to combat Climate Change and Sustainable Energy aggravating challenges and cost effective solutions.

Roundtable Meetings

The series of roundtable consultations involved discussion on the needs and gaps facilitated by the EU PACTVET team. As part of the multi-stakeholder approach, the roundtable meetings involved appointment meetings with relevant stakeholders in the three main sectors; the Education (Ministry of Education, TVET providers and Fiji Higher Education), Climate Change and Energy (private and government).

Desktop Literature Review

This forms the basis for evaluative report of information found in the literature related to technical, vocational education and training with the subject of sustainable energy and climate change as the content. Various literatures were consulted, within the education, energy and climate change sectors, on policy frameworks and national action plans or development strategic plans. Most Policy frameworks (regional and national) were reviewed and those were used as the basis for consolidating future SE and CCA demands or needs in Fiji.

Personal Communications

In a situation where stakeholders cannot make it to the consultative gatherings, due to other commitments, a one-to-one or face-to-face meeting or interviews were conducted. In situations that confined stakeholders against time and distance, phone interview and emails were the alternative methods of communications.

NATIONAL POLICIES & FRAMEWORKS

Education

The education sector in Fiji falls under the Ministry of Education that governs all educational training and facilitation, they are one of our key stakeholders in administering and monitoring of mainstream and TVET education in Fiji. The Ministry of Education is responsible for the design, implementation, monitoring and evaluation of educational legislations, policies and programmes in Fiji by providing the structures, human resources, budget and administrative and management support to ensure that the quality of service delivery is maintained at a high level. The Ministry is specifically tasked to conduct and deliver education services to the following:

- Pre-schools
- Primary and Secondary
- Special Schools for children with special needs and Vocational Schools
- Students in the years of compulsory schooling Year 1-13

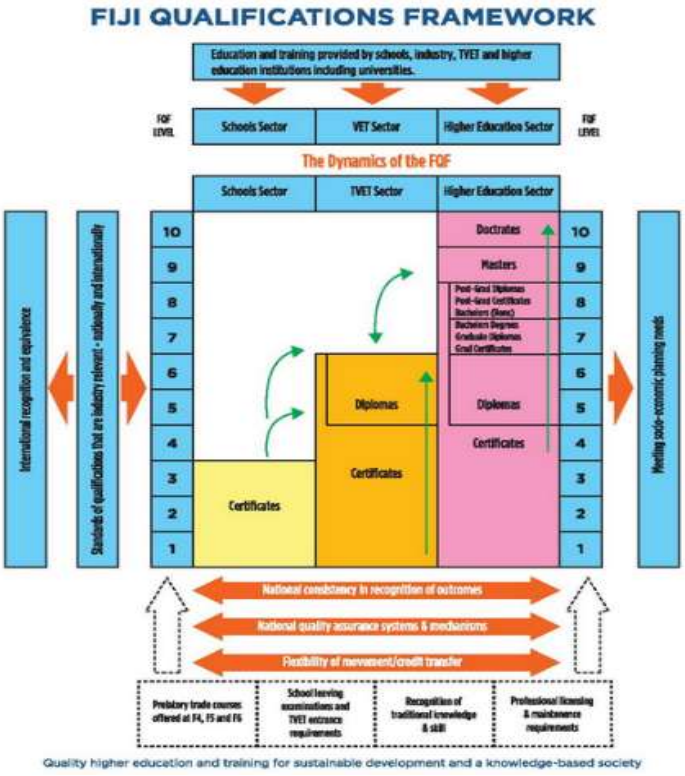
- Students in vocational education and training programs
- Teaching personnel
- School management committees and controlling authorities

The Ministry of Education's National Curriculum Framework developed in 2007and amendments recently highlighted the need to address Environmental Education for Sustainability at school curricula level integrating Climate Change concepts into teaching materials, classroom based activities and projects. The United Nations General Assembly adopted a resolution to establish the Decade of Education for Sustainable Development (2005-2014). This resolution highlights the importance of concerted action to ensure that development processes that we allow to occur today do not impede the livelihoods and quality of life of future generations. One of the pillars of sustainable development that gives shape and content to sustainable learning is environment. Environmental education for sustainability promotes awareness of the fragility of the physical environment affected by human activity. Environmental education for sustainability will be a core cultural feature of early childhood and school programs. All groups that make up a school community will be involved in supporting this important facet of contemporary education.
(Source: Ministry of Education website, 2015)

Fiji Higher Education Commission (FHEC)

The Higher Education Commission is a governing body that was appointed by the Minister for Education in 2010 of its governing legislation known as the Higher Education Regulations 2009 and Higher Education (Qualifications) Regulations 2010 are subsidiary legislations. The role of the Commission are to advise the Minister for Education, on the steps to be undertaken in developing and promoting the higher education sector. The latter includes regulating the operation of higher education institutions to enhance governance and productivity which leads to quality education and training for individuals and the labor market. This, in turn, will improve the sector's contribution to the social, economic and cultural progress of the nation. All higher education institutions are required to get recognition and be registered with the Commission through the Fiji Qualifications Framework, a 10-level framework on which all higher education programs in Fiji should be registered.

Shown below is the Fiji Qualification Framework endorsed by the Fiji Higher Education Commission to be benchmarked throughout the country for any formal training needs.



Source:
http://www.fhec.org.fj/images/advportfolio/Docs/procedures/fijiqualificationframework.pdf

The Fiji Qualification Framework layout provides an educational pathway in bridging three main mainstream educations; the mainstream school sector, the TVET stream and the higher education pathway from levels 1 – 10. It also recognizes non formal and short course trainings to enter from Cert 1 level as this might fit well with those in the workforce without qualifications but have vast loads of experiences. The framework is suitable for this EU PACTVET project simply due to the diverse targeted learning groups which can be as low as those with experiences background only or specific prior knowledge from non-formal training.

Currently, the University of the South Pacific, Fiji National University and University of Fiji are working with the FHEC to process their respective institutional registration, recognition and Accreditation which simply means that all course offered by the three universities are currently reviewed and reformed to meet the standards and guidelines established by the FHEC as they have been mandated to coordinate and act as an advisory body to the government of Fiji to monitor all education and TVET training providers.

Climate Change

The National Climate Change Policy document has provided a pathway for necessary stakeholders to work collectively with guided efforts in following an effective and integrated approach to addressing climate change issues in Fiji, and will support the achievement of relevant key performance indicators identified in Fiji's *Roadmap for democracy and sustainable socio-economic development 2009–2014.*

As a signatory to various international agreements and conventions such as UNFCCC, UNCCD, CBD, and the Kyoto Protocol, Fiji is obligated to develop appropriate national responses. It is also fitting that Fiji establishes national mechanisms that contribute to addressing issues identified in regional policies.

The goals of this climate change policy are:

- To support the implementation of Fiji's *Roadmap for democracy and sustainable socio-economic development 2009–2014* under the *People's charter for change, peace and progress;*
- To promote integration of climate change issues in national planning, budgeting and implementation processes;
- To provide guidance on government's responses to climate change issues;
- to guide sectors to develop appropriate climate change adaptation and mitigation strategies;
- To support requests to regional and international agencies to provide resources and assistance in addressing national climate change issues;
- To contribute to Pacific regional actions and to meeting international commitments.

Within its eight objectives, Education and Training is ranked fourth out of the eight Climate Change Objectives which states to:

Integrate climate change in school curricula, tertiary courses, and vocational, non-formal education and training programs.

Strategies involve**:**

- Review and update the current primary and secondary curricula, and the tertiary and vocational education courses to ensure inclusion of local, accurate and current climate change information, and to encourage student research around the issue of climate change.

  The Curriculum Development Unit to assess and review teaching materials on climate change regularly, given the dynamic nature of climate change science, research and international progress.

- Develop appropriate educational materials and learning tools on climate change for students with special needs in early intervention programs, in special and mainstream primary and secondary schools, and in tertiary institutions.
- Review and update non-formal education programs and training materials to incorporate climate change information where appropriate.
- Build capacity of provincial administrators, Roko Tui, advisory councilors, community leaders, village headmen, youth leaders, faith-based organizations and NGOs to deliver accurate information, integrate local content, and promote critical thinking about climate change.
- Ensure that education and training programs are designed to allow and encourage individuals to understand climate change, and to take action on mitigation and adaptation.
- Develop appropriate training tools on climate change for government officers involved in awareness and training programs in all government departments.
  (Source: National Climate Change Policy, 2012).

Energy

Fiji's energy situation is characterised primarily by a high reliance on imported fuels and thus a need to reduce this reliance is obligatory. Grid-based power supply has arguably the most potential to make Fiji's energy sector more efficient, cost effective, and environmentally sustainable. Over 50% of Fiji's electricity is already generated from hydropower, but there are still likely a number of medium size undeveloped hydro sites and significant unexplored geothermal, solar, and wind resources.

The first National Energy Policy and associated strategic action plan were developed in 2006 with support from the Pacific Island Energy Policy and Strategic Action Planning (PIEPSAP) project. This energy policy was endorsed by the Government in November 2006.

Summaries of the priority policies for each key area of Fiji's energy sector are provided below and were selected on the basis that they are readily achievable and have the most potential to achieve the objectives and targets for the energy sector.

Grid-based power supply:

- Promote private sector investment in electricity generation, including encouraging establishing a transparent process for IPP procurement, Power Purchase Agreement principles, and avoided cost benchmarks.
- Strengthen transparency and effectiveness of the regulation, including establishing a formal regulatory contract with Fiji Electricity Authority (FEA) and ensuring the technical and economic regulatory functions are carried out by institutions external to FEA.
- Develop a national electrification master plan, showing how each un-electrified area will be served with least cost solutions.

- Establish an electrification fund and an associated framework that will be used to provide capital subsidies for electrification projects that increase access for unserved communities

Renewable energy:

- Maintain a comprehensive assessment of Fiji's renewable energy resources, including hydro, wind, solar, and geothermal resources.
- Make all data on renewable energy resources available to the public and prospective investors through a single national repository.

Transport:

- Promote the fuel efficiency of imported motor vehicles, including continuing to enforce age limits for second hand vehicles and providing, as well as introducing labelling for fuel economy and tyre pressure.
- Support the development and implementation of a transport policy that encourages a shift towards more energy efficient forms of land transport, including enhancing public transport provision, the promotion of walking and cycling, and improving the layout of urban areas.

Petroleum and substitute fuels:

- Reduce the cost of imported petroleum products by negotiating directly with fuel suppliers and reviewing the pricing templates for petroleum products.
- Improve the transparency of petroleum supply, including collecting data on fuel quantity imports, re-exports, consumption, and pricing and making this data publicly available.

Energy efficiency:

- Increase public education and awareness of energy efficiency by providing information to households and businesses on the range of energy saving technologies and options available, including encouraging energy audits.
- Extend the current system of energy labelling and minimum energy efficiency standards to all widely imported electrical appliances and industrial equipment that contribute substantially to energy demand.
- Develop and implement an energy information database, so that demand side data is collected and analysed and a verifiable data trail is created upon which energy savings can be verified.

  (Source: A Green Growth Framework for Fiji, 2014).

TRAINING NEEDS & GAPS DATA MATRIX

The matrix below outlines the gaps and needs analysis for TVET programs for Fiji (Table 2).

Groups	Programs	In-Country Needs	Levels	Courses	Competency Skills	Providers to offer	MER	Career Level
1				CLIMATE CHANGE				
CC1	**Disaster Risk Management**	Data compilation with regards to risk assessments & its vulnerability to natural hazards. Designing a national evacuation plan for each natural hazard/ scenario.	levels 5 2 year program	Dip. in Disaster Risk Management	DRM scope (concepts, structures, DRR- community based), DRM processes (IMS, Risk analysis, Hazard mapping, vulnerability analysis, SOPs), DRM planning (contingency, disaster, recovery & business continuity, warning systems, activation review), Disaster Response Systems & Practices (IRS, National Response structures, Assessment planning & implementation, Resource mobilization), Disaster & Development (DRM, project planning, livelihood, resilience, Issues like gender, HIV etc.	University of Fiji	Year 12 and 13 completion, Cert 4 completion, 5 years work experience	tradesman & technician
CC2	**Integrated Farming Practices (Agriculture/ Aquaculture/ Mariculture/ Agroforestry, Food Security)**	Alternative sources of livelihood within communities explored to reduce pressure on the marine resources, More research needs in crop/animal breed that are more tolerant to salt & drought.	levels 3 1 year Program	Cert 3 in Integrated Farming	Feed Formulation and Production using local raw materials (can address feed formulation for pigs, chicken, fish)/Ratio and Proportion, Intercropping (Identify and Establish the types of crop mix), Urban Farming, Understanding of the Climate, Understanding the land Characteristics, Land Use Planning (Composting, biogas, bio-composting), Agro forestry, Aquaculture (Food Security) development, WASH.	Fiji National University, School of Agricultural Engineering	Year 12 and/or 13 in Sciences and Social Science, Cert 3 in Sciences, 5 years work experience, maturity and Prior knowledge.	tradesman & technician

CC3	**Biodiversity (terrestrial & marine)REDD+ (RDF and Mangrove Areas)**	Forest protection as a strategy to mitigate and adapt to Climate change and disaster risks was also suggested. This is mainly on forestry biodiversity conservation including afforestation and reforestation, Ecosystem-based management, Entrepreneurship, Which area of the forest is for water source?, How to "manage" forests, "Identification" of Endangered Species, Sustainable Harvesting-Sustainable consumption and production	levels 4 2 year Program	Diploma in Biodiversity Conservation	Carbon sinks - absorbs and stores carbons in trees to reduce concentrations in the atmosphere. Reforestation & afforestation programs within degraded systems and mangroves should be promoted within communities as a mitigation action, EIAs, develop national policies, protection of reserves for the conservation of rare and endangered species, protection of watersheds, ridge-to-reefs, Seawater desalination plants, protection of watersheds	University of The South Pacific, Faculty of Science, School of Biology & Chemistry	Year 12 and/or 13 in Sciences and Social Science, Cert 3 in Sciences, 5 years work experience, maturity and Prior knowledge.	technician & technologist
CC4	**Traditional Knowledge**	Socio-cultural and environmental adaptation	level 3 1 year Program	Cert 3 in Socio-Cultural & Environmental Practises	Indigenous knowledge systems, environmental protection, policies and regulations, indigenous protocols and approval, heritage sites cultural arts and design epistemologies, ABS policy.	University of The South Pacific, Oceania Centre	Year 12 and/or 13 in Sciences and Social Science, Cert 3 in Sciences, 5 years work experience, maturity and Prior knowledge.	tradesman & technician

Groups	Programs	In-Country Needs	Levels	Courses	Competency Skills	Providers to offer	MER	Career Level
2	**SUSTAINABLE ENERGY PROGRAMS**							
	Renewable Energy							
SE1	**Solar PV System (On-Off Grid)**	alternative power source for FEA, and heavy Electricity consumption companies, supply to cooperate offices, shops and public infrastructures, Stand - Alone Solar PV Home System, domestic use in urban and rural areas	level 5 2 year Program	Dip in RE: Solar PV (On-Off Grid)	Characteristics of sunlight, semi-conductors, solar cells, properties and design, modules characteristics, solar PV system materials, stand-alone PV and Grid connected and specific purpose PV application Fundamentals of Electricity & Solar, Electrical wiring-Residential & Commercial, Fundamentals of refrigeration, Comfort System- Residential & Commercial, Refrigeration systems & practice, trouble shooting & maintenance. wind characteristics and resources, aerodynamics of wind turbine, mechanics and dynamics, electrical systems of	Fiji National University, School of Electrical & Electronics.	Year 12 and/or 13 in Tech or Pure Sciences, Cert 4 in electrical & electronics, 5 years work experience in electrical & electronics field, Prior knowledge through non-formal training	tradesman and technician
SE1	**Solar Refrigeration**	meat and medical use storage in areas without power source	level 5 2 year Program	Dip in RE: Solar Refrigeration		Fiji National University, School of Mechanical Engineering, Department of Refrigeration & Air	Year 12 and/or 13 in Tech or Pure Sciences, Cert 4 in electrical & electronics, 5 years work experience in	tradesman and technician

					wind turbine, wind turbine materials and components, design sitting and testing, Wind energy systems economics, environmental aspects, Wind Software: Wind Atlas, Analysis and Application Program (WAsP) Biomass: Generation and utilization, plant derived, residues, aquatic and marine biomass, various wastes, Agriculture Crop & Forestry residues used as fuels , Properties of biomass, Classification of biomass and use of biomass as fuel, Types of Bio-fuels, Systems utilizing biomass – system optimization, Biochemical and Thermo-chemical Conversion of biomass, Biomass Gasification of Biomass gasifiers and Pyrolysis, Liquification	Conditioning	electrical & electronics field, Prior knowledge through non-formal training	
SE1	**Wind Turbine Plant**	power source for FEA, and heavy Electricity consumption companies and domestic use	level 5 2 year Program	Dip in RE: Wind Turbine Power		Fiji National University, School of Electrical & Electronics.		
SE1	**Hydro Plant (all sizes)**	power source for domestic use installed beside water sheds	level 5 2 year Program	Dip in RE: Hydro Power		Fiji National University, School of Electrical & Electronics.		
SE1	**Bio-mass and Bio gas**	Increase alternative fuel products for domestic use, transportation, manufacturing, commercial cooking.	level 5 2 year Program	Dip in RE: Bio Fuel		Fiji National University, School of Agricultural Engineering		
	Energy Efficiency							
SE2	**Refrigeration & Air Conditioning**	produce alternatives or less hazardous R&AC installations	level 5 2 year Program	Diploma in EE: Installation & Maintenance, Auditing & Regulations	Evolution of Energy management, Implementing Strategic Energy Efficiency Plans, Efficiency program failures & success, Selling & funding energy programs & projects, Procurement & energy built analysis, Energy Audit & Instrumentation, Electrical systems, Remodification of Refrigeration and AC systems and solutions, Energy Planning and Management, policy development, maintenance skills	Fiji National University, School of Electrical & Electronics.	Year 12 and/or 13 in Tech or Pure Sciences, Cert 4 in electrical & electronics, 5 years work experience in electrical & electronics field, Prior knowledge through non-formal training	tradesman and technician
SE2	**Energy Auditing and Applying Energy Efficiency Solutions**	monitor installations and maintenance						
SE2	**Energy Sector Planning & Management**	develop policies to monitor energy installations and stakeholders						
SE2	**Domestic and Office Appliance/ Home and Office Appliance**							

SE3	**Efficient Land Transport**	more research in hybrid units, water (oxygen-hydrogen separation)powered carts	level 4 1 year Program	Cert 4 in ST: Solar, Hybrid & Water	Hybrid & Solar Systems	Fiji National University, School of Automotive Engineering Road & Transport	Cert 3 & 4 in Automotive, Year 12 completion, 5 years work experience, Prior knowledge through non-formal training	tradesman and technician
SE4	**Efficient Infrastructure: Sea Transport (traditional canoe)**	inter-island cargo and dwellers transportation	level 3 1 year Program	Cert 3 in Sustainable Infrastructure	designing, procurement, management, construction, materials preservation and maintenance, sailing and navigation, documentation and education	Fiji National University, School of Building & Civil Engineering	Cert 3 & 4 in carpentry and joinery, ship building apprentice, Year 12 completion, 5 years work experience, Prior knowledge through non-formal training, traditional knowledge in crafting	tradesman and technician
SE4	**Efficient Infrastructure: Construction (traditional)**	traditional architecture and construction, materials processing, tourism construction industry,	level 4 1 year Program	Cert 4 and Dip in Sustainable Infrastructure	tropical architecture, traditional construction, cultural practises, carpentry and joinery, environmental management and adaptation and silviculture	Fiji National University, School of Building & Civil Engineering	Year 12 completion, Cert 3 carpentry and joinery, 5 years work experience, prior knowledge in indigenous practises or non-formal training	tradesman and technician
Groups	**Programs**	**In-Country Needs**	**Levels**	**Courses**	**Competency Skills**	**Providers to offer**	**MER**	**Career Level**
3	**PROJECT MANAGEMENT Program**							
PM1	**Project Concept Drafting** **Logical Framework Analysis** **Monitoring and Evaluation** **Report Writing** **Project Visibility**	equip project coordinators with research, administration, management, planning, documentation & presentation practises	level 4 1 year Program	Cert 4 in Project Management	Intro to PM (life cycle, org structure, translate needs to req. Selection & Planning (approaches, decision methods, evaluation technique, estimation n finances). Management & Leadership (special demands, selection of P Managers, Comms, organisation structure, characteristics of PManagers, styles and leadership, procedures) Planning & Estimation (work schedules, charts, budgeting, resource allocation) Risk & Quality (basics, methods of risk solutions, assessment, approach, simulation, roots)	University of Fiji, Fiji National University	Year 12 and/or 13 in Sciences and Social Science, Cert 3 in Sciences, 5 years work experience, maturity and Prior knowledge.	tradesman and technician

					Project Execution & Control (execution, controls, finance, cost & schedule)			

Table 2: A matrix on the gaps and needs analysis for TVET programs in Fiji

TRAINING NEEDS & GAPS ANALYSIS & DISCUSSION

Training Needs & Gaps

According to the matrix developed, all the probable courses envisioned to be developed and offered through this EU PACTVET project can be offered in Fiji through the three universities; USP, FNU and UniFiji. These tertiary providers currently have the potential and ability in term of qualified staff and suitable facilities to offer them as they are currently offering similar programs and thus would have the appropriate facilities and qualified staff and guided by a conducive educational framework that is relative to a diverse entry requirements. The targeted groups for these programs range from Yr 12/13 school leavers, tertiary students, workers with or without qualifications but have vast work experiences in the relevant trade and those that hold some sort of non-formal certificates from short course trainings.

Disaster Risk Management is one of the programs needed to be offered in Fiji based on the lack of necessary skills and knowledge in assessing our vulnerable systems to natural hazards. Many governing sectors related to this field do not have the systematic approaches and critical analytical skills to report and document realistic findings of different hazards/scenarios, as a result the course needs to incorporate skills in assessing vulnerable environments, gathering data from site which involves observational skills, gathering data skills, and analytical skills for multiple contexts and activities. Running the course needs to be placed at either USP-FSTE or UniFiji as they both have the capacity in place. We have two options for DRM programs, due to its extensive area of study, it can be offered both as a full time for 2 years or in Modules 1, 2 and 3 similar to train of trainers course which are mostly short and intense covered within a month or two, the reason is because the course requires more practical applications rather than theory. This means that DRM can be progressed in stages; stage 1 observation and documentation, stage 2 requires setting up management systems and stage 3 could involve policy planning and executing projects. The MER should vary at different stages, stage 1 can be as low as community reps without any qualifications but has knowledge and experiences about their community sites.

Integrated Farming is another needed program consolidated especially for sustainable livelihood systems. In Fiji, we have agriculture, agroforestry, mari-culture and aquaculture running separately on their own without being coordinated to be recognized as some of the solutions supporting sustainable livelihood alternatives. Establishing successfully in rural communities requires extensive knowledge in a wide scope of area simply because the exposure and the availability of these resources to them than to those in urban settings. This program should not only involve agricultural farming but agroforestry, mari-culture, aquaculture for alternative sources of livelihood within communities to reduce pressure on the marine resources, in addition, more research is needed in designing new crop/animal breed that are more tolerant to salt, drought & disease. This course covers a wide range of farming areas, which may need to be offered at FNU Koronivia campus starting from

Certificate 3 level and onwards. The targeted groups should include Year 11-13 students and those with vast experiences but do not have any qualification. The course is fit for tradesman and technicians.

Biodiversity (terrestrial & marine) REDD+ (RDF and Mangrove Areas) training is a great need to be developed in Fiji so that communities and relevant stakeholders are equipped with skills and knowledge in the protection of forests as a strategy to mitigate Climate change and disaster risks. Based on the consultative meeting, there is an aggravating training need on forest biodiversity and its conservation and the need for afforestation and reforestation programs, Ecosystem-based management, identification of Endangered Species & "hotspots", Sustainable Harvesting- Sustainable consumption and production, carbon sinks - absorbs and stores carbons in trees to reduce concentrations in the atmosphere. Reforestation & afforestation programs within degraded systems and mangroves to be part of this program promoted within communities as a mitigation action, EIAs, developing national policies, protection of reserves for the conservation of rare and endangered species, protection of watersheds, ridge-to-reefs system approaches, seawater desalination plants, protection of watersheds indigenous knowledge systems, environmental protection, policies and regulations. The program is proposed to be offered at Level 5 as Diploma in Biodiversity Conservation which are suitable for targeted groups in year 12 and 13 or pre-tertiary in Sciences, Cert 4 completion in science and those already in the field with less related qualifications but loads of experiences.

Traditional Environmental Practises is one of the lacking components with many climate change project teams that do not have sufficient knowledge and skills in indigenous knowledge systems that relates to environmental sustainable concepts that are practised in their communities that could be used for sustainable livelihood opportunities. Like other PIC's, Fiji has its own traditional environmental practises for land and marine conservation connected to the leadership and members of the community, this course will enable students to understand and be aware of traditional protocols, procedures in establishing networks with traditionally rooted communities and site access procedures. This course will equip students with systematic approaches when doing site assessments, collaborating with communities and most of all understanding traditional environmental practises. This course could be a stand-alone or incorporated into Biodiversity Conservation program as a subset. The course may be offered at Cert 3 level which could target Year 10-13, those in the related field of work and prepared for tradesman and technicians only.

Sustainable Energy trainings is evidently proven through the consultative workshop carried out in Fiji for this EU PACTVET project to be lacking immensely in many areas. With the high retail fuel and electricity prices, Fiji, under our National strategic planning documented needs to target for renewable energy solutions. The availability of local natural resources through advance research to meet the energy demands domestically and commercial needs within has proven to be a way forward and an alternative to the consumption of fossil fuels.

Based on the outcomes of the meeting and survey, only solar PV has been covered widely in the market, compared to other energy initiatives. Solar refrigeration has a great demand but lack of supply and expertise to provide training, wind turbine is another which lacks popularity due to unprecedented factors accounted from a previous project. Hydro power system has been spotted and trialled in a number of site in Kadavu and Vanua Levu but needs experts to conduct local training and installation. Biomass and Biogas fuel extracts have found itself on our top list due to recent findings through FNU educational research and Department of forestry's initiatives identifying a couple of fuel wood (i.e. namely Glyricidia & Acacia) that are grown locally which has high calorific content perfect for the task. The SE related courses involving photovoltaic lighting, solar refrigeration, wind turbine, hydro systems and Biomass/biogas can be combined into a Diploma in Renewable Energy program as one complete program rather than having them as separate exits and also due to overlapping of some units at the initial stages before covering the five trades in later stages where the course can be broken down into 4 semesters for 2 years or 5 trimesters as a Diploma in Renewable Energy course. In scoping the structures for these courses, it is likely that each trade could be covered within a semester or at least within 15 – 18 weeks which fits into both semester and trimester period.

The SE programs will target year 12 and 13 completion with strong Science background in pure science subjects or pre-tertiary at Foundation level. Entry can also be opened to those already in the field that do not meet the requirements but have at least 10 years of experience in this field. Levels of opportunities for work includes tradesman for assistance and technicians for installation and maintenance. The program can be offered at the Fiji National University due to the potential capacity and availability of similar course currently offered at the university in Electrical, Refrigeration, and Agricultural Department.

Energy Efficiency programs is also a needed area in Refrigeration and AC, energy auditing, energy sector planning and stand-alone systems needs to be clustered into one program at Diploma level (level 5) as Diploma in Energy Efficiency integrating Management & Maintenance, Auditing, Planning & Regulations. The target groups will be entry from Year 12 and/or 13 in Tech or Pure Sciences, Cert 4 in electrical & electronics, 5 years work experience in electrical & electronics field and prior knowledge through non-formal training. This course can also be offered FNU due to the availability of resources related to this program at the university. Career opportunities at this level can be of tradesman and technicians.

Sustainable Efficient Land Transport and Sea Transport will not be combined due to the nature of their trades, however, Sea Transport and Traditional construction have similar trades which can be grouped into one program called Sustainable Construction. The targeted entry for Sustainable Construction program sets out from Cert 3 because it involves a lot of carpentry, joinery and plumbing & sheet-metal maritime navigation, traditional design and crafting whereas the Land transport program will start of from Certificate 4 level

as these involves some background in automotive rewiring, solar systems and chemistry. Entry levels for Cert 3 includes year 10 and upwards, experienced tradesman in construction in ship-building (modern and traditional canoes) and building construction (modern and traditional) whereas year 12 and 13 for Cert 4 programs. Job opportunities can be of tradesman and technicians for both trade programs.

Project Management is another lacking field in Fiji that needs to be addressed through this EU PACTVET project to equip project coordinators or supervisors with the necessary techniques to facilitate research based or field work type projects successfully. Managing projects in Fiji has become an issue of concern with donors and recipients due to its poor facilitation and coordination. This has stirred a lot of emphasis in this project to revitalize the deliberation of Project Management course to be developed in order to train interested locals. As mentioned, this course is one of the vital programs identified through this project that will serve to offer trainings equipping project coordinators with research, administration, management, planning, documentation & presentation practises to carry baseline impact vulnerability assessments, analysis of data collection, Developing Action Plan, Skills in communication, how to develop Project Proposals in order to get Financial Funding and Rural/Community Enterprise Development. The Certificate 4 in Project Management will be a qualification designed to bridge the gap between professional Project Managers and fieldwork tradesman applying knowledge and advanced technical skills in his/her area of expertise and generate a range of solutions to the technical problems faced in the field, collaboration with partners, logistical planning, consultation approaches, supervisory responsibility of tradesmen and leadership roles in performance ranging from high level decision making to technical tasks, presentation skills, generating reports and communiqués as required in the industry. Students should be employable in technical areas where Project coordinators technologists and technicians where decision making is required at a middle management level. The graduate may have the technician's role in employment, become a supervisor/ middle manager or proceed to higher education studies to become a fully qualified professional Project Manager. With few years of field experience these graduates can play leadership roles as a team leader or a line supervisor. Moreover, students shall be able to contribute within a wide range of Management work such as schematic set out, feasibility development, cost control, programming and management.

Present & Future Demand Market

Based on on-going consultation during and after the consultative workshop with major stakeholders in Fiji, a list of workforce training needs and priority sectors for skill development are summarised in a table format below. The table is categorized into 3 skill sets which are knowledge-based, transferrable skills and personal skills required for streamlining and capturing Climate Change and Sustainable Energy competency skills for developing specialized training in the two areas. According to one of the major objectives of the workshop, participants were able to develop the necessary skills (Table 3).

Type of Skills	***Skills Description***		
	Sustainable Energy	*Climate Change Adaptation*	
Knowledge-based **Knowledge of specific subjects, procedures, and information necessary to perform particular tasks Such knowledge-based skills are acquired through education, training, and on-the-job experience**	**Renewable Energy Skills**		
	Engineering Mathematics skills	CC Adaptation assessment skills	Basic marine conservation skills
	Engineering Graphics skills	Disaster risk reduction (DRR) skills.	Sea-food processing and preservation skills
	Computer Programming skills	Crop resilience knowledge-based skills	Knowledge-based skills on fish species and breeding cycles.
	Occupational Health & Safety skills	Soil adaptability knowledge-skills.	Knowledge-based skills on sustainable fishing methods.
	Engineering Physics skills	Crop seasonal cycles knowledge-based skills	Budget and marketing skills
	Electrical & electronics Engineering skills	Crop/food preservation skills	Simple Bookkeeping skills
	Fluid Mechanics and Machinery skills	Pest/weed control skills	Water collection and preservation skills
	Biomass and thermal skills	Aqua-culture and agro-forestry knowledge-based skills	Rainwater harvesting skills
	Materials engineering skills	General food handling and hygiene skills	Water pumping and purification skills
	Solar Energy system skills	Feasibility study skills	Seedling nursing
	Wind Energy system skills	Protection of reserves for endangered species skills	Mari-culture skills
	Electrical machine drives and control skills	Protection of water sheds	Seawater desalination plants skills
	Engineering management skills	Ridge to reef skills	
	Energy conservation skills	Install and operate radio equipment skills	

	Installation and maintenance skills	Basic radio Morse code skill	
	wind characteristics and resources)	international radio pro-words and radio operators phonetic alphabets skills	
	aerodynamics of wind turbine skills		
	mechanics and dynamics skills		
	electrical systems of wind turbine skills		
	wind turbine materials and components skills		
	design sitting and testing, Program (WAsP) skills		
	Wind energy systems economics skills		
	Environmental aspects skills		
	Wind Software skills		
	Wind Atlas Analysis and Application skills		
	Generation and utilization skills		
	plant derived residues skills		
	Aquatic and marine biomass skills,		
	Agriculture Crop & Forestry residues skills		
	Classification of biomass and use of biomass skills		
	Types of Bio-fuels Systems utilizing biomass – system optimization skills		
	Biochemical and Thermo-chemical Conversion of biomass skills		
	Biomass Gasification of Biomass gasifiers and Pyrolysis, Liquification skills		
	Energy Efficiency Skills		
	Designing traditional canoe skills		
	Procurement skills		
	Management skills		
	Canoe construction skills		
	Materials preservation and maintenance skill		
	Sailing and navigation skills		
	Documentation and education skills		
	Marketing traditional design skills		
	Filming and Television skills		
	Tropical architecture skills		

	Traditional building construction		
	Cultural practises skills		
	Carpentry and joinery skill		
	Environmental management and adaptation skill		
	Silviculture		
	Energy Auditing skills		
	Remodification of Refrigeration and AC systems and solutions skills		
	Energy Planning and Management skills		
	Policy development skills		
	Maintenance skills		
Transferable/Functional Skills **These are actions taken to perform a task, transferable to different work functions and industries and the skills are based on ability and aptitude**	Organizing and Planning		
	Project Concept or Proposal writing skills.		
	Project Management skills		
	Communication Skills		
	Analyzing skills		
	Ethics & Governance skills		
	Public Speaking skills		
	Coaching & Mentoring skills		
Personal Traits/Attitude **Traits or personality characteristics that contribute to performing work. Such skills are developed in childhood and**	Interpersonal skills		
	Process minded skills		
	Succession Planning skills		
	Resource Sharing skills		
	Language awareness skills (in case		
	Patience Skill		
	Diplomatic Skills		
	Result-oriented skills		
	Independence skills		

through life experience	

Table 3: A list of workforce training needs and priority sectors for skill development in Fiji.

Training Supply: TVET Providers

Fiji has a total of 125 Secondary schools with 51 Secondary/Vocational schools with 9 Technical Vocational centres established to cater for Secondary levels registered with the Ministry of Education and 35 Tertiary training institutions registered with the Fiji Higher Education Commission. Within the 35 training providers, there are 3 universities established and providing extensive courses closely related to the training needs contemplated in this EU PACTVET project. Given below is a matrix providing relevant information on courses offered at the three universities (refer to Appendix 2).

Supply and Demand Market

Code	Subject Area	University of the South Pacific	Fiji National University	University of Fiji	Total
	CLIMATE CHANGE PROGRAMS				
CC1	Disaster Risk Management	×		×	2
CC2	Integrated Farming	×	×		2
CC3	Biodiversity, Mangrove and Water Security	×	×	×	3
CC4	Traditional Environmental Epistemologies	×	×		2
	SUSTAINABLE ENERGY PROGRAMS				
	Renewable Energy				
SE1	Solar PV System (On & Off Grid), Stand-Alone, Wind Turbine, Hydro Plant & Biomass/Biogas and Refrigeration	×	×	×	3

	Energy Efficiency				
SE2	Refrigeration & Air Con	×	×	×	3
SE2	Energy Auditing and Applying Energy Efficiency Solutions	×	×	×	3
SE2	Energy Sector Planning & Management	×	×	×	3
SE2	Domestic and Office Appliance/ Home and Office Appliance	×	×	×	3
SE3	Efficient Land Transport	×	×		2
SE4	Efficient traditional Sea Transport & Construction	×	×		2
	Project Management				
PM1	Project Concept Drafting	×			1
	Logical Framework Analysis	×			1
	Monitoring and Evaluation	×			1
	Report Writing	×			1
	Project Visibility	×			1

Table 4: Summary Matrix of Courses to be provided and potential tertiary providers in Fiji

Code	Subject Area	University of the South Pacific	Fiji National University	University of Fiji
A.	**Training facilities and Course designing**			
	Relevant and up-to-date practical equipment	x	x	
	SE/RE/CCA course designing and mainstreaming.	x	x	
	Facilitate support to TVETs for Training Facilities		x	
	Strategies pathways from TVET to HE		x	

	Development and upgrading of informal skills	x	x	
	Promotion of Low carbon growth	x	x	
B.	**Qualification**			
	TVET Teaching Qualification		x	
	Qualified Teacher Retention Strategy		x	
	Incentivized to retain more local staff to enhance learning	x		
	Local capacity to designing micro-hydropower	x	x	
	Feasibility study skills	x	x	
	Electrical wiring skills	x	x	
	Air conditioning and Refrigeration maintenance skills		x	
	Motor re-winding skills		x	
	Solar PV system sizing skills	x	x	
	Solar PV systems O&M skills	x	x	
	Energy Auditing skills	x	x	
	Training of Trainers on CCA	x		
C.	**Work Readiness/ Networking**			
	Difficulty in putting theory into practice			
	Lack of confidence at workplace			
	Supervision required	x	x	
	Need to communicate in English at work place	x	x	
	Low self-esteem		x	
	Innovative skills	x	x	
	Communication skills	x	x	
	Alignment of relevant Policies on CCA	x		
	Awareness in dramas, videos, news articles	x	x	

	Sharing of lessons learnt	x	x	
	Traditional records of natural disasters	x		
	Policy Awareness	x	x	x
	Technical Working Groups	x		
	Establishment of Information System	x	x	x
D.	**Resources Utilization**			
	Under-load staff cannot be utilized due to limited teaching breadth	x	x	x
	No equitable staffing allocation	x	x	x
	Less in-house mentoring			
	Minimal awareness and less sense of the values underpinning TVET, resulting in less productivity and no professionalism at work		x	
	Lack of innovative ideas to venture into establishment of industrial or business partnership		x	
	Lack of or less innovative ideas in creating income generating activities for the colleges		x	
E.	**Management/Financial and Administrative**			
	PALS – Compliances (Energy Division and Customs) to reinforce the regulations	x	x	
	College Management Plan, If there is one then there is no strict adherence to it.	x	x	
	Training and education be coordinated and incentivized to ensure support for relevant training	x		
	Improved Information flow through networking	x		
	Migration of qualified Instructors to other towns in search for better paid job		x	

	Performance Development - Quarterly reporting of staff and institution operation	x	x	x
	System Performance – ensuring resources are deployed to their best uses in the technical institution	x	x	x

Table 5: A summary of supply & demand within the three Tertiary Providers in Fiji

CONCLUSION & RECOMMENDATION

Based on the consultative meetings analysis and training needs and gaps analysis captured for Fiji, there are a some suggestions that are highlighted below that would provide insights for further deliberation and decision making.

There are needs and gaps identified in the industry and the market to be strengthen through developing appropriate trainings in certain areas:

Sustainable Energy

- Solar PV
- Refrigeration
- Wind turbine
- Hydro systems
- Biomass biogas
- Sea Transport
- Traditional Construction

Climate Change

- Disaster Risk Management
- Integrated farming
- Biodiversity conservation
- Project management

The Fiji Higher Education Commission governs all educational qualification frameworks which involves all programs offered in any local tertiary provider. It is understood that the three universities identified in this report have recently been registered under their amended promulgation act. This qualifies these universities to be able to offer the programs that are currently being proposed in this project.

The Fiji Qualification Framework through the Fiji Higher Education Commission is recognized regionally and internationally and also aligns itself with the Pacific Regional framework by the SPBEA-EQAP. The industry advisory committees also play a vital role in consulting with the alignment of programs in order to meet the needs of the market force.

It is recommended that the climate change programs such as disaster risk management, integrated farming and Project Management to be offered mainly at USP-FSTE and University of Fiji whereas the Sustainable Energy courses could be well accommodated for at the Fiji National University, largely due to the existing programs offered, facilities available and the qualified teaching staff available with these respective institutes. Programs proposed to be offered through this project is mainly circulated around Certificate 3 – 5

levels which targets Minimum entry requirements at Year 11-13, Cert 3 completion, experienced tradesman and technicians with or without qualifications.

REFERENCES

Evenhuis, N. and Bickel, D. J. 2005. The NSF- Fiji Terrestrial Arthropod Survey: Overview. *Bishop Museum Occasional Papers,* **82**: 3- 25.

Fiji Forestry Department, 2011. Fiji REDD- Plus Policy: Reducing emissions from deforestation and forest degradation in Fiji. Suva, Fiji.

Global Sustainable Energy Solutions, 2015. Training Needs Gaps Analysis on Sustainable Energy in Pacific Countries, Current Training Report June 2015, Global Sustainable Energy Solutions Pty. Ltd., NWS, Australia.

Government of the Republic of Fiji, 2012. Republic of Fiji National Climate Change Policy. SPC, Suva, Fiji.

Hall, R. 2002. Cenozoic geological and plate tectonic evolution of SE Asia and the SW Pacific: computer- based reconstructions, model and animations. *Journal of Asian Earth Sciences*, **20**: 353- 431.

Ministry of Strategic Planning, National Development and Statistics. 2014. A Green Growth Framework for Fiji. Republic of Fiji.

Parham, J. W. 1972. Plants of the Fiji Islands. Government Press, Suva.

Rodda, P. 1994. Geology of Fiji. *South Pacific Applied Geo- science Commission (SOPAC) Technical Bulletin,* **8:** 131–151.

Sarnat, E. and Moreau, C. S. 2011. Biogeography and morphological evolution in a Pacific island ant radiation. *Molecular Ecology*, **20**: 114- 130.

Whelan, P. M., Gill, J. B., Kollman, E., Duncan, R. A. and Drake, R. E. 1985. Radiometric dating of magmatic stages in Fiji. Geology and offshore resources of the Pacific island arcs – Tonga region. **In**: D.W. Scholl and T. L. Vallier (eds.), pp. 415–440. Circum-Pacific Council for Energy and Mineral Resources Earth Science Series, Vol. 2. Circum-Pacific Council Energy and Mineral Resources, Houston, TX.

Websites:

Fiji Higher Education Commission Website: www.fhec.org.fj accessed on the 22nd September, 2015.

Fiji National University Website: www.fnu.ac.fj accessed on the 24th September, 2015.

Ministry of Fisheries & Forest Website: www.mff.gov.fj accessed on the 22nd September, 2015.

Fiji Department of Energy Website: www.fdoe.gov.fj accessed on the 16th September, 2015.

SPREP Website: www.sprep.org accessed on the 16th September, 2015.

PACE-SD, USP Website: www.pace.usp.fj accessed on the 23rd September, 2015.

FSTE- USP Website: www.usp.ac.fj accessed on the 16th September, 2015.

Ministry of Foreign Affairs, Climate Change Unit Website: www.foreignaffairs.gov.fj accessed on the 16th September, 2015.

University of Fiji Website: www.unifiji.ac.fj accessed on the 23rd September, 2015.

Department of Environment Website: www.environment.gov.fj accessed on the 24th September, 2015.

Secretariat of Pacific Community Website: www.spc.int accessed on the 24th September, 2015

USP Website: http://www.usp.ac.fj/index.php?id=10948 accessed on the 16th September, 2015.

Ministry of Education Website: www.education.gov.fj accessed on the 28th September, 2015.

http://www.fhec.org.fj/images/advportfolio/Docs/procedures/fijiqualificationframework.pdf

APPENDIX

Appendix 1

	DAY 1: Wednesday, 1st July, 2015	
Time	Activities	Facilitator
9:00 am	Registration	Ashmita Devi
	Workshop Opening - Invitation sent to Minister for Education and EU Ambassador	
9:45 am	Welcome and Introduction to Workshop ❖ Outline EU-PACTVET Project ➢ Outline Rationale ➢ Objectives/Purpose ➢ Country Expectation	Dr. Sarah Hemstock PacTVET Project Team Leader
10:15 am	***Morning Tea Break***	
Time	Activities	
	Gauging Linkages to Sustainable Energy and Climate Change Adaptation	
10:45 am	**Stakeholders Presentations (5 – 7 minutes each)** *Ministry of Education - TVET Education in Fiji* *Ministry of Foreign Affairs – Climate Change Unit* *Fiji Department of Energy* *Fiji National Disaster Management Office* *Ministry of Agriculture* *Ministry of Fisheries and Forests* *Ministry of Local Government, Housing, Environment, Infrastructure and Planning* *Ministry of Youth* *APTC*	
12:15 pm	***Lunch Break***	
1:00 pm	**Continue Stakeholders Presentation** *USP Pacific TAFE* *SPC Energy Programme* *SPC Disaster Reduction Programme* *SPC USAID Enhanced CC Resilience of Food Production Systems Project* *USP PACE-SD EU Global Climate Change Alliance Project* *SPC EU GCCA Project* *USP School of Education (TVET)* *USP Renewable Energy Programme* *USP Edulink LEAP Programme*	
2:00 pm	"Aspects of each Sector relating to Sustainable Energy and Climate Change – Linkages outlined" Group Work Discussions	Nixon Kua – PacTVET PMU
2.30pm	Group Presentations and Discussion	
	Wrap – up of Day 1	
3.45pm	***Afternoon Tea***	
	DAY 2: Thursday, 2nd July, 2015	
Time	Activities	Facilitator
9:00 am	Welcome, Recap of Day 1	

9:45 am	*Presentations from Fiji National University:* • *Solar Refrigeration* • *Solar Electrical* • *Pico Hydro* • *Electrical Wiring* • *Mechanical* •	
10:15 am	***Morning Tea Break***	
Time	Activities	
10:45 am	*Presentations from Fiji National University continue:* • *Agricultural waste for cooking Gas* • *low cost compact solar energy lighting solutions* • *Coastal engineering* • *Regional town and country planning* • *Flattener rotor based model ship building wind energy propulsion system* • *Sustainable sea transport* *Fiji Higher Education Commission* *SPC Educational Quality and Assessment Programme (EQAP)* *GIZ Coping with Climate Change in the Pacific Island Region Programme (CCCPIR)*	
12:15 pm	***Lunch Break***	
1:00 pm	*Pacific Power Association* *Fiji Electricity Authority* *IUCN Oceania – Energy Programme* *Fiji Red Cross* *Live and Learn* *WASH Programme* *Monfort Boys Town* *Conservation International – Fiji Office* *Fiji Meteorological Services* *Water Authority of Fiji* *Suva City Council*	
3.30pm	Wrap-up of Day 2	
3.45pm	***Afternoon Tea Break***	

3rd July, 2015	**DAY 3: Friday, 3rd July, 2015**	
Time	Activities	
	Training Needs and Gap Analysis	
9:00 am	Presentation: (Training/Technical) Needs and Gaps Analysis – Basic Outline	
9:20 am	Discussion	
9:45 am	Plenary Session: *Creating National and Regional capacity and technical expertise to respond to CCA and SE challenges*	
10:45 am	Morning Tea Break	
11:00 am	Group Work: National training needs in SE and CCA. Group Work 1. Sustainable Energy: (RE/Electrical wiring/Energy Efficiency; Refrigeration and Air-conditioning and Sustainable Sea Transportation 2. Climate Change Adaptation: Food Security (Agriculture and Fisheries); Disaster Risk Reduction; Vulnerability and adaptation assessment;	

	Water security and Forestry **<u>Participants are divided into 3 Groups</u>:** Tasks: **<u>Group 1 Discussion Topic</u>**: "Gauge out the technical skills required/demanded by the industries in the Solomon Islands, present and future. Rank them in order , from HIGH DEMAND to LOW DEMAND **<u>Group 2 Discussion Topic</u>**: "Identify technical Institutions in the country (formal and non-formal) that provide formal and informal technical skills in SE and CCA. List down the following: i. Courses, ii. Durations, iii. Award/accreditation iv. Equivalent course and accreditation in the region and internationally; and v. Potential industry(ies) that needs such skills **<u>Group 3: Discussion Topic</u>**: "Gauge out the technical skill and knowledge required for communities (both rural/ remote and urban) to be better equipped to adapt to the adverse effects of Climate Change"	
12:30pm	***Lunch Break***	
1:30 pm	Matching the industries Demand to the Technical Skills Training Courses Supply Group 1 Group 3 Group 2 Group 2 to split up between Group 1 and Group 3 and do the Demand and Supply matching	
2.30pm	Group Reporting i. Group 1 ii. Group 2 iii. Group 3 Matching Demand to Supply Reporting – SPC	
3:30 pm	Wrap-up of 3-day Workshop (Summary of Main Outcomes)	
3:45 pm	***END of Workshop***	
	Afternoon Refreshments	

Training Providers

Table TP1 provides information on Fiji-based training institutes identified in the desktop study. At the time of writing, only FNU has responded to the survey and their response is shown in Table TP2.

Table TP1: Fiji Training Institutes

Institute	Contact	Position	E-mail	Phone
University of South Pacific	Dr. Atul Raturi	Head of Engineering and Physics	Atul Raturi atul.raturi@usp.ac.fj	(679) 3232430
Pacific Technical and Further Education - University of the South Pacific	Mr. Hasmuklal	Director	lal_ha@usp.ac.fj	(679) 3231222
Fiji National University	Mr. Marfaga Solomone	Manager, EEEITD	meeeitd@fnu.ac.fj	(679) 3392000
Technical Training Division - Fiji National University	Mr. Peni Taoi	Deputy Director	peni.taoi@fnu.ac.fj; ddtt@fnu.ac.fj	(679) 3392000 Ext 4505/ (679) 9990748
National Training Center and Productivity Center (part of FNU)	Mr.Kamlesh Prakash	Director	DNTPC@fnu.ac.fj	Phone +679 3311004, ext. 4005 Mobile: +679 999 3080
Division of Business and Information Technology	Mr.Sachin Deo	Deputy Director	ddbit@fnu.ac.fj	(679) 3311004 Ext:4006 999 0763
APTC Fiji East campus			enquiries@aptc.edu.au	+679 334 3958 Fax: +679 334 3971
APTC Fiji West campus			enquiries@aptc.edu.au	+679 672 7342 Fax: +679 672 7345

Table TP2: FNU Capabilities

Does the TVET have any department that could conduct any of the following types of courses	Yes or No?	If Yes, please state which department	Contact Person	Contact E-mail	Contact Phone
Renewable Energy Technologies?	No				
Grid Connect PV Systems?	Yes	DEL	MARFAQA	MEEEITD@fnu.ac.fj	3392000 ext: 4998
Off Grid PV Systems?	Yes	DEL	MARFAQA	MEEEITD@fnu.ac.fj	3392000 ext: 4999

Solar Hot water?	Yes	DEL	MARFAQA	MEEEITD@fnu.ac.fj	3392000 ext: 5000
Wind Power Systems?	No				
Hydropower?	Yes	DEL	MARFAQA	MEEEITD@fnu.ac.fj	3392000 ext: 4998
Micro-Hydro Power?	Yes	DEL	MARFAQA	MEEEITD@fnu.ac.fj	3392000 ext: 4999
Biomass?	No				
Biogas?	No				
Geothermal	No				
Others technologies?	Yes	DEL	MARFAQA	MEEEITD@fnu.ac.fj	3392000 ext: 4998
Energy Efficiency?	Yes	DEL	MARFAQA	MEEEITD@fnu.ac.fj	3392000 ext: 4999
refrigeration?	Yes	RAC	SULIASI RAVUNIKAU	suliasi.ravunikau@fnu.ac.fj	3392000 ext: 4710
air-conditioning?	Yes	RAC	SULIASI RAVUNIKAU	suliasi.ravunikau@fnu.ac.fj	3392000 ext: 4710
Electrical wiring?	Yes	DEL	MARFAQA	MEEEITD@fnu.ac.fj	3392000
efficient land and water transport systems?	No				
Energy sector planning and management?	No				

In the last 5 years, FNU has conducted courses in the following areas:

- Renewable energy technologies (e.g. solar PV, solar water heaters, biogas, wind power and micro-hydropower
- Energy efficiency (e.g. refrigeration and air-conditioning maintenance, motor mechanic, electrical wiring and rewiring of electric motors, efficient land and water transport systems)

FNU has an ongoing electrical course, which includes using tools to repair actual equipment and wiring practice for single and three phase systems. From previous contact with FNU, GSES is aware that they have conducted some solar courses but they did not provide any further details. The course they conduct is approved by the University Senate and is classed as a Level 3 course.

During the VOCTEC project, seven trainers from USP and FNU were trained to conduct off-grid solar training courses and, of this 7, 5 have conducted training. Table TP3 details of these trainers; when they were trained and which of them has conducted training courses.

Table TP3: Trainers trained under VOCTEC project

Institution	Name of Trainer	Contact Number	Email	Course Type	Date Trained	Trainings Delivered
University of South Pacific	Radesh Lal	+ 679 927-8640	radesh.lal@usp.ac.fj	Small Off Grid PV systems	Jan-13	1
University of South Pacific	Viti Buadromo	+ 679 923-8254	buadromo_v@usp.ac.fj	Small Off Grid PV systems	Jan-13	1
University of South Pacific	Joape Cawanibuka	+ 679 979-7357	cawanibuka_j@usp.ac.fj	Small Off Grid PV systems	Jan-13	1
University of South Pacific	Binal Raj	<+6798386886>	binal.raj@usp.ac.fj	Small Off Grid PV systems	Jan-13	1
Fiji National University	Jone Filipe	+679 722-5289	jone.filipe@fnu.ac.fj	Small Off Grid PV systems	Jan-13	1

Fiji National University	Sautoki Buka	+ 679 718-2500	setoki.buka@fnu.ac.fj	Small Off Grid PV systems	Jan-13	0
Fiji National University	Praveen Rajan	9936466	praveen.rajan@fnu.ac.fj	Small Off Grid PV systems	Jan-13	0

From the experience of the project team and from survey responses, 14 courses were identified as having been conducted in Fiji in the last 5 years. Information on these courses is contained in Appendix 4.

In Summary these included;

- Design and Install Grid connect PV Systems
- Overview of Grid Connect PV Systems
- VOCTEC Train the Trainer Course 1
- VOCTEC Train the Trainer Course 2
- VOCTEC Technician Course 1 USP
- VOCTEC Technician Course 2 USP
- VOCTEC Technician Course 1 FNU
- VOCTEC Technician Course 2 FNU
- VOCTEC Wind Policy Workshop
- VOCTEC Micro Hydro Policy Workshop
- Household energy survey training for surveyors and power utility staff- Part of 3 year program 2012-2015 The Pacific Appliance Labelling and Standards Program (PALS)
- Light Vehicle Mechanical Technology
- Technicians course at FNU
- Grid-Connected Photovoltaic Workshop

The grid connect PV course was conducted by GSES, a company which is a Registered Training Organisation in Australia. Those who passed are eligible to apply for industry certification under the Pacific Power Association (PPA) and Sustainable Energy Association of Pacific Islands (SEIAPI) certification and accreditation program.

The VOCTEC course was intended to provide capacity building in these areas.

Pacific Community
Communauté du Pacifique

EUROPEAN UNION

USP
THE UNIVERSITY OF THE SOUTH PACIFIC

EU PacTVET

European Union Pacific Technical and Vocational Education and Training on Sustainable Energy and Climate Change Adaptation Project

Federated States of Micronesia Training Needs and Gap Analysis

Conducted and Compiled by: Sarah Hemstock

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Acknowledgment

Organising a successful stakeholders consultation in a country is a complex exercise and requires an excellent knowledge of the country, in particular the 'who does what', and a broad communication and exchange network with the stakeholders. I was very fortunate to have the support of the USP EU-GCCA In-Country Coordinator in the Federated States of Micronesia, Betty Sigrah, who arranged the logistics for this workshop and contacted the main stakeholders beforehand. The success of this workshop is the result of her work. I must also thank the Micronesia Conservation Trust and Willy Kostka for their unfailing support and expertise during the execution of this exercise. Thanks also go to Pasha Curruthers and Rupeni Mario (Secretariat of the Pacific Community) for their guidance and support.

However, the key to the success of this consultation was really down to the involvement and the enthusiasm of the participants. Once again, I was very fortunate with the level of engagement of the different participants and their interest for the project. The atmosphere of cooperation between the different stakeholders was reassuring and an essential element in the identification of training needs and the best way to address them in the country. I would thus acknowledge the participants of the consultation workshop and give them many thanks for their hard work and support.

1. Background

The 10th European Development Fund European Union Pacific Technical and Vocational Education and Training on Sustainable Energy and Climate Change Adaptation (European Union PacTVET) project is component three within the broader regional Adapting to Climate Change and Sustainable Energy (ACSE) programme.

The project builds on the recognition that energy security and climate change are major issues that are currently hindering the social, environmental and economic development of Pacific - African Caribbean and Pacific (P-ACP) countries.

1.1 EU PacTVET Objectives

The general objective of this project is to enhance sustainable livelihoods in P-ACPs. Sustainable livelihoods are a high priority for Pacific Island communities and governments alike. They are central to current development policy including resource management and conservation but also in emerging policy to meet threats such as climate change. The project aims to enhance Pacific regional and national capacity and technical expertise to respond to climate change adaptation (CCA) and sustainable energy (SE) challenges.

The project is being implemented by the Secretariat of the Pacific Community (SPC) in partnership with the University of the South Pacific (USP) over a period of 53 months from August 2014 with an overall budget of EUR 6.1 million. It will achieve the following results:

1. Assess national training needs in SE and CCA and existing informal and formal TVET training courses and training and education providers are identified and strengthened
2. Develop and implement benchmarks, competency standards and courses on Training of Trainers (ToT) and create a pool of national trainers
3. Develop and establish training courses and support facilities within TVET institutions
4. Strengthen networking in SE and CCA

The project is being implemented in a sequential approach. Result 1 activities will provide a more detailed/clearer understanding of countries' needs and their requirements from the project. The activities under Results 2 and 3 will be then be tailored to the country needs. This report feeds into result area 1.

1.2 Location

The EU PacTVET project will be implemented in the Pacific region comprising of 15 Pacific ACP countries: Cook Islands, Federated States of Micronesia (FSM), Fiji, Kiribati, Nauru, Niue, Palau, Papua New Guinea, Republic of Marshall Islands (RMI), Samoa, Solomon Islands, Timor-Leste, Tonga, Tuvalu and Vanuatu.

Climate change is affecting the livelihoods of the P-ACP communities causing varying degrees of adversity depending on location.

1.3 Context

References:
www.fsmgov.org; www.lse.ac.uk/GranthamInstitute/legislation/countries/micronesia; www.justiceandenvironment.org; FSM Energy Policy 2010, Volume 1; Federated States of Micronesia; Education Sector FSM NATIONAL JEMCO 21 EDUCATION INDICATORS REPORT July 2013; FSM Strategic Development Plan – 2004-2023.

Current total global greenhouse gas (GHG) emissions stand at 42.6 gigatonnes of CO2 (GgtCO2). Of this global GHG emission, Pacific Island countries emit less than 0.03% yet they are amongst the most vulnerable to adverse effects of climate change - the first to be exposed and the least able to respond. Hence there is a moral obligation for the island countries to improve implementation measures to not only mitigate GHG but also adapt to climate imposed environmental change, and prepare for future adaptation measures. Down to the national level, FSM's annual GHG emission is insignificant on a global scale. FSM has already started several programs to help local communities adapt to climate imposed environmental change (i.e. the UGCCA, SPREP, SPC, PIFS, MCT and TNC supported climate adaptation programs.

In spite of efforts to reduce Pacific-African Caribbean and Pacific (P-ACP) countries reliance on fossil fuels and improve energy security almost all Pacific Island countries remain highly dependent on imported petroleum products for energy generation and transportation, which are the two major petroleum consumption sectors in the region.

With the Pacific Island countries facing challenges posed by climate change and energy security, sustainable energy and climate change adaptation are undeniably ranked above all other sectors in regional priorities, as evident through regionally endorsed frameworks, such as the wider Pacific Plan and the Framework for Pacific Regionalism and the more specific Pacific Islands Framework Action on Climate Change (PIFACC) and the Framework Action on Energy Security in the Pacific (FAESP) and individual national policies.

Efforts in addressing energy security and climate change adaptation challenges are ongoing through various regional and national projects. On climate change mitigation, there are some familiar projects such as the Pacific Islands Greenhouse Gas Abatement through Renewable Energy Project (PIGGAREP) that addresses mitigation and Pacific Adaptation to Climate Change (PACC) that focused on climate change adaptation. The PIGGAREP was focussing on complementing PICs initiatives in promoting the widespread use of renewable energy in the regions and PACC focuses on three thematic areas, namely, "Food security"; "Water Security" and "Coastal Management" - assisting communities to implement activities that help them in these three areas. Sustainability of such projects is very important. Now that these projects are coming to their end, it is important that knowledge and skills being acquired and/or hardware that were put in place continue to function and be beneficial to the targeted beneficiaries. Not only on the renewable energy side, but on overall energy services, where there needs to be awareness and improvements to energy

efficiency and conservation and what measures needs to be taken to use energy in a sustainable manner as compared to energy misuse and wastage.

FSM is divided into 4 states and has a population of around 102,000 – 107,000 people. 22.4% of the population are classified as "urban", with less than 75 of FSM's 607 islands currently inhabited. The large rural population are at least 60% dependent on local biomass for domestic energy provision. The State of Chuuk accounts for roughly half the total population - 53,500 people, with a population density of 1,088 people per square mile. Pohnpei is next - 34,500, with a population density of 255. Yap has about 11,200 people with a population density of 243, and Kosrae has a population of around 7,700, with a population density of 170. The population of FSM is one of the youngest in the region, with just over half of people (53%) aged less than 24. There is a high youth dependency ratio (more than 55%), indicating that investment in education and/or institutionalized trainings that lead to formal certification is a must for FSM.

The latest labour force estimate was completed in 2010 and showed 37,920 (35%) of the population were available for work. Almost 70% of those employed are by the government, with 24% in other services (including NGOs), 0.9% in agriculture and 5.2% in industry. Government jobs are essentially funded by the United States of America (USA) which provides 58% of funding for government jobs under a Compact of Free Association. According to the FSM Strategic Development Plan (2004-2023) and based on the national census of 2000, "Eighty percent of the males and 86 percent of the females engaged in subsistence agriculture had either no formal education or had not completed high school. This stark reality highlights the dualistic nature of FSM society—the educated participate in the cash economy; the rest are increasingly marginalized to subsistence agriculture."

The Compact Agreement impacts all sectors of the economy and government, including education. The current Compact Amendment will deliver USD2.1 billion to FSM from 2003-2023. Private sector employment in FSM is low and tourism is not well developed, with less than 25,000 tourists annually. GDP is around USD3,000 per year, with agriculture contributing 26%, industry 19% and services 55%. An estimated 27% of the population lives below the poverty line. 28% of people use the internet and 30% have mobile phones. 34% of schools are located in remote areas where the only means of communication is via VHF radio

It can therefore be implied that for the majority of the population, economic activity consists largely of subsistence farming and fishing. There is also a distinct dichotomy of cash and traditional economies which has been acknowledged in the FSM National Sustainable Development Plan. Knowledge and skills on agricultural and fisheries best practices and other innovative approaches in addressing food security, water security and measures to reduce vulnerability to disaster needs to be well established in rural and urban communities alike. Such knowledge and skills can only be acquired through strategic and systematic

approaches such as capacity building which target the rural majority of the pacific island countries. Such capacity building needs to be targeted at levels and strategic training providers within the countries that would have real impact. Moving away from project-based ad-hoc informal training and towards institutionalized training on skills sets which can build into qualifications that are embedded in national education providers and qualifications is one way of doing this. The EU PacTVET project will be exploring this and other options.

Offshore resources are large (EEZ = 2.6 million km2) but over-fished and collapse of coastal fish populations, most especially important food fish, has been predicted to be within the next decade if over-fishing continues at its current rate (Micronesian Conservation Trust). Terrestrial resources are also limited, with a total land area of 701km2, cultivated land accounts for around 25% of total land area.

The purpose of the in-country-mission is to:

- Identify present and future market demand in FSM;
- Map existing training supply in FSM;
- List priorities for future project activities – including selection of partner TVET institutions.

2. Schedule of Consultation Events

Date	Scheduled activities
Thursday, 21st May	**DAY 1: Workshop Starts**
Time	Activities
9:00 am	Registration
	Workshop Opening
9:45 am	Welcome and Introduction to Workshop ❖ Outline EU-PACTVET Project ➢ Outline Rationale ➢ Objectives/Purpose ➢ Country Expectation
10:15 am	Morning Tea Break
Time	Activities
	Gauging Linkages to SE and CCA
10:45 am	Stakeholders Presentations (5 – 7 minutes)
11:45 am	Discussion – "Aspects of each Sector relating to Sustainable Energy and Climate Change – Linkages outlined"
12:15 pm	Lunch Break
1:00 pm	Continue Stakeholders Presentation
2:00 pm	Discussion - "Aspects of each Sector relating to Sustainable Energy and Climate Change – Linkages outlined"
2:30 pm	
3:30 pm	Discussion – "Aspects of each Sector relating to Sustainable Energy and Climate Change – Linkages outlined"
Time	Activities
4:00 pm	Afternoon Tea Break
4:15 pm	Recap on Day 1
4:45 pm	End of Day 1

Friday, 22nd May	DAY 2
Time	Activities
	Training Needs and Gap Analysis
9:00 am	Presentation: (Training/Technical) Needs and Gaps Analysis – Basic Outline
9:20 am	Discussion
9:45 am	Plenary Session: *Creating National and Regional capacity and technical expertise to respond to CCA and SE challenges*
10:45 am	Morning Tea Break
11:00 am	Group Work: National training needs in SE and CCA.
12:30 noon	Lunch Break
1:30 pm	
1:45 pm	Group Work 1. Sustainable Energy: (RE/Electrical wiring/Energy Efficiency; Refrigeration and Air-conditioning and Sustainable Sea Transportation 2. Climate Change Adaptation: Food Security (Agriculture and Fisheries); Disaster Risk Reduction; Vulnerability and adaptation assessment; Water security and Forestry **Participants are divided into 3 Groups:**
	Tasks: **Group 1 Discussion Topic**: "Gauge out the technical skills required/demanded by the industries in FSM, present and future. Rank them in order , from HIGH DEMAND to LOW DEMAND **Group 2 Discussion Topic**: "Identify technical Institutions in the country (formal and non-formal) that provide formal and informal technical skills in SE and CCA. List down the following: i. Courses, ii. Durations, iii. Award/accreditation iv. Equivalent course and accreditation in the region and internationally; and v. Potential industry(ies) that needs such skills **Group 3: Discussion Topic**: "Gauge out the technical skill and knowledge required for communities (both rural/ remote and urban) to be better equipped to adapt to the adverse effects of Climate Change"
3:30 pm	Afternoon Tea Break

3:45 pm	Matching the industries Demand to the Technical Skills Training Courses Supply Group 1 Group 3  Group 2 Group 2 to split up between Group 1 and Group 3 and do the Demand and Supply matching
4:15 pm	Group Reporting i. Group 1 ii. Group 2 iii. Group 3 Matching Demand to Supply Reporting – SPC
5: 00 pm	END of Workshop

STAKEHOLDER PRESENTATIONS GUIDE

Sector/ Organization	Mission	Goals/ Objectives relevant to Sustainable Energy (SE) & Climate Change Adaptation	SE/ CCA Training Needs & Organizational Capacity – What trainings do you think would benefit your organization's employees?	SE/ CCA Training Opportunities –any training that your organization is offering. (please indicate if secured or potential and through what approach or resources)	Are SE/ CCA training opportunities sufficient to address/ resolve training needs? Please explain.	In the future, what skills and training do you think your organizations will need to compete effectively? Do you have any predictions for market development?

2.1. Project Outline and Presentation

After the opening, an outline of the EU-PACTVET was made, with emphasis on the following aspects of the project:

a. Rationale - current scenario with regard to sustainable energy (SE) and climate change adaptation (CCA) in the P-ACPs and the issues. At a national level there is dependency on fossil fuel for power production and transportation. On the climate change side, the P-ACPs are more vulnerable to climate change, but have the least capacity to respond to these.
b. How the EU PacTVET project intends to responded to these issues by focussing on building the capacity based on country needs - recognising skills acquisition by benchmarking and defining country-requested competencies and accreditation.
c. The Key Result Area (KRA). Each of the 4 EU PacTVET KRAs were outlined and it was made known to the stakeholders that one of the activities under KRA 1 is this in-country consultative workshop and one-on-one consultations for the training needs and gaps analysis (TNGA). Activities that need to be conducted in the hope of achieving each of these KRAs were briefly outlined.
d. A brief overview of the budget. This was to give the stakeholders an outline of the allocation from the €6.1 million.
e. And finally, it was emphasised that the consultations are important to aid the FSM stakeholders in identifying national needs to frame future EU PacTVET activities.

2.2. Stakeholders' Functions Outlines.

The Project outline was followed by brief presentation from each of the stakeholders on the topic (see "stakeholder presentation guide" – above)

This was purposely to establish the baseline as to what each of the sectors are engaged in and how each of these sectors is affected by climate change and how sustainable energy practices are being part of their sectoral policies.

The training needs and gaps identified are outlined in the latter sections, but the outline below is the summary of the different sector's functions and relationships with SE and CCA

Participating Stakeholders:

Firstly, we would like to thank the stakeholders for their commitment to the EU PacTVET project and for their insight and input into the needs and gap analysis process. Their enthusiasm and willingness to share their knowledge and experience to ensure FSM participates fully in the project was much appreciated. Their comprehension and identification of the various issues impacting CCA and SE TVET education in FSM will form the basis of future project activities.

Stakeholders in alphabetical order:

- Alex Nanpei; Pohnpei Utility Corporation
- Alissa Takesy; FSM Dept. of Resources & Development
- Betty Sigrah; Micronesia Conservation Trust
- Canita Swigert; International Office for Migration
- Dave Mathias; FSM Dept. of Resources & Development
- Emy Musrasrik; International Organization for Migration
- Grilly Jack; College of Micronesia- FSM
- Henry Susaia; FSM Dept. of Resources & Development
- Hubert Yamada; FSM Dept. of Resources & Development (Div. of Energy)
- Isao Frank, Jr.; Micronesia Red Cross Society
- Julius Fischer; Conservation Society of Pohnpei
- Kate McDermott; International Organization for Migration
- Kesdy-Ray Ladore; Conservation Society of Pohnpei
- Kummer Biza; FSM Dept. of Transportation, Commerce, & Infrastructure
- Marcelino Actouka; Pohnpei Utility Corporation
- Marlyter Silbanuz; FSM Dept. of Resources & Development
- Mona Tara; Island Food Community of Pohnpei
- Nancy Hines; Island Food Community of Pohnpei
- Pasha Carruthers; Secretariat of the Pacific Communities
- Rainer Jimmy; Island Food Community of Pohnpei
- Rupeni Mario; Secretariat of the Pacific Communities
- Willy Kostka; Micronesia Conservation Trust

Stakeholders from the National Government of the Federated States of Micronesia (FSM):
Dept. of Transportation, Commerce, & Infrastructure;
FSM Dept. of Resources & Development (Div. of Energy);
FSM Dept. of Resources & Development;
OEEM did not attend the workshop, but were identified as one of the key government agencies to make sure that the program is actually institutionalized. That role is acknowledged here.

Other participating organisations in alphabetical order:

College of Micronesia- FSM

It is anticipated that the EU PacTVET will be working with the College of Micronesia - COM-FSM is a two-year, English language speaking institution offering 32 programs of study (i.e., certificates and degrees). The college has locations at six sites among the four island states of the Federated States of Micronesia. Certificate programs are offered mainly at the state campuses, with the degree programs offered at the National campus located in Palikir,

Pohnpei. The COM-FSM system also includes the FSM Fisheries and Maritime Institute located in Yap. The college is committed to assisting in the development of the Federated States of Micronesia by providing academic, career and technical educational opportunities for student learning. The student body at the National Campus is composed primarily of recent high school graduates from the four states in the FSM. These students come to the National Campus with bilingual or trilingual backgrounds representing eight different Micronesian languages and as many cultures. Approximately nine hundred fifty fulltime students are enrolled each semester in either degree programs or programs leading to a certificate of achievement. Fifteen buildings exist at the site that include classrooms, learning resources centre, recreation, student centre, dining hall, residence halls for men and for women, offices for faculty and administration, a multipurpose gymnasium, maintenance facilities, tutoring and counselling centre. The priorities of the State Campuses are to provide short and long term, academic and vocational, certificate and degree programs as dictated by the needs of the local communities and governments and to provide courses and programs to bridge the gap between high school and college. In addition to instruction and extension services, staff also provides support in the areas of student services, learning resources, and business services.

Information on course assessments and educational pathways can be found here: http://www.comfsm.fm/ publications/ handbook/CAC-compressed.pdf

Information on courses offered by the College of Micronesia can be found here: http://www.comfsm.fm/? q=node/180

The COM-FSM Strategic Plan Goal 2.2 fits very well with the EU PacTVET project: Strengthen career, technical, and community-based educational opportunities for non-college-bound students by:

- Exploring opportunities with agencies and NGOs;
- Increasing training opportunities with existing partners;
- Exploring provision for certification examinations;
- Focusing on programs and courses to support career and technical education development benefitting both students and future employers; and

Implementing training programs that result in the adoption of new skills that are designed to improve the quality of life of participants.

Conservation Society of Pohnpei
For more information: http://www.serehd.org
“CSP aims to increase community involvement in the conservation and management of Pohnpei’s natural resources; to build local capacity through public and private partnerships; to develop alternatives to unsustainable practices; and to promote law and policies that support these objectives.
VISION: To live in a safe and clean environment where cultural pride and natural resources are protected, preserved, and balanced with sustainable development.

MISSION: To preserve and enhance the natural heritage of Pohnpei State by promoting community-led resource management and sustainable development. CORE VALUES: Wahu (Respect), Commitment, Consistency & focus, Strive for improvement, Community-driven, locally-led, Equality: sharing work and leadership, Partnership / partner-building, Positive attitude & enthusiasm."

CSP have an active education programme focussing on teaching Pohnpei's residents about the importance of their surrounding environment and encourage their participation in conservation activities. CSP's approach is multi-faceted. The Youth-to-Youth in Environmental Awareness and Education Program focuses on sixth grade classes at each of the schools in Pohnpei. The Green Road Show also travels around the state, visiting fifth grade classes. Additionally, CSP's Youth Environmental Ambassadors Club for high school students and other Community Outreach activities seek to involve members of the community and generate interest in learning about and protecting the environment. CSP produces weekly radio programs, videos, posters, numerous resource materials, and several publications, including a quarterly newsletter.

International Organization for Migration (IOM)

IOM is committed to the principle that humane and orderly migration benefits migrants and society. As the leading international organization for migration, IOM acts with its partners in the international community to:

- Assist in meeting the growing operational challenges of migration management.
- Advance understanding of migration issues.
- Encourage social and economic development through migration.
- Uphold the human dignity and well-being of migrants.

The IOM has offices in Pohnpei, FSM and RMI. It is responsible for the Climate Adaptation, Disaster Risk Reduction, and Education Program (CADRE). This project aims to build the resilience of vulnerable communities in the FSM and the RMI to natural hazards and particularly those that are climate induced. CADRE will target approximately 10,000 school-aged students, and up to 50 schools and their surrounding communities with the Climate Adaptation, Disaster Risk Reduction, and Education (CADRE) Program. At the conclusion of the Program it is expected that IOM will:

- Support sustainable adaptation and preparedness strategies, and increase the resilience of vulnerable schools and communities to climate change and natural hazards in the FSM and RMI;
- Empower schools and communities to independently cope with, and respond to natural disasters; thereby filling a gap in the communication and education sectors for combining climate change adaptation (CCA) and disaster risk reduction (DRR);
- Support National Government efforts in the implementation of their national policies and strategies pertaining to adaptation and disaster risk reduction;

- Implement practices, which will assist in safe guarding the Millennium Development Goals (MDG) in the context of climate change and the impacts to which it is linked.

More information can be found here: http://www.micronesia.iom.int

Island Food Community of Pohnpei
http://www.islandfood.org

"Food is a basic part of our culture. When we promote our island foods, we are also promoting the traditional Pohnpeian way of life and farming system. As the forces of globalization affect indigenous peoples' traditions and food availability, it is imperative that traditional knowledge on agroforestry and cultural beliefs surrounding food are preserved for future generations. Connection to the land and local ecosystems is one way to do this.
Island Food Community of Pohnpei is a small local non-profit organization that has been instrumental in promoting local island food to alleviate food related health problems in Micronesia since World Food Day 2004.

We work with a community-based, inter-agency participatory approaches to improve the quality of life of Micronesian people who face epidemic health issues caused by a decrease in local food production and consumption and a neglect of the traditional food systems with the recent shift to reliance on imported food. We aim to increase self-reliance through traditional food production that provides the benefits of food security, sustainable development, improved health, economic benefits, cultural preservation, and human dignity, whilst at the same time protecting the environment through small-scale agroforestry. IFCP not only promotes local food production and consumption but also advocates for public policy change, maintains a genebank of biodiversity conservation, develops innovative preservation, storage and cooking methods, teaches nutrition education, and aims to create income-generating small-processed local foods industry. Our "Go Local" campaign for promoting local food for its "CHEEF" benefits (Culture, Health, Environment, Economy and Food security) is a consistent message in all of our projects to achieve our mission and vision."

Micronesian Conservation Trust:
http://www.ourmicronesia.org/

"The Micronesia Conservation Trust (MCT) supports biodiversity conservation, climate adaptation and related sustainable development for the people of Micronesia in the Federated States of Micronesia (FSM), the Republic of Palau (ROP), the Republic of the Marshall Islands (RMI), the US Territory of Guam and the Commonwealth of the Northern Mariana Islands (CNMI).
Mission is to: build partnerships, raise and manage funds, make grants, influence policy, and provide conservation and financing expertise. To provide sustainable financing and capacity building support for biodiversity conservation, climate adaptation, and related sustainable development.
Goals:

- To conserve the ecosystems identified as priorities by Micronesia's conservation policy frameworks (i.e. SDPs, NBSAPs, LAS, etc...);
- To reverse degradation and reduce pressure on ecosystems by promoting sustainable productive processes in collaboration with local communities;
- Promote community awareness about biodiversity conservation, climate adaptation and support related environmental education programs that prepare communities to carry out biodiversity conservation and climate adaptation programs; and
- Strengthen the capacity of community networks, NGOs, and other appropriate organizations to improve biodiversity conservation and climate adaptation in Micronesia.

It is now a regional organization supporting and facilitating sustainable development in all five Micronesian jurisdictions (FSM, Republic of the Marshall Islands, Republic of Palau, US Territory of Guam and the Commonwealth of the Northern Mariana Islands). It has a regional Board of Trustees composed of seven regional representatives and three international members, across a range of fields, from conservation and community development, to law, banking, and business. In support of MCT's capacity building goal, MCT began hosting the Pacific Islands Managed and Protected Areas Community (PIMPAC), which provides technical support to the on the field resource managers, scientists and local community conservation officers. MCT is currently running 50 projects funded by 15 different donors. MCT has a capacity building programme and currently supports the executive leadership and management of NGOs and government conservation agencies through the Micronesians in Island Conservation (MIC). MCT coordinates these two peer-learning networks through its Capacity-Building Program. Specifically, MCT supports the executive leadership and management of non-governmental organizations and government conservation agencies through the Micronesians in Island Conservation Network as well as their technical staff through the Pacific Islands Managed and Protected Areas Community. The Capacity-Building Program also coordinates its activities with those of MCT's Conservation Program as the Conservation Program staff regularly monitor projects, providing on-the-spot assistance with project management as well as assessments of organizational needs in financial and institutional management.

Micronesia Red Cross Society

The International Federation of Red Cross and Red Crescent Societies (IFRC) is the world's largest humanitarian organization, providing assistance without discrimination as to nationality, race, religious beliefs, class or political opinions. The IFRC vision: To inspire, encourage, facilitate and promote at all times all forms of humanitarian activities by National Societies, with a view to preventing and alleviating human suffering, and thereby contributing to the maintenance and promotion of human dignity and peace in the world.

More than 30,000 people across Micronesia are believed to have been affected in some way by the recent Typhoon Maysak. The damage caused will have an impact for months to come. Many homes and crops which people rely on for food security in the outer islands

were destroyed. Since the disaster, Micronesia Red Cross volunteers have been actively responding to the disaster. Volunteers provided disaster assessment assistance to communities while also delivering relief items, including tarpaulins, water containers, lanterns, cooking sets and blankets. The two states that were hit badly by the typhoon were Chuuk and Yap. More information can be found at: http://www.ifrc.org/en/news-and-media/news-stories/asia-pacific/micronesia-federated-states-of/reaching-remote-communties-with-relief-after-typhoon-maysak-68398/#sthash.EjvXmdf2.dpuf See more at: http://www.ifrc.org/en/news-and-media/news-stories/asia-pacific/micronesia-federated-states-of/communities-begin-to-rebuild-after-typhoon-maysak-destroyed-and-damaged-homes---68437/#sthash.ElZ68NeU.dpuf

The IFRC is one of the major providers of disaster risk management and preparedness training globally. Within the region, there is a great deal of interest in getting their training built into competencies and qualifications. This would provide a professional aspect to the training currently offered. All training should be aligned toward the overall "professionalization" of disaster management, including an identifiable career path with sequential learning stages. (This is in agreement with the findings of Analysis of Disaster Response Training in the Pacific Island Region Provisional Version September 2012, United Nations Office for the Coordination of Humanitarian Affairs, Regional Office for the Pacific, September 2012).

Pohnpei Utility Corporation

In the power sector, each of the four states has its own utility company. PUC is a public corporation of the State Government and is the primary provider of electricity, water and sewage services for Pohnpei. It has installed generation capacity of 15.5MW (13.65MW from diesel generation and 1.8MW from hydro). PUC also provides drinking water and has the capacity to provide 4.72 million gallons per day – existing daily demand is 2.3 million gallons.

SPC:

The Secretariat of the Pacific Community (SPC) contributes to and shares the vision for the Pacific espoused by Pacific Islands Forum Leaders under the Framework for Pacific Regionalism:

> Our Pacific Vision is for a region of peace, harmony, security, social inclusion and prosperity, so that all Pacific people can lead free, healthy and productive lives.
> Moreover, we envision a dynamic region united by a determination to realise inclusive growth and sustainable development, and to elevate its position in the international arena.

SPC assists and enables members to collectively and individually make transformational progress in achieving their development goals by drawing on SPCs expertise and strategic partnerships. SPCs mission is to apply excellence in science, knowledge and innovation in

support of sustainable development in the Pacific. SPC is the largest and most impactful regional organisation in terms of capacity and scope. It is a member of the Council of Regional Organisations of the Pacific. SPC will be able to coordinate a solid approach to TVET in FSM. SPC is also the lead regional agency for the energy sector, and a key regional player on climate change issues in the P-ACPs.

For SPC in FSM, the urgent restoration of crops and solar systems, and the provision of potable water, were immediate concerns for SPC at the time of the in-country consultation in its support and response in the wake of typhoon Maysak. SPC has a Regional Office North Pacific in Pohnpei, FSM.

Three of SPC island member countries and territories (Federated States of Micronesia – FSM, Palau and Marshall Islands – RMI) pooled their combined 14.4 million Euro of EDF 10 resources to create the North Pacific ACP (African, Caribbean and Pacific) Renewable Energy and Energy Efficiency Project (North-REP) for the development of their energy sectors. It aims to at least to reduce average monthly electricity consumption in urban households by 10%; provide a total of 12,739 people with first time to access electricity in FSM and RMI; and assist 21 health centres and 32 schools access basic electricity.

Day 2:

A plenary session followed the presentation on "Training Needs and Gaps Analysis". The Plenary Session's topic is "*Creating National and Regional capacity and technical expertise to respond to CCA and SE challenges"*

An actual Training Needs and Gaps Analysis was done after the plenary session discussion. Discussion of the Plenary Session and the TNGA are outlined in Section 5.

A plenary Session: Topic, "*Creating National and Regional capacity and technical expertise to respond to CCA and SE challenges*"

3. Consultation Methodologies

In trying to maximise output various methods of consultation were employed in this in-country mission. Determining which methodology to use depend on various factors ranging from availability, distance and timing. The following are the methods employed to capture the required data during the in-country mission:

3.1. Consultative Workshop/Meeting (TNGA)

A consultative workshop is a consultation with stakeholders in a venue where the agendum for discussion or consultation is done for all at once. This was the methodology employed for the first two days during this in-country mission. This methodology was employed because it used the forum to draw ideas and consolidates them.

3.2. One-to-one Consultations (Interview)

In a situation where stakeholders cannot make it to the consultative gatherings, due to other commitments, a one-to-one or face-to-face meeting or interviews are done. This was also employed where for a number of stakeholders who could not attend the consultative workshop.

3.3. Internet – Online

This was used for searching for further information or publication of Reports or Policies. Not only that but to confirm or double-check on information given.

3.4. Literature Review

This forms the basis for evaluative report of information found in the literature related to technical, vocational education and training with the subject of sustainable energy and climate change as the content. Various literatures were consulted, within the education, energy and climate change sectors, on policy frameworks and national action plans or development strategic plans. Most Policy frameworks (regional and national) were reviewed and those were used as the basis for consolidating future SE and CCA demands or needs in country.

3.5 Limitations

The mission did not make provision for travel to any of the States, apart from Pohnpei. Not all invited stakeholders attended the consultation and it was not possible to visit all stakeholders in the time allowed for the mission.

Obtainable literature surrounding educational strategy and labour and sector statistics was mostly out of date – at least 5 to 10 years old.

Limited availability and/or access to information on current/updated capacity development needs for TVET.

Participation/input from some key stakeholders on these matters – it was not possible to consult with all potential stakeholders in the time allowed for the in-country mission.

4. Status Quo - Relevant National Policies and Frameworks and Sectoral Review

All national policy frameworks and their associated action plans set out principles and suggested initiatives designed to guide and support the development and implementation of national activities consistent with the these policy frameworks' visions and goals.

The Forum Leader's endorsement of the Pacific Islands Framework for Action on Climate Change in 2005 and the Framework for Action on Energy Security in The Pacific (FAESP) in 2010, demonstrated that sustainable energy and climate change adaptation are therefore top priorities for Pacific Island governments.

4.1. Education Sector

According to the FSM Strategic Development Plan (2004-2023): "The FSM Education sector is at a significant stage in its development. There is wide agreement that the level of student learning and achievement is low and needs to be raised. It is also beginning to be better understood that an educated population is essential for improving economic growth and social development and that education should be considered a productive sector. The primary resources of a small island developing nation such as the FSM are its human resources." Education is also recognised as a "Critical Issue for Implementation" in all sectors covered by the plan. Highlighted issues can be viewed in Section 6.1.1.

State governments in FSM have responsibility for education. Taking Kosrae as an example – it has seven public schools, one of which is a high school and around 2,300 students attended these schools. All of these schools are community-managed.

The National Infrastructure Development Plan earmarked US$135.4 million for education infrastructure spending across the 20 years between 2004 and 2023. All children in FSM are required by the "No Child Benefit Law" to attend school from Pre-K through to Grade 8, and some continue to college after graduating high school. As a result, FSM has a high literacy rate.

All students learn English as it is the official language of FSM and Grants and US education programs are used to support many FSM students to attend the College of Micronesia - FSM, the University of Guam, and other Pacific and US colleges.

The National Infrastructure Development Plan describes issues relating to education infrastructure including poor maintenance (including failure of water and power supplies); a number of schools in a highly deteriorated state; a shortage of supplies includes furniture, equipment, books and tools; a lack of diverse facilities (such as music rooms, auditoriums, vocational training facilities); inadequately qualified teachers; inappropriate school curricula; and a lack of vocational training.

An FSM TVET conference was held in 2011 by the National Department of Education However, there is no specific TVET policy. National curriculum benchmarks and standards were defined by the Department of Education Federated States of Micronesia Government, Standards Development Working Group (2006-2008). Although there is no mention of climate change in the curriculum, environmental science and CC benchmarks have been developed recently. Additionally, they have been approved by the National Department of Education under the Pacific Climate Education Partnership (PCEP). Benchmarks and lesson plans/ materials were developed through collaborative efforts between PREL, MCT, and the National Department of Education and are being adopted for use in the schools.

4.2. Energy Sector

"FSM is highly dependent on imported petroleum fuels to sustain its economy. Petroleum fuels (specifically diesel) are used for both electricity generation and transportation with the former being the major user. In 2009, around 34.9 million litres of diesel, 23.8 million litres of petrol and 5.8 million litres of kerosene were imported into the country. Fuel import for 2009 stood in the vicinity ofUSD 40.05 million with the current gross domestic product (GDP) of USD 253.5 million. Fuel is mostly imported to FSM via Guam. In 2008, FSM Petroleum Corporation (FSMPC), the government-owned enterprise, was established and took over from Mobil as the only fuel distributor in FSM which currently serves all four FSM states. In the power sector, each of the four states has its own utility company. The FSM Petroleum Corporation (FSMPC) is an entity that needs to be a major partner of this program. A large number of the managerial and technical jobs in this company are taken non-FSM citizens, which shows a clear lack of certified work force in the FSM. The current CEO is sincerely looking to go into renewable energy provision and has convinced his Board to invest US$10M to explore opportunities in the sector, starting with the coconut sector as an alternative to fossil fuels.

In 2009, total power generated from the states equalled 68 GWh of electricity, of which 53 GWh was sold, recording an estimated distribution loss of 27.5% nationally. Of the grid electricity generated in 2009, virtually all of it was sourced from petroleum fuels, with a mere 0.08% contribution from the grid-connected solar photovoltaic (PV) system in Kosrae. Over 18 million litres of diesel fuel oil were consumed for electricity generation in 2009." (FSM Country Energy Security Indicator Profile, 2009).

According to the 2000 census report, around 46% of households in the whole of FSM are connected to the electricity grid network; however, this has been estimated more recently as lower than 30% in light of the recent typhoon. An additional 7.91% have access to some form of electricity from solar home systems and small generators. Dependency on biomass energy for domestic energy services is as high as 90% for some households and is typically around 70% for households in rural areas.

In 2009, total contribution from renewable energy sources (mainly solar PV grid and stand-alone units) stood at 1,255 GJ and accounted for 0.04% of total energy consumed in 2009.

The major goal of the FSM National Energy Policy is to become less dependent on imported sources of energy by having (1) an increased share of renewable energy sources and (2) cross-sectoral energy conservation and (3) efficiency standards in place…. Therefore, by 2020 the share of renewable energy sources will be at least 30% of total energy production, while energy efficiency will increase by 50%.

The FSM National Energy Policy was developed from 2008-2010. It aims to address coordination of energy production and consumption in the country. Particular emphasis has been placed on the uptake and widespread use of renewable energy that must be affordable, clean and safe. The policy pushes for improved energy efficiency and anticipates an accelerated rate in the uptake of RETs. However, in order to achieve these goals in country human capacity must be increased and the capacity of the existing technicians in the energy sector to be able to support the intake of RETs - solar PV in particular.

The FSM National Energy Policy relates to the following energy services:
Electrification of 80% of rural public facilities by 2015; Electrification of 90% of rural households by 2020; Enhance supply side efficiency of utilities by 20% by 2015.

Clearly, FSM will need trained electrical, solar, refrigeration and air conditioning technicians to achieve these goals.

The FSM Strategic Development Plan (2004-2023) mentions energy provision and energy efficiency:
Reduce energy use and convert to renewable energy sources / Minimize emission of greenhouse gases; including:

- Decrease in the import and use of imported petroleum fuels;
- Increase in the use of renewable energy sources;
- Energy efficiency standards for public and private buildings;
- Decrease in motor vehicle ownership;
- Net gain in forest cover;
- Net gain in area and health of coral reefs.

4.3 Climate Change

An integrated FSM national policy for DRM and CC has been under development since 2012 and are used as the guiding documents for this report. The policy is seen as a framework that ensures that the people of FSM, the natural environment and resources and the economy are resilient and be able to adapt to the predicted impacts of climate change and natural disasters.

From the predictions on continual sea level rise; increase in temperature and increasing ocean acidification, there would be new and additional challenges. This will require additional efforts and resources in building their capacity to be able to face these challenges, hence building the capacities of TVETs to be able to deliver to the rural communities the relevant knowledge and skills to be well equipped to face the challenges of the predicted effects of climate change and natural disasters is crucial. Framing this document is the interpretation of climate change as a slow acting natural disaster which will bring about both rapid and longer-term environmental change.

The FSM Strategic Development Plan 2004-2023: The Next 20 Years, Achieving Economic Growth and Self Reliance is a business plan written in response to the Compact Agreement amendment. It does not explicitly focus on sustainable development or climate change, but does reference economic development. Additionally, climate change and disaster risk reduction are identified as cross-cutting issues and are identified as part of the Environment Sector Strategic Plan - “mainstream environmental considerations, including climate change, into national policy and planning as well as in all economic development activities; this includes outcomes for climate change adaptation strategies including those arising from natural hazards developed and implemented in all states” and “Improve environmental awareness and education and increase involvement of citizenry of the FSM in conserving their country's natural resources” amongst other outcomes. The Strategic Development Plan also supports investment in fisheries, agriculture, tourism, environment, health, education, and gender. Additionally “Investing in Human Resource Development” is outlined as one of six “Strategy Components”.

The intent of the vision statement of FSM CC Policy: “FSM is committed to address the adverse impacts of climate change on communities to ensure livelihood and preserve natural heritage, diverse customs, traditions and natural resources in all the islands.” should be retained as a guiding core value for EU PacTVET activities in FSM. Additionally, the FSM SECOND NATIONAL COMMUNICATION TO THE UNFCCC - CLIMATE CHANGE POLICY MAKERS SUMMARY 1999 emphasised the following which should be used to guide EU PacTVET project activities:

* The important role that emerging scientific insights and technology can play in both mitigation and adaptation in FSM;
* The equally important role of integrating traditional knowledge and practices;
* The importance of local capacity building.

The planned FEDERATED STATES OF MICRONESIA NATION WIDE INTEGRATED DISASTER RISK MANAGEMENT AND CLIMATE CHANGE POLICY has the following strategic outcome:

Education:

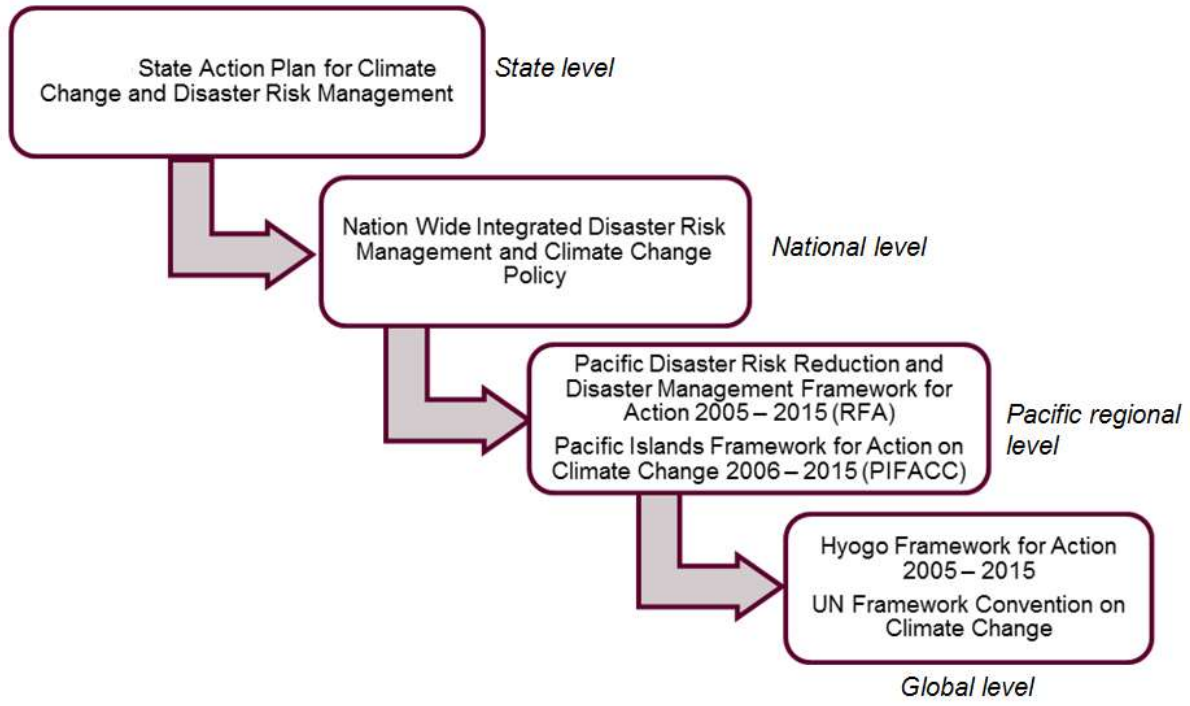
- Uninterrupted learning for students in safe locations
- Increased professional skills and public awareness to enable best practice in adaptation and risk management

And Strategic Objective:

Capacity Building and Public Awareness

1. Develop and disseminate education materials on climate change and disaster risk reduction and integrate these materials through intermediate, primary and secondary education curriculums.
2. Promote, facilitate and develop training programs focused on disaster risk management and climate change for scientific, technical, managerial personnel and policy makers.
3. Promote, facilitate and implement public and political awareness programs on disaster risk reduction and climate change and its effects at national, state and community levels.

As outlined in the Joint State Action Plans for CC & DRM (2014), governance arrangements and the cross-cutting nature of disaster and climate risk management, implementation of the draft National Policy on CC and DRM is a shared responsibility between government, private sector, civil society and communities. The draft National Policy on CC & DRM notes that national and state governments will lead the promotion, coordination and monitoring the implementation of the policy. The constitutional arrangements in FSM require the state governments to be responsible for implementing the policy. The Climate Change Act 2013 deals with governance issues relating to CC & DRM policy and introduces legal obligations for certain national government departments and agencies of FSM.



LINKAGES TO NATIONAL, REGIONAL AND INTERNATIONAL POLICIES AND FRAMEWORKS Source: Joint State Action Plans for CC & DRM (2014)

The FSM Joint Risk Management Network (JRMN) includes all relevant government and some NGO stakeholders in the field of climate change adaptation (CCA) and disaster risk

management (DRM). It should be noted that although MCT are the main funder of community climate adaptation activities, they are not a member of the JRMN. The network is coordinating DRM/CCA activities in FSM, especially at community level, to increase coordination and avoid overlapping and duplication. All EU PacTVET initiatives in FSM will use this network. EU PacTVET should also implement on a national, rather than state, basis since there is a great deal of fragmentation at state level.

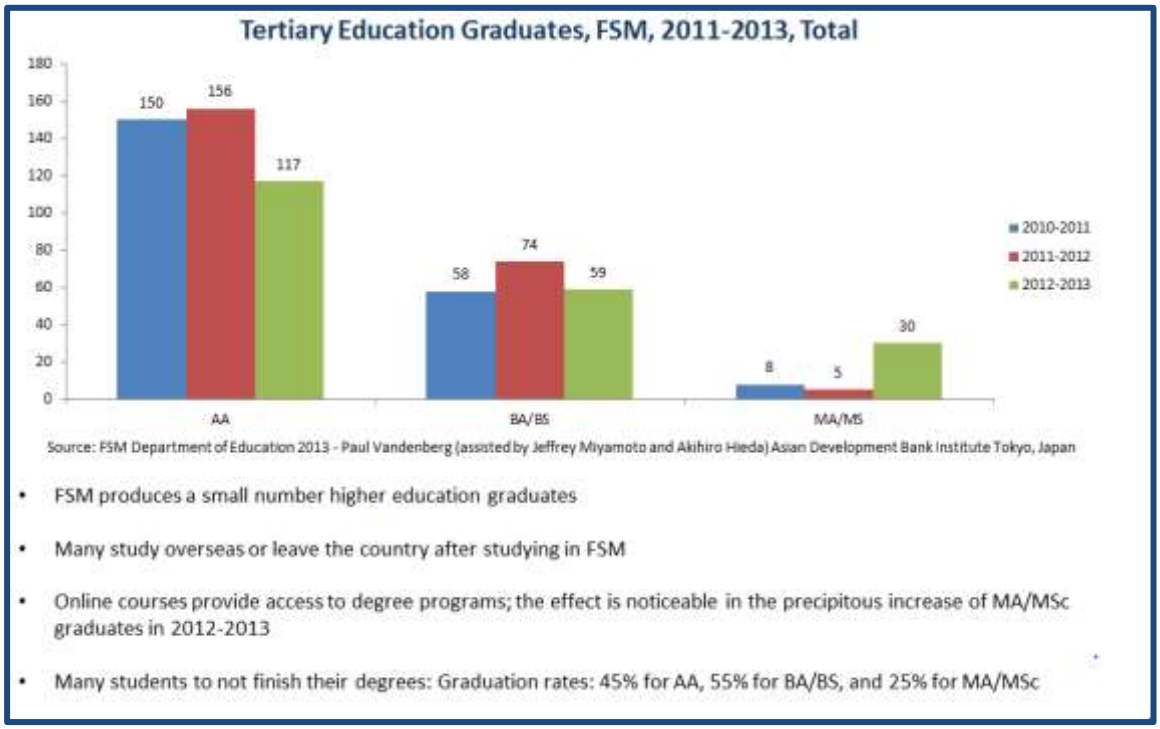
5. Consultation Analysis

5.1 Training Needs and Gaps Analysis (TNGA) - Plenary

The TNGA was preceded by a Plenary Session where selected panelist gave their view on the topic, "*Creating National and Regional capacity and technical expertise to respond to CCA and SE challenges – what are the constraints"*

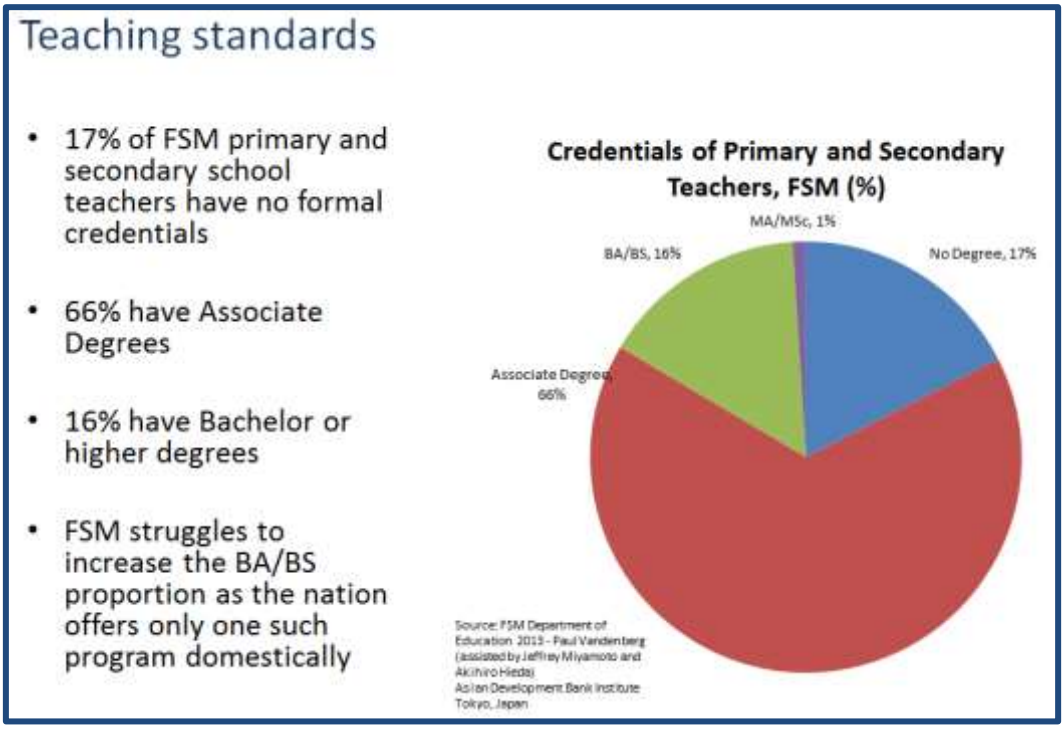
Constraints from the plenary session were wide and varied and revealed that the education sector was facing a major crisis. Discussions revolved around the general "Education Sector" and "Constraints Specific to TVET". Constraints on the "Education Sector" were identified as the following:

- low student achievement and expectation and lack of parental support (only 37% of children progress from primary to secondary school – and only 27% of that 37% go on to tertiary education)
- low student achievement and expectations may be fuelled by low employment prospects – however, this is a vicious circle as "inadequately educated workforce" has been flagged by the World Bank Enterprise Survey (2009) as the biggest constraint to enterprise development in FSM.
- a lack of well-resourced learning facilities, geographical constraints mean lack of resources on outer islands
- low numbers of people in tertiary education resulted in a lack of qualified students to take up scholarships



- teacher quality and qualifications were identified as a major constraint

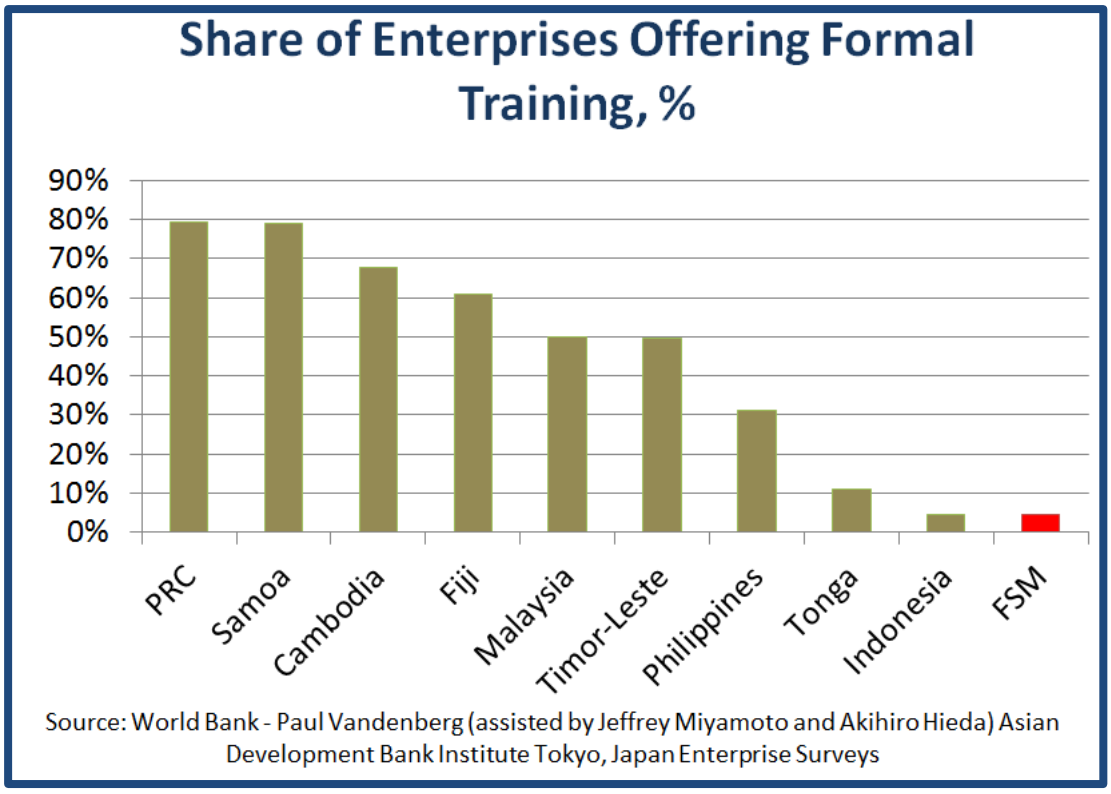
- language was flagged as having a wide ranging impact on learning – it is also feared that some local languages may be lost
- a major impact on the education the sector was identified as the amended Compact Agreement – changes requiring specific subject teaching qualifications come into effect in 2015 and mean that more than 60% of currently employed teachers do not meet minimum qualification requirements and will not be funded. National restrictions (e.g. some states only employ teachers who are from that state in order to promote local language and culture) compound this issue.



Constraints specific to TVET were identified as the following:

- educational pathways – eg colleges, and training institutions – a 2 year diploma course is a limitation to how far things can go – there are no established educational pathways - with the exception of the Education BA and MA degree programs of University of Guam and San Diego State through the COM-FSM.
- PELL grant system and tertiary funding generally means accredited courses and programmes have minimum entry requirements (completion of High School) so recognition of prior learning for TVET skills sets is not an option in FSM
- national standards – minimum benchmarks at national level versus state level, no uniformity between states (e.g. electrical program – state labour versus PUC; local certified graduate versus international engineer)
- lack of infrastructure - FSM has one college
- language – varies across the country, people being educated not uniform - delivery to remote outer islands is problematic as they have no or limited internet and transportation costly - maybe the solution is a 'barefoot college type model'

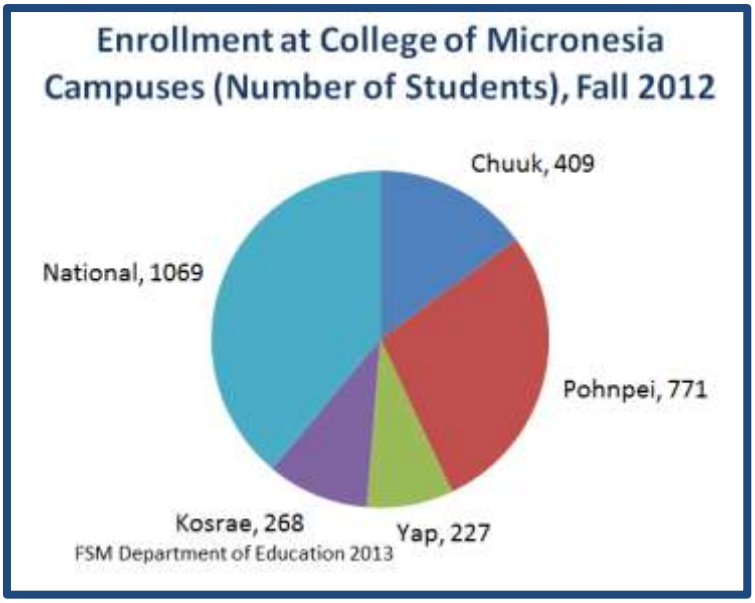
- political will - many of the issues identified at the plenary session were previously highlighted more than a decade ago in the FSM Strategic Development Plan (2004-2023) -little has been done to encourage and/or lure students into secondary and tertiary education
- technology changes are reactive so it is difficult to predict future markets for skills
- limited capacity for certified people to find gainful employment compounded by a current government hiring freeze and a small private sector – this could be linked to outmigration and scholarship students not returning to FSM, despite bonding requirements (which are not enforced)
- attrition – limited on the job training is available and this is a self-limiting situation as people who are trained by one organization leave for better paying ones - less than 5% of enterprises offer formal training programs to their permanent workers



For the College of Micronesia:

- expertise and training is not in the relevant areas - resources and training are made available, but not necessarily applicable to other organisations, eg Red Cross, need to ensure that trainings meet their specific needs.
- courses offered do not meet development needs.
- poor retention of qualified instructors, the current system attracts external short term staff
- salaries should be higher and equate to expertise and performance
- priority areas identified by governments may not reflect the CC needs - over 25% of students at College of Micronesia - FSM are enrolled in education
- Programs offered, with a few exceptions, are Associate Degree level or shorter

- Only one bachelor degree program offered, which is jointly with the University of Guam, it is also in education, and the MA program with San Diego State which is also in education
- FSM students are increasingly using distance education to access education from universities in the region – this could be beneficial for CCA and SE



Top 10 Majors, Graduating Student Total, 2012-2013	
Education	118
Liberal Arts	58
Computer Information Systems	29
Business Administration	24
Agriculture and Food Technology	23
Electronics Technology	20
Micronesian Studies	20
Health Career Opportunities	19
Marine Science	11
Public Health	10
Others	71
Total	**403**

5.1.1 Plenary Conclusions

The role of education in the process of job creation needs to be emphasised. The education system in FSM is modelled on the U.S. system which reflects the priorities and needs of a large developed country. It was evident from discussions that this educational model was not fulfilling the needs of FSM as a small island developing nation. Many of FSM's priorities are not covered in the current system. Courses offered and learning materials and educational pathways do not reflect FSM's priorities.

With respect to disaster response training (including training on post-disaster assessment), the Micronesian Red Cross were very interested in getting their training built into competencies and qualifications. If people in communities were equipped with these skills already it would negate the wait for assessors to visit communities and disaster responses could be faster. Recognised qualifications in disaster response would provide a professional aspect to the training currently offered. It was concluded that all training should be aligned toward the overall "professionalization" of disaster response and management, including an identifiable career paths with sequential learning stages. (This is in agreement with the findings of Analysis of Disaster Response Training in the Pacific Island Region Provisional Version September 2012, United Nations Office for the Coordination of Humanitarian Affairs, Regional Office for the Pacific, September 2012).

Stakeholders agreed that the College of Micronesia - FSM should be the basis of continuing education, outside agencies can deliver at college by agreement. There is a current MOU with USP to that effect. The College of Micronesia -FSM is open to discussions around the issues of regional accreditation. However, Compact Agreement funding requires additional accreditation through US structures if a course or qualification is to be funded under this agreement. COM-FSM is working towards accreditation with the Accrediting Commission for Community and Junior Colleges (ACCJC) of the Western Association of Schools and Colleges (WASC).

In order to achieve useful results with the EU PacTVET project it is essential that all stakeholders remain engaged with the project so that they can provide further advice on future activities – particularly in reference to competency development. Participants saw the EU PacTVET as a "program" and not a "project". They would like to ensure that activities are sustained beyond current EU funding assistance and will find ways to sustain this program by mainstreaming it into existing national mechanisms and programs (COM-FSM, PUC, etc.).

5.2 Training Needs and Gaps Analysis (TNGA) – Group Work

5.2.1 Sectors identified for priority action

Sector	Topic – Linkages to Current Training	Proposed Action* - Future Demand
Food Security	Agricultural productivity, loss of traditional knowledge. Island Food Community of Pohnpei – needs around training community on traditional food processing including: •Business skills training (i.e. costing and pricing, business analysis and planning, marketing plan creating, enterprise operations and management) •Product development, value-adding, and branding •Marketing training (i.e. product display, merchandising, customer service and sales techniques, retail training) •Supplier identification •Safe product handling and storage	Could input into the qualification offered at COM-FSM - Associate of Science in Natural Resource Management (including Agriculture, watershed management); Associate of Science in General Agriculture; Certificate of Achievement in Agriculture and Food Technology; Certificate of Achievement in Bookkeeping; and Associate of Science in Hospitality and Tourism Management. Develop a new qualification in "Project Management" / "Climate Change Practitioner" with specialities in business skills, product development, marketing, safe product handling and storage. There are several dry litter pig pens, so supporting farmers with the development and sales of fertilizers from these such pigpens and training on biogas might be a future option.
Water Security	• water testing, regulations enforcement • watershed management, payment for ecosystem services such as water funds, etc.	A role for Utilities training or new qualification in "Climate Change Practitioner" – integrate into COM -FSM's - Associate of Science in Natural Resource Management; Certificate of Achievement in Plumbing could look at water testing.
Fisheries/Marine	Each state has marine agencies. Current training is available is on general awareness, e.g. protected areas management for communities and local conservation agencies, through PIMPAc UOG, Palau Intl Coral Reef Centre, Socioeconomic monitoring, Training in project management and resource management (marine and terrestrial – ecosystem services and regulations enforcement) were highlighted as key areas for EU PacTVET – particularly increasing capacity of Municipal Governments in these areas. Loss of traditional maritime and boat building skills was a major concern.	Need qualifications on resource management and project management, accountability, biophysical monitoring, Conservation Enforcement Training was offered by Guam Fish and Wildlife - for state and municipal law enforcement officers – this should be reinstated. For Marine Resource Management - College of Micronesia-FSM should run 2 year programmes in partnership with UoH, UoG, SPC and others and identify core competencies/ foundation skills - revamp their Marine Science Course so it covers particular aspects of marine resource management. Marine transportation – traditional skills are being lost, so capturing these with competencies and skill sets would be desirable and useful for tourist trade.
Infrastructure & Transportation	Standard operating procedures, best practices, e.g. building codes.	Integrate into COM-FSM - Associate of Applied Science in Building Technology; provide new courses around specific skill sets related to building codes for professional practice.
Governance	Auditing, monitoring and evaluation, accountability and enforcement. Leadership skills.	Develop courses accessible to people already in employment – link to project management.

Sector	Topic – Linkages to Current Training	Proposed Action* - Future Demand
DRM	Needs to be a "profession" where people are trained and have a qualification. Training on Micronesia Tool Kit for Communities – this could form a course for a qualification already offered by the College of Micronesia-FSM e.g. Micronesian Studies, Agriculture, etc.	Develop new qualifications The recent typhoon has highlighted a gap in people qualified to carry out post disaster assessment. Training in this area would be very beneficial.
Sustainable energy	Training on solar PV maintenance is required in outer islands. Solar PV installation and design is needed to increase use of renewables. Energy efficiency – awareness and training. Utilities – want funding to bring in instructor for linesmen training which is important for post disaster recovery. The Utility does not want a training focus totally on renewables as they anticipate that the "traditional" diesel-based power supply will be around for at least next 20 years.	Develop accredited training schemes for solar installations (design, installation, operation & maintenance) to be delivered through COM-FSM. NorthREP is hoping to replicate sub-regional energy efficient label requirements. COM-FSM could then train the technicians and vendor's to only bring in acceptable appliances/refridgerants. Integrate with courses to be delivered through COM-FSM - Certificate of Achievement in Refrigeration and Air Conditioning; Certificate of Achievement in Small Engine, Equipment, and Outboard Motor Repair. Energy efficiency is also important – a course on being "climate smart" would be useful. The Conservation Society of Pohnpei are working with a variety of projects and may be interested in biogas training as they already have dry litter pig-pens.
Financial	Grants and loans have been given for infrastructure development in high risk area.	Project management/DRR training should include banking and insurance sector training on environmentally responsible lending – not lending for infrastructure in high risk areas.
Forestry	Around 70% of FSM islands are forest areas, this resource needs managing. The industry is not currently sustainable. There is no forestry related training.	EU PacTVET could initiate partnerships with Fiji National University to provide training on forestry.
Identified cross-cutting training topics		
Project management	Basic project management skills were highlighted for every sector. Examples given for general project management include: communication, grant application writing, sourcing funding, climate science, SE concepts, mapping (GIS, spatial planning), networking, using assessment toolkits. "Specialities" could include resource management (terrestrial & marine ecosystem services), climate science, regulations and enforcement, planning, environmental impact assessment.	
Data gathering, management and analysis	General courses on data gathering, management and analysis have also been requested for all identified sectors, along with training on environmental impacts and cost benefit analysis. And on how to take the analysed data to decision makers at all levels (communities, municipal, state and national to influence sound decision making.	
Traditional knowledge	Traditional knowledge was highlighted for every sector – sectoral skills specific to FSM should be developed as competencies and embedded in skill-sets.	
Attitudes	Relevance (to development needs), ownership, responsibility, accountability, professionalism.	

* All EU PacTVET activities should integrate with existing programmes in order for them to be sustainable since there have been issues with past ad hoc training. Ad-hoc training has tended to be project-based and has not led to qualifications or trade relevant skill sets.

Immediate & future training needs for the utilities sector and climate change adaptation were identified as: plumbing, energy efficiency, water catchment (cleaning, maintenance, repair), water safety, solar PV (design, installation, maintenance, procurement), solar pumping (system maintenance, water reservoir maintenance) lineman; climate resilient agriculture (including TK), project management, climate resilient engineering (roads and infrastructure).

5.3 The Training Supply and TVET Providers

This section outlines the various Technical and Vocational Education and Training Institutions in FSM along with the courses and awards they provide.

FSM Fisheries and Maritime Institute (FSM-FMI) is located in Yap. Three majors are offered at FSM-FMI: Navigation, Marine Engineering and Fishing Technology. Currently, these fields of studies or programs normally run for two years, and anyone completing one of them is awarded an Advanced Certificate of Achievement in each of them, and an industry Certificate of Competency as Master of vessels of not over 200 gross tonnage (or Class 5 Master) for a Navigation major; or a Certificate of Competency as Marine Engineer of vessels of not over 500 kilowatts total propulsion power (or Class 5 Marine Engineer) for a Marine Engineering major. These programs, particularly Navigation and Marine Engineering, are offered in accordance with the standards and requirements of the International Convention on Standards of Training, Certification and Watch keeping for Seafarers, 1978, as amended (STCW Convention). The STCW Convention is the international treaty which prescribes the minimum qualifications for seafarers worldwide and, by becoming a Party to the treaty (on October 14, 1998), the FSM has indicated its intention to provide training and maintain the qualifications of FSM seafarers in accordance with the standards and requirements prescribed in the Convention.

College of Micronesia- FSM:

The College awards associate degrees to students who complete a prescribed two-year program of study. The time is extended for students who need to complete preparation classes before beginning the degree program.

Associate of arts degrees	Associate of science degrees	Associate of applied science degrees
•Liberal Arts •Liberal Arts/Health Career Opportunity Program •Micronesian Studies •Pre-Teacher Preparation	•General Agriculture and Natural Resources •Business Administration •Computer Information Systems •Hospitality and Tourism Management •Marine Science •Public Health •Nursing	•Building Technology •Electronic Technology •Telecommunications •Technology

An Associate Degree programme typically consists of 19 courses totalling 66-67 credit points.

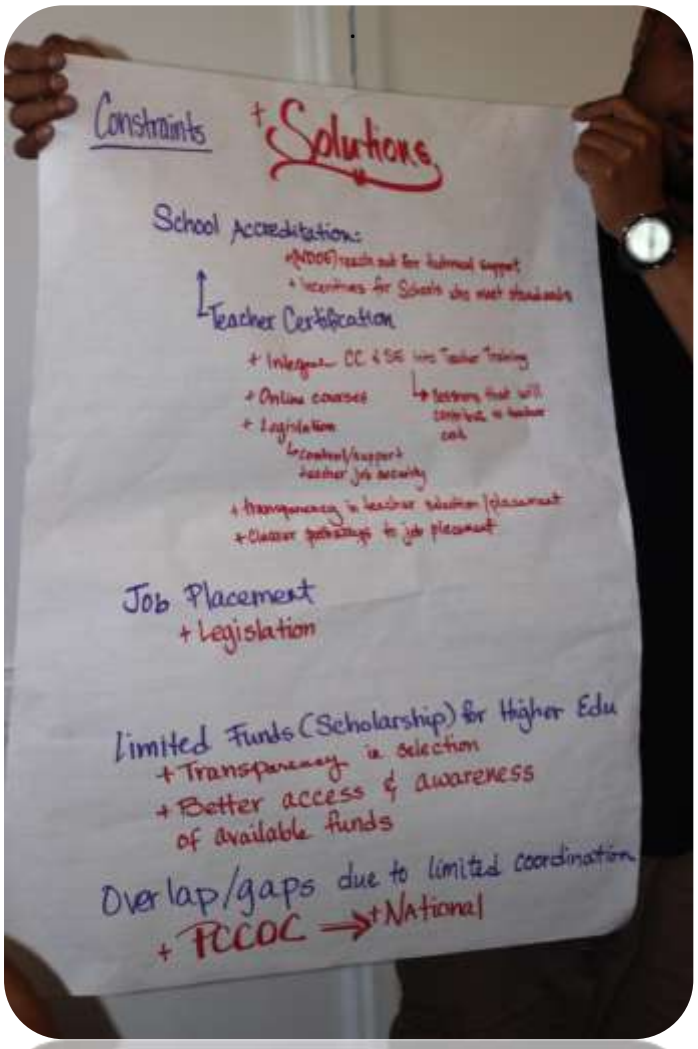
The College awards certificates of achievement to students who complete a prescribed one-year program of study.

Third-year certificates of achievement	Certificates of achievement
•Accounting •General Business •Specialist in Public Health •Teacher Preparation-Elementary	•Agriculture and Food Technology •Bookkeeping •Community Health Sciences-Health Assistant Training Program •Public Health •Secretarial Science •Building Maintenance •Cabinet Making/Furniture Making •Career Education-Motor Vehicle Maintenance •Carpentry •Construction Electricity •Electronic Engineering Technology •Refrigeration and Air Conditioning •Nursing Assistant

A third year certificate of achievement and certificate of achievement generally consists of 10 courses totalling 32-36 credits.

5.4 Present and Future Market Demand

In consultation with the stakeholders in the list of workforce training needs and priority sectors for skill development were captured. The different types of skills (knowledge-based; skills based on ability or aptitude and those skills developed throughout lifetime and experience) required to be able to adapt to the adverse effects of Climate Change and the use of energy in a sustainable way are summarized in the following table. Once areas for skills development are selected an in-depth analysis that is course-specific must be conducted, where each course contents must be analysed in terms of current offerings in country and how these can be added to and supported, or if a new course or skill set needs to be developed and implemented



Type of Skills	Description		
	Sustainable Energy	*Climate Change Adaptation*	
Knowledge-based *Knowledge of specific subjects, procedures, and information necessary to perform particular tasks Such knowledge-based skills are acquired through education, training, and on-the-job experience*	• Linesman • Building/Construction best practice skills • Solar water pump installation, operation and maintenance skills • Solar PV system design skills • Solar PV system installation skills • Solar PV systems O&M skills • Energy Auditing & efficiency skills • Knowledge of different types of renewable energy resources and technologies • Computer Skills • Biogas system design, installation, operation and maintenance skills • Traditional marine transportation skills	1. CC Adaptation assessment, toolkit user skills. 2. Disaster risk reduction (DRR) skills. ▪ Financial – environmentally responsible lending skills 3. Disaster response skills ▪ Post disaster assessment skills 4. Ecosystem services and resource management (terrestrial and marine)skills 5. Climate science and meteorological services skills 6. Agriculture and food security ▪ Crop resilience knowledge-based skills ▪ Soil adaptability knowledge-skills. ▪ Crop seasonal cycles knowledge-based skills ▪ Knowledge-based skill on best crops for certain ecosystem – example: Low lying atoll islands, mountains, grassland. ▪ Crop/food preservation skills – traditional skills ▪ Pest/weed control skills ▪ Knowledge-based and implementation skills on agro-forestry ▪ General food handling and hygiene skills	7. Fisheries and food security ▪ Basic marine conservation skills ▪ Sea-food processing and preservation skills ▪ Knowledge-based skills on fish species and breeding cycles. ▪ Knowledge-based skills on sustainable fishing methods. ▪ Conservation regulation enforcement skills 8. GIS and spatial planning skills 9. Water security ▪ Plumbing ▪ Water collection and preservation skills ▪ Rainwater harvesting skills ▪ Water purification and testing skills ▪ Watershed management skills ▪ Enforcement of regulations skills
Transferable/Functional Skills *These are actions taken to perform a task, transferable to different work functions and industries and the skills are based on ability and aptitude*	• Communication Skills • Analyzing skills • Public Speaking skills • Organizing skills • Writing skills • Promotional skills • Coaching & Mentoring skills • Leadership skills • Knowledge management skills	• Project Management skills ▪ Project design skills ▪ Community engagement skills ▪ Audit/ accountability skills ▪ Monitoring and evaluation skills ▪ Sourcing funding skills ▪ Networking skills ▪ Planning and time management skill ▪ EIA and CBA	• Business skills ▪ costing and pricing, ▪ business analysis and planning, ▪ marketing plan creating, ▪ enterprise operations and management ▪ Product development, value-adding, and branding skills
Personal Traits/Attitude *Traits or personality characteristics that contribute to performing work. Such skills are developed in childhood and through life experience*	• Safety skills • Interpersonal skills • Succession Planning skills • Resource Sharing skills • Language awareness skills • Diplomatic Skills • Result-oriented skills • Independence skills		

5.5 Suggested priorities for future EU PacTVET activities

Sustainable energy:

Gap/Skill Needed	Level	Training type/ intervention	Who	Content/Competencies
Linesman	Trade Test	Technical	Utility	Linesman
Building/Construction Best Practices	Associate Degree & Certificate of Achievement	Integrate in existing courses	COM-FSM with USP & SPC support	Building codes, environmental best practices
ToT for Solar PV system design skills Solar PV system installation skills Solar PV systems O&M skills	Advanced	Technical training for existing COM-FSM staff	EU PacTVET supported	Trained to international industry standards (grid connected and stand-alone systems)
Solar PV system design Solar PV system installation Solar PV systems O&M	Basic to advanced	Course design and implementation	Courses offered at COM-FSM	Content based on international standards for grid connected and stand-alone systems
Energy auditing and efficiency	Basic to advanced	Course design and implementation	Courses offered at COM-FSM	Energy audit Rational use of energy Labelling and appliance standards
Biogas system design, installation, operation and maintenance	Basic	Course design and implementation	Courses offered by NGO sector	Safety, installation, operation and maintenance, feedstock mixing, animal husbandry, use of digestate
Traditional marine transportation skills	Basic to advanced	Course design and implementation	Courses offered at COM-FSM	Wood carving and carpentry, sale making, navigation, timber selection and sustainable harvesting

Climate change:

Gap/Skill Needed	Level	Training type/ intervention	Who	Content/Competencies
ToT for climate change identified needs	Advanced	Technical training for existing COM-FSM staff	EU PacTVET supported	Various – to be determined
CC Adaptation assessment	Basic to advanced	Course design and implementation	COM-FSM with USP & SPC support	Micronesian toolkit, community planning, GIS, community engagement
Ecosystem services and resource management (terrestrial and marine)	Associate Degree & Certificate of Achievement	Integrate in existing courses at COM-FSM	COM-FSM with USP & SPC support	Various – to be determined
Disaster risk reduction and disaster response	Basic to advanced	TOT and Course design and implementation	Courses offered at COM-FSM and in NGO sector	Various – to be determined
Climate science and meteorological services	Basic to advanced	ToT & Course design and implementation	Courses offered at COM-FSM, USP support	Basic climate science, competencies based on International Meteorological Service standards
Agriculture and food security	Basic to advanced	Course design and implementation – integration into existing COM-FSM programmes	Courses offered by NGO sector and COM-FSM	Crop resilience knowledge-based skills; Soil adaptability knowledge-skills; Crop seasonal cycles knowledge-based skills; Crop/food preservation skills – traditional skills; Pest/weed control skills; Knowledge-based and implementation skills on agro-forestry; General food handling and hygiene skills
Fisheries and food security	Basic to advanced	Course design and implementation – integration into existing COM-FSM programmes	Courses offered by NGOs and COM-FSM	Basic marine conservation; Sea-food processing and preservation; Knowledge-based skills on fish species and breeding cycles; Knowledge-based skills on sustainable fishing methods; Conservation regulation enforcement skills
GIS and special planning	Basic to advanced	Course design/ implementation – integration into existing COM-FSM programmes	COM-FSM - support from USP	GIS, Software use, planning, analysis, mapping

Gap/Skill Needed	Level	Training type/ intervention	Who	Content/Competencies
Water security	Associate Degree & Certificate of Achievement	Course design and implementation - Integrate in existing courses at COM-FSM	COM-FSM with USP & SPC support	Plumbing; Water collection and preservation skills; Rainwater harvesting; Water purification and testing skills; Watershed management; Enforcement of regulations

Transferable skills:

Gap/Skill Needed	Level	Training type/ intervention	Who	Content/Competencies
Project Management	Basic-Advanced	Course design and implementation - Integrate in existing courses at COM-FSM	COM-FSM with USP & SPC support	Project design skills; Community engagement; Audit/ accountability; Monitoring and evaluation; Sourcing funding; Networking skills; Planning and time management skills
Business skills	Basic to Advanced	Course design and implementation - Integrate in existing courses at COM-FSM	COM-FSM with USP & SPC support – can be offered in NGO sector	Costing and pricing; business analysis and planning; marketing plan creating; enterprise operations and management; product development, value-adding, and branding skills
Data analysis	Basic to advanced	Course design and implementation - Integrate in existing courses at COM-FSM	COM-FSM with USP & SPC support – can be offered in NGO sector	Types of data, sources of data, questionnaire design, research skills, data analysis, data entry, basic statistics

6. Consultation Outcome

Present and future market demand for TVET in FSM has been identified and existing training supply mapped. The priorities for future project activities will need to be narrowed at the Regional Inception Meeting.

TVET and tertiary education generally in FSM was criticised as not fulfilling the countries development needs. Courses offered and learning materials and educational pathways do not reflect FSM's priorities. The education system in FSM is modelled on the U.S. system which reflects the priorities and needs of a large developed country.

Clearly, the broader issues affecting FSMs educational system are not within the scope of the EU PacTVET project. However, EU PacTVET could help with specific issues related to CCA and SE as well as up-skilling current College of Micronesia, FSM staff. By providing a "skill-set" approach to CCA and SE training EU PacTVET could go some way to providing educational linkages to economic priorities and job creation – especially in the areas of renewable energies such as solar and in project management and conservation as funding for projects in these areas is set to continue. However, it should also be noted that job creation is not strong and many people will seek employment in the U.S. EU PacTVET can also help with food security issues from a community-based subsistence living to resource management and conservation on a professional level.

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European Union Pacific Technical and Vocational Education and Training on Sustainable Energy and Climate Change Adaptation Project

Training Providers

Table TP1 provides information on a training institute. However they did not respond to the survey.

Table TP1: Institute identified in FSM

Name of Institute	Contact People	Position	E-mail	Phone
College of FSM	Mr. Grilly Jack	Career & Tech Ed & Campus Director	gjack@comfsm.fm	691-920-1327/ (691) 320 3795

Although no survey response was received, GSES project team members visited the College of FSM in 2012 and at the time Mr Grilly Jack was interested in establishing solar training. As part of the VOCTEC project, GSES project team members spent time at the College. Although no formal response was received, GSES believe that this institute would be suitable to conduct future training courses and have completed the capabilities table as shown as Table TP2.

Table TP2: Capabilities of College of FSM

Does your TVET have any department that could conduct any of the following types of courses	Yes or No?	If Yes, please state which department
Renewable Energy Technologies?	Yes	Division of Technology and Trade
Grid Connect PV Systems?	Yes	Division of Technology and Trade
Off Grid PV Systems?	Yes	Division of Technology and Trade
Solar Hot water?	Yes	Division of Technology and Trade
Wind Power Systems?	Yes	Division of Technology and Trade
Hydropower?	??	Division of Technology and Trade
Micro-Hydro Power?	??	Division of Technology and Trade
Biomass?	??	Division of Technology and Trade
Biogas?	??	Division of Technology and Trade
Geothermal		
Others technologies?	??	Division of Technology and Trade
Energy Efficiency?	Yes	Division of Technology and Trade
Refrigeration?	Yes	Division of Technology and Trade
Air-conditioning?	Yes	Division of Technology and Trade
Electrical wiring?	Yes	Division of Technology and Trade
Efficient land and water transport systems?	No	Division of Technology and Trade
Energy sector planning and management?	No	

During the VOCTEC project two trainers from the College of FSM were trained to conduct solar training courses their details are provided in Table TP3.

Table TP3: College of FSM trainers trained under VOCTEC project

Institution	Name of Trainer	Contact Number	Email	Course Type	Date Trained	Trainings Delivered
College of FSM	Cirilo B Recana	Use Institution Contact	loyrecana@comfsm.fm	Small Off Grid PV systems	Jan-14	0
College of FSM	Romino Victor	Use Institution Contact	rvictor@comfsm.fm	Small Off Grid PV systems	Jan-14	0

From the experience of the project team and survey responses, 12 courses were identified as having been conducted in FSM in the last 5 years. Information on the courses is contained in Appendix 3. We also received a written response from Bruce Best, who is a trainer based in Guam but has been conducting courses in North Pacific for about 30 years. His response was to outline many courses conducted by him. The main courses of interest were the NABCEP (USA Technician Certification program) courses that have been conducted across Palau, FSM and RMI in recent years.

These comprised:

- VOCTEC Technician Course
- Operation and Maintenance course on Off Grid PV Systems
- DSM Training
- Tariff structuring
- Household energy survey training for surveyors and power utility staff-
- Grid-Connected Photovoltaic Workshop,
- PV grassroots training
- PV grid connected training/SMA
- JICA PV training
- PV Mini Grids
- EE and Energy Audit
- Japan CoolEarth PV Install & O &M

The VOCTEC course shown above had the intention of capacity building while all others were 'one off' courses.

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EU PacTVET

European Union Pacific Technical and Vocational Education and Training on Sustainable Energy and Climate Change Adaptation Project

Kiribati Training Needs and Gap Analysis

Prepared by: Dr. Tess Martin

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Acknowledgment

Organising a successful stakeholders' consultation meeting in Kiribati is challenging due to the current roadworks and heavy rains making travel on the one road in Tarawa extremely slow and time consuming. It is dusty when it is dry and it is muddy when it is wet!

Nevertheless the stakeholders meeting was successfully conducted in Bairiki in South Tarawa where it was likely stakeholders would have the least challenges to attend. Representatives from Government, Civil Society and Private Sectors attended and participated enthusiastically to the gathering of information.

Our sincere thanks go to Dr Ueantabo MacKenzie, Director of USP Kiribati Campus, for directing and giving the team moral support.

And to all our ground team members led by Mr Toaki Arinoko, Country Mobiliser C-CAP and Mr Rae Itinterunga KCCN and from the rest of the team from Kiribati Climate Action Network. thank you for your efficient work and your willingness to work overtime.

I would like crown you all with the Kiribati blessings: Te Mauri (Good Health), Te Raoi (Peace) and Te Tabomoa (Prosperity).

1. Background

The EU-PacTVET (European Union Pacific Technical, Vocational Education and Training) is a European Union (EU) funded project under the broader Adaptation to Climate Change and Sustainable Energy Program (ACSE). It is component three (3) of the ACSE Program. Kiribati is categorised by the United Nations as both a 'Small Island Developing State' and a 'Least Developed Country'. The climate of Kiribati is hot and humid all year round. This tropical climate is closely related to the temperature of the oceans surrounding the atolls and small islands. However, its seasonal rainfall is highly variable from year to year, mostly due to the El Niño–Southern Oscillation (ENSO).

Kiribati is highly vulnerable to the impacts of climate change and disasters. Its vulnerability is principally due to geological and physical features as well as inherent socio-economic characteristics. Climate change and disasters can have serious adverse impacts on the environment, the people of Kiribati and their livelihoods. Kiribati as one of the most vulnerable members of the Pacific- African Caribbean Pacific (P-ACP) is affected by climate change in varying degrees of adversity with the erosion of coastlines, change in rainfall patterns, including extreme rainfall events leading to flooding, higher temperature and extreme winds. According to climate change projections, these impacts will intensify over time. The Government of the Republic of Kiribati has taken note of this worrying trend. It has considered measures to cope with these impacts as high priorities in its National Development Plan 2012–2015. This key policy document identifies improved management of water resources and strengthened coastal resilience as national priorities

Efforts in addressing energy security and climate change adaptation challenges are ongoing through numerous and various regional and national projects. The Kiribati commitment to reducing GHG emissions is in alignment with the priorities of many governments in the region and endorsed in regional frameworks, such as the wider Pacific Plan and the more specific Pacific Islands Framework Action on Climate Change (PIFACC) and the Framework Action on Energy Security in the Pacific (FAESP) and individual national policies.

The Kiribati Joint Implementation Plan on Climate Change and Disaster Risk Management (KJIP) has been developed (2014 – 2023) to reduce the vulnerabilities to the impacts of climate change and disaster risks and to coordinate priorities. This plan is consistent with the regional and international frameworks on climate change and disaster risk management that the Government of the Republic of Kiribati has ratified.

1.1. Mission Objective

The purpose of the in-country-mission is to:

A. Identify the present and future market demand
B. Map out the existing training supply in Kiribati

2. Schedule of Consultation Events

The consultation in Kiribati took place on June 18th and 19th 2015. The first day the participating organisations presented information with 20 participants in attendance. On the second day the Office of the President representative was able to attend and there were 21 participants. The discussion on this second day focused on structured topics to determine the national priority training needs in Sustainable Energy and Climate Change Adaptation.

2.1. Project Outline and Presentation

During the two day consultation workshop an outline of the EU-PacTVET was made by Pelenise Alofa (PacTVET Kiribati In-country Coordinator) with emphasis on the following aspect of the project:

a. Rationale - current scenario with regards to SE and CCA in the P-ACPs and the issues emanating from those scenarios. It was focussed on the situation for Kiribati, where there is lot of dependency on fossil fuel for transportation. On the climate change side, the P-ACPs are more vulnerable to climate change, but have the least capacity to respond to these.
b. How the EU responded to these issues and the approach it took by focussing on building the capacity and empowering the capacities through benchmarking and the aim of setting standards of competencies and accreditation.
c. The objective and the purpose were stated as being taken to try and address the issues
d. The Key Result Areas of PacTVET. Each of the 4 KRAs were outlined and it was made known to the stakeholders that one of the activities under KRA 1 is in-country-assistance through the consultative workshop and one-on-one consultation to do a training needs and gaps analysis (TNGA). Activities that need to be conducted in the hope of achieving each of these KRAs were briefly outlined.
e. A brief overview of the budget. This was to give the stakeholders a glimpse of the allocation from the €6.1 million
f. And finally, it was emphasised that the consultations are important in that the stakeholders need to identify the needs so that they could be noted as requiring support.

3. Status Quo – Energy, Climate Change and TVET in Kiribati

This section is to establish the baseline as to what each of the sectors are engaged in and how each of these are affected by climate change. Furthermore it will identify how sustainable energy practices are integrated in sectoral policies.

The training needs and gaps identified will be outlined in the latter sections. The outline below is a summary of the different sector's functions and relationships with SE and CCA

3.1. Energy

The Energy Planning Unit (EPU) is responsible for coordinating the implementation of energy policies and providing necessary advice and assistance on all energy activities and energy-related matters. Coordination and management of the energy sector is done by the Ministry for Public Works and Utilities (MPWU) and the Public Utilities Board (PUB) through the Energy Planning Unit. The MPWU also coordinates and implements the National Energy Policy. The Kiribati National Energy Policy (KNEP) provides a single framework to administer all energy and energy-related activities and incorporates measures to mitigate carbon emissions by promoting renewable energies and energy efficiency.

The Public Utilities Board (PUB) is a statutory authority responsible for provision of power, water supply and sewerage services for South Tarawa and the provision, operation and maintenance of all assets associated with service delivery. The Kiribati Oil Company (KOIL), an incorporated company involved in distribution of petroleum products with majority owned by the Government.

The Kiribati Solar PV Grid Connected Project in Tarawa (2012 – 2015) covers the Installation of a 400kWp solar PV system to the South Tarawa electricity grid. The power generated from the Solar PV system will contribute to the supply of approximately 3.7% of the total electricity production of the Public Utilities Board.

The Kiribati Solar Energy Company is a government-owned corporation responsible for the provision of electrical services for rural areas through the operation and maintenance of solar photovoltaic (PV) systems. It currently manages 224 kilowatts peak (kWp) of solar PV for outer island residences, 47.6kWp of solar systems for community buildings, 7.5 kWp for streetlights and 6.4kWp for communications.

3.2. Climate Change

Climate change is an important issue for Small Island Developing States, especially for the Republic of Kiribati, a low-lying atoll state directly threatened by sea level rise. His Excellency Anote Tong, the President of Kiribati launched the Kiribati Joint Implementation Plan for Climate Change and Disaster Risk Management (KJIP) on 29 August 2014 in Tarawa, together with the Population Policy and Implementation Plan. The KJIP formalises the role of the Kiribati National Expert Group on Climate Change and Disaster Risk Management (KNEG) as the main advisory body and coordination mechanism as well as the entry point for climate change and disaster risk management initiatives.

The KJIP (2014-2023) will be implemented through 12 strategies towards clearly defined results. Performance indicators and prioritised actions will ensure that the vision and the goal are achieved. It is estimated that about AUD 104 million is required to implement the plan over the next nine years. The plan will improve coordination and is expected to minimise ad hoc and piecemeal approaches, as its approach is carefully designed, integrating relevant stakeholders to promote timely and coherent adaptation, risk reduction and response activities on the ground.

With weather extremes becoming more severe due to climate change, Kiribati is at high risk of experiencing more intense storms and wave events, extreme rainfall, sea-level rise and increased temperatures and associated inundations and damage to buildings and infrastructure, plagues and epidemics, coastal erosion as well shortages of food and fresh water. The National Disaster Risk Management Plan (NDRMP; GoK) identifies the following as acute impact events threatening Kiribati that arise from 'natural' sources: inundation, tsunami, drought, epidemics and maritime disasters.

3.3. Education Department – TVET Division

In Kiribati, Technical and Vocational Education and Training (TVET) is administered by the the Ministry of Labour and Human Resource Development (MLHRD) and the Ministry of Education (MoE). MLHRD directly operates two Technical Institutions: Kiribati Institute of Technology (KIT) and the Maritime Training Centre (MTC) (merged with the Fisheries Training Center in 2015). Both of these institutions are supported by significant Australian (KIT) and New Zealand (MTC) donor funds. Thus these TVET institutions are comparatively well resourced with skilled personnel and internationally accredited programs.

The Ministry of Education administers limited TVET programs in the secondary school system. The four church schools education authorities also play a key role in TVET in secondary schools since they manage 16 of the 19 secondary schools in Kiribati.

KIT offers a wide range of TVET courses (see Appendix 2). Many of these are accredited with the Australian Quality Training Framework. KIT is currently implementing Phase III of the TVET sector strengthening project (TSSP). It is also currently building new classrooms and workshops to accommodate the planned expansion. MTC offers 18 month courses for Able Seaman qualifications (accredited with NZ) in addition to a wide range of upgrading short courses for existing Maritime workers and seafaring officers. These are detailed in their prospectus (http://www.mtc-tarawa.edu.ki).

The main TVET programs offered in secondary schools focus on Industrial Arts and Home Economics. The Ministry of Education and church school education authorities are keen to further the development of TVET in the secondary school sector.

4. Consultation Methodologies

In trying to maximise output various methods of consultation were employed in this in-country mission. Determining which methodology to use depended on various factors ranging from availability, distance and timing. The following are the methods employed to capture the required data during the in-country mission:

4.1. Consultative Workshop/Meeting (TNGA)

A consultative workshop is a consultation with stakeholders in a venue where the agenda for discussion or consultation is done at the same time. This was the methodology employed for the two days (June 18 & 19) during this in-country mission. This methodology

was employed because it was considered a suitable forum to draw ideas and consolidates them.

4.2. Internet – Online

This was used for searching for further information or publication of Reports or Policies. Not only that but to confirm or double-check on information given.

4.3. Desktop Literature Review

This forms the basis for evaluative report of information found in the literature related to technical, vocational education and training with the subject of sustainable energy and climate change as the content. Various literature were consulted, within the education, energy and climate change sectors, on policy frameworks and national action plans or development strategic plans. Most Policy frameworks (regional and national) were reviewed and these were used as the basis for consolidating future SE and CCA demands or needs in Kiribati.

5. Relevant National Policies and Frameworks

At the regional level, the endorsement by the Forum Leaders of the Pacific Islands Framework for Action on Climate Change in 2005 and the Framework for Action on Energy Security in the Pacific (FAESP) in 2010 demonstrated that sustainable energy and climate change adaptation are therefore top priorities for Pacific Island government. Each country in the region also has national policy frameworks and Action Plans that set out principles and suggested initiatives designed to guide and support the development and implementation of national activities consistent with these regional policy frameworks' visions and goals.

The Kiribati Development Plan (KDP) 2012–2015 is the overarching national development plan detailing national priorities. The Kiribati Joint Implementation Plan for Climate Change and Disaster Risk Management (KJIP, 2014-2023) is a key policy document. The KJIP is building on and strengthening existing implementation, financing and monitoring functions by integrating them with climate change and disaster risk management considerations.

The KJIP vision, goal, strategies and results will be disseminated by all implementing partners through existing information sharing networks, media and forums at international, regional, national and local levels. The KJIP will be monitored through the Kiribati Development Plan Monitoring and Evaluation Framework (2012) in compliance with the Monitoring and Evaluation Policy. At the ministerial level, the KJIP strategies will be monitored through the annual Ministry Strategic Plans, which will have to incorporate relevant KJIP actions and outcome indicators.

The KJIP is part of the commitments Kiribati made under the Pacific Islands Framework for Action on Climate Change (PIFACC), the Regional Framework for Action on Disaster Risk Management endorsed by the Pacific Leaders in 2005 and the Pacific Islands Meteorological

Strategy (PIMS) approved in 2012. The KJIP is consistent with these three inter-related regional frameworks, specifically in terms of the national priorities for actions. As party to the United Nations Framework Convention on Climate Change (UNFCCC; ratified in 1992), the Kiribati Government sees the KJIP as its National Action Plan on climate change. Similarly, the KJIP is contributing to the implementation of the Hyogo Framework for Action (2005–2015) under the United Nations International Strategy on Disaster Risk Management (UNISDR) and the Climate Services priorities of the World Meteorological Organisation (WMO).

5.1. Education Sector

In Kiribati the education sector is governed by the Ministry of Education Sector Strategic Plan (ESSP 2012- 2015). The Ministry of Education is in the process of a major reform program, the Kiribati Education Improvement Program (KEIP) developed in partnership between Kiribati and its development partners in the education sector. It is the framework within which the major donors in the education sector provide support to Kiribati to address its most pressing education issues up until the year 2020.

The ESSP reflects Kiribati's commitment at the international level for improved education outcomes. Goals in the ESSP (2012-2015) include the delivery of a high quality, coherent and relevant school curriculum for all Kiribati children, and are aligned with Education for All (EFA) goals.

The report on the EFA in the Republic of Kiribati represents some of the issues regarding TVET in this country. TVET is often considered as a second choice for school 'drop-outs'. As a result, the integration of TVET programs in the secondary school curriculum provokes a strong debate between the supporters of its inclusion and its opponents. For the first group, it is important to develop more TVET programmes which will encourage students to continue their education, especially those who prefer to 'learn by doing'. For the second group, TVET programs 'distract' student form more important topics which are those used to measure national and regional successes of students, teachers and schools. In particular it is the 'non-TVET' academic subjects that provide students opportunities through pathways to further learning through scholarships. Furthermore, Kiribati government sponsorship of students in secondary schools is based on the results of students in 'academic' subject areas.

5.2. Energy Sector

As mentioned in the previous section, the energy sector in the Republic of Kiribati is guided by the National Energy Policy (KNDP) endorsed in 2009. The Ministry of Public Works and Utilities (MPWU) is responsible for the planning, management and coordination of the energy sector. The growing importance accorded to energy issues necessitates the need to ensure that there are resources to effectively manage the national energy sector. Seven key areas are specifically identified as the policy focus for energy.

1. ***Power:*** Electricity in Kiribati is primarily generated from fossil fuels by the Public Utilities Board (PUB) in South Tarawa, Ministry of Lines and Phoenix on Kiritimati

Island, and Kiribati Solar Energy Company (KSEC) on the other hand is responsible for the electrification of the outer islands using solar PV systems.

2. ***Outer Islands and Rural Electrification:*** The need for the provision of a reliable, affordable and environmentally friendly energy supply to the outer islands is essential given

   that the outer islands where 58% of the households reside in Kiribati only 30% have access to electricity, mostly stand-alone solar PV home systems with some using micro oil-based fuel generators. These rural dwellers rely heavily on biomass as their primary energy fuel for cooking. Petroleum products at times are not reliably and safely available and at affordable price with respect to their income.
3. ***Petroleum:*** Safety, reliability and affordability are primary concerns requiring attention. Additional components including sufficient storage, proper handling, regular supply, affordable pricing, to name a few areas which are addressed in policy.
4. ***Efficiency and Conservation:*** The heavily reliance on imported fuel coupled with increasing demand and inefficient appliances and equipment warrants an optimal use of available energy sources.
5. ***Renewable Energy:*** Increased use of applicable renewable energy technologies is seen as the most appropriate long term alternative to conventional systems, however there are a number of barriers to its widespread use which are addressed through policy.
6. ***Environment:*** Energy development is incorporated into environmental considerations in energy sector planning, thereby reducing the impacts..
7. ***Transport:*** The transport sector, in particular land transport, is one of the largest consumers of petroleum products. Registration of new vehicles in South Tarawa has an annual average of 9% increase over the period 1996 – 2006 whilst in Kiritimati Island registration of new vehicles has declined by 0.2% from 2004 – 2007. Policies address the energy issues in the transport sector through the promotion of environmentally clean, energy efficient and cost-effective modes in land and sea transport.

5.3. Climate Change

The KDP has six broad key policy areas (KPAs). Climate change is incorporated into KPA 4 on environment, providing the link to the KJIP. The key objective of KPA 4 is to facilitate sustainable development by mitigating the effects of climate change through approaches that protect biodiversity and support the reduction of environmental degradation by the year 2015.

Legal functions and responsibility for climate change adaptation, disaster risk reduction and disaster responses and management continue to be vested in various agencies, as determined by national legislation. However, some laws need to be adjusted to enable agencies to respond effectively to impacts of climate change and disasters. The

Government of the Republic of Kiribati sees the KJIP as a means to prioritise actions on climate change and related disaster risks.

The Kiribati Adaptation Program (KAP) is a project of the Office of the President, Government of Kiribati and consists of three phases, running from 2003 to 2016. It aims to reduce Kiribati's vulnerability to climate change, climate variability and sea level rise by raising awareness of climate change, assessing and protecting available water resources and managing inundation.

Phase III of the KAP (expansion 2012-2016) aims to:

- Improve water use and management via the installation of groundwater, roof rainwater harvesting systems, reducing water leakages and waste in existing systems, protecting water reserves, and improving long- term planning for local-level water management ensure cleaner, safer drinking water.
- Protect against coastal erosion by investing in protection such as seawalls and mangrove planting at priority sites
- Strengthen government and community capacity to manage the effects of climate change and natural hazards by supporting the development and adoption of a national Coastal Management Policy as well as the development and implementation of locally managed Adaptation Plans
- Support and assist the Government in managing, monitoring and evaluation activities.

The Kiribati Climate Change Library provides access to a range of policies and documents on a range of topics such as rainwater harvesting, improving water resource use and management, increasing coastal resilience to storm waves and flooding, and information on climate risk management. (http://www.climate.gov.ki/resources/information-library).

6. Consultation Analysis

During the consultations that were held in Bairiki, Tarawa (in the Kiribati Consultative workshop) and through online research, issues regarding technical, vocational education and training in Kiribati emerged. Common ones are summarized under the following themes: training of trainers, development of TVET programs on renewable energy, in particular solar and biogas, development of TVET programs on climate change adaptation project management, with a focus on coastal management and protection and food security, and accreditation of TVET programs.

Most of these issues are similar to those encountered in other countries in the region and some of the solutions may be thus more relevant when implemented at the regional level, for example training of trainers programs.

The four specific TVET issues raised at the workshop were:

- Establishment of Tertiary Institution Association (TVET Providers)

- Coherent TVET curriculum that runs from secondary to tertiary
- Franchising of technical courses from FNU and other technical institutions
- Injection of funds to secondary schools to be able to set up high quality TVET programs School of Agriculture is needed in the country

The following are some of the issues, needs and gaps that were raised during the consultations to improve the TVET offered on climate change and sustainable energy by training institutions in Kiribati.

6.1. Training Needs and Gaps Analysis (TNGA)

This method was used to determine whether training needs related to sustainable energy and climate change exists or not in the Republic of Kiribati. It is a systematic approach to identify status quo of TVET in the Republic of Kiribati and to identify if the objectives/goal of TVET in Kiribati are forthcoming or not. If there are needs and gaps identified that could bring the present status of TVET to a desired state that will meet its goal, then there is a training need. In the case of the Republic of Kiribati, the key points in terms of gap analysis were:

- Lack of project management skills, from data collection and lab analysis to grant application and M&E and also including soft skills such as negotiation, problem solving, teamwork, communication etc.
- Lack of specific training on coastal management and protection, food security, water management and crisis response (including counselling).
- Lack of understanding of entrepreneurship and what the real 'working life' is.
- Not enough technically skilled people to maintain sustainable energy projects and support the national targets.
- Lack of qualified people in sustainable energy, including for different renewable energies, energy audit, site assessment, etc.
- Limited understanding of equipment utilization and removal/recycling of used equipment
- Lack of qualification and accreditation mechanisms in place.

6.2. Present and Future Market Demand

In consultation with the stakeholders in Kiribati, a list of workforce training needs and priority sectors for skill development were captured. This is best summarized table formats. The different types of skills (knowledge-based; skills based on ability or aptitude and those skills developed throughout lifetime and experience) required to be able to adapt to the adverse effects of Climate Change and use energy in a sustainable way are summarized in the following table. These skills were not associated with any particular subject within the TVET institutions but were given in general as some of the skills required. Due to time constraint, in-depth training needs and gaps analysis that is course-specific must be conducted, where each course contents must be analyzed.

Type of Skills	*Skills Description*		
	Sustainable Energy	*Climate Change Adaptation*	*Disaster Risk Management*
Knowledge-based Knowledge of specific subjects, procedures, and information necessary to perform particular tasks Such knowledge-based skills are acquired through education, training, and on-the-job experience			
	Grid connected systems maintenance skills	CC Adaptation data collection and analysis skills	Disaster risk reduction (DRR) skills
	Biofuel and biogas installation and maintenance skills	Resource management skills (incl. marine protection)	Crisis response skills
	Advanced mechanics for hybrid vehicles	Water management skills	First aid skills
	Equipment and meters usage and interpretation skills	Coastal management and protection skills	Counseling skills
	Solar PV system installation and maintenance skills	Crop resilience knowledge-based skills	Stress management skills
	Energy Auditing skills	Agriculture skills (incl. traditional food preservation)	Human right education and training skills
	Fuel quality control and fuel handling skills	Aquaculture skills	
	Battery and used equipment disposal skills	Traditional handicraft skills	
	Legal aspect of energy (price control, import, etc.)	Eco-tourism and hospitality skills	
Transferable/Functional Skills These are actions taken to perform a task, transferable to different work functions and industries and the skills are based on ability and aptitude		Project Concept or Proposal writing skills (incl. grant seeking).	
		Project Management skills	
		Communication Skills	
		Analyzing skills	
		Simple Bookkeeping, budget and marketing skills	
		Basic Maths and Physics	
		Community engagement skills	
		Entrepreneurship skills	
		Language skills (English and i-Kiribati) for trainers	
Personal Traits/Attitude Traits or personality characteristics that contribute to performing work. Such skills are developed in childhood and through life experience		Interpersonal skills	
		Problem solving skills	
		Conflict management	
		Negotiation skills	
		Result-oriented skills	
		Independence skills	

6.3. The Training Supply: TVET Providers

The Republic of the Kiribati has 19 secondary schools. 3 of these schools are wholly government owned with 13 of the remaining 16 schools managed by the Catholic Education Authority. The majority of secondary schools offer Industrial Arts and Home Economics as TVET programs. A few schools offer limited TVET programs in carpentry and joinery and tailoring (eg: St Louis, South Tarawa). However, the main TVET supplier is the Kiribati Institute of Technology located in Betio, South Tarawa. In addition the Maritime Training College offers a range of specific work focused TVET programs. The University of the South Pacific offers limited TVET programs at the Tarawa campus. Both KIT and MTC are progressive institutions and currently developing new programs to meet the needs of the country (KIT will deliver plumbing in 2015, with MTC offering upgrade courses with the latest of maritime technologies). Appendix 2 outlines the courses offered by KIT in 2015.

6.4. The Identified Training Needs

During the consultation, specific training needs were highlighted and discussed by the participants. They include, for the sustainable energy sector:

Gap/Skill Needed	Level	Training type	Who	Content/Competencies
competent trainers (ToT) in i-Kiribati to bridge gap	advanced	SE basics SE advanced	KIT/MoE/USP	can easily grasp scientific concepts in English and deliver them in i-Kiribati
Standard services Standard product equipment	basic	consultation, adaptation of international existing standards and codes	MLHRD/MoE/USP	quality assessment quality standards raining inclusive of standards
ToT in solar systems	advanced	advanced knowledge and skill in solar systems	MPWU/KIT/MTC	SHS systems grid-connected systems solar components system design maintenance troubleshooting and repair
ToT in biodiesel/fuel/CNO	advanced	fuel handling fuel quality biodiesel manufacture	KOIL/MPWU/KOIL	fuel handling and quality testing design, maintain troubleshoot and repair equipment operated on biodiesel CNO

For the climate change sector:

Gap/Skill Needed	Level	Training Duration	Who	Content/ Competencies
Water Usage Survey	basic	1 – 2 mths	MPWU MOE PUB	basic maths surveying skills reporting skills communication skills
Eco-tourism & Hospitality	basic	3-12 mths	KIT/MLHRD/MTC/ MoE/USP	marketing skills finance management HRM
Coastal Management & Protection	advanced (engineer)	2-4 years	MTC/USP	coastal profiling coastal planning assessment surveying designing (hard structures) M&E
Project Management	Basic	1-2 months	USP/KIT/NGOs	record keeping data collection report writing community consultation participatory management basic M&E time management problem solving OHS leadership

These training needs correspond to the identified skill gaps presented in the table in section 6.2.

7. Consultation Outcome

This in-country mission's objectives were to:

A. Identify the present and future market demand in SE and CCA; and
B. Map out the existing training supply for the Republic of the Marshall Islands.

There are a good range of TVET programs currently offered in Kiribati due to the Kiribati Institute of Technology implementation of a significant Australian DFAT funded TVET Sector Strengthening Project and the New Zealand Aid support for the Maritime Training College (MTC). Both of these TVET training institutions are highly recognized both nationally and regionally. They offer quality accredited TVET programs which are highly suited to integrating CCA and SE competencies. In addition both TVET institutions are keen to work collaboratively and in partnerships to pursue national and regional objectives in Climate Change and Sustainable Energy.

Thus the outcome of this consultation focuses on the skill gaps and training needs. The outcomes of this in-country mission thus provide good indications on the priorities for TVET training in Kiribati which can be pursued in partnerships with existing quality TVET providers in Kiribati. In addition there is capacity to work collaboratively with the MoE to establish and develop TVET in secondary school programs which will facilitate pathways in TVET training.

Another outcome of the consultation is the request for the PacTVET project to provide support for the establishment of robust and relevant quality accreditation processes based on the experience and lessons learnt from other countries in the region.

Appendix 1: Schedule of Consultations

PACTVET CONSULTATION WORKSHOP

18-19 JUNE 2015

REPORT

Venue: TSKL (Telecom) Conference Room

Time: 12 noon to 7 pm

Present: Day 1 – Twenty people attended (list attached)

Day 2 – Twenty One people attended (list attached)

Welcome: Dr Ueantabo MacKenzie, USP Director, gave a formal welcome to all participants and briefly explained what PACTVET and invited everyone to contribute and to participate.

Prayer: Opening Prayer was offered by Mr Toaki Arinoko.

Introducing Participants:

Toaki did the Answer with your Feet activities to introduce participants to each other. There were 20 participants (one from the Chamberof Commerce, five NGOs and the rest are from government (14).

PACTVET Introduction:

Pelenise Alofa explained the PACTVET Rationale, Objectives & Purpose and Country Expectations.

Lunch for everyone.

Gauging Linkages for SE and CCA: Participants Presentations.

All presentations will be sent by separate cover by email.

We did not follow the list on the program but rather choose randomly whoever is ready to present. All organisations represented gave a presentation on the program they were involved in that was or may be related to the SE & CCA. We tried to have all ministries and departments to present on Day 1.

Discussion on the linkages of each program to the SE and CCA.

First day ended at 6.30 pm and the team had dinner until 7.30 pm.

Appendix 1: Schedule of Consultations

PACTVET CONSULTATION WORKSHOP

REPORT (continued)

DAY 2: Commenced with Lunch

Welcome new participants: the Office of the President was able to attend on the second day.

RECAP OF DAY ONE – Pelenise Alofa

Continue the Presentations by those who could not present on Day One.

- Presentation 1: Dr Ueantabo MacKenzie
- Presentation 2: Mr Choi Yeeting – Office of the President
- Discussion on the linkages of these presentations to the SE & CCA.
- GROUP WORK: National training needs in SE and CCA

Group 1 Discussion Topic: "Gauge out the technical skills required/demanded by the industries in the Kiribati Islands, present and future. Rank them in order , from HIGH DEMAND to LOW DEMAND

This group comprised of Chamber of Commerce and Government Ministries.

Group 2 Discussion Topic: "Identify technical Institutions in the country (formal and non-formal) that provide formal and informal technical skills in SE and CCA. List down the following:

i. Courses,
ii. Durations,
iii. Award/accreditation
iv. Equivalent course and accreditation in the region and internationally; and
v. Potential industry(ies) that needs such skills

This group comprised of all technical institutions, high schools and University of the South Pacific.

Group 3: Discussion Topic: "Gauge out the technical skill and knowledge required for communities (both rural/ remote and urban) to be better equipped to adapt to the adverse effects of Climate Change"

This group comprised of Non-government organisations in Kiribati.

At the end of the discussion, each group gave a presentation on their findings. These are attached.

Pelenise Alofa discussed the linkages and brought to the attention that more consultations will be done to get all the total picture of what Kiribati needs are on SE & CCA. Visitations to other ministries and sectors that did not turn up for the workshop and urged that each one make an effort to identify anything that is missing from the discussions to the coordinator.

The Director for USP concluded the workshop.

Closing prayer: Mrs Moia Tetoa and followed by dinner.

All participants collected $25 travel allowance at the end of each day.

Appendix 2: TVET Courses (KIT)

KIRIBATI INSTITUTE OF TECHNOLOGY

2015 Courses

TRADE COURSES	QUALIFICATION
Automotive Mechanical	**AUR20512 Certificate II in Automotive Servicing Technology** *(Year 2, complete qualification June 2015)* **AUR20512 Certificate II in Automotive Servicing Technology** *(Existing workers. Start Term 2.Estimated finish November 2015. May vary according to students RPL and skill testing outcomes.)* **AUR30612 Certificate III in Automotive Light Vehicle Mechanical Technology Skill Set** *(Complete qualification November 2015)*
Construction	**CPC20211 Certificate II in Construction Pathways** *(Year 1, complete qualification March 2016)* **CPC20211 Certificate II in Construction Pathways** *(Year 2, complete qualification March 2015)* **CPC30211 Certificate III in Carpentry Skill Set** *(Qualification –Not offered 2015)*
Electro technology	**UEE22011 Certificate II in Electro technology (Career Start)** *(Year 1, complete qualification June 2016)* **UEE22011 Certificate II in Electro technology (Career Start)** *(Year 2, complete qualification June 2015)* **UEE30811 2014 intake Certificate III in Electro technology Skill Set (***complete qualification June 2015)* **UEE30811 2015 intake Certificate III in Electro technology Skill Set (***complete qualification June 2016)*
Plumbing	**CPC20712 Certificate II in Drainage** *(Year 1, complete qualification November 2015)* **CPC20812 Certificate II in Metal Roofing and Cladding** *(Year 2, complete qualification November 2015)* **CPC32413 Certificate III in Plumbing - Water Plumbing Skill Set** *(Year 2, complete qualification November 2015)* ***NWP20107 Certificate II Water Operations - KAP III Project** (one off delivery)
OTHER COURSES	**QUALIFICATION**
Accounting	**FNS30311 Certificate III in Accounts Administration** *(complete qualification November 2015)* **FNS40611 Certificate IV in Accounting** *(complete qualification November 2015)*
Business	**BSB 20112 Certificate II in Business** *(complete qualification November 2015)*
Community Services	**CHC20112 Certificate II in Community Services** *(complete qualification November 2015)*
Information Technology	**Hardware Technicians' Skill Set** incorporated in 'ICA30111 Certificate III in Information Digital Media and Technology' (Part Time) *(complete qualification November 2015)*
COURSES - IDENTIFIED NEEDS	**QUALIFICATIONS (Not to be moderated or a parchment awarded to students, except for units identified with a star*)**
Vocational Preparation *Full time during Term 1 for all first year students*	**KIT Course** *(Three clustered units, not accredited)*
	KIT Business Course (Accredited Unit *Organize and complete daily activities)*
	KIT ICT course *(Time allocation equals two units. *Accredited units for Business and Accounting students only as part of industry qualification)*
	English *(Time allocation equals one unit)*
	WHS (Accredited unit for trade courses, business, accounting, community services)*
English *For all students*	New **KIT Certificate** delivered *over whole training period for all students. Non accredited*
Information Technology *For all students*	*Delivered over whole training period. Non accredited except for units that are part of the industry area qualification*

Training Providers

Table TP1 provides information on the sole training institute identified: they did respond to the survey. Their response is shown in Table TP2.

Table TP1: Institute Identified in Kiribati

Name of Institute	Contact People	Position	E-mail	Phone
Kiribati Institute of Technology	Mr. Rokobati Tearo	Principal	rtearo@kit.edu.ki	(686) 97517

Table TP2: Kiribati Institute of Technology (KIT) Capabilities

Does your TVET have any department that could conduct any of the following types of courses	**Yes or No?**	**If Yes, please state which department**	**Contact Person**	**Contact E-mail**
Renewable Energy Technologies?	Yes	Electrotechnology	Antoine Barnaart	antoineb@scopeglobal.net
Grid Connect PV Systems?	No		Antoine Barnaart	antoineb@scopeglobal.net
Off Grid PV Systems?	Yes	Electrotechnology	Antoine Barnaart	antoineb@scopeglobal.net
Solar Hot water?	No		Antoine Barnaart	antoineb@scopeglobal.net
Wind Power Systems?	No		Antoine Barnaart	antoineb@scopeglobal.net
Hydropower?	No		Antoine Barnaart	antoineb@scopeglobal.net
Micro-Hydro Power?	No		Antoine Barnaart	antoineb@scopeglobal.net
Biomass?	No		Antoine Barnaart	antoineb@scopeglobal.

				net
Biogas?	No		Antoine Barnaart	antoineb@scopeglobal.net
Geothermal	No		Antoine Barnaart	antoineb@scopeglobal.net
Others technologies?	No		Antoine Barnaart	antoineb@scopeglobal.net
Energy Efficiency?	Yes	Electrotechnology	Antoine Barnaart	antoineb@scopeglobal.net
Refrigeration?	No		Antoine Barnaart	antoineb@scopeglobal.net
Air-conditioning?	No		Antoine Barnaart	antoineb@scopeglobal.net
Electrical wiring?	Yes	Electrotechnology	Antoine Barnaart	antoineb@scopeglobal.net
Efficient land and water transport systems?				-
Energy sector planning and management?				-

In the last 5 years KIT has conducted courses in the following areas:

- Renewable energy technologies (e.g. solar PV, solar water heaters, biogas, wind power and micro-hydropower
- Energy efficiency (e.g. refrigeration and air-conditioning maintenance, motor mechanic, electrical wiring and rewiring of electric motors, efficient land and water transport systems)

During the VOCTEC project, two trainers from the Kiribati Institute of Technology and one from Kiribati Solar Energy Company were trained to conduct solar training courses, their details are provided in Table TP3.

Table TP3: Trainers trained under VOCTEC project

Institution	Name of Trainer	Email	Course Type	Date Trained
Kiribati Institute of Techology	Teangngang Barekiau	teangngang.barekiau@kit.edu.ki	Small Off Grid PV systems	Jan-14
Kiribati Institute of Techology	Tarataake Buibui	tarataake.buibui@kit.edu.ki	Small Off Grid PV systems	Jan-14
Kiribati Solar Energy Company	Tebukei Betero	tebukei@gmail.com	Small Off Grid PV systems	Jan-14

From the experience of the project team and from the survey response, 5 training courses were identified as being conducted in the last 5 years. Details are provided in Appendix 5.

In summary these were:

- 2 x Design and Install Grid connect PV Systems
- 2 x VOCTEC Technician Course
- Household energy survey training for surveyors and power utility staff

The 2 grid connect PV courses were conducted by GSES, a company which is a Registered Training Organisation in Australia. Those who passed are eligible to apply for industry certification under the Pacific Power Association (PPA) and Sustainable Energy Association of Pacific Islands (SEIAPI) certification and accreditation program

Note: Not included in the list of courses are 2 x courses that the project team understand were completed by a Laos based company, Sunlabob. In May 2013, the Ministry of Finance and Economic Development released a tender for the following training courses to be conducted:

- Training on Solar PV Diesel Generation Hybrid System
- Training on PV Grid Connect System

Sunlabob was sent the survey, but no response was received.

The VOCTEC course had the intention of capacity building.

Pacific Community
Communauté du Pacifique

EUROPEAN UNION

USP
THE UNIVERSITY OF THE SOUTH PACIFIC

EU PacTVET

European Union Pacific Technical and Vocational Education and Training on Sustainable Energy and Climate Change Adaptation Project

Nauru Training Needs and Gap Analysis

Conducted and Compiled by: Nixon Kua

Pacific Community
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EUROPEAN UNION

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EU PacTVET

European Union Pacific Technical and Vocational Education and Training on Sustainable Energy and Climate Change Adaptation Project

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Acknowledgement

Nauru is a small island and it is easy to get around. It is not advisable to walk from one office to another, due to the scotching head of the equatorial sun. Moreover, as in all other countries in-country logistical support will always be available. So yes, one person cannot achieve everything by him or herself. In this gesture, it is worthy to acknowledge the time and effort given by the In-Country Coordinator for the PacTVET, Mr. Tyrone Deiye who is based at the University of the South Pacific – Nauru Centre. His time in doing the logistics and assisting me in doing the face-to-face consultation and in conducting the workshop is really valuable.

I would also like to thank the following for being very optimistic by providing some valuable information that helped in collecting the required data Thanks to:

- Reagan Moses (Director of Climate Change)
- Fay Itaia (Program Manager, Department of Education)
- Monte Depaune (Manager Coastal Fisheries, Nauru Fisheries Marine Resource Authority)
- Mavis Depaune (Program Manager, PIDF, DoFAT)
- Asterio Appi (Director – Quarantine and Plant Protection)
- Principal Nauru Secondary School
- Alamanda Lauti – Director - Nauru USP Centre
- Abraham Simpson (Nauru Utilities General Manager)

And lastly but not the least, to the workshop participants and others that we had met and consult face-to face during my consultations in Nauru, thank you so much for your time and knowledge. Without these, we would not be able to come up with this comprehensive report

Tubwa

Thank you

1. Background

The European Union funded Pacific Technical, Vocational Education and Training (EU-PacTVET) is a project under the broader Adaptation to Climate Change and Sustainable Energy Programme (ACSE). It is component three (3) of this ACSE Programme.

It is of practical evidence that climate change is affecting the livelihoods of the Pacific Island communities in varying degree of adversity. These practical evidence are community-based assertion that take into account comparative measures of the present and past scenarios on various physical aspects, such as increased ocean acidification and coastal line erosion due to increasing CO2 capture and sea level rise respectively, to name a few.

The global greenhouse gas (GHG) emission projection for 2019, according to the IPCC fifth assessment Report, stands at 43.2 gigatonnes of CO2 (GgtCO2-e)[1]. Of this global GHG emission, Pacific Islanders countries emit less than 0.03% yet they are amongst the most vulnerable to adverse effects of climate change since they are the first to be exposed and the least able to respond. Though being the least CO2 emitter in the region, Nauru will continue to exert efforts in mitigating GHG. Such action though insignificant, Nauru has the moral obligation to do so because it plus its neighbouring sister pacific island country are the most vulnerable, yet no capacity to respond to such adverse effect of climate change.
On the national level, Nauru's annual GHG emission is 100 kilo-tonnes CO2, which on a global scale, is insignificant.

In spite of efforts to reduce Pacific ACP (P-ACP) countries reliance on fossil fuels and improve energy security, almost all Pacific Island countries are almost 100% dependent on imported petroleum products for energy generation and transportation, which are the two major petroleum consumption sectors in the region.

With the Pacific Island countries facing challenges pose by climate change and energy security, sustainable energy and climate change adaptation are undeniably ranked above all other sectors in the regional Governments priorities, as evident through regionally endorsed frameworks, such as the wider Pacific Plan and the more specific Pacific Islands Framework Action on Climate Change (PIFACC) and the Framework Action on Energy Security in the Pacific (FAESP) and individual national policies.

Efforts in addressing energy security and climate change adaptation challenges are ongoing through various regional and national projects. On climate change mitigation, there are some familiar project such as the Pacific Islands Greenhouse gas Abatement through Renewable Energy Project (PIGGAREP) that addresses mitigation and Pacific Adaptation to climate change (PACC) that focused on climate change adaptation. The PIGGAREP was focussing on complementing PICs initiatives in promoting the widespread use of renewable energy in the regions and PACC focuses its project on three thematic areas, namely, "Food

[1] https://IPCC 5AR

security"; "Water Security" and "Coastal Management". This project focusses on assisting communities to implement activities that help them in these three areas.
Sustenance of such projects on mitigation and adaptation is very important. Now that these projects are coming to their end, it is important that knowledge and skills being acquired and/or hardware that were put in place continue to function and be beneficial to the targeted beneficiaries. Not only on the renewable energy side, but on the overall energy scene, where there are needs to be able to understand energy efficiency and conservation and what measures needs to be taken to use energy in a sustainable manner as compared to energy misuse and wastages.

Knowledge and skills on agricultural and fisheries best practices and other innovative approaches in addressing food security, water security and measures to reduction of vulnerability to disaster needs to be well established in small communities like in Nauru is very important. Such knowledge and skills can only be acquired through strategic and systematic approaches such as capacity building which target the rural majority of the pacific island countries, and Nauru is no exception. Such capacity building needs to be targeted at levels and strategic training providers within the countries that would have real impact to the rural communities and other level of communities. It might be seen simpler to do this in Nauru, but only during and after implementation will tell, as Nauru have its fair share of pros and cons, even though it might be small in size.

Nauru has a population of 10,481[2] and the younger generation is growing at a rate of. To further enhance their livelihood, knowledge and skills in agricultural and fishing best practices and energy security, including energy efficiency and conservation, needs to be passed on to community youth drop-outs that comprises of the majority of the population.

The purpose of the in-country-mission is to assess or more fittingly map out the baseline of the Technical, Vocational Education and Training (TVET) providers, including any community-based organisation like the Nauru Community Base Organisation (NCBO), in the country, by identifying these TVET and what courses they provide, along with the awards given after completion of each programme.

[2] www.countrymeters.info/en/Nauru

2. Schedule of Consultation Event

Day 1: Monday 20th July 2015
Stakeholders One-to- one Consultations (Refer to Annex 1 Programme)
Day 2: Tuesday 21st July 2015
The opening of the Consultative Workshop was done by the Director of USP – Nauru Centre. This is followed by the introduction of the Workshop, its outline and objectives, the outline of the project and the project objective. The Consultation Workshop went on for 1 day. See attached Programme (Annex 1)

Day 1: Monday 20th July: Stakeholder one-to-one consultation

9:30 am Department of Foreign Affairs and Trade - CEO

A courtesy call to the country's Foreign Affairs Ministry to register to them the purpose of being in the country and gave an outline of the project. There was an appreciation for the Project to take in Nauru as one of the beneficiaries was made by the CEO.

10.00 am Department of Education (Ms Fay Itaia Programme Manager)

The Project was outlined to the Progarmme Manager and it was emphasized that there is a need to have the project established with the Education Department as it is be one of the key stakeholder. The project was welcomed by the Progarmme Manager and looking forward to working closely with the In-country Coordinator (ICC) and the project team members in Fiji. The Programme Manager emphasised the fact that there are only 2 secondary schools in the country and that TVET is new to them. The TAFE Queensland had just established a TVET centre in Nauru, concentrating in Basic mechanical and electrical trades. This could be an opportunity for Nauru.

11:00 am Principal: Nauru Secondary School (Ms. Darrina Kun)

The Project was introduced to the Principal to see how Nauru Secondary School can collaborate. Nauru Secondary School takes in grades 10 to 12. Grade 7- 9 were taken care of by Nauru College, run by the Catholics.

The topic c around course development and course accreditation in CC and SE were discussed

1:00 pm Director of Climate Change (Mr. Reagan Moses)

The Project was introduced and outline to the Climate Change Director. The objective and purpose of the project stated. The Director welcomes the project and shares the same notion that there is something to be done about imparting the basic science of climate change, its causes and effects so that majority of people in Nauru would have some basic knowledge so that they become responsible citizens.

2:30 pm: Nauru Utility General Manager

The Project was introduced and outline to the General Manager. The General Manager welcomes the project and shares the same notion that if talking about developing course on SSE and CC in Nauru, the level has to be very basic so that most can comprehend the concept that could be new to them.

4:00 pm: Director of Coastal Fisheries (NFMR Authority)

Outline of the project was disseminated to the Director, in which he welcomes the project. The nature of operation in term of procurements and related matters were clarified.

Picture 1: Meeting with Nauru Marine Resources Authority

Day 2 – Tuesday 2st July - Training Needs and Gap Analysis

(Venue: Nauru USP Centre)

To start off the Training Needs and Gap Analysis (TNGA), a brief presentation on what a TNGA is was made to give an overview of what is expected from the stakeholder during the TNGA. The Project overview was presented as given in the Programme (refer to Annex 1)

2.1. Project Outline and Presentation

After the opening, an outline of the EU-PACTVET was made, with emphasis on the following aspect of the project:

a. Rationale - current scenario with regards to sustainable energy (SE) and climate change adaptation (CCA) in the P-ACPs and the issues emanating from those scenarios. It was focussed down to the case of Nauru, where there a lot of dependency on fossil fuel for power production, secondary phosphate mining, asylum-seekers sustenance and transportation. On the climate change side of the coin, the P-ACPs are more vulnerable to climate change, but have the least capacity to respond to these.
b. How the EU responded to these issues and the approach it took by focussing on building the capacity and empowering the capacities through benchmarking and the aim of setting standards of competencies and accreditation.
c. The objective and the purpose were state as being taken to try and address the issues
d. The Key Result Area (KRA). Each of the 4 KRAs were outline and it was made know to the stakeholders that one of the activities under KRA 1 is this in-country-assistance on consultative workshop and one-on-one consultation to do a training needs and gaps analysis (TNGA). Activities that need to be conducted in the hope of achieving each of these KRAs were briefly outlined.
e. A brief overview of the budget. This was to give the stakeholders a glimpse of the allocation from the €6.1 million
f. And finally, it was emphasised that the consultation is important in that the Nauru (stakeholders) need to identify its needs so that they could be noted as one of the activities that needs support from the PacTVET project.

3. Key Stakeholders Functions in Nauru

The usual stakeholder presentations with regards to their functions were not done as it was deem not possible due to various factors like the smallness of the administration in Nauru and other related factors. In lieu of that, the approach that was taken is to do a discussion on "*Aspects of key sectors relating to Sustainable Energy and Climate Change*". This was purposely to establish the baseline as to what each of the sectors are engaged in and how does each of these sectors are affected by climate change and how sustainable energy practices are being part of their sectoral policies, which is briefly explored in section 5.

The discussion would be based on each of the three key stakeholders in the project, namely: (i) Energy; (ii) Climate Change and (iii) Education.

3.1. Energy

It must be noted that there is no Energy Office within the government departments. The office that would be responsible is the Nauru Utilities Corporation (NUC) that looks after water and power. All energy matters are handled by the NUC.

Since 2005 electrical power in Nauru has been provided by the Nauru Utility Corporation (NUC) with the exception of the Australian refugee camps and the main processing plant of the Republic of Nauru Phosphate Company (RONPHOS), which both generate their own power. The Republic of Nauru Government imports petroleum which is supplied to all petroleum customers for retailing, explaining the so many fuel (diesel and petrol) stations every 200 - 300 hundred meter along the circumference of the island road. Only RONPHOS does its own importation. Diesel fuel, petrol and jet fuel are stored and distributed by NUC to all users except RONPHOS, which maintains a separate diesel fuel storage facility for industrial use. Two private importers imports and distributes LPG and kerosene.

Nauru is aiming to provide reliable, affordable and sustainable energy for enabling the socio-economic development of Nauru. It includes a target to supply 50% of the total energy use in Nauru from renewable sources by 2015[3]. Whilst trying to improve accessibility, affordability and safety, Nauru is also facing some of it fair share of challenges with regards to it sustainable use of energy. These are outlines in section 6.

The Nauru Government is also looking at improving transport infrastructure and provide reliable and affordable public transport system as means to reduce on it consumption of fossil fuel. Currently there is no public transport system in place in Nauru and the people are using their own vehicle rental vehicles for transportation. Public transportation could lessen the fuel consumption in Nauru as more people travel in one vehicle – number of passenger kilometres per litre of fuel consumed.

Picture 2: Consultation with the NUC General Manager Mr. Aben Sion

[3] Pacific Lighthouse-Nauru

3.2. Climate Change and Disaster Risk Management

The Climate Change in Nauru comes under the President's Office, which is a more strategic location. The office is manned by only one staff, who is the Director of Climate Change.

The climate and weather situations in Nauru is very much tropical as expected, there are very small changes in temperature from one season to another (with its only two distinct seasons – wet and dry seasons) and temperatures throughout the year is fairly constant. Such temperatures are strongly influenced by changes in the surrounding ocean temperature.

It is crucial to understand the climate and the changes in climate in the Pacific region as it affect the daily living of the people in the Pacific, with no exception to Nauru.

The annual maximum and minimum temperatures for Nauru had increased since the 1950. The maximum temperature had increased by $0.18^{0}C$ per decade since 1950, which are global-pattern consistent. Increase in temperature in usually cooler region of the islands mean introduction of pest (animal or plant) that could the agricultural productivity.

There is a show of substantial variation in rainfall from year to year for Port Vila which clearly demonstrated no clear trend as alluded to earlier. There is increase in sea level as warming of the sea continues on, giving rise to increased sea volume. Satellite data and tide gauges gave indications that the sea level in Vanuatu had risen by 6 mm per year since 1993. This is larger than the global average of 2.8 – 3.6 mm per year. Such scenario could be partly due to the ENSO. It is predicted that this trend will continue with sea level rising to 3-17 cm under high CO_2 emission scenario[4].

The ocean as one of the major sinks for CO_2 can absorb one quarter of carbon dioxide emitted through human activities. More CO_2 absorption creates an imbalance of the oceans pH level. The ocean tends to be more acidic. Correspondingly, sea dwelling creature and the reef ecosystems will experience the imbalance and their survival is at stake. The level of acidity of the ocean is predicted to continue to rise, by three different CO_2 emission scenarios.

Adverse effects of climate change would need to be known and understood so that any adaptation strategies or measures can be effective.

[4] Pacific Climate Change Science – Current and Future Climate of Nauru

Changes in the climate and weather patterns affect the production and consumption pattern of energy. Wide-spread understanding on this is important as measure or strategic approaches can be taken to minimize energy losses and be able to meet the energy demand of the Nauru population.

There is a need for a sustainable consumption or utilisation of different forms of energy, so that energy is available for consumption during times of natural disaster. Not only that, but disaster risk management plans for Nauru must be in place to be administered.

Nauru has an act of Parliament that provides for Disaster Risk Management and Related Matters in Nauru on an even of a disaster. It spells out the roles of various authorities and gave power to certain designated officials to be responsible on certain aspect within the Nauru Disaster Risk Management Plan.

It was understood that the Climate Change Office and the Nauru Disaster Authorities are doing some community awareness programmes on the island. This is a good community educational programme that needs to be supported and taken new dimensions.

3.3. Ministry of Education

The Government of Nauru values its human resources and commits to train and educate the people as means to "prepare and equip Nauru's future generations for the challenges ahead".

Nauru Education Department's Mission[5] is to ensure that;

> Every Nauruan is literate and numerate and recognizes the importance of, and the right to education.
> There is access to, and equity in education and training and that standard are comparable to the highest in the region, and
> To ensure that students leave the Nauruan education system enriched and equipped to be productive members of the workforce, to be qualified, to access further specialized training opportunities outside Nauru and to be independent individuals.

The Department of Education envisions to nurturing students in Nauru to achieve academic excellence through training to develop Nauru's future leaders and entrepreneurs.

Its goals are outlined under the National Sustainable Development Strategy (NSDS) (2005-2025) which states[6]: "*The Framework for learning and environmental development in the Education Sector through the Footpath for Education and Training Strategic Plan for 2008-*

[5] http://www.naurugov.nr/government/departments/department-of-education.aspx
[6] National Sustainable Development Strategy – Nauru (2005 – 2025)

2013, will lead students from Secondary School to leave school as a confident citizen to live and contribute to the Country's complex and global networked society."

The Department of Education is the vehicle of commitment and opportunity to provide excellent and quality lifelong learning for all.

Climate change is a cross-cutting issue and of course it does affect the education sector in many ways. It is pivotal in the way we make decisions regarding educational matters, including course designing; teacher training; teaching facilities and the requirements from parents and the employers.

Incorporating climate change into the primary and secondary curriculum would see a more basic-climate literate early schooling pool of children that when they move up to the higher education and TVET level, their mind-sets have the baseline that would be easier to introduce climate change issues to. Having to develop stand-alone CC or Sustainable Energy courses would be good too as it would give in-depth facts on CC and provide pathways to further training and employment as CC practitioners for Nauruans.

3.4. Other Stakeholders

Nauru's other Government services needs to be explored because they are equal partners when it comes to climate change and disaster risk reduction. A brief statement on each sector is given as follows:

3.4.1. Agriculture and Quarantine

The NSDS had vow to increased level of domestic agricultural production aimed at addressing food security and health in Nauru. The Republic of China (Taiwan) Technical Assistance Mission is embarking on trialling out different varieties of vegetable (cucumber, tomatoes; lettuce; Chinese cabbage, to name a few), to see which varieties can withstand drought and the Nauru soil which is high in phosphate concentration (higher than the normal soil concentration for such crops to grow). Progresses are made and there are promising signs for local subsistence farmers to take up small-scale farming around their houses.

Picture3: Taiwanese Technical Assistance Mission to Nauru Farm Cucumbers can be grown

3.4.2. Fisheries

Enhance development and sustainable management of marine and fisheries resources to provide sustainable economic returns

Ocean is the largest CO_2 sink. Nauru's exclusive economic zone (EEZ) covers a total area of 430,000 km^2, and this much ocean surface is acting as the natural sink for CO2. CO2 is being absorbed by the ocean via the physicochemical and biological processes. In Nauru, slow increase in ocean acidification since the 18^{th} century[7], is slowly impacting on the coral reefs and the fish and other marine resources used as food (source of protein).

Coastal erosion can result in washing away of breeding grounds for fish and seashells. Coral bleaching due to increased ocean acidification – hence depletion of coral reef-fish species and other marine lives

3.4.3. Tourism, Traditional Leadership & Culture

The Government of the Republic of Nauru saw the need to promote development of small-scale sustainable eco-tourism. Alongside this the promotion of a healthy, socio-cultural, inclusive, cohesive and self-reliant community with sustainable livelihoods be attained

[7] Pacific Climate Change Science Program: Current and the Future Climate of Nauru

3.4.4. Water & Sanitation and Waste & Sewerage

The Government of the Republic of Nauru vows to provide a reliable, safe, affordable, secure and sustainable water supply to meet socio-economic development needs of the people of Nauru. This must go in parallel with the need for effective management of waste and pollution that minimizes negative impacts on public health and environment.

4. Consultation Methodologies

In trying to maximise output various methods of consultation were employed in this in-country mission. Determining which methodology to use depend on various factors like availability. The following are the methods employed to capture the required data during the in-country mission in Nauru:

4.1. Consultative Workshop/Meeting (TNGA)

A consultative workshop is a consultation with stakeholders in a venue where the agendum for discussion or consultation is done for all at once. This was the methodology employed in the last two days during this in-country mission. This methodology was employed because it used the forum to draw ideas, discuss and consolidates them.

4.2. One-to-one Consultations (Interview)

In a situation where stakeholders cannot make it to the consultative gatherings, due to other commitments, a one-to-one or face-to-face meeting or interviews are done. This was also employed where a number of stakeholders like the Directors, Managers and others cannot attend the Consultative workshop. This methodology was employed on the first day and last 3 days, where a schedule was made for the consultation team to meet various stakeholders like the relevant Government official.

4.3. Phone calls

In situations that the stakeholders are busy (but virtually can respond to questions) and that one cannot make it due to travelling time constraints, phone interviews is probably the best option. It is versatile because you can probe question at different angle and can ask supplementary or follow-up question.
In Nauru this method was done to consolidate or confirm what was not clear.

4.4. Internet – Online

This was used for searching for further information or publication of Reports or Policies and Strategies. It was also employed to confirm or double-check on information given.

4.5. Desktop Literature Review

This forms the basis for evaluating report or information found in the literature related to technical, vocational education and training with the subject of sustainable energy and climate change as the content. Various literatures were consulted, within the education, energy and climate change sectors (and all climate change related sectors), on policy frameworks and national action plans or development strategic plans. Most Policy frameworks (regional and national) were reviewed and those were used as the basis for consolidating future SE and CCA demands or needs in Nauru.

5. Relevant National Policies and Frameworks

All national and regional policy frameworks and their Action Plan set out principles and suggested initiatives designed to guide and support the development and implementation of national activities and programmes consistent with the these policy frameworks' visions and goals. This is the true for regional island countries, including Nauru

The Forum Leader's endorsement of the Pacific Islands Framework for Action on Climate Change in 2005 and the Framework for Action on Energy Security in The Pacific (FAESP) in 2010, demonstrated that sustainable energy and climate change adaptation are therefore top priorities for Pacific Island governments.

The 9th Pacific Forum Education Ministers' Meeting in May 2012 in Port Vila, on the session of Regional Framework for TVET Development, contextualised that TVET could be the solution to key issues/challenges pelts out in the Pacific Education Development Framework (PEDF), Education for All, MDG and cross-cutting regional and national development issues.

5.1. Education Sector

Since the education sector is one of the major actors in this project, relevant national education policies and frameworks have to be visited to be sure of being guided by their bounds.
Under the Pacific Plan, the Forum Leaders recognise that a majority of youth population in the Pacific has not gained sufficient employment skills to lead productive lives. TVET could provide an opportunity for these young people to gain these productive skills.

At the national level, within the education sector in Nauru there are various policies, frameworks and action plans that are put in place a roadmaps in guiding Nauru to progress forward in a sustainable manner. The "Partnership Schedule" is the existing relevant guiding document for the Nauru education sector. The Implementation Strategy to the "*Schedule to the Nauru/Australia Partnership for Development*" for the Partnership Priority Outcome 2, is

Improved education. This document is called the "Nauru Education Strategy". One of the aims of the Partnership schedule is, "Increased number of students graduating from regionally recognised tertiary, and technical and vocational training courses. The Partnership will assist the Government of Nauru to develop, establish and maintain an education system that provides full enrolment in and completion of basic education. It will also assist the Government of Nauru to increase the number of Nauruans gaining locally, regionally and internationally recognized professional, technical and vocational skills in areas of industry, commercial and public sector demand both locally and abroad.

5.2. Energy Sector

The Nauru Energy Road Map (NERM) was endorsed in 2014. The NERN 2014 – 2020 aims to emphasize related energy issues outlined in the National Sustainable Development Strategy 2005 - 2025 (revised 2009) and the National Energy Policy Framework (NEPF) of 2009.

Nauru's overall vision of "*A future where individual, community, business and government partnerships contribute to a sustainable quality of life for all Nauruans*" is the goal of the NSDS, the NEPF and that of the Nauru Energy Road Map.
The Nauru Energy Road Map aims to:

Contribute to the long-term development goals of a stable, trustworthy, fiscally responsible government;
Provide an enhanced social, infrastructure and utilities services;
Develop an economy based on multiple sources of revenue;
Rehabilitate mined out lands for livelihood sustainability; and
Develop domestic food production.

Given its aims the NERM expect to have a more efficient, robust and well-resourced institution that can provide universal access to a reliable, affordable, safe and efficient power supply employing sustainably sound financial and management systems.

5.3. Climate Change

The National Sustainable Development Strategy (NSDS) 2005 – 2025 (revised 2009) envisioned to build a future "a future where individual, community, business and government partnerships that contribute to a sustainable quality of life for all Nauruans".
The 2009 Review of the NSDS identifies the main factors which have prevented the milestones from being achieved is lack of Capacity in many areas of Government institutions including finance and audit, law and order, development planning and public administration, let alone the education sector and climate change/environment and energy sectors.

The 2005 NSDS that was reviewed in 2009 identified some areas that have been significantly strengthened with new NSDS Strategies and Milestones, among other on environmental issues. The original NSDS coverage on environmental issues was limited to rehabilitation of mined out areas in topside. This is seen as just one-off the many environmental issues, since other issues closely related to climate change were not addressed such as the need to build resilience to climate change and formulation of a comprehensive law on environmental management that would include a requirement for new projects to be assessed for their environmental impact. The 2009 NSDS review addressed this issue.

With respect to regional and international platforms, Nauru's environmental processes are also guided by the following policies and framework:

a. United Nations Framework Convention on Climate Change
b. United Nations Convention on Biodiversity
c. Pacific Island Framework for Action on Climate Change 2006-2015 (PIFACC)
d. Regional Framework for Action for Disaster Risk Reduction and Disaster Management 2005 -2015 (status/document?)

All these Policies, strategies and action plans were advocating on the tune of safeguarding the natural resources for present use and for the future generation so that the Nauruans would be less exposed and more resilience to the impact of climate change.

From the predictions[8] on continual sea level rises; increase in temperature and increasing ocean acidification, there would be new and additional challenges faced by Nauru. This would require effective policies and resources in building their capacities to be able to face these new challenges.

6. Consultation Analysis

6.1. Training Needs and Gaps Analysis (TNGA)

This is a method of determining if training needs exits or not. It is a systematic approach to identify status of Education providers, including the technical, vocational education and training (TVET) in Nauru to identify if the objectives/goals to meet the needs of the industries in Nauru were forthcoming or not. If there are needs and gaps identify then there is a training need.

The Training Needs Analysis was conducted and tabulated in the Matrix shown in Annex 2. This is the Demand and Supply Matrix for Climate Change (Annex 2a). Demand and Supply Matrix for the Energy sector is presented in Annex 2b.

[8] Pacific Climate Change Science Program: Current and the Future Climate of Nauru

Prior discussion on issues face by the 3 key stakeholders with regards to climate change and sustainable energy was done and the following are some points raised:

- The capacity to prepare project proposals and provide project management for renewable energy projects is limited.
- Energy mandate is not centralised in one government institution.
- High logistics cost to access to the island can give high cost to energy infrastructure and energy pricing.
- Land tenure issues may be a problem for largescale installations of solar PV grid-connect.
- Nauru's high ambient temperatures, moisture, coral dust and high levels of atmospheric salt create a difficult environment for electrical and mechanical equipment.
- Technical capacity for maintenance and repair of mechanical and electrical items is lacking.
- Limited knowledge of renewable energy at decision-making levels in the government.
- Lack of a realistic and well-defined action plan to achieve fuel import reduction targets.

Picture 4: During the Training Needs Analysis group discussion

6.2. The Training Providers (Supply)

Nauru has only 1 high secondary school and 1 lower (junior) secondary school. These secondary school concentrates on the normal academic subject streams like, mathematic, English, Social Science and Science. Social Science and Science streams incorporate aspects

of climate change and sustainable energy as different topics taught throughout the semesters in the schools.

Queensland Technical, Advance Further Education (TAFE) TVET program had recently being set up in Nauru. This TVET mainly concentrate in electrical and mechanical to work in trades, as Nauru has been bring in tradesmen from other neighbouring Pacific Island countries to work in the rehabilitation scheme in the island.

6.3. Present and Future Market Demand

In consultation with the stakeholders in Nauru, a list of workforce training needs and priority sectors for skill development were captured. The matrix presented here provides some of the skills on demand by the Industries in Nauru that could be addressed by a TVET provider in Nauru or in the region for Nauruans. Skills could be categorized into three distinct types as presented in the following table. These are the knowledge, skills and attributes that are on demand at present and will be on demand in the future in Nauru.

Type of Skills	Description	
	Sustainable Energy	*Climate Change Adaptation*

Knowledgebased
Knowledge of specific subjects, procedures, and information necessary to perform particular tasks Such knowledge-based skills are acquired through education, training, and on-the-job experience
	• Electrical Appliances O&M skills
	• Energy Efficient building designing and construction skills
	• Air conditioning and Refrigeration maintenance skills
	• Solar PV system sizing skills
	• Solar PV systems O&M skills
	• Energy Auditing skills
	• knowledge of different types of renewable energy Resources
	• Operation and & Maintenance Skills of electrical appliances
	• Building Construction Design Skills
	• Electrical wiring
		• CC Adaptation & DR Assessment skills.
		• Food security (Agriculture & Fisheries)
		• Water security
		• Weather Patterns & Climate Variability
		• Crop Resilience
		• Fish Species & Breeding Cycle
		• Marine Conservation
		• Soil and Nutrition Analysis
		• Traditional Knowledge
		  • Knowledge-based skills on fish species and breeding cycles.
		  • Knowledge-based skills on sustainable fishing methods Food Preservation

Transferable/Functional Skills *These are actions taken to perform a task, transferable to different work functions and industries and the skills are based on ability and aptitude*	• Communication Skills • Analyzing skills • Public Speaking skills • Organizing skills • Planning Skills • Report Writing Skills • Research Skills	• Creative and Innovative skills • Administrative skills • Coaching & Mentoring skills • Project Management • Listening skill
Personal Traits/Attitude *Traits or personality characteristics that contribute to performing work. Such skills are developed in childhood and through life experience*	• Hard worker • Interpersonal skills • Dependable • Positive • Self-motivated • Leadership skills	• Patience Skill • Diplomatic Skills • Result-oriented skills • Independence skills • Flexible • Confident

Table 1: Skills identified to be on demand

7. Consultation Recommendation

The Nauru consultation findings are presented in the section 6 and tables in Annex 2. Both climate change/disaster risk and sustainable energy issues were documented. Those issues that can be addressed administratively are also listed and it would not be given a solution in this report, but for the sake of highlighting them, they were pointed out and in one way or another, collaborative efforts with the Government of Nauru and other scheme could address them. From these issues (identified training needs), the stakeholders recommended the following strategies outlined in section 7.2 as means to addressing them.

7.2. Preliminary Recommendation

After the consultation and the Training Needs Analysis Workshop, the following recommendations were made in which two (2) Options were given as follows:

Recommendation 1: Established a Course on Climate Change at a very basic level and the following areas needs to be emphasized:

Drought tolerant plants
Traditional knowledge
Water conservation methods
Coastal monitoring
Land-use planning skills
Project Proposals
Negotiating Skills in international CC fora (Basic)
Marine – Coral monitoring (secondary school level)
Water indicators/drought management
Ocean acidification identification
GIS Training
Customized surveying in biology transects

Recommendation 2: Establish training Programme for Communities on Community-Based Climate Change Skills Set. The training programme must emphasize, but limited to, the following areas but at a very basic level:

Drought tolerant plants /Drought management
Traditional knowledge (Food security, Climate and weather patterns)
Water conservation methods
Coastal monitoring
Land-use planning skills
Water conservation and rainwater harvesting

Recommendation 3: Established a Course on Sustainable Energy at a very basic level and the following areas needs to be emphasized:

i. Renewable Energy Resources

Concept of wind power systems (off/on grid), best systems for Nauru, how to install and operate the system, Repair & Maintenance of units.
Concept of solar powered systems (off/on grid), best systems for Nauru, how to install & operate the system, Repair & Maintenance of units.

ii. Energy Efficiency measures

Training in Energy Auditing techniques.
Training in Repair & Maintenance of IT, phones & radio hardware & software.
Training on Repair & Maintenance of Reverse Osmosis & Water Pumps.
Water Quality Training
Training on repair & maintenance of industrial & residential electricians
Concept of & Repair & Maintenance of Heavy machineries, generators, plant & equipment & Power tools
Concept of Electric Appliances i.e. microwave, stove, rice cooker, toaster and Repair & Maintenance including knowledge on energy efficient appliance
Concept of ozone layer friendly & energy efficient white goods i.e. fridges, freezers, A/Cs and Repair & Maintenance.

iii. Project Management

Communications Skill and Strategy
Research and data collection methodologies against indicator(s) on national analysis on carbon foot print
Project Proposal writing
Project Report Writing

So basically, the recommendations are on Climate Change requirements both for anticipated grade 12 leavers and below grade 10 push outs. For recommendation 3 there are three requirements: (i) Basic renewable energy (Solar and wind system designing, installation and operation and maintenance; (ii) Energy Efficiency and (iii) Project Management

8. General Outlook of TVET in the Nauru

The Nauru Energy Road Map (NERM), the National Sustainable Development Strategy (NSDS) and the Nauru Education Strategy (NES) in collaboration with the regional frameworks can, if commitments at the national level, pave way forward to a vibrant technical, vocational education and training programme (TVET) that will address the requirements of the people in Nauru.

Nauru aims at creating more opportunities for young people to be trained to acquire employable skills related to the field of sustainable energy and climate change and disaster risk management as spelt out in the NSDS.

The targets of the Energy Road Map are based on existing targets in the NSDS and on guidance from the NEPF and the Nauru Government.
The targets are:

i. 24/7 grid electricity supply with minimal interruptions
ii. 50% of grid electricity supplied from renewable energy sources
iii. 30% improvement in energy efficiency in the residential, commercial and government sectors

With the improving governance and departmental administration, the policies and strategies should be able to be implemented in a hope of achieving a
individual, community, business and government partnerships contribute to a sustainable quality
.

A new outlook for Nauruan can be attained through the education process, in other non-curricular mentoring and counselling on the importance of education and in particular "knowledge" in livelihood sustenance. Now that the Queensland TAFE in in Nauru, which is the beginning of the new era in Nauru - an era that would see human resources building – where all technical jobs and supervisors post are controlled by the locals.

With all the knowledge based skills, the functional skills and those skills acquired through individual experiences, aided by the policies and strategies, TVET in Nauru, in the years to come, would be looking good in producing graduates that are work-ready and such employable mass of TVET graduates will contribute in shaping the job market in the country by inducing the businesses and industries in creating new jobs, in a hope to increase productivity, hence increase economic activities that is translated down to every household in Nauru. By then the goal of the NSDS would be realised.

Picture 5: Remaining of the phosphate mining pinnacles

Annex 1. Nauru TNGA Consultation Programme

Date	Stakeholder/Activities	Facilitator
Mon 20th July 9:30 am 11: 00 am 1:00 pm 2:30 pm	**Meeting with Key Stakeholders** **Department of Foreign Affairs and Trade (CEO)** **Department of Education (Programme Manager)** **Nauru High School – (Principal)** **Climate Change Office (Director of Climate Change)** **Energy Office (Nauru Utilities) – CEO** **Nauru Fisheries and Marine Resources Authority – Director Coastal Fisheries**	
Tue 21st July 2015	**Workshop**	
Time	Activities	Facilitator
08:30hrs	Registration	Mr Tyrone/Alamanda
09:00hrs	Workshop Opening	Director
09:15hrs	Welcome and Introduction to Workshop ❖ Outline EU-PACTVET Project ➢ Outline Rationale ➢ Objectives/Purpose ➢ Country Expectation	Nixon Kua – Nauru USP Centre Director
9:45hrs	Stakeholders Presentations (15 minutes minimum– 20 minutes maximum) 1. Education Sector 2. Energy Sector 3. Climate Change Sector **4.** Representative from the Industries	**Nixon Kua/ ICC**
10:45	**Tea Break**	
11:00 hrs	Presentation: (Training/Technical) Needs and Gaps Analysis – Basic Outline	
11:20 hrs	**Group Work: National Training Needs Assessment in SE and CCA.** Groups: **Participants are divided into 3 Groups:** 1. **Group 1: Sustainable Energy/Industries** 2. **Group 2: Climate Change Adaptation –** **3. Group 3: Education Sector**	Nixon Kua/ICC

	<u>Group Tasks</u>: **<u>Group 1 Discussion Topic</u>**: "Gauge the technical SKILLS and KNOWLEDGE required/demanded by the industries in the Vanuatu, present and future. Rank them in order, from HIGH DEMAND to LOW DEMAND. **<u>Group 2: Discussion Topic</u>**: "Gauge the technical SKILLS and KNOWLEDGE (relating to CC) that are required/needed for communities (both rural/ remote and urban) to be better equipped to adapt to the adverse effects of Climate Change" **<u>Group 3: Discussion Topic</u>**: "Identify technical Institutions in the country (formal and non-formal) that provide formal and informal technical skills in SE and CCA. List down the following: 1. Institutions; 2. Course; 3. Duration; 4. Award; 5. Accrediting Agency; 6. Etc….	
12:20hrs	Lunch Break	
12:50 hrs	**Resume Group Work** Merge into two Groups. Education Group (Group 3) to divide into two and join the Energy (Group 1) and CC groups (Group 2) Work in 2 groups. Group 1: - Develop a Supply and Demand Matrix or Course Providers and KS Matrix for SE Group 2: - Develop a Supply and Demand Matrix or Course Providers and KS Matrix for CCA	Nixon/ICC
14:45 hrs	Tea Break	
15:00hrs	Group Presentation of TNA	Nixon
16:00 hrs	Discussion of the Findings	ICC/Nixon
17:00 hrs	**End of Workshop**	**ICC**
Wed 22nd	**Follow up meetings with Key Stakeholders and Matters arising**	**Nixon**
Thu 23rd	**Follow up meetings with Key Stakeholders and Matters arising**	**Nixon**
Friday 24th	**Visit to the Taiwanese Technical Mission Demonstration Farm**	**Nixon/ICC**

Annex 2: Training Needs and Gap Assessment - Matrix

Annex 2a: TNGA Matrix - CCDRR

Identified Climate Change Skill	Responsible Parties	Activities	Remarks	Level of Priority
Literacy and Numeracy	▪ Education ▪ USP ▪ Climate Change Office	Basic English Basic Mathematics and Basic Communication Skills	Ongoing USP Centre Continuing Education Program Could be used as pre-requisite to Certificate Courses in CC and SE for lower secondary school dropouts	1
Develop skills set for assessment of Climate Change impacts	AusAID TVET Education (include in secondary curriculum)	Marine – Coral monitoring (secondary school level) Water indicators/drought management Ocean acidification identification GIS Training Customized surveying in biology transects Project Proposals	Can be mainstreamed into the curriculum Certificate I or II, taking the courses identified as the units. Some aspects of these courses are found at the different levels of education but needs to be highlighted These courses identified are along the lines of what should be found in the different levels of education	2
Community Skill Set	Climate Change talk show AusAID TVET Agriculture/Taiwan Technical Mission	Drought tolerant plants Traditional knowledge Water conservation methods Coastal monitoring Land-use planning skills Project Proposals Negotiating Skills in international CC fora (Basic)	Target Group are the early school dropout (Below Grade 10)	2
Sustainable Climate Change and DRR Awareness Programs to Communities and schools (both Primary and Secondary)	Climate Change Unit Media Education Department	Media- national issues connect to international developments Mainstream Climate Change across Gov't Dept. Link current events to Climate Change Introduce Climate Change day for awareness	Targeting Communities; Secondary and Primary Schools.	3
Climate Change Negotiation Skills – Community/Schools	TVET Climate Change Unit	Linkages of National to International agreements	Targeting Government Officials	3

Annex 2b: TNGA Matrix – Sustainable Energy

Issues	Training Needs	Course/Output Required
Awareness on energy conservation	Communications Skill and Strategy	Public relations
Research & Data Collection	Research and data collection methodologies against indicator(s) on national analysis on carbon foot print	Introduce to HIES/CENSUS?
Energy Auditing	Training in Energy Auditing techniques.	Qualification in EA techniques.
Communications i.e. IT, phones & radio	Training in Repair & Maintenance of IT, phones & radio hardware & software.	Qualification in Repair & Maintenance of IT, phones & radio hardware & software.
Reverse Osmosis, Water Quality Testing & Water-Pumps	Training on Repair & Maintenance of Reverse Osmosis & Water Pumps. Water Quality Training	Qualifications Repair & Maintenance of Reverse Osmosis & Water-Pumps. Qualification in Water Quality Testing.
Solar Power System (panels, backup batteries, inverters, regulators)	Concept of solar powered systems (off/on grid), best systems for Nauru, how to install & operate the system, Repair & Maintenance of units.	Qualifications on use & Repair & Maintenance of solar powered systems (off/on grid). Reduce carbon foot print, electricity bills.
Heavy machineries, generators, plant & equipment & Power tools	Concept of & Repair & Maintenance of Heavy machineries, generators, plant & equipment & Power tools	Qualifications on use & Repair & Maintenance of Heavy machineries, generators, plant & equipment & Power tools
Electrical (Industrial/residential)	Repair & Maintenance of industrial & residential electricians.	Qualifications in industrial/residential electricians.
Electric Appliances i.e. microwave, stove, rice cooker, toaster, etc.	Concept of Electric Appliances i.e. microwave, stove, rice cooker, toaster and Repair & Maintenance.	Qualifications on Repair & Maintenance of Electric Appliances i.e. microwave, stove, rice cooker, toaster, etc.
Wind power system (panels, backup batteries, inverters, regulators)	Concept of wind power systems (off/on grid), best systems for Nauru, how to install and operate the system, Repair & Maintenance of units.	Qualifications on use & Repair & Maintenance of wind power systems (off/on grid), best systems for Nauru. Reduce carbon foot print, electricity bills.
Ozone layer friendly & energy efficient white goods i.e. fridges, freezers, A/C, etc.	Concept of ozone layer friendly & energy efficient white goods i.e. fridges, freezers, A/Cs and Repair & Maintenance.	Qualifications on Repair & Maintenance of ozone layer friendly & energy efficient white goods i.e. fridges, freezers, A/Cs. Reduce carbon foot print, electricity bills& promote use.
Solar powered hot water systems	Concept of solar systems (off/on grid), best systems for Nauru, how to install and operate the system, R&M of units.	Qualifications on use & Repair & Maintenance of solar powered hot water systems. Reduce carbon foot print, electricity bills.
Vehicles, vessels, motorcycles	Repair & Maintenance of VHs, VEs, MOs	Qualifications on Repair & Maintenance of VHs, VEs & MOs

Training Providers

The only training institute identified in the study for Nauru was the Nauru APTC as shown in Table TP1. The head office of APTC did respond and advised that they do not conduct any relevant courses within Nauru.

Table TP1: Institute Identified in Nauru

Name of Institute	Contact People	Position	E-mail	Phone
APTC Nauru Campus			formosa.halstead@aptc.edu.au	+674 557 3380 ext. 207 Fax +674 557 3382

Since there was no relevant training institute, there is no TVET capabilities information.

Only 1 previous training courses has been identified and it was a grid connected PV systems training course conducted in 2012, however GSES will be conducting a PV Grid Installation and Maintenance course in Nauru in July 2015 (funded by IUCN) and information on this course is provided in Appendix 6.

The grid connect PV course to be conducted by GSES, a company that is a Registered Training Organisation in Australia. Those who pass this course are eligible to apply for industry certification under the Pacific Power Association (PPA) and Sustainable Energy Association of Pacific Islands (SEIAPI) certification and accreditation program

Pacific Community
Communauté du Pacifique

EUROPEAN UNION

USP
THE UNIVERSITY OF THE SOUTH PACIFIC

EU PacTVET

European Union Pacific Technical and Vocational Education and Training on Sustainable Energy and Climate Change Adaptation Project

Niue Training Needs and Gap Analysis

Conducted and Compiled by: Leigh-Anne Buliruarua

Table of Contents

1. Background

The 10th European Development Fund European Union Pacific Technical and Vocational Education and Training on Sustainable Energy and Climate Change Adaptation (European Union PacTVET) project is component three within the broader regional Adapting to Climate Change and Sustainable Energy (ACSE) programme.

The project builds on the recognition that energy security and climate change are major issues that are currently hindering the social, environmental and economic development of Pacific - African Caribbean and Pacific (P-ACP) countries.

1.1 EU PacTVET Objectives

The general objective of this project is to enhance sustainable livelihoods in P-ACPs. Sustainable livelihoods are a high priority for Pacific Island communities and governments alike. They are central to current development policy including resource management and conservation but also in emerging policy to meet threats such as climate change. The project aims to enhance Pacific regional and national capacity and technical expertise to respond to climate change adaptation (CCA) and sustainable energy (SE) challenges.

The project is being implemented by the Secretariat of the Pacific Community (SPC) in partnership with the University of the South Pacific (USP) over a period of 53 months from August 2014 with an overall budget of EUR 6.1 million. It will achieve the following results:

1. Assess national training needs in SE and CCA and existing informal and formal TVET training courses and training and education providers are identified and strengthened
2. Develop and implement benchmarks, competency standards and courses on Training of Trainers (ToT) and create a pool of national trainers
3. Develop and establish training courses and support facilities within TVET institutions
4. Strengthen networking in SE and CCA

The project is being implemented in a sequential approach. Result 1 activities will provide a more detailed/clearer understanding of countries' needs and their requirements from the project. The activities under Results 2 and 3 will be then be tailored to the country needs. This report feeds into result area 1.

1.2 Location

The EU PacTVET project will be implemented in the Pacific region comprising of 15 Pacific ACP countries: Cook Islands, Federated States of Micronesia (FSM), Fiji, Kiribati, Nauru, Niue, Palau, Papua New Guinea, Republic of Marshall Islands (RMI), Samoa, Solomon Islands, Timor-Leste, Tonga, Tuvalu and Vanuatu.

Climate change is affecting the livelihoods of the P-ACP communities causing varying degrees of adversity depending on location.

1.3 Context

Current total global greenhouse gas (GHG) emissions stand at 36.9 gigatonnes of CO2 (GgtCO2). Of this global GHG emission, Pacific Island countries emit less than 0.03% yet they are amongst the most vulnerable to adverse effects of climate change - the first to be exposed and the least able to respond. Hence there is a moral obligation for the island countries to start implementing measures to not only mitigate GHG but also adapt to climate imposed environmental change, and prepare for future adaptation measures. At the national level, the Niue's annual GHG emission is insignificant on a global scale.

In spite of efforts to reduce Pacific-African Caribbean and Pacific (P-ACP) countries reliance on fossil fuels and improve energy security almost all Pacific Island countries remain highly dependent on imported petroleum products for energy generation and transportation, which are the two major petroleum consumption sectors in the region.

With the Pacific Island countries facing challenges posed by climate change and energy security, sustainable energy and climate change adaptation are undeniably ranked above all other sectors in regional priorities, as evident through regionally endorsed frameworks, such as the wider Pacific Plan and the more specific Pacific Islands Framework Action on Climate Change (PIFACC) and the Framework Action on Energy Security in the Pacific (FAESP) and individual national policies.

Efforts in addressing energy security and climate change adaptation challenges are ongoing through various regional and national projects. On climate change mitigation, there were some familiar projects such as the Pacific Islands Greenhouse Gas Abatement through Renewable Energy Project (PIGGAREP) that addresses mitigation and Pacific Adaptation to Climate Change (PACC) that focused on climate change adaptation. The PIGGAREP was focussing on complementing PICs initiatives in promoting the widespread use of renewable energy in the regions and PACC focused on three thematic areas, namely, "Food security"; "Water Security" and "Coastal Management" - assisting communities to implement activities that help them in these three areas. Additionally the University of the South Pacific's European Union Global Climate Change Alliance project has been active in all 15 P-ACPs enabling climate change adaptation by formal and informal education, direct community engagement and applied research. Sustainability of such projects is very important. Now that these projects are coming to their end, it is important that knowledge and skills being acquired and/or hardware that were put in place continue to function and be beneficial to the targeted beneficiaries. Not only on the renewable energy side, but on overall energy services, where there needs to be awareness and improvements to energy efficiency and conservation and what measures needs to be taken to use energy in a sustainable manner as compared to energy misuse and wastage.

Niue's remoteness, as well as cultural and linguistic differences between its Polynesian inhabitants and those of the adjacent Cook Islands, has caused it to be separately administered by New Zealand. The population of the island continues to drop (from a peak of 5,200 in 1966 to an estimated 1,229 in 2013) with substantial emigration to New Zealand 2,400 km to the southwest.

The economy suffers from the typical Pacific island problems of geographic isolation, few resources, and a small population. Government expenditures regularly exceed revenues, and the shortfall is made up by critically needed grants from New Zealand that are used to pay wages to public employees. Niue has cut government expenditures by reducing the public service by almost half. The agricultural sector consists mainly of subsistence gardening, although some cash crops are grown for export. Industry consists primarily of small factories to process passion fruit, lime oil, honey, and coconut cream. The sale of postage stamps to foreign collectors is an important source of revenue. The island in recent years has suffered a serious loss of population because of emigration to New Zealand. Efforts to increase GDP include the promotion of tourism and financial services, although the International Banking Repeal Act of 2002 resulted in the termination of all offshore banking licenses. Economic aid allocation from New Zealand in FY13/14 was US$10.1 million. While in the process of rebuilding, Niue has been dependent on foreign aid.

The annual average temperature on Niue is around 24°C. Changes in the temperature from season to season are relatively small (4°C difference between the warmest and coolest months) and strongly tied to changes in the surrounding ocean temperature. The country has two distinct seasons – a warm wet season from November to April and a cooler dry season from May to October. Increase in extreme rainfall, increase in intensity of cyclones and mean sea level rise – these are but a few of the likely main impacts of climate change on Niue.

2. Schedule of Consultation Events

Day One – Wednesday, 24th June, 2015

The workshop was facilitated by the Project Management and Coordination Unit (PMCU) of the Prime Minister's Office, Niue Government, Department of Education and the Niue In-Country Coordinator.

A welcoming address was made by the Secretary to Government, Mr Richard Hipa, following which, the workshop was officially opened by the Minister for Social Services (Education, Health, Justice, Lands, Survey & Community Affairs & Taoga Niue), Hon. Pokotoa Sipeli..

2.1. Project Outline and Presentation

1. An overview of the PacTVET project was presented, with emphasis on the following aspects:

- Rationale - current scenario with regard to sustainable energy (SE) and climate change adaptation (CCA) in the P-ACPs and the issues. At a national level there is dependency on fossil fuel for power production and transportation. On the climate change side, the P-ACPs are more vulnerable to climate change, but have the least capacity to respond to these.
- How the EU PacTVET project intends to respond to these issues by focussing on building the capacity based on country needs - recognising skills acquisition by benchmarking and defining country-requested competencies and accreditation.
- The Key Result Area (KRA). Each of the 4 EU PacTVET KRAs were outlined and it was made known to the stakeholders that one of the activities under KRA 1 is this in-country consultative workshop and one-on-one consultations for the training needs and gaps analysis (TNGA). Activities that need to be conducted in the hope of achieving each of these KRAs were briefly outlined.
- A brief overview of the budget. This was to give the stakeholders an outline of the allocation from the €6.1 million.
- And finally, it was emphasised that the consultations are important to aid the Niue stakeholders in identifying national needs to frame future EU PacTVET activities.

2.2. Stakeholders' Functions Outlines.

The Project outlining was followed by brief presentations from each of the stakeholders on the topic "Aspects of each Sector relating to Sustainable Energy and Climate Change – capacity and technical expertise on demand by industries and communities but lacking from the supply side". This was purposely to establish the baseline as to what each of the sectors are engaged in and how does each of these sectors are affected by climate change and how sustainable energy practices are being part of their sectoral policies.

The training needs and gaps identified would be outlined in the latter sections, but outline below is the summary of the different sector's functions and relationships with SE and CCA.

<u>Disaster Risk Reduction-Niue's Position linkage to Sustainable Energy & Climate Change Adaptation – Secretary to Government, Mr Richard S Hipa</u>

Under the Niue National Strategic Plan Vision – 'to build a sustainable future that meets our economic and social needs while preserving environmental integrity, social stability and the Niue culture. The NNSP has 7 national development pillars; financial stability, governance, economic development & maintain crucial infrastructure, social, natural resources, environment & climate change, taoga Niue & private sector development.

Environment Pillar – sustainable use and management of Niue's natural resources and environment for present & future generations. Strategies for Environment;

- Environment - Administer the Environment Act to ensure the threats to Niue's pristine natural environment, fauna and floral species and natural resources are minimised, preserve and/or conserve;
- Agriculture-ensure the sustainable use and management of the land, soil, animals and plant genetic resources;
- Fisheries/Marine Resources-enhanced sustainable management and conservation of the marines resources;
- Climate Change, Disaster Management & Risk Reduction- ensure the adverse effects of climate change and natural hazards are mitigated and appropriate adaptation programs are implemented to strengthen Niue's resilience;
- Solid & Hazardous Water & Pollution-review and strengthen the implementation of national initiatives in addressing solid and hazardous waste including marine pollution;
- Biodiversity/Conservation-conserve marine, freshwater & terrestrial biodiversity & ecosystems with the view of establishing or declaring protected or conservation areas to safeguard biodiversity and natural habitats of iconic marine and land species;
- Education for Environment & Sustainable Development-Strengthen public awareness on environment, climate change, disaster management and sustainable development principles usage and practices;
- Forestry-protect, manage and conserve the forest

The National Disaster Council comprises of the Minister for National Disaster Management-DRR/DRM, Chairperson-Secretary to Government, Village Councils of the 14 villages, heads of Niue Power Corporation, Bulk Fuel, Broadcasting Corporation of Niue, Health, Environment, PWD/Utilities & Police.

Role 7 Responsibilities of the National Disaster Council
Management of national DRM/DRR – outlines roles and responsibilities of the villages and every Ministry & Central Agencies
Disaster Plans-outlines roles and responsibilities of the key agencies to respond to disasters before, during and after to cover all disasters such as; tropical cyclones, earthquakes, tsunamis, drought, fire, also Search and Rescue and health pandemic.

Government Activation Process
RSMC in Nadi notifies Niue Meteorological Service who notifies the Chairperson of NDC/COP & Secretary to Government. NDC calls a meeting with Niue National Disaster Council who decides, based on severity of disaster the Emergency Executive Group & NEOC

Initiatives undertaken by Niue National Disaster Executive Council

- Maintain everyday watch
- Work with Police to Review & update 14 Village Disaster Plans
- Tsunami warning exercise with Early Childhood Education & Niue Primary School

- Relocation of ECE/Niue Primary School to higher ground-Paliati, opening February 2016
- Develop and implement Joint National Action Plan (JNAP)
- Installation of electrical & communication underground (include TV)
- Engagement with regional DRM/DRR programs – EU, SPC, GEF etc, that assist Niue with our mitigation and adaptation programse.g; installation of new rainwater harvesting catchments to all 500 homes, capacity building, food security, review building code, Renewable Energy etc.

Way forward: Construction of;

- Village Evacuation Centres
- Emergency Operation Centre
- Reduce fossil fuel use – target clean energy
- Update Village Disaster Plans (following Village Council Elections)-available in both Vagahau Niue & English and distributed to each village household – ensure all community members are familiar with the Plan and know what to do during emergencies
- Receive and disseminate urgent and essential information and advice executed in a timely & effective manner
- Everyone to take all National warnings/responses as serious,

Project Management and Coordination Unit – Mr. Vilnus Talagi

This is the Unit that reports directly to the National Authorising Officer Premier of Niue. It is the focal point for all donor-funded projects for Niue. Its core objectives are to:

- Provide a CENTRALIZED project management service dedicated to coordinating all project activities for all donor funded projects
- Create an effective ASSESSMENT, MONITORING & REPORTING framework for projects
- Ensure that all donor funded projects are strategically aligned with Niue's national priorities & interests
- Be the focal point for building project management capacity & capability through training and practical knowledge transfer.

The Unit has proposed a National Working Group for the EU-PacTVET project comprising:

- Secretary of Government (Deputy National Authorising Officer)
- Director General of Infrastructure
- Director General of Social Services
- Director General of Natural Resources
- Director of Utilities
- Director of Environment
- Niue USP Representative
- Director of Education / Niue In Country Coordinator EU-GCCA USP

- Project Support Manager

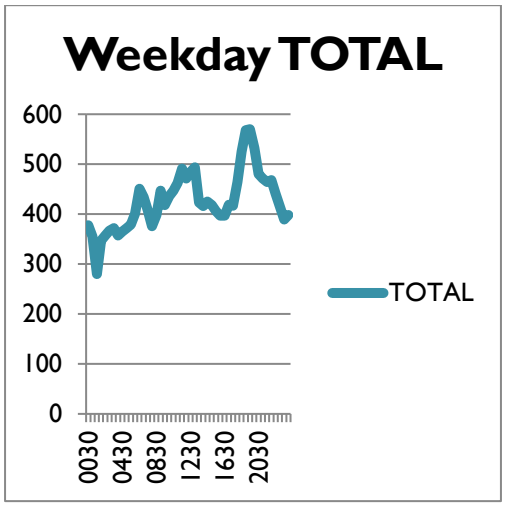
Renewable Energy: Ministry of Infrastructure – Director General, Mr. Andre Siohane

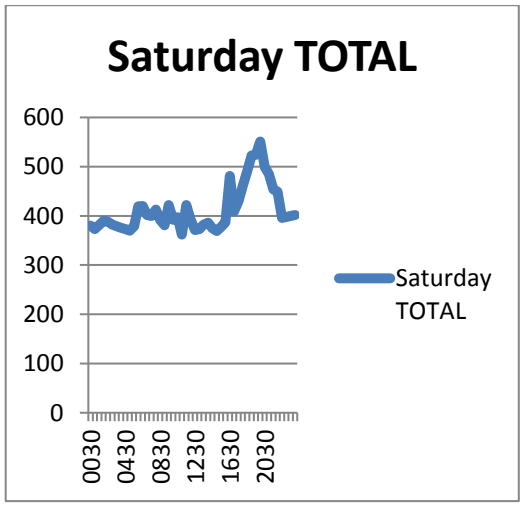
The Ministry of Infrastructure's mission is "to optimise current public infrastructure through good leadership, knowledge, and collaboration with our partners to promote quality of life and a prosperous Niue". It holds the mandate for the National Energy Policy and Action Plans of 2005. The recent launch of the Niue Strategic Energy Road Map (NiSERM) 2015-2025 represents a whole of government approach to addressing the energy security challenges of Niue.

Niue was noted as the second highest total electricity use per capita of 1500kwh/year per person but this may-be due to its declining population and high number of electric appliances per household - Total electricity consumption (residential plus other) divided by total population.

Energy Consumption of every country will continue to increase as they try to develop their economies, raise the standard of living of its people. Niue wants more of that increase to come from clean energy sources.

Reducing fossil dependence will then be achieved when the increase in RE penetration and effective EE programs in place.





The Ministry of Infrastructure identified the following challenges and ways forward for the energy sector for Niue:

Current challenges	Ways forward
• Grid Instability • Management Capacity-Too many commitments • Staff Capacity vs New Technologies • Transportation • Aging infrastructure-Key Assets Management Programs	• Strengthen National Human Resource Capacity RE New Technologies • Collect Data for ongoing system improvements and monitor Supply and Demand trends • Budget Harmonisations –Donors, Suppliers and Contractor

• Supply & Demand Management - Fluctuations • System Monitoring and Data Collections.	• Reduce Dependent on fossil fuel • Increase RE and EE at National Level- eg, Homes and Water Pumps • Maintenance and Replacement Programs of Key Assets • Utilising National ICT Services Available for Local and Remote Monitoring • Monitoring and Evaluation • Review Tariff • Strengthen National Coordination among Ministries and PMCU

Renewable Energy – Mr. Deve Talagi – Director of Utilities

The Director of Utilities provided insight on the Solar installations on Niue, which include:

- Niue High School: 36kw
- Hospital: 30kw
- Airport: 92kw
- Tuila: 200kw including 180kw battery storage system.
- Individual homes: Off grid (stand alone)
- Morris Tafatu in Atafu, Alofi: No longer in use.

Niue's electricity generation consists of:

- Power house: 4 x 500kw Caterpillar generator units, use 2 for peak hours (around about 500-600kw) and one for low peak.
- Feeder Systems: Southern and northern feeders operated as 2 radial circuits.
- Human resource in this area needs enhancing as technology is advancing very quickly.

The following were highlighted as challenging of RE on island systems:

- The random variability of the output and the required DC/AC inverters. Varying wind speed and cloud cover directly affect the output of wind and solar generation.
- These variations are largely unpredictable and the power system must be able to handle the resulting output changes.
- The generation system must have enough reserves to adjust for the changing wind and solar output.
- The generation system must be able to respond instantly to control the system frequency as the wind and solar generation changes.
- This affect is called "Ramp-Rate", the speed of change in generation – usually measured in MW/minute.

It was noted that Wind and Solar generation produce direct current (DC) electricity. This DC output must be converted to alternative current (AC) used by the electrical power system. This conversion is made by an electronic DC/AC inverter. The inverters provide power to the system by following the system frequency and voltage that must be provided by conventional generation. This means that there must always be some conventional generation operation and this, in turn, means that no system can be 100% supplied by wind or solar power.

We depend very much on outside technical advice in renewable energy technology. It is important that training in this area is built into our HRD plan. PV penetration into the system was commissioned in 2012 but experienced instability issues and currently all solar installations are disconnected from the system.

At the time of the in-country consultation, the Power utility was working with Mitshibushi Electrics to solve the problem to enable the resumption of PV penetration into the system.

Suggested ways forward for RE in Niue were noted as:

- The 4 solar installations on Niue were designed and installed by different companies. The instability issue with PV penetration into the system will continue until we find a solution or solutions to overcome the problem.
- To achieve the 80% power generation from solar, Niue need to look at it at a bigger scale.
- Design and install a system that can generate 80% electricity from solar as main source of power and retain only 2 generator engines at the power house as back-up.

- Training of our own people in renewable energy technology is very important and to be included in our HRD Plan. There are opportunities in different programs outside Niue that we can tap into. We are behind in this technology by about 40 years and we have a lot of catch up.

- Climate Change Adaptation – Ministry of Natural Resources (Agriculture, Fisheries & Foresty, Environment & Niue Meteorology) –Director-General – Dr. Josie Tamate.
- The Ministry's goal/roles are:
- Promoting sustainable use of natural resources
- Providing reliable weather and climatic information for the Niue public
- Building/enhancing Niue's resilience against climate change impacts
- Facilitating/promoting the implementation of the Climate Change Policy and JNAP

It was noted from the presentation that Niue has the following Climate Change related policies/principles in place:
- Niue National Integrated Strategic Plan and Vision: Niue ke Monuina
- Climate Change Policy 2009
- Joint National Action Plan for Disaster Management and Climate Change (JNAP)
- National Communication Reports (1st and 2nd)

Four adaptation projects under the Ministry include:
- Rainwater Harvesting – GEF and IWR (Water Sector focused)
- FAO Telefood Project
- Development of Sustainable Agriculture
- Sustainable Land Management

The project has the potential for further collaboration with these projects on Niue.

Identified ways forward for the Ministry include:
- Establishing the Climate Change Division

- Launching of the Second National Communication
- Ridge to Reef Project
- EU-GIZ project on Waste Water
- Waste Management
- GEF 6 Programme – identifying Niue's priority area(s)

Department of Agriculture, Foresty & Fisheries – Food Security – Mr. Poi Okesene

There is a draft Food & Nutrition Security Policy and a draft Agriculture Sector Plan, both of which have priority focus on food security.

One of the main objectives of the Niue Draft Agriculture Sector Plan 2015 is to improve food and nutritional security for all Niue peoples and, which include:

(i) increased production of crops and livestock; and

(ii) Increased contribution of locally grown food to the diets.

One of the main needs identified for this sector was to explore pathways for commercialisation of small scale agricultural farms building on the production capacity and resilient farming systems and practices.

Niue Meteorology – Melissa Douglas/Rossy Mitiepo

The Niue Meteorological Service provides climatological, meteorological, marine, aviation, as well as tropical cyclone forecasting products and services to the Niue local community. They also provide synoptic information and climatological observations to international stakeholders and clients. The majority of the Niue Meteorological Service's meteorological and climatological information is recorded by an Automatic Weather station, as well as a Satellite remote sensor. One of the projects recently undertaken by the Met Services was the documentation of oral weather-related stories.

Water Security – Crispina Konelio

A number of projects in the area of water security were presented:

1. The Integrated Water Resource Management – finalised in December 2014.
2. An overview of Niue's Water and Waste Institutional Arrangements:
   Three government agencies are empowered under the Water Act 2012 for Water, Sanitation and Waste management.

- The Public Works Department, (PWD) Water Supply Division, have the overall responsibility for integrated water resource management in Niue. It includes the oversight of the influences of wastewater and agriculture activities on the water supply.
- The Environment Department (DoEnv) is responsible for the protection and quality of the water resources, waste management, septic tank pumping and effluent disposal.
- The Health Department (DoH)is responsible for monitoring the quality of the water sources for microbiological and chemicals. The Health Director is empowered by law to shut down a supply due to health concerns.
- The Department for Agriculture, Forestry and Fisheries (DAFF) is responsible for the agriculture bores used for irrigation purposes as well as for the rainwater catchment units that are erected in selected plantation locations.

The National Steering Committee is the key national coordination mechanism comprising key heads of relevant government agencies and a member from a non-government organisation.

3. National STAR Ridge to Reef Concept for biodiversity conservation, and for the enhancement of ecosystem service and cultural heritage in Niue. The main objective of the project is to strengthen conservation and sustainable use of land, water and marine areas and their biodiversity by building on their cultural heritage values through national and community actions.
4. IW Project Concept - The project aims to integrated Ridge to Reef approaches into IWRM in order to reduce environmental stress and build ecosystem and climate resilience through improved water, sanitation and waste management in Niue.
5. Complimentary SGP -

- Catchment Management Plan (Alofi-Kaimiti)- coordinate and raise awareness of land use activities at catchment area (piggeries, septic tanks, aggregates pits, plantations)
- Marine Protected Management Plan (Alofi North)- (Alofi north have 2 marine protected areas-one is a marine reserved, other marine conservation-recently opened after 8 years of close issues still people do some illegal fishing need proper policing and some proper management plan to coordinate and raise awareness)
- Coastal Fishery- Aquaculture (Hakupu) (breed sea clams, ugas, and other sea/land crabs, fish for village food security)
- Ecotourism-Hand Dug Well (Alofi South) (a hand dug well to become scenic site or education purpose for students, it was dug during WW2 by US Marines, including the establishment of the Niue Airport.

<u>Schools TVET – Mr Charles Ioane</u>

Mandate – Education Act 1989

Niue Schools TVET Curriculum Framework plus four curriculum pathway guides developed under PRIDE project-FNCT (hospitality), ICT (technology), Agriculture, Horticulture & Technology. School budget is not sufficient to fund resources to ensure a fully operational TVET curriculum. In 2014, NHS received consent to assess the Certificate in Toursim Lev 2. At least students who enrolled on this course will leave school with NCEA Levels 1 & 2 plus Certificate in Tourism Lev 2. NHS will continue to seek consent to assess and seek approvals from NZQA and Industry Training Organisations for other relevant TVET courses.

- NHS is keen to work together with this PacTVET project to set up the required infrastructure/resources/equipment in the Graphics Design & Technology block for students use during the day and community use after hours and/or weekends.
- Courses offered could include; Gasfitting/Plumbing & Drainlaying, Fitter & Turner, Solar Panel installation and maintenance, Building & Construction/Joinery/Frame & Truss, Manufacture/Design/Electrical Engineering
- English and Maths teachers can teach the literacy and numeracy components of the course
- NHS delivers the NZ Curriculum and NZ National Certificates-international recognition, acceptance and can be offered in-country
- Connect learning with earning-students who understand the relationship between learning and career skills are more likely to make a successful transition from school to career

- NHS is keen to develop a common vision for all partners-educators, business partners and the community/donors – need to enhance this partnership to provide a more qualified and competent workforce
- Demand high expectations for all students – some students learn better if theory is combined with practical skills

Niue Chamber of Commerce – Ms Roxathina Falepeau

Three key initiatives were being set up by the Niue Chamber of Commerce. These include:

- Youth employment scheme (YES) which caters for years 12/13 students for work experience in the private sector – noticeable trend towards the agriculture sector.
- Eco-tourism opportunities
- Special projects with IUCN including the promotion of bicycles as main transportation.

National Training and Development Unit – Mrs Tanya Tagelagi

The Unit provides Secretariat services to the National Training and Development Council through ongoing operational tasks in the oversight of scholarships and training awards. It also acts as Coordinating Agency for the processing of eligible candidates for training through the Australian Pacific Technical Colleges (APTC) within the Pacific region, and processes all training proposals that are submitted through the HRD unit for discussion by the NTDC. The Unit also provides up to date and accurate information of all training scholarships and funding availability.

Scholarships are offered for the following training programs:

- Long Term (more than 1 year), Commonwealth Post Graduate (NZ only), NZPS (New Zealand Pacific Scholarships – NZ or regional), People's Republic of China (PROC) tenable in China, APTC (Australia Pacific Technical College)
- Short Term (up to 6 months), capacity building on overseas attachments
- Correspondence – USP, Open Polytechnic, Massey University, others

USP-EU GCCA Project – pt time Consultant, Birtha Richmond-Togahai

The USP-EU GCCA project commenced in Niue in 2012 after the Premier signed off the USP & EU GCCA Agreement in Vanuatu in 2010. This project was one of the offshoots of the 39th Pacific Islands Leaders Forum in in Niue 2008 under the Niue Climate Change Declaration. 15 countries including Niue (Makefu, Tamakautoga & Avatele) with 40 pilot sites became the base of implementing the Climate Change Adaptation community engagement component of this project.

Avatale Community Adaptation Plan – EUGCCA Project, USP – Loseligi Siakimotu

The workshop was informed about development of an Adaptation Plan 2014 – 2024 by the Avatale community through participatory process that included multiple stakeholders and provided empowerment for them. The process enabled community ownership of the plan in every step of its development. Through the Plan, the community was able to:

- Identify strategic direction
- Identify key Adaptation Priorities for Action – and also identify skills and types of training required for up-skilling and empowering of communities, in turn building resilience towards the impacts of Climate Change.
- Align their Community Adaptation plan with National Plans & Policies
- Promote Good Governance.

- Harmonise the activities to avoid clashes with other activities the community is involved in.

  Gaps
- This Community Adaptation Plan will be used to attract new funding from other donors to implement activities beyond the budget allocated for under the USP-EU GCCA
- There is an urgent need for qualified expertise to check gas bottles and maintenance of gas stoves in the homes as well as solar panels;
- Need for certified plumbers/carpenters to assist with recovery during disasters rather than wait for government personnel;
- Need for community members trained in Loss & Damage Assessment skills to provide immediate report following a cyclone or disaster;

USP Niue Campus – Mrs. Maryanne Talagi

An overview of courses provided by distance learning through Niue Campus was provided. These included courses provided through the USP Pacific TAFE such as project management. The Campus was also identified for providing access to those training programs that would be delivered online.

Taoga Niue – Ms Moira Z Enetama

Important linkages between Sustainable energy, climate change adaptation & Taoga Niue Linkages & Strategic arrangements: National and Taoga Niue Vision, Mission & Core delivery. Taoga Niue core function aligns with the Vision for the Niue National Strategic Plan 2009-2013 & 2014-2018; 'to build a Sustainable future that meets our economic & social needs while preserving environmental integrity, social stability & Niue culture. Taoga Niue Vision-the sovereign and ethnic standing of the people of Niue will be secured and will thrive as the driving force in the development & sustainability of Niue and its people. The Department's Mission therefore; 'to provide effective & efficient coordinating, monitoring & facilitation role in the promotion and strengthening of Niue cultural heritage values, language and identity. The Department promotes all aspects of work associated with taoga Niue, keeping the public informed of any dangers threatening the intangible cultural heritage of Niue and activities carried out for the purposes of safeguarding that heritage.

Taoga Niue assists government, communities, groups in developing and sustaining family, village and Niue heritage/taoga under the traditional knowledge umbrella. It record, teach and use traditional knowledge through Niue living, survival and livelihoods-life skills, nurturing and gathering of resources such as food, vital weather and climate related information and sustaining meaningful relationships for all sectors as mandated under the legislation of Taoga Niue Act 2012-Traditional Knowledge-Context, Uses and Protection.

3. Consultation Methodologies

In trying to maximise output various methods of consultation were employed in this in-country mission. Determining which methodology to use depend on various factors ranging from availability, distance and timing. The following are the methods employed to capture the required data during the in-country mission:

3.1. Consultative Workshop/Meeting (TNGA)

A consultative workshop is a consultation with stakeholders in a venue where the agendum for discussion or consultation is done for all at once. This was the methodology employed for the first two days during this in-country mission. This methodology was employed because it used the forum to draw ideas and consolidates them.

3.2. One-to-one Consultations (Interview)

In a situation where stakeholders cannot make it to the consultative gatherings, due to other commitments, a one-to-one or face-to-face meeting or interviews are done. This was also employed where for a number of stakeholders who could not attend the consultative workshop.

3.3. Internet – Online

This was used for searching for further information or publication of Reports or Policies. Not only that but to confirm or double-check on information given.

3.4. Literature Review

This forms the basis for evaluative report of information found in the literature related to technical, vocational education and training with the subject of sustainable energy and climate change as the content. Various literatures were consulted, within the education, energy and climate change sectors, on policy frameworks and national action plans or development strategic plans. Most Policy frameworks (regional and national) were reviewed and those were used as the basis for consolidating future SE and CCA demands or needs in country.

3.5 Limitations

Not all invited stakeholders attended the consultation and it was not possible to visit all stakeholders in the time allowed for the mission.
Obtainable literature surrounding educational strategy and labour and sector statistics was mostly out of date – at least 5 to 10 years old.
Participation/input from some key stakeholders on these matters – it was not possible to consult with all potential stakeholders in the time allowed for the in-country mission.

4. Status Quo - Relevant National Policies and Frameworks and Sectoral Review

All national policy frameworks and their associated action plans set out principles and suggested initiatives designed to guide and support the development and implementation of national activities consistent with the these policy frameworks' visions and goals.

The Forum Leader's endorsement of the Pacific Islands Framework for Action on Climate Change in 2005 and the Framework for Action on Energy Security in The Pacific (FAESP) in 2010, demonstrated that sustainable energy and climate change adaptation are therefore top priorities for Pacific Island governments.

4.1. Education Sector

There is no current national TVET Policy – other than the Niue Schools TVET Policy as mandated under the Niue Education Act 1989, Part 3-Establishment of Schools; There shall be established in Niue such government schools, instructions, classes etc. as Cabinet considers necessary for the purposes of;

- Providing pre-school education, primary school education, intermediate and secondary education, special education
- Continuing education for communities
- Provision for the training of technical skills, trades including cultural arts and crafts and any form of education or instruction which the Cabinet may determine as necessary and appropriate for the people of Niue.

The Department of Education Vision under the Niue Education Corporate Plan 2014-2018 aligned to the Niue National Strategic Plan 2014-2018;

Vision

'Inclusive lifelong learning as the pathway to prosperity-Fakatuleva e Moui Fakaako ko e Halavaka ke he monuina'.

Niue Schools TVET Policy

Vision:

To provide and sustain a quality, relevant and balanced TVET curriculum, incorporating traditional and cultural principles, practices and values, maintaining Niue's unique identity, to raise student achievement in partnership with the Private Sector and the Wider Community.

Mission:

To provide and sustain a quality relevant service to enable all as lifelong learners, and to become responsible citizens responding to change and make appropriate moral choices that contribute to the human and skills needs thus fulfilling national aspiration.

There is only one high school with its curriculum noted as too academically driven. The Education system in Niue follows the NZ Qualifications Framework/NZQA with content contextualised to suit the local environment. However, in 2009, Niue Schools TVET Curriculum Framework plus 4 curriculum pathway guides developed under PRIDE funding – FNCT (hospitality), ICT (technology), Agriculture & Horticulture & Technology was launched. No funding for resources as yet. NHS has yet to implement the above Framework. There will be robust discussions to find a way forward on how we could implement this TVET programme as a way of integrating the aspects of Climate Change Adaptation, Sustainable Energy and Disaster Risk Reduction into the Niue High School TVET Framework. In 2014-NHS received consent to assess Certificate in Tourism Lev 2- students who enrolled will leave school with two to four qualifications, NCEA Levels 1, 2 & 3 & Certificate in Tourism;

NHS continues to seek consent to assess/approvals from NZQA and Industry training Organisations for other TVET courses. There are Vocational Pathways from the New Zealand Qualifications Authority (NZQA) Curriculum that the students can select from as a basis of their career studies. Students can leave school with NCEA Levels 1, 2 & 3 with Certificate in Tourism or a Certificate in a Vocational pathway. A new initiative commencing in 2014 is the Careers Education within the school to assist students select subjects that aligned with their further studies/future careers. Teachers will also assist with directing the not so-academically inclined students towards vocational pathways. After completion of Year 12/13, the only option for further studies is in NZ or USP next door. However, with the current TVET programme, the Department of Education anticipates the provision of expertise and funding from this PacTVET project to enhance implementation.

4.2. Energy Sector

According to the NIUE NATIONAL ENERGY ACTION PLAN (2005) Niue has very limited indigenous energy resources (solar, biomass, wind and tidal energy) and faces a growing dependence on imported petroleum and a range of environmental and public safety issues related to petroleum supply. Additionally, the country has limited technical expertise and very limited financial resources (with a GDP of around 15-16 million USD). Since 2005, Niue has been carefully considering both the future role of the energy sector in the nation's development and, importantly, the approach that Government will take in securing a sustainable supply of energy. Some impressive gains have been made. Niue spends around US$1.9 million on fuel imports, nearly one third of Niue's foreign aid income. Diesel fuel for the electricity and transport sector accounts for the biggest portion of fuel imported into Niue, with over 60% of diesel used for electricity generation. Petrol imported into the country is mainly used for transportation.

Through the implementation of the National Energy Policy (2005) the Government has increased the contribution of the energy sector to the welfare of the nation in an efficient, equitable and sustainable manner. The energy policy has functioned as part of the nation's overall development strategy. In this regard, the Policy recognized the pivotal role of the Niue Strategic Development Plan and relevant legislation. The energy policy includes a commitment to energy efficiency and renewable energy. Under the National Action Plan, Niue committed to convert 30% of all electrical generation to renewable energy by 2013 and 100% by 2020.

Key for the EU-PacTVET project is that one of 3 “Management Actions” in the National Energy Action Plan is that the policy is to “Ensure capacity building and training in energy related issues.”

Niue Power Corporation (NPC) is the nationally owned power utility and reports to the Secretary for Government. Currently, all electrical generation and energy efficiency programmes, both for renewables and fossil fuels, comes under the NPC, which has 19 employees. Petroleum tenders are managed by the Department of Bulk Fuel. Fuel is delivered about once every three months. The retail price is set by the Government and a tax of NZD 0.10 (USD 0.082) per litre is applied to diesel fuel, petrol (gasoline) and jet fuel. Imports have risen rapidly over the past decade despite the declining population. LPG is imported by private sector operations.

Over a 5 year average (2006-2010), NPC generated 3.4 GWh of electricity of which 2.9 GWh was sold, recording an estimated 13% distribution loss annually.
Prior to 2008, electricity for cooking and water heating accounted for most of the energy consumption at the household level. Through the REP-5 Programme (2006–2010, 9th European Development Fund), solar hot water systems and LPG cook stoves were installed in households around Niue benefiting 70% of the population (300 household). Most of the homes in Niue prior to this were cooking using electricity, so the use of LPG has brought energy efficiency savings.

In terms of renewable electricity generation in Niue, three grid-connected solar PV systems totalling 52.5 kWp were installed in 2009 by the REP-5 Programme. Additionally, 3 kWp is installed as a large solar home system on the only home that is not on the grid – all households in Niue have access to electricity. The grid-connected solar PV systems are also estimated to save 18,000 litres of diesel fuel a year and contribute some 2% in clean electricity production.

Traditional biomass use for cooking has declined in recent years, and biomass has not been identified as a resource that people want to use for electricity generation or biofuel production. However, wind is an economically exploitable resource for electricity generation, with over 10 years of data available to show this. Solar is also a resource that has not been used to its full potential and represents an area for renewable energy technology growth.

However, over the next 12 months, ‘”the Government of Niue is expecting savings to the tune of NZ$137,000 per annum with the recent commissioning of their solar photovoltaic system project. The US$4 million initiative is expected to provide significant benefits to the people of Niue through the supply of solar-generated electricity throughout the entire island nation.

The project, developed and implemented by the Government of Niue, is funded through the Government of Japan’s Pacific Environment Community (PEC) Fund which is administered by the Pacific Islands Forum Secretariat.
In addition to the considerable savings to government expenditure, it is also anticipated that the PEC funded solar project will reduce GHG emission by 329 tons per year.” Hann Roldan, 2015, www.solarapac.org

It is now anticipated that solar will make a major contribution to electricity generation in Niue.

4.3 Climate Change

The Climate Change Policy for Niue was developed in 2009. The Vision of the Policy is for "A safe, more resilient Niue to impacts of climate change and towards achieving sustainable livelihoods". Its goal is "To promote understanding of and formulate appropriate responses to the causes and effects of climate change in support of national sustainable development objectives".

There are 6 main objectives that include: Awareness raising; Data Collection, Storage, Sharing and Application; Adaptation; Mitigation; Governance and Mainstreaming; Regional & International Cooperation with the anticipated improved awareness; sound and reliable information for planning and assessment; strengthened national capacity to respond to climate change; targeted action on climate change mitigation and adaptation.

Niue is yet to decide where Climate Change should eventually sit. Climate Change work is divided amongst the Ministries.

Under the Ministry of Infrastructure, there is the Department of Communications, Department of Transport and Department of Utilities (Niue Power, Bulk Fuel).

At present, the Ministry of Natural Resources with Department of Agriculture, Fisheries and Forestry facilitates Food Security projects, Sustainable Land Management, Department of Environment facilitates the SPC-GCCA, PACC amongst other projects and Niue Meteorology who are also in charge of other CC projects. The Ministry of Social Services has Education, Health (Climate Change Plan), Justice, Lands, Survey & Community Affairs and Taoga Niue (traditional knowledge).

5. Consultation Analysis

5.1 Training Needs and Gaps Analysis (TNGA)

Participants were divided into 2 groups and asked to identify the needs in the areas related to Climate Change Adaptation and Sustainable Energy. The following needs were identified:

For Climate Change Adaptation

- Training on waste management (re-use/recycle/reduce)
- Need to have people trained in quality data collection and analysis;
- Need for training on life-skills/adaptation skills (vaka-making, traditional food preservation techniques, house-building, documenting of weather-related TK stories, weaving), document medicinal plants/herbal medicine for the knowledge of younger generations to build resilience of communities & encourage SMEs.
- Need for training for certified plumbers;
- Need for training on organic farming principles.
- Need to include life-skills vocation training courses into curriculum.

- Training for communities on Loss & Damage Assessment following a cyclone so communities can get on with it rather than wait for Government, proposal development, project administration, finance, monitoring and evaluation.

For Sustainable Energy:

- Training on new renewable energy technologies (installation and maintenance);
- Training on maintenance of existing technologies;
- Training on quality data collection and documentation;
- Training on Project Management (Budget Harmonisations –Donors, Suppliers and Contractor) and M & E.
- Training for certified electricians
- Simple template so households can monitor monthly electricity usage

In addition, an overarching need identified was the need for refresher courses to maintain and up-skill trades in the Sustainable Energy and Climate Change related areas.

6.0 Discussions and Recommendations

A summary of discussions include:

- Since consultation workshop, Niue Department of Education is seeking PacTVET assistance towards the development of the National TVET Policy.
- There was a strong call for scholarships to be offered for TVET programmes.
- APTC previously provided scholarships for electricians training out of country. However, this is the final year such scholarships are being offered and only for experienced and skilled workers;
- Many Climate Change related projects are being implemented in Niue that the project can collaborate with (eg. Training in waste management, organic farming, and plumbing).
- With a population of only approximately 1,600, there is a serious lack of man-power to cover the national commitments/obligations.
- The question was raised about whether it would be feasible to send people overseas for training or bring trainers in-country to provide training.

Recommended ways forward that PacTVET could provide support in:

- Development of vocational courses in life-skills for offer at Niue High School in conjunction with the National Cultural Centre, Taoga Niue.
- Collaboration with PIPSO for training on basic entrepreneurship skills.
- Offer of online courses on project management through the USP Campus.
- Training for trainers – certified plumbers/electricians/gas fitters etc
- Development of hands-on training for plumbing, electrical wiring, cleaning of new rainwater harvesting systems, cleaning of solar panels in the homes, installation & maintenance of RE technologies
- Training on how to assess loss and damage following a cyclone or other natural disasters such as drought etc.

- PacTVET can fund trainers/instructors & some equipment and use Niue High School Department of Graphics' Design & Technology during the day for students and after hours/weekends for community training;
- Need further consultation with ICC and Cultural Centre on fine-tuning details on vocational courses and at what level in high school this will be introduced.
- Training on project management, cost benefit analysis and monitoring and evaluation

7.0 Consultation Outcome:

Present and future market demand for TVET in Niue has been identified and existing training supply initially identified but needed for further elaboration. The priorities for future project activities will need to be narrowed at the Regional Inception Meeting.

EU PacTVET could help with specific issues related to CCA and SE as well as up-skilling identified training provider(s) in Niue. USP Niue Campus has the infrastructure in place to facilitate potential regional online courses such as project management and the Climate Change practitioner's course.

By providing a "skill-set" approach to CCA and SE training EU PacTVET could go some way to providing educational linkages to economic priorities and job creation – especially in the areas of renewable energies such as solar and in project management and conservation as funding for projects in these areas is set to continue. EU PacTVET can also help with food security issues from a community-based subsistence living to resource management and conservation on a professional level.

Appendix 1: In-country Consultation Programme

NIUE PACTVET NATIONAL LEVEL CONSULTATION WORKSHOP

Venue: Niue Golf & Sports Club, Fonuakula, Alofi

Wednesday 24th - Thursday 25th JUNE 2015, 9.00am-4.00pm

PROGRAMME

DATE	Scheduled Activities	Stakeholder	Discussion Topics	Venue	Comments
	24 June 2015- DAY 1:Workshop Starts				
Time	Activities			Facilitator(s)	
9.00am	Registration				
	Benediction – Rev Navy Salatielu Workshop Opening - MC - Angela Tuhipa (PCMU) - Secretary to Government - Opening Address Minister for Ministry of Social Services-Hon Pokotoa Sipeli			MC-Angela Tuhipa	
9.15am	Welcome and Introduction to Workshop ❖ Outline EU-PACTVET Project ➢ Outline Rationale ➢ Objectives/Purpose ➢ Country Expectation			Leigh-Anne Buliruarua	
9.20am	**Gauging Linkages to Sustainable Energy and Climate Change Adaptation** **First presentations:** Stakeholders Presentations (5-7 minutes) Role of PCMU - Mrs Angela Tuhipa			Niue ICC	

	Renewable Energy: Ministry of Infrastructure - Director-General, Mr Andre Siohane NPS/PIGARREP - Renewable Energy- Deve Talagi Climate Change Adaptation - Ministry of Natural Resources-Director-General, Dr Josie Tamate Department of Agriculture, Forestry & Fisheries - Food Security-Mr Brendon Pasisi/Mr Poi Okesene Niue Meteorology- Tasi Pulehetoa/Rossy Mitiepo	
10.15am	Morning Tea Break	
10.30am	Continue with Stakeholders Presentations; Dept of Environment - PACC-Sauni Tongatule & Haden Talagi Water Security - Crispina Konelio Ministry of Social Services - Director-General, Mrs Gaylene Tasmania & Mr Charles Ioane-School-based TVET USP-EU GCCA - Niue ICC USP-EU GCCA: Deve Talagi/Darren Tohovaka (Makefu) & Kuso Pavihi/Loseligipepe Siakimotu-(Avatele) and Tamakautoga-Lavea Puheke & Sean Tukutama Maryanne Talagi - USP TVET Manogi Poihega - NTDC - SE & CCA Training	
11.15am	Group Work - Discussion - *'Aspects of each Sector relating to Sustainable Energy and Climate Change-Linkages outlined'* Participants divided into two main Groups - SE (Sustainable Energy) and CCA (Climate Change Adaptation) Depending on the number of participants, suggest 3 groups of 5 for SE and 3 for CCA. Facilitators for **Sustainable Energy** groups: Group 1-Andre Siohane- Topic: Motor Mechanic & Electrical Wiring, Group 2: Deve Talagi-Sector: Refrigeration & Renewable Energy Technology Group 3: Sonya Talagi-Sector: Sustainable Sea Transport Facilitators for **Climate Change Adaptation** Groups: Group 1-Brendon/Poi- Sector: Food Security & Forestry	Facilitators' to nominate Recorders to write contributions from groups

	Group 2-COP Tony Edwards –Sector: Disaster Risk Reduction Group 3-Crispina Konelio-Sector: Water Security Group 4-Kuso Pavihi/Lavea Puheke-Sector: Vulnerability & Adaptation Assessment (V & A) Group 5-Angela Tuhipa/Sauni Tongatule-Sector: Project Management	
12.15pm	LUNCH BREAK	
1.00pm	Groups Presentations	
2.00pm	Discussion - **Questions & Answers on "Aspects of each Sector relating to Sustainable Energy and Climate Change- Linkages outlined'** Panel: Secretary to Government, Director-Generals for the Ministries of Infrastructure, Social Services & Natural Resources and Directors	
3.00pm	Recap and Conclusion of Day 1 AFTERNOON TEA BREAK	Group Presentations
	DAY 2 - Thursday 25 June 2015	
	Training Needs and Gap Analysis	
9.00am	Presentation: (Training/Technical) Needs and Gaps Analysis - Basic Outline	Ms Leigh-Anne Buliruarua
9.20am	Discussion - hand out TNA Survey for all participants to complete	Niue ICC/PCMU
9.45am	Plenary Session: **Creating National and Regional Capacity and technical expertise to respond to CCA and SE challenges** - SOG, DGs for Infrastructure, MoSS, Natural Resources and Resource Experts - Sauni Tongatule, Brendon Pasisi, Tony Edwards, Deve Talagi	Information will go towards formulating National TVET Policy
10.15am	Morning Tea Break	
10.30am	<u>Part 1 Group Work</u>: National Training Needs in SE and CCA **Group Work - Work out the technical skills needed for each Sector and identify skills already filled**	6 Sector Groups – Participants will be given a number from 1 – 6 as they come in.

	1. Sustainable Energy (RE/Electrical wiring/Energy Efficiency; Refrigeration and Air-conditioning - Facilitators: Andre 2. Sustainable Sea Transportation- Facilitators: Deve Talagi & Sonya Talagi 3. Climate Change Adaptation: Food Security (Agriculture and Forestry & Fisheries) Facilitators: Brendon Pasisi & Poi Okesene; 4. Disaster Risk Reduction; Vulnerability and Adaptation assessment - Facilitators: SOG, Mr Richard Hipa & COP, Mr Tony Edwards; 5. Water Security- Facilitator: Crispina Konelio 6. Project Management-Angela.Manogi	
11.00am	Group Presentations – Groups 1, 2, 3, 4, 5 & 6	
12.00pm-1.00pm	Lunch Break	
1.00pm-1.30pm	<u>Group Work - Part 2 - Use the information collected in Part 1</u> <u>Tasks: Group 1 Discussion Topic:</u> <u>Facilitators:</u> Mr Andre Siohane & Dr Josie Tamate- **"Gauge out the technical skills required/demanded by the industries in Niue, present and future.** Rank them in order from HIGH DEMAND to LOW DEMAND <u>Group 2: Discussion Topic</u>: Facilitators: Sauni Tongatule & Manogi Poihega - **"Identify technical institutions in the country (formal and non-formal) that provide formal and informal technical skills in SE and CCA.** List down the following: i) Courses ii) Durations; iii) Award/accreditation iv) Equivalent course and accreditation in the region and internationally; and v) Potential industry(ies) that needs such skills.	<u>Participants are divided into 3 Groups</u> 3 Main Groups

	Group 3 Discussion Topic: Facilitator: Maryanne Talagi & Loseligi Siakimotu- **"Gauge out the technical skills and knowledge required for communities to be better equipped to adapt to the adverse effects of Climate Change.**	
1.30pm	**Group Presentations – Groups 1, 2 & 3**	
2.00pm	**Matching the industries Demand to the Technical Skills Training Courses Supply** Group 1 & Group 3 Group 2 - Group 2 to split up between Group 1 and Group 3 and do the Demand and Supply matching	
2.30pm	**Group Reporting - Matching Supply and Demand Summaries** 1. Group 1 (half of Group 2) 2) Group 3 (half of Group 2) Matching Demand to Supply Reporting -SPC	
3.00pm	**SUMMARY & CONCLUSION OF THE WORKSHOP**	
3.30pm	Afternoon Tea Break	

Appendix 2: Participants List

EU PACTVET – Niue In country consultations 25-26 June 2015

Registration Sheet

	Name	Designation/Position	Ministry/Organization	Physical Address	Email	Phone Contact
1	Tanya Tagelagi	Scholaships Officer	Niue Public Service Commission/Niue Training Development Council	Niue Public Service Building, Fonuakula	Tanyar.tagelagi@mail.gov.nu	4124
2	Roxathina Falepeau	Education & Communications Officer	Niue Chamber of Commerce	Utuko, Alofi South	roxy@niuechamber.com	4399
3	Fuarosa Eu Funaki	Chairperson	Tamakautoga Village Council	Tamakautoga		
4	Cherie Morris-Tafatu	Assistant Director	Department of Education, Ministry of Social Services	Halamahaga, Alofi South	Cherie.morris-tafatu@mail.gov.nu	4145
5	Lavea Puheke	Taoga Niue	Ministry of Social Services	Fugamouga, Paliati	Lavea.puheke@mail.gov.nu	5674
6	Moira Enetama	Director	Taoga Niue, Ministry of Social Services	Fugamouga, Paliati	Moira.enetama@mail.gov.nu	4656
7	Darren Tohovaka	Chairperson	Makefu VVillage Council	Makefu	Darren.tohovaka@mail.gov.nu	4125
8	Emi Hipa	Small Islands States Officer/PA to Secretary to Government	Premier's Department	NPSB Building Fonuakula	Emi.hipa@mail.gov.nu	4664
9	Loseligi Siakimotu	USP-EU GCCA Avatele Working Group	Avatele Community	Talamaitoga, Avatele	ahimai@niue.nu	5281 0 7710
10	Sonya Talagi	Director of Department of Transport	Ministry of Infrastructure,	NPSB Building, Fonuakula	Director.transport@mail.gov.nu	5911
11	Haden Talagi	GCCA/PACC Project Coordinator	Department of Environment, Ministry of Natural Resources	Fonuakula	Haden.talagi@mail.gov.nu	5277
12	Crispina Konelio	Water	Department of Utilities, Ministry of Infrastructure	PWD, Fonuakula	Crispina.konelio@mail.gov.nu	
13	Mellisa Talagi Douglas	Met Officer	Niue Meteorology, Ministry of Natural Resources	Met Office, Airport	Melissqa.talagi@mail.gov.nu	4601
14	Poi Okesene	DAFF Officer	Department of Agriculture, Fisheries & Forestry, Ministry of Natural Resources	DAFF Office, Fonuakula	Poi.okesene@mail.gov.nu	4233
15	Dr Josie Tamate	Director-General	Ministry of Natural Resources	NPSB Building, Fonuakula	Josie.tamate@mail.gov.nu	4712
	Name	**Designation/Position**	**Ministry/Organization**	**Physical Address**	**Email**	**Phone Contact**
16	Fakahula Mitimeti	President	National Council of Womens	Makini Hall, Main St, Alofi		4145
17	Deve Talagi	Director	Department of Utilities, Ministry of Infrastructure	PWD, Fonuakula	Deve.talagi@mail.gov.nu	4297/5263
18	Maryanne Talagi	Campus Coordiantor	Niue USP Campus	Paliati, Alofi South	Maryanne.talagi@usp.ac.fj	
19	Luina Vilila	Environment	Ministry of Natural Resources	NPSB Building	Luina.vilila@mail.gov.nu	6024

20	Rossy Mitiepo	Senior Scientific Officer	Niue Met Service	Hanan Airport	Rossy.mitiepo@mail.gov.nu	6666
21	Vilnus Talagi	PCMU	Premier's Department	Fale Fono, Main St, Alofi		
22	Itzy Tukuitoga	Principal, Niue Primary School	Department of Education	Halamahaga, Alofi South	Itzy.tukuitpga@mail.gov.nu	4070
23	Gaylene Tasmania	Director-General	Ministry of Social Services	NPSB Building	Gaylene.tasmania@mail.gov.nu	
24	Togia Sioneholo	Chairman, NPAC, USP-EU GCCA project	USP, Paliati	USP, Paliati	Togia.sioneholo@mail.gov.nu	
25	Kim Ray Vaha	Government Statistician	Treasury & Planning	NPSB Building	Kimray.vaha@mail.gov.nu	
26	Charles Ioane	Principal, Niue High School	Department of Education	Paliati	Charles.ioane@mail.gov.nu	4263
27	O'Love Hekesi	Teacher-in-Charge for Early Childhood Education	Department of Education	Halamahaga		4702
28	Andre Siohane	Director-General	Ministry of Infrastructure	NPSB Building	Andre.siohane@mail.gov.nu	
29	Manila Nosa	Director	Department of Health, Ministry of Social Services	Health Department, Niue Foou Hospital, Kaimiti	Manila.nosa@mail.gov.nu	4100
30	Rev Navy Salatielu	Pastor	Alofi Ekalesia Kerisiano	Alofi		
31	Birtha Togahai	Director of Education & ICC for USP-EU GCCA project	EU-GCCA	Lamea, Alofi South	Birtha.togahai@mail.gov.nu	4145
32	Leigh-Anne Buliruarua	PACTVET	Head Office	USP, Suva, Fiji	Leighanne.buliruarua@usp.ac.fj	

Pacific Community
Communauté du Pacifique

EUROPEAN UNION

USP
THE UNIVERSITY OF THE SOUTH PACIFIC

EU PacTVET

European Union Pacific Technical and Vocational Education and Training on Sustainable Energy and Climate Change Adaptation Project

Republic of Palau
Training Needs and Gap Analysis

Conducted and Compiled by: Sarah Hemstock

Table of Contents

Acknowledgment

Organising a successful stakeholders consultation in a country is a complex exercise and requires an excellent knowledge of the country, in particular the 'who does what', and a broad communication and exchange network with the stakeholders. I was very fortunate to have the support of the USP EU-GCCA In-Country Coordinator in Palau, Carol Emaurois, who arranged the logistics for this workshop and contacted the main stakeholders beforehand. The success of this workshop is the result of her work. I must also thank the Palau International Coral Reef Centre for their unfailing support and expertise during the execution of this exercise.

However, the key to the success of this consultation was really down to the involvement and the enthusiasm of the participants. Once again, I was very fortunate with the level of engagement of the different participants and their interest in the project. The atmosphere of cooperation between the different stakeholders was reassuring and an essential element in the identification of training needs and the best way to address them in the country. I would thus acknowledge the participants of the consultation workshop and give them many thanks for their hard work and support.

1.Background

The 10th European Development Fund European Union Pacific Technical and Vocational Education and Training on Sustainable Energy and Climate Change Adaptation (European Union PacTVET) project is component three within the broader regional Adapting to Climate Change and Sustainable Energy (ACSE) programme.

The project builds on the recognition that energy security and climate change are major issues that are currently hindering the social, environmental and economic development of Pacific - African Caribbean and Pacific (P-ACP) countries.

1.1 EU PacTVET Objectives

The general objective of this project is to enhance sustainable livelihoods in P-ACPs. Sustainable livelihoods are a high priority for Pacific Island communities and governments alike. They are central to current development policy including resource management and conservation but also in emerging policy to meet threats such as climate change. The project aims to enhance Pacific regional and national capacity and technical expertise to respond to climate change adaptation (CCA) and sustainable energy (SE) challenges.

The project is being implemented by the Secretariat of the Pacific Community (SPC) in partnership with the University of the South Pacific (USP) over a period of 53 months from August 2014 with an overall budget of EUR 6.1 million. It will achieve the following results:

1. Assess national training needs in SE and CCA and existing informal and formal TVET training courses and training and education providers are identified and strengthened
2. Develop and implement benchmarks, competency standards and courses on Training of Trainers (ToT) and create a pool of national trainers
3. Develop and establish training courses and support facilities within TVET institutions
4. Strengthen networking in SE and CCA

The project is being implemented in a sequential approach. Result 1 activities will provide a more detailed/clearer understanding of countries' needs and their requirements from the project. The activities under Results 2 and 3 will be then be tailored to the country needs. This report feeds into result area 1.

1.2 Location

The EU PacTVET project will be implemented in the Pacific region comprising of 15 Pacific ACP countries: Cook Islands, Federated States of Micronesia (FSM), Fiji, Kiribati, Nauru, Niue, Palau, Papua New Guinea, Republic of Marshall Islands (RMI), Samoa, Solomon Islands, Timor-Leste, Tonga, Tuvalu and Vanuatu.

Climate change is affecting the livelihoods of the P-ACP communities causing varying degrees of adversity depending on location.

1.3 Context

References:
Ministry of Finance, Bureau of Budget & Planning, Office of Planning & Statistics http://www.palaugov.org/bureau-of-budget-planning/ ; 2006 Republic of Palau HIES,

Current total global greenhouse gas (GHG) emissions stand at 42.6 gigatonnes of CO2 (GgtCO2). Of this global GHG emission, Pacific Island countries emit less than 0.03% yet they are amongst the most vulnerable to adverse effects of climate change - the first to be exposed and the least able to respond. Hence there is a moral obligation for the island countries to improve implementation measures to not only mitigate GHG but also adapt to climate imposed environmental change, and prepare for future adaptation measures. Down to the national level, Palau's annual GHG emission is insignificant on a global scale. Palau has already started several programs to help local communities adapt to climate imposed environmental change (i.e. the EUGCCA, SPREP, SPC, PIFS, JICA, UNDP, IUCN and US supported climate adaptation programs to name a few).

In spite of efforts to reduce Pacific-African Caribbean and Pacific (P-ACP) countries reliance on fossil fuels and improve energy security almost all Pacific Island countries remain highly dependent on imported petroleum products for energy generation and transportation, which are the two major petroleum consumption sectors in the region.

With the Pacific Island countries facing challenges posed by climate change and energy security, sustainable energy and climate change adaptation are undeniably ranked above all other sectors in regional priorities, as evident through regionally endorsed frameworks, such as the wider Pacific Plan and the Framework for Pacific Regionalism and the more specific Pacific Islands Framework Action on Climate Change (PIFACC) and the Framework Action on Energy Security in the Pacific (FAESP) and individual national policies.

Efforts in addressing energy security and climate change adaptation challenges are ongoing through various regional and national projects. On climate change mitigation, there are some familiar projects such as the Pacific Islands Greenhouse Gas Abatement through Renewable Energy Project (PIGGAREP) that addresses mitigation and Pacific Adaptation to Climate Change (PACC) that focused on climate change adaptation. The PIGGAREP was focussing on complementing PICs initiatives in promoting the widespread use of renewable energy in the regions and PACC focuses on three thematic areas, namely, "Food security"; "Water Security" and "Coastal Management" - assisting communities to implement activities that help them in these three areas. Sustainability of such projects is very important. Now that these projects are coming to their end, it is important that knowledge and skills being acquired and/or hardware that were put in place continue to function and be beneficial to the targeted beneficiaries. Not only on the renewable energy side, but on overall energy services, where there needs to be awareness and improvements to energy

efficiency and conservation and what measures needs to be taken to use energy in a sustainable manner as compared to energy misuse and wastage.

The Republic of Palau is governed by three branches: an executive branch; a legislative branch; and a judicial branch. In addition, the President is advised by a council of traditional chiefs. The Executive Branch consists of the President, Vice President, and eight appointed Ministers. The eight ministries are: Commerce and Trade; Community and Cultural Affairs; Education; Finance; Health; Justice; Resources and Development; and State. The legislative branch consists of a Senate with nine members and a House of Delegates with sixteen members, one representing each State. The council of traditional chiefs consists of the highest-ranking chiefs from each of the sixteen States.

The sixteen States are governed by elected chief executives, and Legislatures comprised of both elected and traditional representatives. Each village within Palau has a traditional council of leaders who are entrusted with the overall welfare of their communities. This unique combination of traditional and modern governance has enabled Palau to build upon centuries of knowledge and values while moving forward within a global society.

Palau is divided into 16 states and has a population of around 19,500 people, with tourist arrivals adding another 10,000-17,000 people to the population at any one time. Just under 20% of the resident population are classified as rural, and around one third (33%) are under the age of 24 years.

Palau has over 500 islands but total land area is only 459 km2 and there are 4 island types - atolls, limestone, low platform and volcanic. 10.8% is classed as agricultural (arable land 2.2%; permanent crops 4.3%; permanent pasture 4.3%) and around 86% of land is classified as forest. Environmental vulnerability in Palau is high due to diverse, but limited, natural resources and fragile ecosystems that must withstand the pressures of a rapidly growing population, a large tourism industry and the expected rapid and large-scale development of Palau's largest island, Babeldaob. More than 90% of the population have access to mobile phones and the internet.

With 1,519 kilometres of coastline, Palau has identified its main vulnerabilities due to climate change as being related to: increased drought and storm activity; extreme high tides; sea level rise; coastal erosion; habitat fragmentation; sea surface temperature rise; and coral bleaching.

Palauan's enjoy relatively high standards of health, education, and free basic social services. However, Palau's geography, small markets, and tourism-based economy make it vulnerable to external economic shocks, the impacts of climate change, and extreme weather events. There are also severe issues with waste disposal – municipal solid waste and hazardous waste in particular. Transport costs are high and cargo volumes small. The small domestic

market prevents the creation of large-scale economies. Palauan labour is effectively fully employed, and there is a high reliance on foreign labour to meet demand.

The latest labour force estimate was completed in 2006 and showed 13,272 Palau residents were available for work (roughly half were male and half female) with 6,740 of these employed full time and 3907 people were not employed for various reasons (1,529 men and 2,378 women). The government and tourism sectors are provide almost all salaried jobs. There are also an additional 4,600 foreign workers in Palau – 4,500 of whom are from Asian countries (3000+ form the Philippines). Government is a major employer of the work force relying, employing around 3,300 people, but relies on financial assistance from the US under the Compact of Free Association (Compact) with the US. The Compact took effect, after the end of the UN trusteeship on 1 October 1994. The US provided Palau with roughly $700 million in aid for the first 15 years following commencement of the Compact in 1994 in return for unrestricted access to its land and waterways for strategic purposes.

Average household income was estimated at just under 20,000US$ per year, with around 1,200US$ being spent on utility and energy services. There are 5,082 households, according to the 2006 census. There are 747 subsistence farmers – 26% of subsistence farmers are in Koror. 190 people make a living from producing traditional handicrafts and 933 from fishing. In 2013, Palau had a GDP of around 247 million US$, around 20% of this is from external aid, 3% from agriculture and 70% from services. Imports totalled 144 million US$, with fuels accounting for 48 million US$, and meat imports totalling 7.5 million US$.

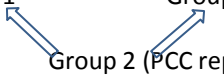
It can therefore be implied that for the majority of the population, economic activity consists largely of paid employment. There is also a distinct dichotomy of cash and traditional economies for some of the population – especially in Koror. Knowledge and skills on agricultural and fisheries best practices and other innovative approaches in addressing food security, water security and measures to reduce vulnerability to disaster needs to be established in rural communities. Such knowledge and skills can only be acquired through strategic and systematic approaches such as capacity building which needs to be targeted at levels that would have real impact. In order to be sustainable, capacity building needs to move away from ad-hoc project-based and informal training and towards institutionalized training on skills sets which can build into qualifications. These are then embedded as courses within national education providers. The EU PacTVET project will be exploring this and other options.

The purpose of the in-country-mission is to:

- Identify present and future market demand in Palau;
- Map existing training supply in Palau;
- List priorities for future project activities – including selection of partner TVET institutions.

2. Schedule of Consultation Events

Date	Scheduled activities
Tuesday, 12th May	**DAY 1: Workshop Starts**
Time	Activities
9:00 am	Registration
	Workshop Opening
9:45 am	Welcome and Introduction to Workshop ❖ Outline EU-PACTVET Project ➢ Outline Rationale ➢ Objectives/Purpose ➢ Country Expectation
10:15 am	Morning Tea Break
Time	Activities
	Gauging Linkages to SE and CCA
10:45 am	Stakeholders Presentations (5 – 7 minutes)
11:45 am	Discussion – "Aspects of each Sector relating to Sustainable Energy and Climate Change – Linkages outlined"
12:15 pm	Lunch Break
1:00 pm	Continue Stakeholders Presentation
2:00 pm	Discussion - "Aspects of each Sector relating to Sustainable Energy and Climate Change – Linkages outlined"
2:30 pm	
3:30 pm	Discussion – "Aspects of each Sector relating to Sustainable Energy and Climate Change – Linkages outlined"
Time	Activities
4:00 pm	Afternoon Tea Break
4:15 pm	Recap on Day 1
4:45 pm	End of Day 1

Wednesday, 13th May	DAY 2
Time	Activities
	Training Needs and Gap Analysis
9:00 am	Presentation: (Training/Technical) Needs and Gaps Analysis – Basic Outline
9:20 am	Discussion
9:45 am	Plenary Session: *Creating National and Regional capacity and technical expertise to respond to CCA and SE challenges*
10:45 am	Morning Tea Break
11:00 am	Group Work: National training needs in SE and CCA.
12:30 noon	Lunch Break
1:45 pm	Group Work 1. Sustainable Energy: (RE/Electrical wiring/Energy Efficiency; Refrigeration and Air-conditioning and Sustainable Sea Transportation 2. Climate Change Adaptation: Food Security (Agriculture and Fisheries); Disaster Risk Reduction; Vulnerability and adaptation assessment; Water security and Forestry **Participants are divided into 3 Groups:**
	Tasks: **Group 1 Discussion Topic**: "Gauge out the technical skills required/demanded by the industries in Palau, present and future. Rank them in order , from HIGH DEMAND to LOW DEMAND **Group 2 Discussion Topic**: "Identify technical Institutions in the country (formal and non-formal) that provide formal and informal technical skills in SE and CCA. List down the following: Courses, Durations, Award/accreditation, Equivalent course and accreditation in the region and internationally; and Potential industry(ies) that needs such skills IT WAS DECIDED BY PARTICIPANTS TO OMIT DISCUSSION TOPIC 2 SINCE THERE IS ONLY ONE TECHNICAL INSTITUTION – A site visit and staff interviews were held at Palau Community College on May 14th **Group 3: Discussion Topic**: "Gauge out the technical skill and knowledge required for communities (both rural/ remote and urban) to be better equipped to adapt to the adverse effects of Climate Change"
3:30 pm	Afternoon Tea Break
3:45 pm	Matching the industries Demand to the Technical Skills Training Courses Supply Group 1 Group 3  Group 2 (PCC reps) Group 2 to split up between Group 1 and Group 3 and do the Demand and Supply matching
4:15 pm	Group Reporting Matching Demand to Supply Reporting – SPC
5: 00 pm	END of Workshop

2.1. Project Outline and Presentation

After the opening, an outline of the EU-PACTVET was made, with emphasis on the following aspects of the project:

a. Rationale - current scenario with regard to sustainable energy (SE) and climate change adaptation (CCA) in the P-ACPs and the issues. At a national level there is dependency on fossil fuel for power production and transportation. On the climate change side, the P-ACPs are more vulnerable to climate change, but have the least capacity to respond to these.
b. How the EU PacTVET project intends to responded to these issues by focussing on building the capacity based on country needs - recognising skills acquisition by benchmarking and defining country-requested competencies and accreditation.
c. The Key Result Area (KRA). Each of the 4 EU PacTVET KRAs were outlined and it was made known to the stakeholders that one of the activities under KRA 1 is this in-country consultative workshop and one-on-one consultations for the training needs and gaps analysis (TNGA). Activities that need to be conducted in the hope of achieving each of these KRAs were briefly outlined.
d. A brief overview of the budget. This was to give the stakeholders an outline of the allocation from the €6.1 million.
e. And finally, it was emphasised that the consultations are important to aid the Palau stakeholders in identifying national needs to frame future EU PacTVET activities.

2.2. Stakeholders

The Project outline was followed by brief presentation from each of the stakeholders on the topic (see "stakeholder presentation guide" – above)

This was purposely to establish the baseline as to what each of the sectors are engaged in and how each of these sectors is affected by climate change and how sustainable energy practices are being part of their sectoral policies.

The training needs and gaps identified are outlined in the latter sections, but the outline below is the summary of the different sector's functions and relationships with SE and CCA

Participating Stakeholders:

Firstly, we would like to thank the stakeholders for their commitment to the EU PacTVET project and for their insight and input into the needs and gap analysis process. Their enthusiasm and willingness to share their knowledge and experience to ensure Palau participates fully in the project was much appreciated. Their comprehension and identification of the various issues impacting CCA and SE TVET education in Palau will form the basis of future project activities.

Stakeholder presentations can be found here:
http://prdrse4all.spc.int/production/node/4/content/pactvet-palau-national-stakeholders-consultative-workshop-may-2015

Identified stakeholders in alphabetical order:

FIRST NAME	LAST NAME	AGENCY	Title	Unit
A	Rudirnch	Food Security		
A	Del Rosario	Palau Community College	Head of Research	Research and extension
C	Beouch	DRM		
C	Ngemaes	Palau Development Bank		
Carol	Ngiraidis	Palau Organic Growers Association	Chairman	NGO
David	Dengokl	Water & Waste Water Operations, Division, PPUC	Manager	Public Corporation
Eric	Whipps	Surangel & Sons Co.	Private Co.	Note: Building is operated by major solar panels.
Fred	Sengebau	Bureau of Agriculture	Director	Ministry of Natural Resources, Environment & Tourism, National Government
Fabian	Iyar	Palau Community Action Agency	CEO	NGO
Gregorio	Decherong	Program Energy Office	Director	National Government
GS	Kim	Taiwan Technical Mission-Agriculture	Director	Embassy of the Republic of China, Palau Office
Gustav	Aitaro	Ministry of State	Director	Bureau of Foreign Affairs & Trade, National Government
Jennifer	Koskelin Gibbons	Palau Chamber of Commerce	Chief Executive Director	NGO
Joel	Toribiong	The Senate	Senator	Chairman Committee on EPUI
JK	Beouch	Agriculture		
Judy	Dean	Grant Office	Coordinator	Office of the President
Karla	West	National Development Bank of Palau	Operations Manager	Public Corporation
Ken	Sugiyama	Palau Public Utilities Corp	Chief	Renewable Energy Division
Kiblas	Soaladaob	Small Grant Program Office	Coordinator	UNOPS
Kioni	Isechal	Palau Public Utilities Corp	CEO	Public Corporation
Ledan	Akitaya	Division of Marine Transportation	Chief	Bureau of Commercial Development, National Government
Lencer	Basilius	House of Delegate	Delegate	Chairman Committee on ETC
Maria	Rehuher	Palau Farmers Association	President	NGO
Mario	Katosang	Palau Conservation Society	CEO	NGO
Nyk	Kloulubak	Program Energy Office	Energy Planner	National Government
Dr. Patrick	Tellei	Palau Community College	President	College
Priscilla	Subris	National Emergency Management Office	Coordinator	Office of the Vice President, National Government
Robert	Ramarui	Palau Community College	Dean of Academic	College

S	Hideyos	CCA		
Secilil	Eldebhel	Office of the President	Chief of Staff	Office of the President
Thomas	Taro	Palau Community College	Vice President	College of Research & Extension
Tmetuchl	Baules	Palau Public Utilities Corp	PIO	Public Corporation
Dr. Victor	Yano	Palau Chamber of Commerce	President	NGO
W	Andrew	Fisheries		
Xavier	Matsutaro	Climate Change Office	Coordinator	Bureau of Budget & Planning

The Palau Community College was identified as the EU PacTVET partner institution for Palau.

Palau Community College (PCC):

(source: Palau Community College Factbook, 2014 and http://pcc.palau.edu/)

Palau Community College is an accessible public educational institution helping to meet the technical, academic, cultural, social, and economic needs of students and communities by promoting learning opportunities and developing personal excellence. Palau Community College is a post-secondary vocational/ technical and academic institution serving not only the Republic of Palau and Micronesia, but the Asia-Pacific Region as well. PCC offers a wide variety of Associate of Science (AS), Associate of Arts (AA), Associate of Applied Science (AAS) degree programs including continuing education programs and short-term training programs.

Palau Community College has been accredited by the Accrediting Commission for Community and Junior Colleges (ACCJC) – Western Association of Schools and Colleges (WASC) for thirty-six years. The college was evaluated and continued to receive reaffirmation from 1977, 1982, 1988, 1992, 1998, 2004 and 2010. The college is due for evaluation in 2015-2016.

Palau Community College Institutional Master Plan (2009-2023) provides the direction of the College to enhance and provide more programs and services as well as the structural improvement of facilities for student access and success. The Plan also clarifies the visioned directions of integrated planning and decision-making as the College leadership and all College entities work together to achieve college-wide improvements and build endowment capacity. Strategic directions are summarised here:

Strategic Direction 1: Student Success

- enhance existing programs and services, as well as develop new ones, all in an effort to improve student success.

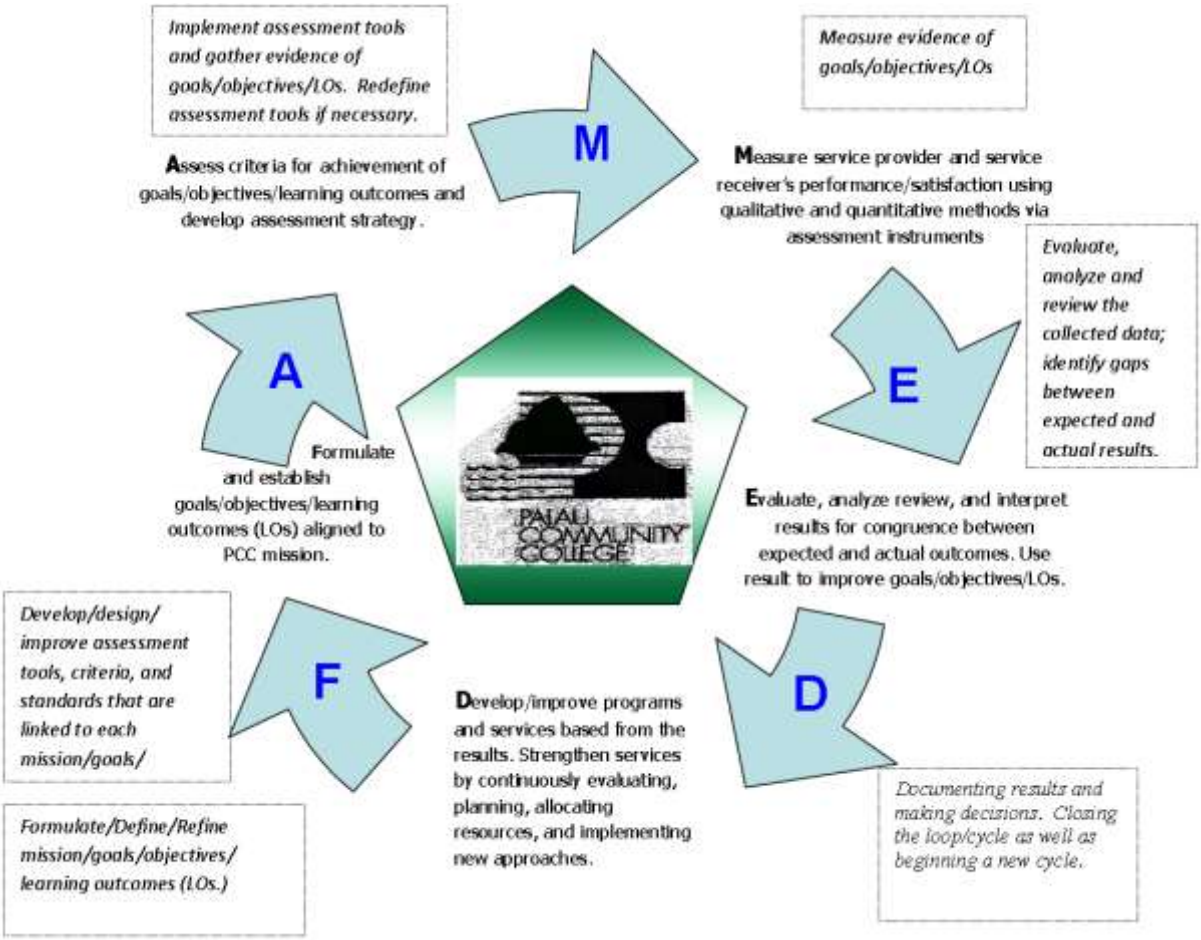
Strategic Direction 2: Institutional Culture

- embraces planned changes to continually improve and links the mission and vision in guaranteeing quality and excellence.

Strategic Direction 3: Resources

- diversify and increase resources to provide quality programs and services, facilities, technology, and human resources to support its mission and goals. Strategic Direction 4: Culture of Evidence
- provide data driven assessment which generates accurate and reliable information.

The CCP has a board of trustees, an executive committee, faculty senate association and classified staff organisation. Institutional assessment is based on the "Formulate, Assess, Measure, Evaluate, Develop" (FAMED) model.



The Cooperative Research & Extension (CRE) Department's mission is to collaborate with partners and clients to generate, develop, and disseminate practical, relevant, and sustainable technologies and knowledge in agriculture, environment, food and human sciences to benefit the people of Palau.

CRE Department implements the Agriculture Experiment Station (AES), Cooperative Extension Service (CES), and Residential Instruction (RI) of the College of Micronesia Land Grant Programs in Palau. CRE's programs are done in a multi-disciplinary approach through the four main divisions:

1. AGRICULTURE DIVISION

Agriculture Science; Integrated Pest Management; Tissue Culture; Sustainable Agriculture; Germplasm conservation; Cultural Management

2. NATURAL RESOURCES AND ENVIRONMENTAL EDUCATION DIVISION (NRED)

Marine & Environmental Education; Water Quality Program; Aquaculture

3. FAMILY and CONSUMER EDUCATION DIVISION (FaCE)

Food Technology Training; Food Security; Root crops and sea food processing

4. EXPANDED FOOD AND NUTRITION EDUCATION PROGRAM (EFNEP)

Youth & Adult EFNEP; Food Safety and Nutrition; Research and Development Station (R&D).

The Research and Development Station in Ngermeskang, Ngaremlengui, serves the need of the Republic and the region in the area of agricultural research and experiment. At the R&D Station, the numerous research and experimental projects in agriculture, aquaculture, and the environment use practices that are both sustainable and environmentally sound.

Multi Species Hatchery: In 2010, PCC inaugurated a state-of-the-art multi-species hatchery at Ngermetengel, Ngaremlengui State. This facility was established to support PCC's active role in the development of aquaculture in the country. At present, there are an increasing number of individuals who are interested in farming various aquaculture commodities; however, the supply of locally produced fingerlings is very limited. Therefore this multi-species hatchery is expected to augment the seedstock requirement of the prospective fish farmers in the country. In addition, this hatchery will also be utilized as a demonstration and training facility to clients and the community who are interested to learn and develop their skills in the seed production of marine organisms.

Day 2:

A plenary session followed the presentation on "Training Needs and Gaps Analysis". The Plenary Session's topic is "*Creating National and Regional capacity and technical expertise to respond to CCA and SE challenges"*

An actual Training Needs and Gaps Analysis was done after the plenary session discussion. Discussion of the Plenary Session and the TNGA are outlined in Section 5.

A plenary Session: Topic, "*Creating National and Regional capacity and technical expertise to respond to CCA and SE challenges*"

3. Consultation Methodologies

In trying to maximise output various methods of consultation were employed in this in-country mission. Determining which methodology to use depend on various factors ranging from availability, distance and timing. The following are the methods employed to capture the required data during the in-country mission:

3.1 Consultative Workshop/Meeting (TNGA)

A consultative workshop is a consultation with stakeholders in a venue where the agendum for discussion or consultation is done for all at once. This was the methodology employed for the first two days during this in-country mission. This methodology was employed because it used the forum to draw ideas and consolidates them.

3.2 One-to-one Consultations (Interview)

In a situation where stakeholders cannot make it to the consultative gatherings, due to other commitments, a one-to-one or face-to-face meeting or interviews are done. This was

also employed where for a number of stakeholders who could not attend the consultative workshop.

3.3 Internet – Online

This was used for searching for further information or publication of Reports or Policies. Not only that but to confirm or double-check on information given.

3.4 Literature Review

This forms the basis for evaluative report of information found in the literature related to technical, vocational education and training with the subject of sustainable energy and climate change as the content. Various literatures were consulted, within the education, energy and climate change sectors, on policy frameworks and national action plans or development strategic plans. Most Policy frameworks (regional and national) were reviewed and those were used as the basis for consolidating future SE and CCA demands or needs in country.

3.5 Limitations

The mission did not make provision for travel to any of the outer islands. Not all invited stakeholders attended the consultation and it was not possible to visit all stakeholders in the time allowed for the mission.

Obtainable literature tended to be out of date in some cases.

Limited availability and/or access to information on current/updated capacity development needs for TVET.

Participation/input from some key stakeholders on these matters – it was not possible to consult with all potential stakeholders in the time allowed for the in-country mission.

4. Status Quo - Relevant National Policies and Frameworks and Sectoral Review

All national policy frameworks and their associated action plans set out principles and suggested initiatives designed to guide and support the development and implementation of national activities consistent with the these policy frameworks' visions and goals.

The Forum Leader's endorsement of the Pacific Islands Framework for Action on Climate Change in 2005 and the Framework for Action on Energy Security in The Pacific (FAESP) in 2010, demonstrated that sustainable energy and climate change adaptation are therefore top priorities for Pacific Island governments.

4.1 Education Sector

"Article VI of the Palau Constitution mandates provision of free and compulsory public education for Palau citizens as described by law. Such free and compulsory education for the public is further defined through Republic of Palau Public Law 5-2, which mandates compulsory education for all children aged 6 to 17, or until graduation from high school. The Ministry of Education (MOE) was created by the Palau National Government to implement the public education law. There are two major constraints faced by the Ministry of Education as it delivers its mandate for free and compulsory education. The first constraint is the obvious limited funding allocated for education. This contributes to the second major constraint, which is the critically limited number of well-trained and qualified teachers within the school system." Palau National Assessment Report Barbados Programme of Action + 10 Review (2005).

Palau 2020 National Master Development Plan (PNMDP) strengthening of policy mechanisms, legislative frameworks, institutional capacity building, education, research and data collection, waste management, and pollution control, among other development issues.

The National Biodiversity Strategy and Action Plan identifies "Public Awareness and Capacity Building – Public awareness and support, education, and the strengthening of local capacity are essential for the protection, conservation, and sustainable management of Palau's biodiversity" as one of the ten guiding principle for biodiversity management in Palau. Additionally, "Traditional leaders (men and women) develop an educational program to revive traditional knowledge, practices, skills, and ethics" and "Develop educational program to revive traditional conservation knowledge, practices and ethics" were identified as a "Priority Issues and Actions from Community Consultations in all States". Traditional knowledge and culture will be emphasised wherever possible in EU PacTVET initiatives.

One of the nine "high-level government visions, objectives, and priority initiatives for "no regrets" adaptation" of the new Climate Change Policy (2015) is:

Vision: Future Palauan generations will be proactive, knowledgeable, and accountable and will use traditional and new adaptation and mitigation tools to promote positive behaviour change.

Objectives: By 2020, Palau's educational system will include coordinated climate change and disaster risk information in its curriculum and will offer professional development for adults.

Priority initiatives:
1. Integrate climate change and disaster management into education policies and action plans, considering formal and non-formal learning
2. Revise the current school curriculum to incorporate climate change and disaster management, and develop teachers training modules/materials
3. Prioritize scholarship and education opportunities in climate/disaster
4. Implement professional training in climate/disaster related studies including through a Teachers Conference on climate change and disasters
5. Improve access to information on climate change and disasters
(Palau Climate Change Policy For Climate and Disaster Resilient Low Emissions Development, 2015 – draft policy at the time the in-country consultation took place).

The new Climate Change Strategy acknowledges training in the areas of DRM and energy efficiency and building codes. However, it does not make provision for training technicians in the design, installation and maintenance of renewable energy systems – this is a gap that can be filled with EU PacTVET initiatives in Palau.

4.2 Energy Sector

References:
Palau Public Utilities Corporation (2011)
Palau National Energy Policy (2010)
Climate, Environment and Energy (2011) Pacific Brief, May 2011, Volume 6
http://www.rep5.eu/
Palau Energy Efficiency Action Plan (2010)
IRENA (2010) Renewable Energy Country Profile – Palau
Palau Climate Change Policy For Climate and Disaster Resilient Low Emissions Development, 2015 – draft policy at the time the in-country consultation took place

Total Primary Energy Supply in 2008 was 71.65 ktoe (kilo tonnes of oil equivalent), and total installed electricity capacity is 28 MW (2011). Diesel power plants in the country are located at Malakal, Aimeliik, Peleliu, Angaur, and Kayangel. Malakal and Aimeliik provide power to the central grid supplying Koror, Melekeok—the capital city, and the rest of Babeldaob. Palau's installed solar capacity, and small hydroelectric installations account for less than 5% of total demand. Satellite measurements and estimates based on sunshine hours place the solar PV resource at more than 5.5kWh/m2/day, signifying a high potential for solar energy development. Solar water heating is used on houses and tourist facilities. There are also a

few small-scale farm-based biogas digesters which produce cooking gas – there is scope for much wider use of this technology. There have been no wind resource measurements in Palau. The International Renewable Energy Agency categorizes the potential for wind energy uptake as “Medium”, indicating a lesser potential than solar power, but still a notable potential. Hydroelectric dams are feasible for exploitation; however, limited information is available on the potential resource.

Palau’s economy relies almost entirely on fossil fuels for energy. Annual supply is approximately 55Ml of diesel fuel, and 60Ml of petrol. Fuel imports cost 47 million US$ in 2013. Approximately 50% of imported diesel is used to generate electricity. Electricity is used for cooking in over 52% of households. LPG use for cooking is increasing in market share. In 2008, average household electricity use was 542 kWh per month, much higher than the average usage for other Pacific SIDS.

The Palau Public Utilities Corporation (PPUC) has power distribution lines to approximately 97% of the population in the primary islands. The transmission and distribution network covers around 47 linear miles of 34.5KV transmission lines, and 114 linear miles of 13.8KV distribution lines. PPUC (www.ppuc.com) is a semi-private corporation that operates and maintains the national electricity grid (split over four systems, Koror-Babeldaob, Peleliu, Angaur and Kayangel) and manages power generation and distribution for all islands, except for the distant Southwest Islands that have solar power, and small diesel networks. Even though legislation does not limit electricity generation to PPUC only, the only renewable systems that have taken off for private development have been solar water heaters. The UNDP, in association with the Government of Palau and the GEF, implemented the Sustainable Economic Development through Renewable Energy Applications (SEDREA) project from 2009 - 2011. It aided the creation of a Renewable Energy Fund Window (REFW) at the National Development Bank of Palau (NDBP). The REFW finances off-grid/grid-connected solar PV and SWH systems which were identified as the most cost-effective RES for the country, for both households and businesses. Through a mix of subsidies and loans (and equity for commercial projects), REFW financing improved the economics and the affordability of the RE systems, facilitating the widespread application of renewable energy technologies in Palau. The project intends that the subsidy percentage be gradually reduced on an annual basis with the subsidy completely dropped by 2016, in an effort to encourage fast uptake of the technologies, and the emergence of an unsubsidised, market-based system. Clearly, an increase in in-country solar technicians will be required to support this, so solar PV (on and off-grid) and solar water heaters training and training of trainers should be considered by the EU PacTVET project.

Various capacity concerns have been outlined: Generators and solar systems have maintenance problems due to a lack of funding for services, maintenance and inspections. Inappropriate technology choice and lack of maintenance has led to the failure of many solar home systems that were installed in the southern archipelago around a decade ago.

Lack of funding has also decreased utility employee training, resulting in higher internal costs from equipment failure and extended equipment outages. Many large businesses have installed their own generators. It is estimated that customer-generated power is 10 to 25MW. On the islands of Kayangel, Angaur, and Peleliu, low consumption has led to generation surpluses of up to 300%.

The National Energy Policy (2010) wants to achieve a 30% reduction of 2005 energy consumption by 2020. Some work has been done on energy efficiency with SPC's PELS and NorthREP projects. However, switching from electricity to LPG would improve efficiencies as would a reduction in the use of two-stroke marine engines on boats. Pumping public water and sewage is the highest single component of the government electricity bill in 2011. Using solar energy pumps for this purpose will significantly reduce imported fuel for power generation.

The Palau National Energy Committee was created in 2011. It overseas the implementation of the Strategic Action Plan, and consists of representatives from the Office of the President, the House, the Senate and the Chamber of Commerce, as well as from the PPUC, the Palau Energy Office, and the Palau Community College. The Strategic Action Plan for the Energy Sector (2009) is a framework for the implementation of the Palau National Energy Policy (2010). The creation of an enabling legal and institutional framework for renewable energy development is also described, targeting such areas as IPP development and subsidies for the creation of new renewable energy generation by 2015, as well as the development of standard power purchase agreements for renewable energy producers. This Energy policy is linked to government policies on economic development, sustainability, climate change; infrastructure, transport, resource management, and education, science and technology.

The Palau National Energy Policy (2010) outlines a role for the EU PacTVET project, it states: "Capacity within both private and public sectors to analyse, plan, develop, implement and manage renewable energy systems will be improved through education, training and knowledge management."

The new Palau Climate Change Policy, 2015 (Palau Climate Change Policy For Climate and Disaster Resilient Low Emissions Development, 2015 – draft policy at the time the in-country consultation took place) reiterates and supports the priorities in the National Energy Policy 2010, which states the Government's strategies for the planning and management of the nation's energy sector to 2020. The National Energy Policy 2010 set national targets of a 20% contribution of renewable energy to the energy mix by 2020 and a 30% reduction in energy consumption. It goes on to identify "Energy Efficient Building Code - Develop and implement an energy efficient building code, upgrade government buildings to comply with the new code, and develop and launch education programs on energy efficiency and energy conservations in schools and colleges" as a priority intervention.

4.3 Climate Change

From the predictions on continual sea level rise; increase in temperature and increasing ocean acidification, there would be new and additional challenges. This will require additional efforts and resources in building their capacity to be able to face these challenges, hence building the capacities of TVETs to be able to deliver to the rural communities the relevant knowledge and skills to be well equipped to face the challenges of the predicted effects of climate change and natural disasters is crucial. Framing this document is the interpretation of climate change as a slow acting natural disaster which will bring about both rapid and longer-term environmental change.

Ongoing climate change adaptation activities in Palau:
(source: pacificclimatechange.net)

- Micronesia Challenge (MC): 2006-ongoing
- Micronesia Conservaton Trust (MCT): 2002-ongoing
- Pacific Islands Climate Education Partnership: 2011-ongoing
- Pacific - Australia Climate Change Science and Adaptation Planning Program (PACCSAP): 2011-2013
- Coastal and Marine Resources Management in the Coral Triangle of the Pacific : 2008-2013
- Asia Pacific Climate Change Adaptation Project Preparation Facility: 2011-2016
- Implementing Sustainable Water Resources and Wastewater Management in Pacific Island Countries (Pacific IWRM):
- Global Climate Change Alliance: Pacific Small Island States (GCCA:PSIS): 2011-2014
- University of the South Pacific -EU GCCA Project: 2011-2014
- North Pacific ACP Renewable Energy and Energy Efficiency Project (North-REP): 2010-2014
- Coping with Climate Change in the Pacific Island Region (CCCPIR): 2009–2015
- Palau Sustainable Economic Development for Renewable Energy Application: 2008–2012
- Palau Sustainable Land Management Project: 2005–2012
- Unite for Climate
- ADAPT Asia – Pacific Annual USAID Forum on Adaptation: 2012 -onwards
- Schools of the Pacific Rainfall Climate Experiment (SPaRCE): 1995–ongoing
- National Climate Change and Health Action Plan (NCCHAP)
- Pacific Adaptation to Climate Change Project (PACC): 2009-ongoing
- Palau is currently involved in the food production and food security aspect of the PACC Project.

“Palau is a leader among Small Island Developing States in taking action to balance its economic and environmental goals. Also, Palauans have already faced the negative

consequences of global climate change. This Policy demonstrates solidarity with global efforts to manage the causes and impacts of climate change and furthers efforts towards achieving the strategic vision of Palau's National Master Development Plan t*o "Substantially enhance the quality of life of Palauans and future generations of Palauans*." By developing and implementing this Policy, Palau is keeping its commitments to the UNFCCC, the *Pacific Islands Framework for Action on Climate Change 2006-2015*, the *Pacific Disaster Risk Reduction and Disaster Management Framework for Action 2005–2015*, the *Hyogo Framework for Action 2005–2015,* and the Pacific Island Forum mandated Regional *Strategy for Climate and Disaster Resilient Development in the Pacific.* It establishes the policy framework that will guide and inform action in accordance with *Palau's Medium Term Development Strategy - Action for Palau's Future 2009–2014* and the *National Master Development Plan – Palau 2020."* (Palau Climate Change Policy For Climate and Disaster Resilient Low Emissions Development, 2015 – draft policy at the time the in-country consultation took place).

5. Consultation Analysis

5.1 Training Needs and Gaps Analysis (TNGA) - Plenary

The TNGA was preceded by a Plenary Session where participants gave their view on the topic, "*Creating National and Regional capacity and technical expertise to respond to CCA and SE challenges – what are the constraints"*

- Technology changes have tended to be donor driven. However, Palau now has coordinated governance for CCA and SE and it is believed that there will be an increased demand for solar system design, installation, operation and maintenance.
- The Renewable Energy Fund Window (REFW) at the National Development Bank of Palau (NDBP) was seen as putting people into debt and viewed as unsuccessful.
- Solar Power Program/Units are not being used by many homes. So ultimately Solar pv training becomes moot as there are not enough users – only around 10 homes and a few government buildings – awareness about solar is minimal.
- It may be a case of relying on policy to make market changes for renewable energy – need to use 30% less fossil fuels, so solar might increase in future.
- Very low enrolment on the solar servicing programme at Palau Community College (only 5-10 students every 2 years).
- In order to engage youth, the role of education in the process of job creation needs to be emphasised.
- "Lack of access" to place to learn (especially for outer-islands) and on-line courses and resources.
- Lacking training/facilities/equipment for livestock inspection & certification (college level)
- Lack of capacity development opportunities for college teaching staff. There is a need formal certification for trainers and trainees. However, there is a lack of

assistance (cash) for staff capacity development. Education courses are expensive & unaffordable.

- Lack of information sharing.
- A mechanism for recognition and certification of short courses needs to be put in place.
- Support Training Facilities & Course Designing
- No formal training on CC Toolkit for communities
- Work Readiness – there is a lack of training, resources and support such as mentoring
- Few people are trained as trainers but existing trainers are under-utilizing their available expertise
- Ad-hoc training given to and by NGO's leads to no qualification and has no status
- Lack of emphasis on traditional knowledge.
- Gaps identified in current project management training were specific to CCA and DRR projects and included: proposal writing and project planning, accessing funds – CC & DRR finance, logistical frameworks, CC and DRR budgeting at national and sector levels, integrated management of natural resources (land and marine), using assessment toolkits
- Compact arrangements for tertiary funding generally mean accredited courses and programmes have minimum entry requirements (completion of High School) so recognition of prior learning for TVET skills sets is not an option in Palau
- Information on how to access to online courses from overseas education institutions through PCC & at the workplace or homes was requested.

5.1.1 Plenary Conclusions

The role of education in the process of job creation needs to be emphasised. The education system in Palau is modelled on the U.S. system which reflects the priorities and needs of a large developed country.

Technology changes have tended to be donor driven. However, Palau now has coordinated governance for CCA and SE and it is believed that there will be an increased demand for solar system design, installation, operation and maintenance. The Renewable Energy Fund Window (REFW) at the National Development Bank of Palau (NDBP) was seen as putting people into debt and viewed as unsuccessful. It was also pointed out that without a "kick-start" to the solar energy industry; there might not be enough jobs for trained technicians.

With respect to disaster response training (including training on post-disaster assessment), the DRM participants were very interested in getting their training built into competencies and qualifications. If people in communities were equipped with these skills already it would negate the wait for assessors to visit communities and disaster responses could be faster. Recognised qualifications in disaster response would provide a professional aspect to the training currently offered. It was concluded that all training should be aligned toward the

overall “professionalization” of disaster response and management, including an identifiable career paths with sequential learning stages. (This is in agreement with the findings of Analysis of Disaster Response Training in the Pacific Island Region Provisional Version September 2012, United Nations Office for the Coordination of Humanitarian Affairs, Regional Office for the Pacific, September 2012).

Stakeholders agreed that the Palau Community College should be the basis EU PacTVET interventions. In order to achieve useful results with the EU PacTVET project it is essential that all stakeholders remain engaged with the project so that they can provide further advice on future activities – particularly in reference to competency development.

5.2 Training Needs and Gaps Analysis (TNGA) – Group Work

5.2.1 Sectors identified for priority action

Sector	Topic – Linkages to Current Training/projects/ highlighted issues	Proposed Action* - Future Demand

Food Security	Issue – Loss of agricultural productivity & loss of traditional knowledge.
	Issue – no market for local produce, especially meat.
	Need - training community on traditional food processing including:
	•Business skills training (i.e. costing and pricing, business analysis and planning, marketing planning, enterprise operations and management)
	•Product development, value-adding, and branding
	•Marketing training (i.e. product display, merchandising, customer service and sales techniques, retail training)
	•Supplier identification
	•Safe product handling and storage
	FOOD SAFETY & MEAT INSPECTION – new project to develop an abattoir for locally produced livestock – livestock tracking and record keeping.
	•Agricultural waste management
	
	<u>What We Have (hospitality and tourism):</u>
	• Information and curriculum established
	  ○ Vocational education courses
	• Data & research results available
	  ○ Food tech & aqua research results &agriculture
	• Resources are available
	  ○ Plants, materials, etc.
	• State projects being implemented
	  ○ Hydroponics, milk fish, clam, composting, agriculture
	• Formal and non-formal agriculture courses from PCC
		Develop a new qualification in "Project Management" / "Resilience Practitioner" with specialities in business skills, product development, marketing, safe product handling and storage.
		There are several dry litter pig pens, so supporting farmers with the development and sales of fertilizers from these such pigpens and training on biogas might be a future option & improved soil management for farmers.
		Need training on livestock record keeping.
		Need training on food safety and meat inspection.
		Integrate some subjects into existing PCC courses - Associate of Science in Tourism and Hospitality; Associate of Science in Agriculture
		
		<u>What We Need (GAPS):</u>
		• Information needs to be disseminated and shared
		• Non-formal courses (short) established and certification
		  ○ i.e. food technology, agri & aquaculture, farm management, record-keeping, train trainers
		• Formalized courses for data collection research & business management
		• Pilot projects to serve as training centers for bio-gas, bio-diesel
		• Centralized market place for gauging price control
		• Developed quality standards, paravet

Water Security	• water testing, regulations enforcement • watershed management, Need course on plumbing	A role for new qualification in "Resilience Practitioner" – Plumbing courses could integrate water testing.

Sector	Topic – Linkages to Current Training/projects/ highlighted issues	Proposed Action* - Future Demand
Fisheries/Marine	Current training is available is on general awareness, e.g. protected areas management for communities and local conservation agencies, through Palau Intl Coral Reef Centre. Marine & Environmental Education; PCC offer: Water Quality Program; Aquaculture (NRED) & Seafood processing (FaCE) Training Socioeconomic monitoring, project management and resource management (marine and terrestrial – ecosystem services) were highlighted as key areas for EU PacTVET. Loss of traditional maritime and boat building skills was a major concern.	Need qualifications on resource management and project management, accountability, biophysical monitoring. Courses could be developed and formalised at PCC. Marine transportation – traditional skills are being lost, so capturing these with competencies and skill sets would be desirable and useful for tourist trade.
Infrastructure & Transportation	Standard operating procedures, best practices, e.g. building codes.	Integrate into PCC - Associate of Applied Science in Construction Technology; provide new courses around specific skill sets related to building codes for professional practice.
Governance	Auditing, monitoring and evaluation, accountability and enforcement. Leadership skills.	Develop courses accessible to people already in employment – link to project management.
DRM	Needs to be a "profession" where people are trained and have a qualification. Training on Micronesia Tool Kit for Communities – this could form a course for a qualification already offered by the Palau Community College **What We Have:** ➢ Toolkit on CC: o Planning/Assessment o Coastal Change o Designing Effective PA (resilience) ➢ PCC CRE – Research ➢ PCC – Marine Science/Agriculture/Plumbing (CET)/Social Sciences ➢ Agriculture: Farming ➢ NEMO: Disaster Response/Preparedness	**We Need**: to develop new qualifications/courses on: 1. Community Resource Management (planning) 2. Disaster Risk Reduction Planning/Preparedness – using toolkits - Use existing toolkits (i.e. Coastal Change, LMA, LEAP & other CC toolkits) to train senior high school students & PCC students to be able to work in states that are members of the PAN & other CBO's managing natural resources. 3. Coastal Change Planning 4. Climate Change Awareness/Assessment/Planning 5. Designing Effective Protected Areas (Resilience) 6. Networking – Sharing – Learning (Science, Traditional Knowledge) 7. Building codes and best practices – inspection of existing buildings.

Sector	Topic – Linkages to Current Training/projects/ highlighted issues	Proposed Action* - Future Demand
Sustainable energy	Training on solar PV maintenance is required in outer islands. Solar PV installation and design is needed to increase use of renewables. Energy efficiency – awareness and training is needed to support energy and climate change policies. Utilities – linesmen training is important for post disaster recovery. **Key to success: Support Training Facilities & Course Designing at Palau Community College** Biogas and biodiesel pilot projects in Palau could provide training resources for students.	Develop accredited training schemes for solar installations (design, installation, operation & maintenance) to be delivered through PCC. NorthREP is hoping to replicate sub-regional energy efficient label requirements. PCC could then train the technicians and vendor's to only bring in acceptable appliances/ refridgerants. Integrate with courses to be delivered through PCC - in Refrigeration and Air Conditioning & Electrical Technology.
Financial	Grants and loans have been given for infrastructure development in high risk area.	Project management/DRR training should include banking and insurance sector training on environmentally responsible lending – not lending for infrastructure in high risk areas.
Forestry	General comments to resource and project management apply	EU PacTVET could initiate partnerships with Fiji National University to provide training on forestry.

Identified cross-cutting training topics	
Project management	Basic project management skills were highlighted for every sector. Examples given for general project management include: communication, grant application writing, sourcing funding, climate science, SE concepts, mapping (GIS, spatial planning), networking, using assessment toolkits. "Specialities" could include resource management (terrestrial & marine ecosystem services), climate science, regulations and enforcement, planning, environmental impact assessment.
Data gathering, management and analysis	General courses on data gathering, management and analysis have also been requested for all identified sectors, along with training on environmental impacts and cost benefit analysis. And on how to take the analysed data to decision makers at all levels (communities, municipal, state and national to influence sound decision making. Training on social research to inform policy-makers and formulate legislation Data integration and information management and sharing Capacity-building for farmers on record-keeping
Training for Site Managers & Conservation Officers	1. Community Resource Management Planning 2. Biological Monitoring 3. Socioeconomic Monitoring 4. Surveillance & Enforcement using technology (Radars, Computers, GPS, Boats, Tablets, etc.) 5. Communications & Facilitation skills 6. How to conduct effective education & outreach programmes 7. Accounting & Budgeting 8. Grant Writing & Report Writing 9. Project Management 10. Conservation Law Enforcement 11. Tropical Marine & Terrestrial Ecology 12. Data Management & Analysis 13. Partnership Development & Networking 14. Climate Change Awareness/Planning/Assessment
Traditional knowledge	Traditional knowledge was highlighted for every sector – sectoral skills specific to Palau should be developed as competencies and embedded in skill-sets. Access to local experts in traditional knowledge or transferring local knowledge to young generations re: CCA.
Attitudes	Relevance (to development needs), ownership, responsibility, accountability, professionalism.

* All EU PacTVET activities should integrate with existing programmes in order for them to be sustainable since there have been issues with past ad hoc training. Ad-hoc training has tended to be project-based and has not led to qualifications or trade relevant skill sets.

	Now	Future

Required	• Traditional coastal/Resource Management Practice (e.g. leaf litter as ground cover)
	• Understanding FUTURE RISKS
	• Education & Awareness
	  ○ Sustainable Land use
	  ○ Sustainable Coastal Development
	  ○ Sustainable Water & Natural Resources
	• Farming Law/Regs need
	• CC Causes, Understanding & Knowledge
	• DRM
	• Awareness & Understanding of Food Security Issue
	• Water Security
	• Health Issues
	• Biodiversity, wildlife, ecosystem functions and connectivity
		• Zoning Law (Land Use)
		• Self-sufficiency (farming, fishing, aquaculture..)
		• Maritime Law enforcement (i.e. Marine Sanctuary)
		• Marine Sanctuary

Helpful (but not required)	Helpful (but not required) • Effects of CC on mesei, fisheries • Burning & wildfire issues	• Grant writing/reporting • Management Tools ○ Coastal Change • DRR

Immediate & future training needs for the utilities sector and climate change adaptation were identified as: plumbing, energy efficiency, water catchment (cleaning, maintenance, repair), water safety, solar PV (design, installation, maintenance, procurement), solar pumping (system maintenance, water reservoir maintenance) lineman; climate resilient agriculture (including TK), project management, climate resilient engineering (roads and infrastructure).

5.3 The Training Supply and TVET Providers

This section outlines the various Technical and Vocational Education and Training Institutions in Palau along with the courses and awards they provide.

5.3.1 Existing Actions to Manage Disaster Risk

(Identified by the Palau Climate Change Policy 2015)

Among other disaster-related documents, Palau developed the *National Disaster Risk Management Framework 2010*, EU PacTVET relevant priorities and processes relating to existing actions to manage disaster risks are outlined here:

Infrastructure

• Establishment of the National Emergency Management Office (NEMO) as the central coordinating agency for Disaster Management
• Construction of a NEMO Emergency Operation Centre (EOC) with Communication Room, Training Room/Briefing Room
• Tools and technologies in place such as Geographical Information Systems (GIS), satellite imagery, computer modelling software, and long-term climate predictions

Education and Capacity Building

• Delivery of training programs through national, regional, or international training providers
• Formal and informal disaster risk management education and awareness programs offered by the National Weather Office and Palau Red Cross Society, among others

Planning and Evaluation

• Disaster risk assessment processes within agencies tasked with permitting development and major capital investments

5.3.2 Non formal training

A wide variety of ad hoc training occurs across Palau and is carried out by various agencies.

- PCC – VOC Technology
- PPUC – Education & Awareness Program
- ROP – Energy Office – Solar Power
- PCC-CRE – Plant seedlings & composting
- MNRET-BoA – Tawain Technical Farm (Support on plant seedlings & animal feed & composting)
- KS Sanitation – Recycling – composting
- Palau CBO's – i.e. POGA/PFA/PACA
- MNRET – Marine Resource – Aqua Culture
- PICRC – training on marine resources management and other issues related to environmental stewardship
- The GEF Small Grants Programme is currently running a school based capacity building project on climate change awareness.
- Training on project management: GLOBAL CLIMATE CHANGE ALLIANCE: PACIFIC SMALL ISLAND STATES PROJECT - TRAINING ON LOGICAL FRAMEWORK APPROACH, PALAU April 2015
- Palau Community college Cooperative Research and Extension run a wide variety of agricultural and farming based courses. For example: Development and training on production of new food products from root crops - flour and flour products, new recipes; 2014 - Workshop on FAO-ABS Treaty Project with Palau Farmers Association.
- Palau Organic Growers Association (POGA) – provided training on various aspects of organic agriculture, including composting.

- Ministry of Natural Resources, Environment and Tourism, Burea of Agriculture has provided training on Soil Management; Compost Making; Nursery Management; Poultry Production; Swine Production; Farm Equipment; Air-Layering.

5.3.3 Formal Education

Palau Community College:

The College awards associate degrees to students who complete a prescribed two-year program of study. The time is extended for students who need to complete preparation classes before beginning the degree program. Associate of Arts degrees; Associate of Science degrees; and Associate of applied science degrees are formally awarded.

http://www.pacificclimatechange.net/index.php/palau-overview
http://www.reegle.info/policy-and-regulatory-overviews/PW

Programmes offered –

School of Arts and Sciences	
Agricultural Science (AG); Criminal Justice (CJ); Community & Public Health (CPH) Environmental/Marine Science (ES) Liberal Arts (LA) Palauan Studies (PW) - (Proposed) STEM Discipline (SD)	Education (ED) • Early Childhood (EDEC) • Elementary Education (EDEE) • Secondary Education (EDSE) • Special Education (EDSP) Library & Information Services (LS) Nursing (NU)
School of Business	
Business Accounting (BA) Business Administration (BU) Information Technology (IT) Office Administration (OA)	Tourism & Hospitality (TH) • Food & Beverages (THFB) • Hospitality Management (THHM) • Hotel Operations (THHO) • Tour Services (THTS)
School of Technical Education	
Air Conditioning and Refrigeration Technology (AC) Architectural Drafting (AD) – (Proposed) Automotive Body Repair (AB) – (Proposed) Automotive Mechanics Technology (AM)	Construction Technology (CT) Electrical Technology (ET) General Electronics Technology (GE) Small Engine and Outboard Marine Technology (SE)

Degrees conferred by programme (2012-2013)

		BY DEGREE AWARDED			
	PROGRAM	AAS	AS	AA	TOTAL
School of Arts and Sciences	Agricultural Sciences (AG)	10	1	-	11
	Criminal Justice (CJ)	-	0	-	0
	Education (ED)	-	3	-	3
	Environmental/Marine Science (ES)	-	3	-	3
	Liberal Arts (LA)	-	-	11	11
	Library & Information Services (LS)	12	0	-	12
	Nursing (NU)	1	4	-	5
School of Business	Business Accounting (BA)	-	5	-	5
	Business Administration (BU)	-	0	-	0
	Information Technology (IT)	-	0	-	0
	Office Administration (OA)	18	-	-	18
	Tourism & Hospitality (TH)	7	2	-	9
School of Technical Education	Air Conditioning and Refrigeration Technology (AC)	0	-	-	0
	Automotive Mechanics Technology (AM)	6	-	-	6
	Construction Technology (CT)	2	-	-	2
	Electrical Technology (ET)	7	-	-	7
	General Electronics Technology (GE)	5	0	-	5
	Small Engine and Outboard Marine Technology (SE)	2	-	-	2
TOTAL		70	18	11	99

Between 600-700 students are enrolled at the college at any one time.

Additional Services/Offices of PCC

- Asian American and Native American Pacific Islander-Serving Institutions (AANAPISI)
- Community Advocacy Program (CAP)
- EducationUSA
- Federal TRIO Programs (Upward Bound, Talent Search)
- Learning Resource Center (LRC)
- National Occupational Competency Testing Institute (NOCTI)
- Non-Instrument Navigation Program
- Operations & Maintenance Improvement Project (OMIP)
- Pacific Island Health Offices Association (PIHOA)
- Palau Wind Orchestra
- PCC Adult High School
- PCC Child Care Center
- PCC Medical Clinic
- Penn Foster Career Training Program

- San Diego State University (Master Degrees, Bachelor Degrees in Education)
- Western Curriculum Coordination Center (WCCC)
- Workforce Investment Act (WIA)

San Diego State University (SDSU) Programs

The Bachelor of Arts in Liberal Studies program is offered in collaboration with the Center for Pacific Studies at Interwork Institute/SDSU, the Undergraduate Division at SDSU and Palau Community College. This course of study is designed to provide knowledge in multiple subjects to elementary and secondary educators.

The Masters of Arts degree offered in collaboration with the Center for Pacific Studies at Interwork Institute/SDSU, the Department of Administration, Rehabilitation, and Postsecondary Education within the College of Education at SDSU and Palau Community College. This program is designed for Education and Human Services Professionals desiring to earn a graduate degree focusing on leadership and administration.

These programs are specifically designed and delivered to accommodate the working adult. All instruction is delivered on island or through distance learning.

Maintenance Assistance Program (MAP)

The MAP Training Program was established at Palau Community College with the expressed goal of establishing a permanent short-term training program for workers in the area of infrastructure operation and maintenance. The program concentrates on assessment and training of government/semi-government employees working in infrastructure, operation, maintenance and utility related fields.

Penn Foster Career School -Thomson Education Direct (former)

Penn Foster is one of the oldest and largest distance learning institutions in the world. The school provides programs and services that are designed to meet the life-long learning needs of the adult learner. Programs of study lead to career-specific diplomas.

National Occupational Competency Testing Institute (NOCTI)

The National Occupational Competency Testing Institute (NOCTI) is the foremost provider of occupational competency examinations to business, education, industry, government, and military in the United States. These examinations are offered at two levels: Job ready and the experienced worker. NOCTI assessments can assist educators and employers in identifying occupational skills required of entry level employees or for experienced workers to move ahead in their fields. Palau Community College is an approved NOCTI Area Test Center and is responsible for coordinating and administering NOCTI examinations in Palau.

Pacific Islands University (PIU)

Pacific Islands University (PIU) is a Christian university offering certificates, diplomas, and degrees in biblical studies. Working in collaboration with Palau Community College, PIU's

Palau Teaching office is located on the PCC campus and uses PCC's facilities for its courses. PIU students in Palau can take their general education and elective requirements at PCC.

PCC Continuing Education

The Continuing Education Division (CE) serves as an outreach arm of the college responsible to sponsor activities including non-credit and short-term training designed to meet pre-service and in-service needs of the community. Continuing Education provides programs and services that empower the community to meet its growing and changing educational and training needs.

1. CE serves the community by offering non-credit programs such as pre-service training for those who are looking for jobs, in-service training for those who are employed and need to enhance and upgrade their skills; workshops, seminars, conferences, conducting community surveys, or apprentice training for persons regardless of their age or previous education, and who are not concerned with earning academic credits but wish to enrich their lives and improve their personal efficiency.
2. CE provides one-on-one advising, counseling and guidance for people interested in acquiring entry-level skills or for employees who need to upgrade themselves.
3. CE offers summer programs such as keyboarding, computer applications, mathematics, English reading and writing, music, art, camping, marine science, and Internet exploration for school-age children.

Enrichment or Non-Credit Programs

Individual programs are developed based on specific requests made by individuals or groups for their immediate and/or long term needs. CE customizes the programs to fulfill the needs of the customers. However, due to high costs of materials, trainers and facilities, CE sets the minimum number of participants at ten (10) for each program offered and reserves the right to change this number. Certificates of enrichment/completion are awarded to individuals who fulfill established program requirements.

Apprentice Training Program

Apprentice training program offers an opportunity for anyone who lacks the skills to work and want to learn the skills under an expert trainer. Participants commit themselves to work under an established agreement between PCC and a local agency that offers the training sought to register in the program and be placed on the work site. The training is free and the participants who undergo the training will not receive any compensation from either PCC or the agency providing the training. However, the participant will learn as much under close and direct supervision of a selected staff from the agency proving the training. Participants will be assed of their skill level after the training and awarded a certificate of completion showing their competency level on the skills they have acquired from the training.

Adult High School

The PCC Adult High School, established in the Fall 2000, serves members of the community who have not earned high school diplomas or its equivalent. The program offers two tracks toward a high school diploma: a terminal program for those in the work-force or those planning to enter the work-force after completion of the program, and another track for individuals desiring entry into post-secondary institutions. Working in collaboration with the Ministry of Education, the Adult High School program serves Palauans of 18 years or older who choose not to go back to a regular high school or to enroll in the GED program.

5.4 Present and Future Market Demand

In consultation with the stakeholders in the list of workforce training needs and priority sectors for skill development were captured. The different types of skills (knowledge-based; skills based on ability or aptitude and those skills developed throughout lifetime and experience) required to be able to adapt to the adverse effects of Climate Change and the use of energy in a sustainable way are summarized in the following table. Once areas for skills development are selected an in-depth analysis that is course-specific must be conducted, where each course contents must be analysed in terms of current offerings in country and how these can be added to and supported, or if a new course or skill set needs to be developed and implemented.

Type of Skills	Description		
	Sustainable Energy	*Climate Change Adaptation*	
Knowledge-based *Knowledge of specific subjects, procedures, and information necessary to perform particular tasks Such knowledge-based skills are acquired through education, training, and on-the-job experience*	• Linesman • Building/Construction best practice skills • Solar water pump installation, operation and maintenance skills • Solar PV system design skills • Solar PV system installation skills • Solar PV systems O&M skills • Energy Auditing & efficiency skills • Knowledge of different types of renewable energy resources and technologies • Computer Skills • Biogas system design, installation, operation and maintenance skills • Traditional marine transportation skills	1. CC Adaptation assessment, toolkit user skills. 2. Disaster risk reduction (DRR) skills. ▪ Financial – environmentally responsible lending skills 3. Disaster response skills ▪ Post disaster assessment skills 4. Ecosystem services and resource management (terrestrial and marine)skills 5. Climate science and meteorological services skills 6. Agriculture and food security ▪ Crop resilience knowledge-based skills ▪ Livestock record keeping ▪ Crop seasonal cycles traditional knowledge-based skills ▪ Knowledge-based skill on best crops for certain ecosystems – example: Low lying atoll islands, mountains, grassland. ▪ Crop/food preservation skills – traditional skills ▪ Pest/weed control skills ▪ Meat inspection and food safety ▪ General food handling and hygiene skills	7. Fisheries and food security ▪ Basic marine conservation skills ▪ Sea-food processing and preservation skills ▪ Knowledge-based skills on fish species and breeding cycles. ▪ Knowledge-based skills on sustainable fishing methods. ▪ Conservation regulation enforcement skills 8. GIS and spatial planning skills 9. Water security ▪ Plumbing ▪ Water collection and preservation skills ▪ Rainwater harvesting skills ▪ Water purification and testing skills ▪ Watershed management skills ▪ Enforcement of regulations skills
Transferable/Functional Skills *These are actions taken to perform a task, transferable to different work functions and industries and the skills are based on ability and aptitude*	• Communication Skills • Analyzing skills • Public Speaking skills • Organizing skills • Writing skills • Promotional skills • Coaching & Mentoring skills • Leadership skills • Knowledge management skills	Project Management skills for site managers Community Resource Management Planning; Biological Monitoring; Socioeconomic Monitoring; Surveillance & Enforcement using technology (Radars, Computers, GPS, Boats, Tablets, etc.); Communications & Facilitation skills; How to conduct effective education & outreach programmes; Accounting & Budgeting, Grant Writing & Report Writing; Conservation Law Enforcement; Tropical Marine & Terrestrial Ecology; Data Management & Analysis; Partnership Development & Networking; Climate Change Awareness/Planning/Assessment; EIA and CBA	• Business skills ▪ costing and pricing, ▪ business analysis and planning, ▪ marketing plan creating, ▪ enterprise operations and management ▪ Product development, value-adding, and branding skills
Personal Traits/Attitude *Traits or personality characteristics that contribute to performing work. Such skills are developed in childhood and through life experience*	• Safety skills • Interpersonal skills • Succession Planning skills • Resource Sharing skills • Language awareness skills • Diplomatic Skills • Result-oriented skills • Independence skills		

5.4.1 Future Market Demand based on Annex 1 of the Climate Change Policy 2015 – 5 year strategy

OBJECTIVE: By 2020, Palau's educational system will include coordinated climate change and disaster risk information in its curriculum and will offer professional development for adults

Strategy to achieve Climate Change Policy (2015)	Time frame	Lead Agency Supporting Agencies	Indicators
Integrate climate change and disaster management into education policies and action plans, considering formal and non-formal learning	Year 1 – Year 2	MOE	• Scholarship list climate related studies as a priority • Applied science techniques w/ educators meeting held annually
Revise the current school curriculum to incorporate climate change and disaster management, and develop teachers training modules/materials	Year 2 – Year 4	MOE	• Curriculum revised and covers climate change
Revise current curriculum and Pilot revised curriculum	*Year 1 – Year 3*	*MOE*	• *Curriculum developed and tested*
Develop training modules and train teacher to use revised curriculum	*Year 4 – Year 5*	*MOE*	• *Number of teachers trained increases*
Gather materials: (books, apps, lab equipment, etc.)	*Year 1 – Year 5*	*MOE-BCI (Bureau of Curriculum & Instruction)*	• *Inventory of materials collected and location of materials*
Prioritize scholarship and education opportunities in climate/disaster	Year 1 – Year 5	Scholarship Office MOE, Congress	• Number of scholarships offered and awarded
Implement professional training in climate/disaster related studies including through a Teachers Conference on climate change and disasters	Year 2 – Year 4	National Emergency Council	• Professional training development established & implemented annually • Trainers guide pamphlet is produced and disseminated • Trainers have been trained to go out to site-visits
Teachers Education Conference dedicated to climate change	*Year 2*	*MOE*	• *Annual conference dedicated to climate change component*
Established focal point based at MOE to help in coordination, implementation, monitoring, and evaluation	*Year 2*	*MOE*	• *Focal point identified and hired*
Community outreach: state visits, development of trainers management (material to educate about risks in that specific community and where to find more information), student involvement through hands on activities, inter-generational knowledge sharing	*Year 2 – Year 5*	*MOE*	• *Number of communities reached*
Improve access to information on climate change and disasters	Year 1 – Year 3	MOE & MOS BFSCA, BEEA, Private Schools	• Repository of information identified and communicated • Resources received and allocated appropriately

5.5 Suggested priorities for future EU PacTVET activities

Immediate priorities are outlined in red text

Sustainable energy:

Gap/Skill Needed	Level	Training type/ intervention	Who	Content/Competencies
Building/Construction Best Practices	Associate Degree	Integrate in existing courses	CPP with USP & SPC support	Building codes, environmental best practices; Building inspection
ToT for Solar PV system design skills Solar PV system installation skills Solar PV systems O&M skills	Advanced	Technical training for existing CPP staff	EU PacTVET supported	Trained to international industry standards (grid connected and stand-alone systems)
Solar PV system design Solar PV system installation Solar PV systems O&M	Basic to advanced	Course design and implementation	Courses offered at PCC	Content based on international standards for grid connected and stand-alone systems
Energy auditing and efficiency	Basic to advanced	Course design and implementation	Courses offered at PCC	Energy audit Rational use of energy Labelling and appliance standards
Biogas system design, installation, operation and maintenance	Basic	Course design and implementation	Courses offered by NGO Sector or PCC	Safety, installation, operation and maintenance, feedstock mixing, animal husbandry, use of digestate
Traditional marine transportation skills	Basic to advanced	Course design and implementation	Courses offered at PCC	Wood carving and carpentry, sale making, navigation, timber selection and sustainable harvesting

Climate change:

Gap/Skill Needed	Level	Training type/ intervention	Who	Content/Competencies
ToT for climate change identified needs	Advanced	Technical training for existing PCC staff	EU PacTVET supported	Various – to be determined
CC Adaptation assessment	Basic to advanced	Course design and implementation	PCC with USP & SPC support	Various toolkits, community planning, GIS, etc
Ecosystem services and resource management (terrestrial and marine)	Associate Degree	Integrate in existing courses at PCC	PCC with USP & SPC support	Various – to be determined
Disaster risk reduction and disaster response	Basic to advanced	TOT and Course design and implementation – "professionalization" of existing training	Courses offered at PCC and in NGO sector	Various – to be determined – see tables in 5.3.3 and 5.4 above
Climate science and meteorological services	Basic to advanced	ToT & Course design and implementation	Courses offered at PCC & NGO & Met Office, USP support	Basic climate science, competencies based on International Meteorological Service standards
Agriculture and food security	Basic to advanced	Course design and implementation – integration into existing PCC programmes - Associate of Science in Tourism and Hospitality; Associate of Science in Agriculture	Courses offered by NGO sector and PCC	Crop seasonal cycles traditional knowledge-based skills; - Capacity-building for farmers on record-keeping (maybe a continuing education course?)Crop/food preservation skills – traditional skills; General food handling and hygiene skills; Meat inspection; Waste utilization from livestock production for bio-gas;
Fisheries and food security	Basic to advanced	Course design and implementation – integration into existing PCC programmes	Courses offered by NGO sector and PCC	Resource management; Sea-food processing and preservation; Traditional knowledge; Conservation regulation enforcement skills

Gap/Skill Needed	Level	Training type/ intervention	Who	Content/Competencies
Water security	Associate Degree & Certificate of Achievement	Course design and implementation - Integrate in existing courses at PCC – new courses on plumbing	PCC with USP & SPC support	Plumbing; Water collection and preservation skills; Rainwater harvesting; Water purification and testing skills; Watershed management; Enforcement of regulations

Transferable skills:

Gap/Skill Needed	Level	Training type/ intervention	Who	Content/Competencies
Project Management	Basic-Advanced	TOT, Course design and implementation - new courses at PCC	PCC with USP & SPC support	Project design skills; Community engagement; Audit/ accountability; Monitoring and evaluation; Sourcing funding (as listed in 5.2.1)
Business skills	Basic to Advanced	Course design and implementation - Integrate in existing courses at PCC	PCC with USP & SPC support – can be offered in NGO sector	Costing and pricing; business analysis and planning; marketing plan creating; enterprise operations and management; product development, value-adding, and branding skills
Data analysis	Basic to advanced	Course design and implementation - Integrate in existing courses at PCC	PCC with USP & SPC support – can be offered in NGO sector	Types of data, sources of data, questionnaire design, research skills, data analysis, data entry, basic statistics

6. Consultation Outcome

Present and future market demand for TVET in Palau has been identified and existing training supply mapped. The priorities for future project activities will need to be narrowed at the Regional Inception Meeting.

Current TVET and tertiary education generally in the Palau has been highlighted as not fulfilling the countries development needs – with particular reference to the National Energy Policy 2010 and the draft Climate Change Policy 2015. The EU PacTVET project has the potential to fill these gaps.

By providing a "skill-set" approach to CCA and SE training EU PacTVET could go some way to providing educational linkages to economic priorities and job creation – especially in the areas of renewable energies such as solar and in project management and DRM as funding for projects in these areas is set to continue.

SPC Secretariat of the Pacific Community

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USP THE UNIVERSITY OF THE SOUTH PACIFIC

EU PacTVET

European Union Pacific Technical and Vocational Education and Training on Sustainable Energy and Climate Change Adaptation Project

Training Providers

Table 14 provides information on the sole training institute identified in the desktop study and they did respond to the survey. Their response to the survey is shown in Table 15.

Table 14: Palau Training Institute

Institute	Contact	Position	E-mail	Phone
Palau Community College	Mr. Patrick Tellei	Principal	tellei@palau.edu	(680) 488-2470

Table 15: Palau Community College (PCC) Capabilities

Does your TVET have any department that could conduct any of the following types of courses	Yes or No?	If Yes, please state which department	Contact Person	Contact E-mail
Renewable Energy Technologies?	Yes	Electrical Technology Dept, College of Technical Educ.	Jerry Taroy	jerry.taroy@gmail.com
Grid Connect PV Systems?	Yes	Electrical Technology Dept, College of Technical Educ.	Jerry Taroy	jerry.taroy@gmail.com
Off Grid PV Systems?	Yes	Electrical Technology Dept, College of Technical Educ.	Jerry Taroy	jerry.taroy@gmail.com
Solar Hot water?	Yes	Engineering Department, Faculty of Applied Sciences	Jerry Taroy	jerry.taroy@gmail.com
Wind Power Systems?	Yes	Engineering Department, Faculty of Applied Sciences	Jerry Taroy	jerry.taroy@gmail.com
Hydropower?	Yes	Engineering Department, Faculty of Applied Sciences	Jerry Taroy	jerry.taroy@gmail.com
Micro-Hydro Power?	Yes	Engineering Department, Faculty of Applied Sciences	Jerry Taroy	jerry.taroy@gmail.com
Biomass?	Yes	Engineering Department, Faculty of Applied Sciences	Jerry Taroy	jerry.taroy@gmail.com
Biogas?	Yes	Engineering Department, Faculty of Applied Sciences	Jerry Taroy	jerry.taroy@gmail.com
Geothermal	??	Engineering Department,	Jerry	jerry.taroy@gmail.com

		Faculty of Applied Sciences	Taroy	
Others technologies?	Yes	Academic Affairs Office	Robert Ramarui	rramarui@palau.edu
Energy Efficiency?	Yes	Engineering Department, Faculty of Applied Sciences	Jerry Taroy	jerry.taroy@gmail.com
Refrigeration?	Yes	Air-conditioning Technology Dept, College of Technical Educ'n	Medardo Rejano	-
Air-conditioning?	Yes	Air-conditioning Technology Dept, College of Technical Educ'n	Medardo Rejano	-
Electrical wiring?	Yes	Electrical Technology Dept, College of Technical Educ'n	Jerry Taroy	jerry.taroy@gmail.com
Efficient land and water transport systems?	Yes	Maintenance Assistance Program - PCC	Don Hanser	donhanser@yahoo.com
Energy sector planning and management?				

In the last 5 years, PCC has conducted courses in the following areas:

- Renewable energy technologies (e.g. solar PV, solar water heaters, biogas, wind power and micro-hydropower
- Energy efficiency (e.g. refrigeration and air-conditioning maintenance, motor mechanic, electrical wiring and rewiring of electric motors, efficient land and water transport systems)

The PCC has an ongoing electrical course and their trainer, Mr Jerry Taroy, was trained by GSES in a SPC North-REP funded project for the delivery of grid connect PV courses. Mr Taroy has conducted a pilot grid connect PV course in 2014 and, from 2015, the grid connect courses will form part of the Electrical Technology Program at PCC and have been approved within this program.

During the VOCTEC project, two trainers from PCC were trained to conduct off-grid solar training courses. Details are provided in Table 16.

Table 16: Trainers trained under VOCTEC project

Institution	Name of Trainer	Contact Number	Email	Course Type	Date Trained

Palau Community College	Jerry Taroy	Use Institution Contact	jerry.taroy@gmail.com	Small Off Grid PV systems	May-14
Palau Community College	Frutoso Tellei	Use Institution Contact	frutosot@palau.edu	Small Off Grid PV systems	May-14

From the experience of the project team and from the survey response, 7 courses were identified as having been conducted in Palau in the last 5 years. Information on the courses is contained in Appendix 8.

In summary these include:

- Design and Install Grid connect PV Systems (Train the Trainers course)
- VOCTEC Train the Trainer Course 1
- VOCTEC Train the Trainer Course 2
- University of Guam - Intensive Photovoltaic System Engineering and Installation Course
- NDBP Standard Grid Connected PV System: Hands-on Training and Refresher Training
- Grid-connected PV System, Design and Installation (PPC pilot course)
- Household energy survey training for surveyors and power utility staff

The grid connect PV course was conducted by GSES, a company which is a Registered Training Organisation in Australia. Those who passed are eligible to apply for industry certification under the Pacific Power Association (PPA) and Sustainable Energy Association of Pacific Islands (SEIAPI) certification and accreditation program.

The VOCTEC course had the intention of capacity building.

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EU PacTVET

European Union Pacific Technical and Vocational Education and Training on Sustainable Energy and Climate Change Adaptation Project

Papua New Guinea
Training Needs Analysis

Prepared by Nixon Kua, SE Adviser, PacTVET, March 2015

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Acknowledgment

Papua New Guinea surely is the "Land of the Unexpected". The weather could be fine now but in the next hour, no one knows what lies ahead. The name is well-earned because of the so vast extremes in the physical features of the natural environment – from the islands and the coastal communities to the cooler highland terrain of Eastern Highlands Province to the near western City of Mt. Hagen and the rest of the highlands of Papua New Guinea. The diversity of the environment, the people and the culture is so amazing that it make you hear the inner echo from within you saying, "This is truly the untouched paradise of the Pacific".

These words of inner appreciation cannot be said without the assistance of the following people who in one way or another facilitated this in-country mission to the land of the unexpected:

- **In Port Moresby – Manu Rawali and Moyap Kilepak from the Physic Department at the University of Papua New Guinea;**

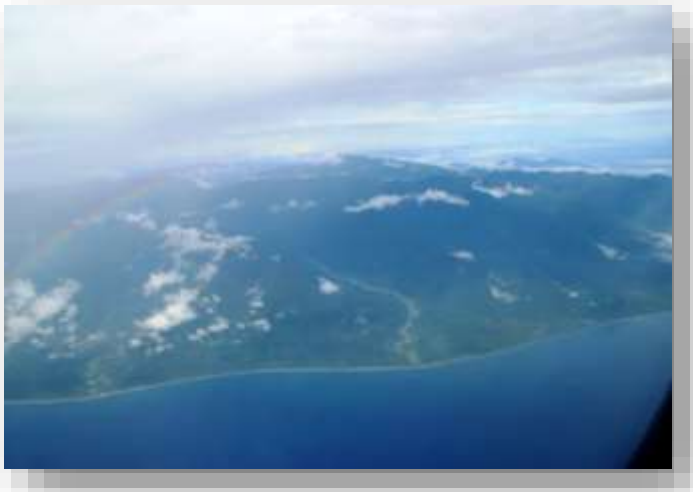
- **In Lae – Mr. John Tenakanai (Deputy Director – ATCDI – UNITECH) and Mr Ronal Dei (ATCDI Technician)**

And lastly to my mission assistant, facilitator and of course my chief security, Mr Garaio Gafie for arranging for all logistics in Port Moresby, Goroka, Lae and Madang. Without him, this mission won't achieve its objectives.

In a show of appreciation, I would like to say it in Tok Pisin, "Tenkiu tru ol Wantoks", (thank you very much friends).

1. Background

The EU-PacTVET (European Union Pacific Technical, Vocational Education and Training) is a European Union (EU) funded project under the broader Adaptation to Climate Change and Sustainable Energy Programme (ACSE). It is component three (3) of this ACSE Programme.



Papua New Guinea (PNG) as one of the largest member of the Pacific-African Caribbean Pacific (P-ACP) is affected by climate change in varying degree of adversity, from the coastal lines up to the cooler highlands. There practical community-based assertion that take into account comparative measures of the present and past scenarios on various physical aspects, such as coastal line erosion and introduction of pest due to warming of cooler regions in the populated highland region of Papua New Guinea.

Current total global greenhouse gas (GHG) emission stands at 36.9 gigatonnes of CO2 (GgtCO2). Of this global GHG emission, PNG emit less than 0.02%, which is $^{2}/_{3}$ of the total Pacific emission. Coastal and highland people are also amongst the vulnerable to adverse effects of climate change since they would be exposed and the least able to respond. Hence there is a moral obligation for the PNG to start implementing measures in mitigating GHG. On a national level, PNG's annual GHG emission is about 11,000 kilo-tonnes CO2, which on a global scale, is insignificant.

PNG's total power installed is closer to 550 MW. From this 40% is from hydropower; 38 % is from diesel oil and the rest is from natural gas and geothermal. From the installed capacity nation-wide, 295 MW belongs to PNG Power Limited whilst the remaining 255 MW belong to the mining and the manufacturing industries[1]. PNG's population that have access to modern electricity for lighting is 12%[2].

PNG emit less than 0.02%, which is $^{2}/_{3}$ of the total Pacific emission. Coastal and highland people are also amongst the vulnerable to adverse effects of climate change since they would be exposed and the least able to respond. Hence there is a moral obligation for the PNG to start implementing measures in mitigating GHG

[1] Promoting Energy Efficiency in the Pacific (PEEP 2)
[2] Promoting Energy Efficiency in the Pacific (PEEP 2)

With the Pacific Island countries facing challenges pose by climate change and energy security, sustainable energy and climate change adaptation are undeniably ranked above all other sectors in the regional Governments priorities, as evident through regionally endorsed frameworks, such as the wider Pacific Plan and the more specific Pacific Islands Framework Action on Climate Change (PIFACC) and the Framework Action on Energy Security in the Pacific (FAESP) and individual national policies.

Efforts in addressing energy security and climate change adaptation challenges are ongoing through various regional and national projects. On climate change mitigation in PNG, there are some familiar project such as the LNG Project (Liquefied Natural Gas Project) and the Lihir Geothermal power plant, and hydropower schemes on the scale of more than 200 MW.

Climate change adaptation regional project like Pacific Adaptation to climate change (PACC) had focussed on food security in PNG. The PIGGAREP, whilst having minimal impact in PNG was focussing on complementing PICs initiatives in promoting the widespread use of renewable energy and PACC focuses its project on three thematic areas, namely, "Food security"; "Water Security" and "Coastal Management". This project focusses on assisting communities to implement activities that help them in these three areas.

Sustenance of such projects on mitigation and adaptation is very important. Now that these projects are coming to their end, it is important that knowledge and skills being acquired and/or hardware that were put in place continue to function and be beneficial to the targeted beneficiaries. Not only on the renewable energy side, but on the overall energy scene, where there are needs to be able to understand energy efficiency and conservation and what measures needs to be taken to use energy in a sustainable manner as compared to energy misuse and wastages.

Knowledge and skills on agricultural and fisheries best practices and other innovative approaches in addressing food security, water security and measures to reduction of vulnerability to disaster needs to be well established in rural and urban communities alike. Such knowledge and skills can only be acquired through strategic and systematic approaches such as capacity building which target the rural majority of the pacific island countries, especially in the Melanesian countries, and PNG is no exception. Such capacity building needs to be targeted at levels and strategic training providers within the countries that would have real impact to the rural communities and other level of communities.

Papua New Guinea has a population of 7,635,291[3] and about 87.5% of this population are rural and remote community dwellers, practising subsistence farming and have been using biomass for their energy needs, hence for livelihood sustenance. To further enhance their livelihood, knowledge and skills in agricultural and fishing best practices and energy security, including energy efficiency and conservation, needs to be passed on to community youth drop-outs that comprises of the majority of the population.

[3] http://countrymeters.info/en/Papua_New_Guinea

1.1. Mission Objective

The purpose of the in-country-mission is to:

A. Identify the present and future market demand
B. Map out the existing training supply for the Papua New Guinea

2. Schedule of Consultation Events

The schedule of events from the 23rd February to the 5th of March is outline in Appendix 1. The project outline was given to all the stakeholders that were consulted from Day 1 to Day 8. KRAs and in particular the KRA 1 was emphasised during the consultation. The consultations were centred on technical training providers, them as suppliers of trainings and the demands from the industries and communities regarding Sustainable Energy (SE) and Climate Change Adaptation (CCA). Would they be able to meet the skills that are on demand? If not, why and what can be done and how

2.1. Project Outline and Presentation

During the various consultation meetings, including the one day consultation workshop, the opening, an outline of the EU-PacTVET was made, with emphasis on the following aspect of the project:

a. Rationale - current scenario with regards to SE and CCA in the P-ACPs and the issues emanating from those scenarios. It was focussed down to the case of PNG, where there a lot of dependency on fossil fuel for power production and transportation. On the climate change side of the coin, the P-ACPs are more vulnerable to climate change, but have the least capacity to respond to these.
b. How the EU responded to these issues and the approach it took by focussing on building the capacity and empowering the capacities through benchmarking and the aim of setting standards of competencies and accreditation.
c. The objective and the purpose were state as being taken to try and address the issues
d. The Key Result Area. Each of the 4 KRAs were outline and it was made know to the stakeholders that one of the activities under KRA 1 is this in-country-assistance on consultative workshop and one-on-one consultation to do a training needs and gaps analysis (TNGA). Activities that need to be conducted in the hope of achieving each of these KRAs were briefly outlined.
e. A brief overview of the budget. This was to give the stakeholders a glimpse of the allocation from the €6.1 million
f. And finally, it was emphasised that the consultations are important in that the PNG (stakeholders) need to identify it needs so that they could be noted as one of the activities that needs support.

3. Status Quo – Energy, Climate Change and TVET in PNG

This section is to establish the baseline as to what each of the sectors are engaged in and how does each of these sectors are affected by climate change and how sustainable energy practices are being part of their sectoral policies.

The training needs and gaps identified would be outlined in the latter sections, but outline below is the summary of the different sector's functions and relationships with SE and CCA

3.1. Energy

PNG is the largest country in the South Pacific in terms of land area and population. It comprises of around 600 islands, and, administratively, the country is divided into 22 provinces in four regions, that is, Southern, Highland, Momase and Island regions. PNG is richly endowed with natural resources, but exploitation has been hampered by rugged terrain, land tenure issues, and the high cost of developing infrastructure.

PNG's oil production in 2008 was 38,080 barrels a day from three oil fields. With the commissioning of its first refinery plant in 2004, crude is now refined locally. Sixty-five percent of the refinery's output is consumed locally for different end-uses in the industrial and transport sectors, as well as for electricity generation. The remaining 35% is exported overseas. A new world-scale export oriented Liquefied Natural Gas (LNG) project is presently under development in PNG and was in operation since 2014.

The Energy Division of the Department of Petroleum and Energy (ED-DPE) is responsible for preparing energy policies, planning initiatives, data collection and analysis as well as advising the government on energy sector issues. Over the past years, three policy drafts, including Draft Energy Policy, Draft Electricity Industry Policy (EIP) and Draft Rural Electrification Policy, have been circulated within the ED-DPE and discussed with the Government and concerned stakeholders. PNG endorsed their National Electric Industry Policy in December 2011, and the Energy Department is the custodian of Energy Technical Regulation, which includes energy efficiency and conservation.

Price and other aspects of electricity supply operations in PNG are regulated by the Independent Consumer and Competition Commission (ICCC), an independent regulator of the electricity industry established through an Act of Parliament in 2002 (ICCC Act 2002). There are two Acts cover the provision of power supplies within PNG, i.e.: a) the Electricity Industry Act of 2000 (formerly Elcom Act), and; b) the Government Power Stations Act.

The PNG Power Limited (PPL) is a fully integrated power authority responsible for generation, transmission, distribution and retailing of electricity nationwide. PPL was corporatized under the Electricity Commission (Privatization) Act 2002 as the successor company to the Papua New Guinea Electricity Commission (ELCOM). In 2009, PPL was delegated a regulatory role by ICCC and their responsibilities include approving licenses for

electrical contractors, providing certifications for electrical equipment and appliances to be sold in PNG, and providing safety advisory services and checks for major installations.

Based on the PEEP1 report for PNG, the total installed capacity in PNG was estimated to be 547 MW with 40% hydro and 38% thermal (mostly from diesel fired power stations) for the 2008-2009 period. The remaining installed capacity was constituted by geothermal and natural gas power plants. Of this total installed capacity nationwide, 295 MW belongs to PPL, comprising 148 MW of hydro (50%) and 137 MW of thermal (47%) power plants. The remaining installed capacity belongs to mining and manufacturing industries, as well as 150 to 200 small rural electricity systems (called "C-Centres") that are operated by local government authorities.

According to the PPL Annual Report 2009, hydropower serves base load in the Port Moresby, Ramu and Gazelle Systems. However, most of these hydropower plants are more than 30 years old and have not been properly maintained due to the previously poor financial situation of PPL. As a result, power outages have been prevalent and increasing for many years, and the total hydropower generations are estimated to be lower than 30% of the total annual electricity generation in PNG. Greater use of natural gas in electricity generation is expected, as a result of natural gas supply becoming available in the Port Moresby area.

3.2. Climate Change

Climate change does not rule out anyone, big or small. Whatever you do, living up in the mountains or along the coast, or living in a city, the predicted adverse effect of climate change will surely catch up on you.

Climate change and food security and climate change and water security always go hand-in hand. Climate change is affecting all sectors of life. It affects agriculture, fisheries and water. Human's food security and water security are at stake. The adverse effects of climate change – how can human being face the challenges? Adaptation could be the key to resilience.

Adaptation encompasses the efforts to reduce the vulnerability of the people and assets of PNG to climate change associated risks, from both gradual hazards (e.g., increase in vector-borne diseases like malaria) and event-driven hazards (e.g., increase in instances of landslides, flooding).

Many people in Papua New Guinea are today vulnerable to the changes of the natural environment. Coastal flooding, inland flooding, landslides and droughts take a severe toll on the people and the economy. Climate change will likely exacerbate some of these event-driven hazards and may also introduce new hazards due to gradual shifts in climatic conditions – most prominently, further malaria penetration into the highlands, changed agricultural yields and damaged coral reefs.

Therefore the implementation of specific adaptive measure identified through a five step risk management methodology will be applied to each sector, such as the agriculture, fisheries, extractive industries, and critical infrastructure is critical.

In agriculture, land management techniques are ongoing issues with challenges of fostering crop diversification. Furthermore, there are issues of changing traditional crop calendar with problems arising from water availability and usage. Effective management of pest, diseases and weeds are current focus and need to be up-scaled coupled with the development and use of crop varieties resistant to pest and diseases.
In fisheries, there is a need to diversify and readjust fishing practices and encourage viable options to maintain fisheries productivity. There is also a need to identify most practical and profitable fishing options mixed with selective usage of adaptive fishing gears and baits that can exclude unwanted and attract desired species. Furthermore, development and uptake of methods that increase shelf life of fish stock and the construction and deployment of low-cost fish aggregating devices at strategic location are possibilities to establish adaptation mechanism in the Fisheries sector. Aquaculture is also a tool for adaptation to some impacts of climate change on fisheries.

3.3. Education Department – TVET Division

Technical and Vocational Education and Training in Papua New Guinea is administered by the TVET Division of the Education Department. It directly operates 7 Technical Institute (National Institutions) in PNG and 132 Vocational Training Centres (Provincial Institutions). These institutions are located in most of the cities, town and various locations in the rural communities in the country.
TVET itself can be seen in two distinct components yet complement each other from the village community level up thee formal working environment. So in a nutshell "technical education and training" is the planned acquisition of competencies and related knowledge designed to produce skilled and semi-skilled persons with the attitudes/abilities and work ethics appropriate to the modern working environment and current work practices, or be employable or "work-ready".

The other component is "vocational education and training". This is the planned acquisition of competencies together with the necessary knowledge defined by community, individual, social and economic needs to the development of material wellbeing in the informal and village economic sectors.

This distinction cannot be really separated in the Vocational Training Centres because of the need to prepare learners to be a good village citizen taking part in community social governance and at the same time be able to be employed in formal workplaces and be able to use the skills learned.

The PNG TVET system comprises the TVET institutions under the PNG Education System, private training institutions, the National Apprenticeship and Trade Testing Board (NATTB) and the National Training Council (NTC).
The private training institutions provide a wide range of short courses that focus on specific workplace skills, and longer courses for certificate qualifications in trade and business areas.
The NATTB provides for the development of National Occupational Standards to meet industry requirements, accreditation of skills training providers and the awarding of

occupational qualifications. The NTC provides for the development of training in PNG and the certification of private training institutions.

4. Consultation Methodologies

In trying to maximise output various methods of consultation were employed in this in-country mission. Determining which methodology to use depend on various factors ranging from availability, distance and timing. The following are the methods employed to capture the required data during the in-country mission:

4.1. Consultative Workshop/Meeting (TNGA)

A consultative workshop is a consultation with stakeholders in a venue where the agendum for discussion or consultation is done for all at once. This was the methodology employed for the one day during this in-country mission. This methodology was employed because it used the forum to draw ideas and consolidates them.

4.2. One-to-one Consultations (Interview)

In a situation where stakeholders cannot make it to the consultative gatherings, due to other commitments, a one-to-one or face-to-face meeting or interviews are done. This was also employed where a number of stakeholders like the Ministries' Secretaries and those who stay in other institutions in Lae, Goroka and Madang

4.3. Phone calls

In situations that the stakeholders are busy (but virtually can respond to questions) and that there is time and financial constraint, phone interview is probably the best option. It is versatile because you can probe question at different angle and can ask supplementary or follow-up question.

4.4. Internet – Online

This was used for searching for further information or publication of Reports or Policies. Not only that but to confirm or double-check on information given.

4.5. Desktop Literature Review

This forms the basis for evaluative report of information found in the literature related to technical, vocational education and training with the subject of sustainable energy and climate change as the content. Various literatures were consulted, within the education, energy and climate change sectors, on policy frameworks and national action plans or development strategic plans. Most Policy frameworks (regional and national) were reviewed and those were used as the basis for consolidating future SE and CCA demands or needs in the PNG.

5. Relevant National Policies and Frameworks

All national policy frameworks and their Action Plan set out principles and suggested initiatives designed to guide and support the development and implementation of national activities consistent with the these policy frameworks' visions and goals.

The Forum Leader's endorsement of the Pacific Islands Framework for Action on Climate Change in 2005 and the Framework for Action on Energy Security in The Pacific (FAESP) in 2010, demonstrated that sustainable energy and climate change adaptation are therefore top priorities for Pacific Island governments.

Papua New Guinea has different policies within each of its government departments that guides their development plans. Brief outline of some of the Policies within the Education, Energy and Climate Change Departments are given below. As development projects, whether national or regional, they must be channelled through existing national policies within the stakeholder government departments. In this PacTVET project, these three government stakeholders are the Energy Department, Education Department and Office of Climate Change and Development

5.1. Education Sector

Since the education sector is one of the major actors in this project, relevant national education policies and frameworks have to be visited to be sure of being guided by their bounds.

Within the education sector there are various policies, frameworks and action plans. Briefly outline here is the PNG TVET Policy. This Policy aspired to be implemented to achieve the following:

- TVET development plans which reflect the development priorities of Papua New Guinea.
- Partnerships between key stakeholders including the NATTB, NTC, employer an employee associations, and provincial level agencies to ensure adequate planning and access to information and resources.
- TVET that is Demand Response through:
  - ✓ Quality TVET programs and services relevant to vocational skill needs of the PNG industries and communities.
  - ✓ Technical Colleges and Vocational Centres providing relevant and responsive education and training services to their respective industries and communities.
  - ✓ A competent teaching force which is responsive to the contemporary skill needs of industries and communities, and the learning needs of students and trainees.
  - ✓ The enhancement of material wellbeing of Papua New Guineans through the acquisition, development and formal recognition of competencies that are relevant to their economic and social life.
- An effective and efficient TVET Division which focuses on the overall planning, quality, coordination, monitoring and evaluation of TVET for the Department of Education.
- A coordinated and unified Public TVET through the integration of vocational education and technical education.

This policy should be seen in the general context of the Papua New Guinea TVET system but focuses to the public TVET institutions within the Education System.

5.2. Energy Sector

PNG at the moment does not have a National Energy Policy, which is quite unbelievable for such a big country and a large consumer of energy in the region. There are numerous investors interest in energy generation in the country. It is recognized that the country must have a National Energy Policy to promote and guide renewable and clean power generation. In its Mid-Term Development Strategy (MTDS), energy is not captured as priority. But the government is working on its Long Term Development Strategy (LTDS) which finally captured energy in it, as priority for economic development.

There are various overarching policies and Energy sector policies. This includes the following:

- The Petroleum Policy under the Petroleum Division
- Electricity Industry Policy (Draft), with its objectives to improve reliability of electricity supplies; increase access to electricity by people and ensure electricity is affordable.

From this it is sufficient to conclude that electricity is required for livelihood sustenance in all aspects of life in PNG. Hence the requirement to build capacities at all levels and across level, to be able to foresee that the above mentioned aspirations can be forthcoming.

5.3. Climate Change

PNG had its 'Vision 2050' at the top of its development goals hierarchy that aspired to have a smart, wise, fair and happy PNG. In achieving Vision 2050, seven pillars of progress needs to be implemented and one is 'Climate Change and Environmental Sustainability'. The National Development Strategic Plan (DSP) (2011-2030) operationalized these seven pillars, and for Climate Change and Environmental Sustainability, strives to make sure that PNG "*Adapts to the impacts of Climate Change and Contribute to the Global Efforts to Mitigate Green House Gases".*

The PNG Climate Change Corporate Plan set it mandate to ensure that Papua New Guinea's economic and social development objectives are climate compatible and that Vision 2050, particularly Pillar Five on Environmental Sustainability and Climate Change, is achieved by:

- Ensuring its natural resources were used in a way that does not negatively impact its future generation, and are managed equitably.
- Protecting the people, assets, heritage and environment of PNG and giving them the knowledge and the tools to enable them to be resilient to natural and human disasters and environmental changes.
- Contributing to the global effort to reduce greenhouse gas emissions and mitigate the negative impacts of climate change.

6. Consultation Analysis

During the consultations that were made in Port Moresby (in the Consultative workshop), face-to-face consultation and through online research,

Support Training facilities and Course designing	Instructor qualification	Work Readiness	Resource Utilisation	Management/Financial and Administrative
No relevant and up-to-date practical equipment	Vocational Teachers Training need strengthening	Difficulty in putting theory into practice	Under-load staff cannot be utilised	PALS – Compliances (Energy Division and Customs) to reinforce the regulations
Lack of mainstreaming SE and CC into curriculum	Lack of relevant Qualified teachers	Lack of confidence at workplace	No equitable staffing allocation to technical and vocational centres	No college Management Plan, If there is one then there is no strict adherence to it.
Funding for facilities improvement being divert to incentivised qualified staff	Qualified graduates retention	Supervision required	Less in-house mentoring	Training and education be coordinated and incentivised to ensure support for relevant training
Limited national expertise course designing. If any, then a lucrative package if required.	Not most graduate engineers take up TVET teaching as teaching may be regarded as "second option"	Language barrier. Need to communicate in English at work place	Minimal awareness and less sense of the values underpinning technical, vocational education and training, resulting in less productivity and no professionalism at work	Improved Information flow through networking
Limited funding support to TVETs for Training Facilities	Some Vocational Training Centres (VTC) instructors are TRC graduates without work experience and teaching qualifications	Low self-esteem	Limited teaching breadth – less cost effective	Migration of qualified Instructors to town in search for better paid job
Devolve some Diploma course to Technical Institutions from UNITECH to ensure pathway from Technical Institute to University is wide and clear	Need more qualify local TVET instructors to enhance learning	Lack of Innovative skills	Lack of innovative ideas to venture into establishment of industrial or business partnership	Performance Development - Quarterly reporting of staff and institution operation
	Local capacity to designing micro-hydropower	Lack of communication skills	Lack of or less innovative ideas in creating income generating activities for the colleges	System Performance – ensuring resources are deployed to their best uses in the technical institution

Key: - Management/Admin solutions; - Requires Training; - Both Mg'mt and Training needs

Table 1: issues with TVET in PNG

Most of these issues are similar to those encountered in the Solomon Islands and there is no doubt that they will resurface again for the other two Melanesian neighbours of Vanuatu and Fiji. But for Fiji, it is seemingly not the extent as that in the Solomon Islands. This is an opinion from one's own observations.

The following are some point raised regarding the issues, needs and gaps that determines the performance of these technical, vocational education and training institution in PNG and these are categorized under five different groups as present in the following matrix.

6.1. Training Needs and Gaps Analysis (TNGA)

This is a method of determining if training needs exits or not. It is a systematic approach to identify status quo of an organisation, and in this case the broader TVET in PNG, and to identify if the objectives/goal of TVET in PNG are forthcoming or not. If there are needs and gaps identify that could bring the present status of TVET to a desired state that will meet its goal, then there is a training need.

Table 1, presents issues encountered by TVETs in PNG. Most of them are not training needs that would require a training to be achieved. They are administrative and/or management issues that can be addressed through administrative means or strategic management approaches. Some of the issues that were raised in Table 1 and skills in Table 2 were extracted to be used as present and future SE and CCA demands. The Demand and Supply Matrix is given in section 6.4).

6.2. Present and Future Market Demand

In consultation with the stakeholders in PNG a list of workforce training needs and priority sectors for skill development were captured. This is best summarised table formats. The different types of skills (knowledge-based; skills based on ability or aptitude and those skills developed throughout lifetime and experience) required to be able to adapt to the adverse effects of Climate Change and use energy in a sustainable way are summarised in the following table. These skills were not associated with any particular subject within the TVETs but were given in general as some of the skills required. Due to time constraint, in-depth training needs and gaps analysis that is course-specific must be conducted, where each course contents must be analysed. In spite on that, effort was made to try and match these required skills with each of the TVETs, and not the course or programmes within each TVET.

Type of Skills	*Skills Description*		
	Sustainable Energy	*Climate Change Adaptation*	
Knowledge-based Knowledge of specific subjects, procedures, and information necessary to perform particular tasks Such knowledge-based skills are acquired through education, training, and on-the-job experience			
	Feasibility study skills	CC Adaptation assessment skills	Basic marine conservation skills
	Electrical wiring skills	Disaster risk reduction (DRR) skills.	Sea-food processing and preservation skills
	Air conditioning and Refrigeration maintenance skills	Crop resilience knowledge-based skills	Knowledge-based skills on fish species and breeding cycles.
	Motor re-winding skills	Soil adaptability knowledge-skills.	Knowledge-based skills on sustainable fishing methods.
	Solar PV system sizing skills	Crop seasonal cycles knowledge-based skills	Budget and marketing skills
	Solar PV systems O&M skills	Crop/food preservation skills	Simple Bookkeeping skills
	Energy Auditing skills	Pest/weed control skills	Water collection and preservation skills
		Aqua-culture and agro-forestry knowledge-based skills	Rainwater harvesting skills
		General food handling and hygiene skills	Water pumping and purification skills
		Feasibility study skills	Seedling nursing
Transferable/Functional Skills These are actions taken to perform a task, transferable to different work functions and industries and the skills are based on ability and aptitude		Organizing and Planning	
		Project Concept or Proposal writing skills.	
		Project Management skills	
		Communication Skills	
		Analysing skills	
		Public Speaking skills	
		Coaching & Mentoring skills	
Personal Traits/Attitude Traits or personality characteristics that contribute to performing work. Such skills are developed in childhood and through life experience		Interpersonal skills	
		Process minded skills	
		Succession Planning skills	
		Resource Sharing skills	
		Language awareness skills (in case	
		Patience Skill	
		Diplomatic Skills	
		Result-oriented skills	
		Independence skills	

Table 2: Skills in Demand

6.3. The Training Supply: TVET Providers

PNG has 132 Vocation Training Centres and 7 Technical Training Colleges or Institutes. The table shows the various Technical and Vocational Education and Training Institutions. **Appendix 2**, outline these Institutions and the courses they offered.

6.4. The Demand and Supply Matrix

The matrix presented here provides some of the skills on demand by the Industries and course provided by the TVETS (Appendices 2). Skills could be categorized into three distinct types as presented in section 6.2.

In the matrix the TVET providers (Course Suppliers) are on the top row of the matrix, whilst the demand (skills) or training needs on the left column. If a particular training need is required by a training provider, “X” is marked on the common cell.

The Demand and Supply Matrix

	PNG COURSES PROVIDERS																	
	Universities						Technical Training Colleges							Others				
	University of Papua New Guinea	PNG University of Technology	University of Goroka	Divine Word University	Pacific Adventist University	PNG University of Natural Resources	Port Moresby Technical College	PNG National Polytechnic College	Madang Technical College	PNG Maritime College	Goroka Technical College	West New Britain Technical College	Mt Hagen Technical College	Don Bosco Tech Institute	IEA TAFE (PNG)	Caritas Technical Secondary School	Vocational Training Centres (132)	Tally
A. Training facilities and Course designing																		
Facilitate support to TVETs for Training Facilities	NA	NA	NA	NA	NA	NA	X	X	X	X	X	X	X	X	X	X	X	**11**
Strategies pathways from TVET to UNITECH	NA	NA	NA	NA	NA	NA				NA					X	X	X	**3**
Relevant and up-to-date practical equipment		X	X			X	X	X	X		X	X	X	X		X	X	**12**
SE/RE/CCA course designing and mainstreaming.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	**17**
Development and upgrading of informal skills	NA	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	**15**
Promotion of Low carbon growth	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	**17**
Develop educational curriculum and materials																	X	**1**
Assess learning styles and respond accordingly							X	X	X	X	X	X	X	X	X	X	X	**11**
Institutional Needs Summary	**40%**	**50%**	**50%**	**50%**	**50%**	**50%**	**75%**	**75%**	**75%**	**71%**	**75%**	**75%**	**75%**	**75%**	**62.5%**	**87.5%**	**100%**	
											Total count							**87**
											Overall Urgency Rating							**71%**
											National Technical Institutes + DBTI (excl. UNITECH)							**71%**
B. Qualification/Technical Experience and Expertise																		
TVET Teaching Qualification	NA	X	X	NA	NA	NA	X	X	X	X	X	X	X	X		X	X	12
Local capacity to designing micro-hydropower	NA	X	X				X	X	X		X	X	X	X	X	X	X	12
Feasibility study skills	X	X	X		X	X	X	X	X	X	X	X	X	X		X	X	15
Electrical wiring skills	NA	X	X	NA	NA	NA					X				NA	X	X	5
Air conditioning and Refrigeration maintenance skills	NA	NA	NA	NA	NA	NA			X		X			X	NA	X	X	5
Motor re-winding skills	NA	X	X	NA	NA	NA			X						NA	X	X	5
Solar PV system sizing skills		X	X				X	X	X		X	X	X	X	NA	X	X	11
Solar PV systems O & M skills		X	X				X	X	X		X	X	X	X	NA	X	X	11
Assemble and install technical equipment	X	X	X							X					X	X		6

Build a structure, follow proper sequence										X					X	X		3
Understand blueprints and architectural specs			X	X	X	X	X	X	X	X	X	X	X		X	X		13
Repair machines/tools and equipment	X	X	X	X	X									X	X	X		8
Analyze and correct plumbing or electrical problems	NA	X	X							X				X	X	X		6
Use tools and machines/equipment effectively and properly	X	X	X	X	X	X								X	X	X	X	10
Energy Auditing skills			X	X			X	X	X	X	X	X	X	X	X	X	X	13
Training of Trainers on CCA & SE	NA	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	15
Institutional Needs Summary	**44.4%**	**80%**	**93%**	**42%**	**42%**	**33.3%**	**50%**	**50%**	**62.5%**	**50%**	**62.5%**	**50%**	**50%**	**68.9%**	**73%**	**100%**	**68.9%**	
											Total Count							**150**
											Urgency Rating							**61%**
											National Technical Institutes + DBTI (excl. UNITECH)							**56%**
C. Work Readinessor Employable																		
Supervision required	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	17
Induction Programme	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	17
Difficulty in putting theory into practice	X						X	X	X	X	X	X	X	X	X	X	X	12
Need to communicate in English at work place	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	17
Low self-esteem	NA	X	X		NA	NA	X	X	X	X	X	X	X	X		X	X	12
Creative and Innovative skills		X					X	X	X	X	X	X	X	X		X	X	11
Communication skills	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	16
Lack of confidence at workplace	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	17
Debate ideas with others							X	X	X	X	X	X	X	X	X	X	X	11
Intuit strategies and solutions	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	17
Institutional Needs Summary	**78%**	**80%**	**70%**	**60%**	**67%**	**60%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**70%**	**100%**	**100%**	
											Total Count							147
											Urgency rating							88%
											National Technical Institutes + DBTI (excl. UNITECH)							100%
D. Networking and Information Sharing																		
Technical Working Groups	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	17
Sharing of lessons learnt	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	16

Improved Information flow through networking	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	16
Traditional records of natural disasters	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Policy Awareness	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	17
Awareness in dramas, videos, news articles	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	17
Establishment of Information System			X			X	X	X	X		X	X	X	X		X	X	10
Gathering information from a number of sources		X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	15
Institutional Needs Summary	**75%**	**88%**	**100%**	**88%**	**88%**	**100%**	**100%**	**100%**	**100%**	**75%**	**100%**	**100%**	**100%**	**100%**		**100%**	**100%**	
												Total Count						123
												Urgency rating						90%
												National Technical Institutes + DBTI (excl. UNITECH)						97%
E. Resources Utilisation																		
Under-load staff cannot be utilised due to limited teaching breadth	NA	NA	NA	NA	NA	NA	X	X	X	X	X	X	X	X	X	X	X	11
Alignment of relevant Policies on CCA and SE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	17
No equitable staffing allocation	NA	NA	NA	NA	NA	NA	X	X	X	X	X	X	X	X		X	X	10
Less in-house mentoring							X	X	X	X	X	X	X	X		X	X	10
Minimal awareness and less sense of the values underpinning TVET, resulting in less productivity and no professionalism at work	NA	NA	NA	NA	NA	NA	X	X	X	X	X	X	X	X		X	X	10
Lack of innovative ideas to venture into establishment of industrial or business partnership							X	X	X		X	X	X	X	X	X	X	11
Lack of or less innovative ideas in creating income generating activities for the colleges																X	X	2
Institutional Needs Summary	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**	**83%**	**83%**	**83%**	**67%**	**83%**	**83%**	**83%**	**83%**	**33%**	**100%**	**100%**	
												Total Count						54
												Urgency rating						64%
												National Technical Institutes + DBTI (excl. UNITECH)						81%

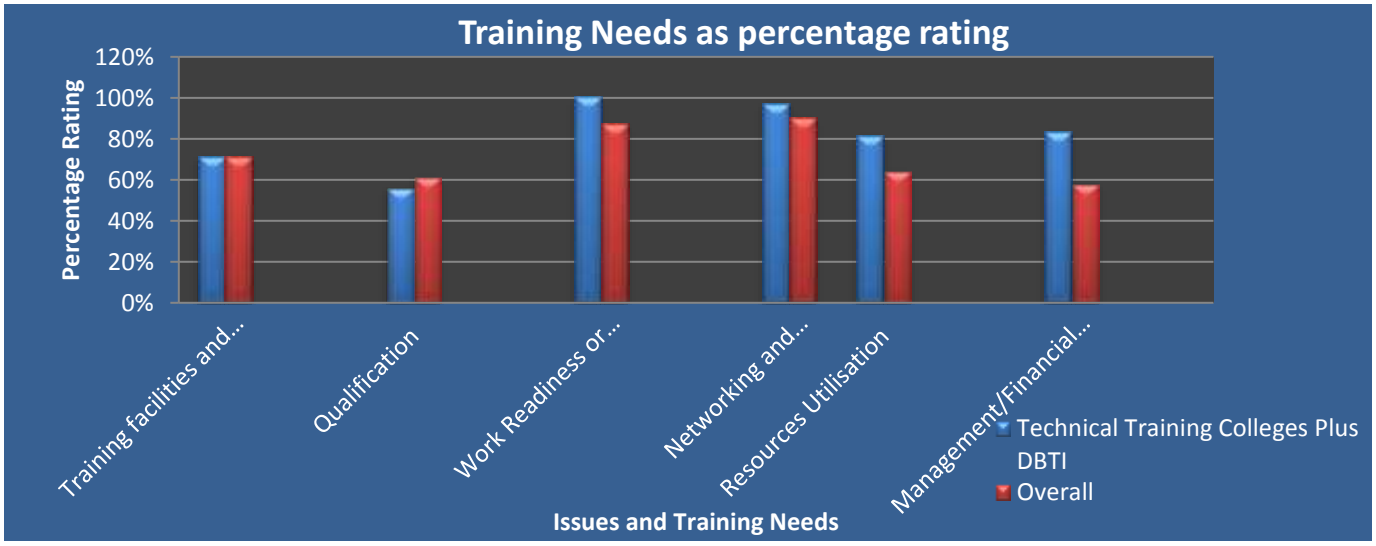
F. Management/Financial and Administrative																		
Identify and purchase necessary resource materials	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	17
College Management Plan, If there is one then there is no strict adherence to it.														X	X	X	X	4
Training and education be coordinated and incentivised to ensure support for relevant training							X	X	X	X	X	X	X	X			X	9
Qualified Teacher Retention Strategy							X	X	X	X	X	X	X	X		X	X	10
Incentivised to retain more local staff to enhance learning							X	X	X	X	X	X	X	X		X	X	10
Migration of qualified Instructors to other towns in search for better paid job											X	X	X	X	X		X	6
Performance Development - Quarterly reporting of staff and institution operation							X	X	X	X	X	X	X	X	X	X	X	11
System Performance – ensuring resources are deployed to their best uses in the technical institution		X	X				X	X	X	X	X	X	X	X		X	X	12
Institutional Needs Summary	**13%**	**25%**	**25%**	**13%**	**13%**	**13%**	**75%**	**75%**	**75%**	**75%**	**88%**	**88%**	**88%**	**100%**	**50%**	**75%**	**100%**	
																Total Count		79
																Urgency Rating		58%
																National Technical Institutes + DBTI (excl. UNITECH)		83%

Those issues that are highlighted are not strictly training needs, but could be classified as administrative or management issues that can be addressed administratively and/or through strategic management approaches

*Don Bosco Technical Institute (DBTI)

"Urgency Rating" Table

	Categorised Issues/Training Needs	Vocational Training Centres*	National Technical Institutes + DBTI (excl. UNITECH)	Training Needs ranking	Overall	Overall Training Needs ranking
1	**Training facilities and Course designing**	100%	71%	5	71%	3
2	**Qualification**	100%	56%	6	61%	5
3	**Work Readiness or employability**	100%	100%	1	87%	2
4	**Networking and Information sharing**	100%	97%	2	90%	1
5	**Resources Utilisation**	100%	81%	4	64%	4
6	**Management/Financial and Administrative**	100%	83%	3	58%	6
	Average	100%	81%		71%	



7. Consultation Outcome and Analysis

This in-country mission's objectives are to:

A. Identify the present and future market demand in SE and CCA; and
B. Map out the existing training supply for the Papua New Guinea.

The question that can be asked now is: are the objectives being achieved? PNG is a big country not only in its land mass and population, but it physical geography or topography makes it difficult to conduct a thorough TNGA within a very short span of time. The outcomes of this in-country mission might not be quite accurate but it holds indicative outcomes of the needs and gaps in the TVETs in PNG.

With regards to mission objective A: "*Identifying the present and future market demand in SE and CCA"*, a TNGA was made through various methodologies as outlined in section 4. A group consultation was done in Port Moresby where different stakeholders were consulted and each sector outlined their function and SE and CCA present and future demand were identified and discussed. Further one-to-one consultations were done also in Port Moresby, Goroka, Lae and Madang, which gave the issues outlines in Tables 1 and 2.

Table 1 outlines the concerns raised by the TVETs and the industries and Office of the Climate Change Division (OCCD) that voices out what is being raised by rural communities regarding sustainable energy and climate change adaptation. Some of the concerns or issues raise are administrative issues that can be addressed through non-training means or strategic management approaches as previously state in section 6.2 and the supply/demand matrix, whilst some are real training needs that needs training to be undertaken. There are others that would require both administrative and training to be addressed.

Table 2 spells out some of the skills that were identified to be lacking from TVET graduates. These are mainly those transferable or functional skills like communication, report writing, planning and organising, project management and analysis skills to name a few. Graduates can be competent in the technical knowledge they learnt through training, but having very limited communication; management; analysis; creativity and innovative skills, to name a few, do not supplement the technical 'know-how' that would delivery best results in any industrial settings – hence objectives cannot be fully achieved.

These skills and some of the issues in tables 1 and 2 were used in the supply/demand matrix. This supply/demand matrix outlines the TVET provides at the top of the table whilst the skills or issues are on the left-side of the table. Each TVET (from the courses they provide in general, see Appendix 2) is matched up against each skill. If that TVET is lacking such skills in most of its course (regarding SE and CCA) then an 'X' is marked in each common cell. This 'X' indicates a training need or action needs to be taken to address the need, as earlier state in section 6.4.

Whilst doing the scoping of issues requiring training need, future scenarios have to be anticipated and taken care of. Policies (regional and especially national ones) could be one other means to gauge what the future situation might be like, even though it might not be an accurate mean, but at

least it is indicative. Education, climate change and energy mid-term and long-tern development plans could be consulted. These usually are embedded in the respective policies. Further analysis can be done if the course contents and the different teaching/mode of delivery can be made available so that it can be deduced as to the level of competency that student can attain plus the kind of transferable skills that could be acquired from such contents and teaching methodologies.

From the supply /demand matrix a quantitative analysis was made to gauge the degree of training needs in each area of concern. It was found that for the five (5) categories stated in the 'urgency rating', all five categories require attention. These attentions could be administrative or through training.

With regards to mission objectives 'B': "*Map out the existing training supply for the Papua New Guinea"*, all of the TVETs available in the country are listed in Appendix 2 along with the courses they provided. Almost all the courses offered by the universities are academically-oriented where mainly education is taking place whilst the 7 National Technical Colleges and the DBTI and the rest of the vocational training centres that dotted the country teaches technical and vocational skills. This is not to rule out the fact that the highly regarded programs such as medicine and engineering are also technical and vocational training programs.

7.1. Specific Findings worth Noting

During the in-country consultation there were some specific programs or projects undertaken by various technical institutions in PNG, which is worth noting for formulation of a particular training need for PNG. These are outlines hereafter

7.1.1. University of Papua New Guinea MSc Program

The University of Papua New Guinea and the University of Fiji in Partnership with the University of Alicante (in Spain) are implementing the EU funded EPIC Project. The EPIC, Renewable energy in Pacific islands: Developing Skills and Capacity, was an initiative to react to the current challenges and immediate needs to the renewable energy (RE) development in the Pacific. It has been drawn from the low energy access rate, urgent need of alternative energy supply, and the vulnerability to the impact of climate change in the region.

The challenges posed by energy security and climate change in the Pacific region needs to be addressed through training of young local generation and establishing research centres that can foster regional co-operation in the field of renewable energy.

This initiative saw the establishing of the master programme in Renewable Energy Management serves as a base to equip the new scientists, as well as academic staff, with up-to-date knowledge which is highly in demand in both countries. Furthermore, the Centre of Renewable Energy (CORE) facilitates the collaboration at university, national and regional levels. Through the dissemination of master programmes and CORE, public awareness in RE and climate change will also be enhanced.

7.1.2. University of Technology's (UniTech) ATCDI Program

ATCDI (Appropriate Technology Community Development Institute) is a non-profit development organisation located at the Papua New Guinea University of Technology (Unitech) in Lae, Morobe Province.

The Institute provides technical information & assistance to rural communities, and to research & develop new technologies that are appropriate for the PNG environment. The Institute assistance, in some instances is able to work with communities to assist with the application for funding from donor agencies.

ATCDI is responsible for the community servicing functions of the university in accordance with its third objective as stipulated in the PNG University of Technology Act, 1986. This objective of the university is aimed at linking the university with the communities of rural and semi-rural areas in the provisions of community development projects and programs through the application of appropriate technology and development information.

Appropriate technologies for the rural Communities:

Left: Brick mould

Right: Multi-cooking bench

The Institute has programs in Energy, Small Industries, Food Technology and Water and Sanitations. The staffs of these sections are actively engaged in research and design of technology appropriate for rural areas aimed at improving the living standards of the people. In order to achieve this, the Institute is required to work in collaboration with national and international organizations and donors.

ATCDI also operate the Liklik Buk Information Centre (a book store and library) which provides development resources to the wider development community.

7.1.3. PNG National Polytechnic arrangement with UniTech

It is encouraging to see close collaboration between the PNG National Polytechnic and the PNG University of Technology, whereby some Diploma in Engineering Courses are relinquished by the PNG-UNITECH to the PNG National Polytechnic. Some of the Diploma Engineering courses are: Diploma in Mechanical Engineering; Diploma in Electrical Engineering and Diploma in Civil Engineering

7.2. Supply/Demand Matrix Analysis

From the matrix and graph 1, it can be seen that there is a need for more networking and Information sharing amongst the TVETs nationally, regionally and international. It is very important in the fast advancing information technology that out there as a tool for development. TVET institutions need to establish and join more national, regional and international technical working groups for information exchange and sharing.

Work readiness of TVET graduates from technical colleges and vocational training centres seems to quite poor as noted from the industries. This is a need for close supervision for new intake from vocational and technical centres.

Communication in English is a barrier in the industries and this is one of the requirements by most industries. For most technical and vocational training institutions or colleges, functional skills such as communication, creativity, innovative, intuitive and analysis skills are lacking from the graduates that enters the industries. Graduates seem to have low self-esteem at workplace and lacking confidence in themselves. These are the skills that could complement any technical-know-how so that goals of industries and organisations can be achieved.

With "Training facilities and course designing" the most-needy area would be course designing and mainstreaming in SE and CCA with relevant up-to date practical equipment for technical colleges.

In PNG there are technically qualified people in their respective areas. Their willingness to be able to transfer such technical-know-how in a TVET institution is an issue. With low paid teacher in the teaching profession, there is little that can be done to attract engineers to teach in technical and vocational training centres in the rural areas of PNG. If there is willingness, then do these engineers have the teaching qualification to be able to deliver the training modules systematically.

Most of the technical college and vocational training centres need to upgrade their teaching staff in renewable energy technology. There need to be a more skilful electrical teaching staff on the area of solar PV system designing, installation and operation and maintenance. In addition to this, a good knowledge of the process of conducting an energy audit would be desirable for those electrical tradesmen and tradeswomen.

The issue of staff under-load due to less teaching breadth needs to be relooked into. There is a need to look at utilizing such staff by training them on other related subject area. Short module course can be conducted in-house through distance learning or short course at selected institutions in PNG or Australia and New Zealand.

Valuing teaching and training is of great importance, when it comes to trying to deliver quality education and training. It was sensed by most technical training college and vocational training centre principals that some teaching staff and students have less sense of values under-pining TVET, resulting in less productivity and no professionalism at work. There needs to be a sense of pride in being a teacher and moreover a technical trainer. There is a mentality that teaching is a women's profession and men give it a very low regards and don't want to take it up as a profession. In most case it is usually a career to fall back to if ones aim is missed. Most men who end up in teaching could be because of their original aim to become a lawyer; an engineer; a medical doctor; and an accountant were never being realised or fulfilled due to various reasons known to each them only.

Most Technical and vocational training institutes were engaged in some income-generating activities, like furniture making and selling chairs. This is good in a sense that students do practice what do study. Apart from this, the only other related matter that needs to be addressed is the needs for more pro-activeness and innovativeness by moving into establishment of industrial

business partnerships. This will foster good industrial relation with TVETs and at the same time give opportunity for students who are on practical attachment, exposure to new state of the art equipment.

TVET management and financial administration was also one of the weak areas that were identified. With the limited financial allocation from the national government these technical training institutions are struggling to meet their requirements to deliver.

In most of these technical colleges and vocational centres, if there are Performance Development Systems (PDS) put in place for monitoring of staff performance and the overall institutional performance and operation, these system might be quite weak and needs strengthening, to ensuring resources are deployed to their best uses in these technical institution.

One common issue faced by most or nearly all technical training colleges and vocational training centres is qualified staff retention. How can the management, both at the institutional and the ministerial level, formulate strategies to incentivise teaching staff. It will remain a non-training issue unless the national TVET authority in PNG device approaches in addressing the issue.

7.3. Preliminary Findings

From the analysis given in section 7.1, the following findings can be deduced:

- Technical Training College and Vocational Training Centre staff retention: Technically qualified staff are quite difficult to be retained in these technical colleges and especially the vocational training centres that dotted the rural PNG;
- Technical Training Colleges and Vocational Training Centres lacking relevant training facilities (Workshops/tools/machineries);
- Technical Training College and Vocational Training Centre lacking Financial and Administrative/Management support;
- Technical Training College and Vocational Training Centre graduates are lacking most transferable/functional skills that prepare a person to be able to adapt readily to different work situation and jobs. These skills are:
    - Communication (verbal, non-verbal and written) skills
    - Planning/organisation skills
    - Creative and innovative skills
    - Intuitive skills
    - Analysis skills
- Graduate seems to have very low self-esteem and lack of confidence in themselves
- Limited technical know-how on RE technologies by electrical graduates from Technical Training Colleges and Vocational Training Centres;
- Most teaching staff needs TVET qualification upgrading and refreshing;
- Limited Networking and Information sharing nationally, regionally and internationally
- Limited Course designing and SE and CCA mainstreaming into existing modules in TVET curriculum

Appendix 1: Schedule of Consultations

Day 1: Monday 23rd February: Logistical arrangement and meetings with some stake holders

The first day was spending on following up invitations that were sent to stakeholders, by calling up their offices to get confirmation of their attendance, for the Port Moresby stakeholders, and call up the Lae, Goroka and Madang stakeholders to confirm to them of my scheduled consultation visit to them the following week.

I also met with the following stakeholders in Port Moresby on the first day:

i. TVET Department of the Ministry of Education – Director (Ag) of TVET (Mr. Damon Tiromry)- An outline of the project was made to the TVET Director (Ag). The Acting Director appreciated the objective of the project and is keen to have the project complementing their effort in building TVET capacity in the country.

ii. Office of the Climate Change Division – REDD+ Manager (Mr. Joe Pokana). Introduced and outlined the project. Office of the Climate Change is keen in working closely with SPC/USP in implementing the project in PNG

iii. Environmental Science Division (UPNG) – Acting Head of Division (Dr. John Duguman) since Professor Chalapan Kaluwin was on duty travel. A brief outline of the project was made as Dr. Duguman was not well versed of the project compare to Professor Chalapan

iv. Physics Division (UPNG) – Head of Physics Division (Dr. Moyap Kilepak and Manu Rawali) – The same introduction and outlining of the project was made to the Physics Division. There is another EU project implemented by the Physics Division which looks at desgining and conducting a Masters in Renewable Energy target all graduates in all disciplines. The focus will be on RE Management

Day 2 – Tuesday 24th February: Logistical arrangement for Consultative Meeting and further consultative Meetings

Since pre-arranged conference room for the consultative workshop was found to lack most of the required conference facilities, it had prompted us (myself and my facilitator, Mr . Garaio Gafie) to search for a suitable conference facility for the meeting. So the next half of

the day was spent on meeting venue search. Since the budget for a conference venue was originally quoted to be substantially low (from the original quotes K350 per day, given us K700 for 2 days), it was decided that the meeting should be conducted for one 1 day. This was due to the fact that the conference facility's hire price was quite high. Re-adjustment of the programme was easily done and we did managed to secure a room for the next day's meeting. This was a Conference Room at the Hide Away Hotel at 6 Miles, Port Moresby.

Day 3 - 25th February: Training Needs and Gaps Analysis

A brief outline of the role of each stakeholder was made. This noted down in the Full Scoping Mission Report.

To start off the TNGA, a brief presentation on what a TNGA is was made to give an overview of what is expected from the stakeholder during the TNGA that will follow from mid-morning until the end of day 3. Outline of the TNGA presentation is as follows:

- Project Rationale leading on to the Project objectives and purpose;
- What are training needs?
- What are Gaps-training needs and KSA?
- What is its purpose and why do a TNA?
- When does training needs exist?
- Indications for the need of training;
- Identification of training needs at different levels;
- Methods for determining training needs;
- Steps involved in the identification of training needs

TNGA Session

Group Work

- Group 1: Sustainable Energy - (RE/Electrical wiring/Energy Efficiency; Refrigeration and Air-conditioning and Sustainable Sea Transportation
- Group 2: Climate Change Adaptation
- Group 3: Education and Training

Stakeholder divide up into these three groupings to discussion the following Topics:

Group 1: "Gauge out the technical skills required/demanded by the industries in the Solomon Islands, present and future, paying particular attention to SE. Rank them in order, from HIGH DEMAND to LOW DEMAND"

Group 2: "Gauge out the technical skill and knowledge required for communities (both rural / remote and urban) to be better equipped to adapt to the adverse effects of Climate Change"

Group 3: "Identify technical Institutions in the country (formal and non-formal) that provide formal and informal technical skills in SE and CCA. List down the following:

i. Institution/ Course Provider
ii. Courses,

iii. Durations,
iv. Award/accreditation
v. Accreditation Agency
vi. Equivalent course and accreditation in the region and internationally; and
vii. Potential industry(ies) that needs such skills
viii. Year of establishment

Each of the three (3) groups discussed their topics in their groups and made presentations. Detail of the discussion presented on the Full Scoping Mission Report.
This TNGA Approach is to map out the SUPPLY (TVET Education – Group 3); map out the DEMANDS (Group 1 and Group 2 on SE from the Industries and CCA from the communities, respectively) and see if there is a match in the SUPPLY and the DEMAND. If there is a mismatch, then what can we do about the Supply to be aligned to the DEMAND.

Day 4 – 26th February: Stakeholders meeting

A consultation meeting was made with the Principal (Mr. Allan Tira) of Port Moresby Technical College, known to the locals as POM Tech. I made an outline of the project, emphasising on the objectives and purpose; the rationale and the Key Result Areas (KRAs), especially the KRA 1; what will come after the training needs and gaps analysis (TNGA), highlighting the need for a TNGA as means to figure out PNG's activity for the project.
The POM Tech is one of the 7 Government Technical institutions in the country. The College was established in 1947, as a Technical will be discussed Training Centre. The Principal made a brief account of the college and some of the issues that faced which in general in the Full Scoping Mission Report.
The a follow up meeting with the TVET Department, where I met with the First Assistant Secretary TVET – Management and Operation Division, Ms Monica Maluan; Senior Project Officer – Assets, Mr Korepa Lasa; the Superintendent – TVET Curriculum, Mr Damon Tiromry; the Assistant Secretary – Curriculum, Ms Rossa Apelis and Deputy Secretary - TVET & UNESCO, Mr Godfrey Yerua.
This was a follow up meeting that was done on the 23rd February with Tiromry. These senior officers pledged their support, with only one issue to be sorted out. And that is to do with the formalising of the project with the relevant stakeholder within the PNG Government, including the TVET Department, Office of the Climate Change Division (OCCD) and the Energy Department.
Another follow up meeting was done with the OCCD's REDD+ (Reducing Emissions from Deforestation and forest Degradation) Manager, Mr Joe Pokana.

There was also another consultation meeting with the PNG Power Limited (PPL). The Project was outlined and see how PPL can fit in in terms of addressing Sustainable Energy.

Day 5 – Friday 27th February – Goroka Tour

This day was dedicated to consultation with Goroka stakeholder in the Eastern Highlands of PNG. The following were consulted:

i. University of Goroka. The University comprises of 5 schools, namely the School of Education; School of Humanities; School of Science and Technology; School of Distance and Flexible Learning and the Institute of TVET. The institute of TVET has 5 Division, namely: Technical and Vocational Education; Design and Technology; Tourism and Hospitality; Human Movement (Physical Education) and Applied Science which includes Home Economics. The Technical and Vocational Education (TVE) is offering Bachelor's degree in TVE (Technical Studies and Business Studies); Postgraduate Diploma in TVE; National Advanced Automotive Engineering and Diploma in TVE.

ii. Kamaliki Vocational Training Centre – This is a Vocational Training Centre some 3 to 4 kilometers away from Goroka CBD. The centre teaches basic life skills subjects such as Agriculture; Carpentry; Automotive; and Home economics. Some of the issues highlighted include lack of teaching facilities; retaining qualified and experienced.

iii. Goroka Technical College. The Technical College was called the Goroka Business College where it offers Diploma in Accounting; Diploma in Management and Diploma in Office Administration. Certificate in trade for automotive is also part of the colleges courses being offered.

Saturday and Sunday – Rest Day in Port Moresby

Day 6 – Monday 2nd March: Lae Tour

Flew off from POM in the morning and held the following consultations:

i. University of Technology (UNITECH) - A consultation was held with the Deputy Vice Chancellor, Dr. Ora Renagi – Dr. Renagi emphasised that one of the objectives of the UNITECH is to form partnership with stakeholders and the support of SPC is essential in ensuring that their graduates are employable or entrepreneurial and the support UNITECH provides to TVET programs contribute towards human resource requirements needed for adaptation to challenges posed by climate change.

ii. UNITECH's ATCDI (Appropriate Technology & Community Development Institute). The Institute is the rural project implementation arm of the University. It does community project installation of RETs, rural water supply and sanitation, community Basic Life Skills training and other related activities. This includes Food processing; Brick moulding and cooking stoves designing and construction.

Day 7- Tuesday 3rd March: Further Consultation in Lae

The following stakeholders were met with:

i. National Polytechnic Institute of PNG (PNG Polytechnic). The Polytechnic was officially launched in December 2009. The Polytechnic was established from what was called the Lae Technical College. It is one of the 7 government Technical institutions. The Institution is committed to develop individuals in various life skills through

quality and relevant education and training programmes that will target the needs of the business industries and communities. The Polytechnic also spell out the issues that the technical institution is having. This is no different from the other polytechnic where training facilities are under-resourced and need staff upgrading.

ii. Consort Express Shipping Line – This is one of the largest freighting and shipping company based in Australia but had offices in PNG and Fiji. Ship Safety, safe cargo handling and use of RET for lightings and electronics is expressed as one of the main factor to attaining sustainable sea transport.

iii. Trans Wonderland transport Limited – This is a Road Freighting Company that transport goods for the mining and LNG companies in the Highland of PNG. Routine and regular maintenance is crucial for the sustainable transportation of good to the clients. Need to have experience drivers and driver trainers. The support services needs to have qualified and experience truck mechanics to ensure there is a safe and fuel efficient transport fleet.

Day 8 – Wednesday 4th February: Madang Consultation

The following were consulted in Madang:

i. Divine Word University. This is a Roman Catholic owned university. It conducted courses in various disciplines, within 4 faculties (Arts; Health Science; Education and Business Informatics). Some of the course in these faculties can be offered through the Centre for Flexible Learning, targeting people in workplace.

ii. PNG Maritime College – Offers Engineers Cadet and Deck Cadet, including safety at different level. The Deck Cadets are offered from Class 5 up to Class 1. Engineer Cadets are from Class 5 up to Class 2.

iii. Madang Technical College – This College comprises of the following Department:

- Furniture Timber Trades/Cabinet making Department
- Office Administration and Tourism & Hospitality
- Building Construction Department
- Plumbing and Sheet Metals Department
- Business Studies Department

Day 9- Thursday 5th March – Consult the Office of the Climate Change Division in Madang.

They expressed interest in knowing the work of the project and are happy to be part of any project implementation if it comes their way. I Left to POM after this consultation (11:30 am).

Appendix 2: Table of Course Provider and Courses

TVET Provider	Course Provided	Duration	Award	Accrediting Agency	Contacts
University of Papua New Guinea (Port Moresby)					1. Professor Chalapan Kaluwin; email:ckaluwin@gmail.com 2. Manu Rawali, Physics Department
Papua New Guinea University of Technology (UniTech) Lae.					1. Deputy Vice Chancellor (Dr. Ora Renagi, Vice Chancellors Office), email; 2. John Tenakanai, Deputy Director (ATCDI), UniTech, email
Papua New Guinea University of Technology (UniTech) Lae	Building Studies	3 Years	Diploma	Self-accrediting (University Academic Board	Grade 12
Papua New Guinea University of Technology (UniTech) Lae	Architecture	3 Years	Diploma	Self-accrediting (University Academic Board	Grade 12
Papua New Guinea University of Technology (UniTech) Lae	Commerce (Accountancy)	2 Years	Diploma	Self-accrediting (University Academic Board	Grade 12
Papua New Guinea University of Technology (UniTech) Lae	Commerce (Management)	2 Years	Diploma	Self-accrediting (University Academic Board	Grade 12
Papua New Guinea University of Technology (UniTech) Lae	Commerce (Computing)	2 Years	Diploma	Self-accrediting (University Academic Board	Grade 12
Papua New Guinea University of Technology (UniTech) Lae	Commerce (Economics & Finance)	2 Years	Diploma	Self-accrediting (University Academic Board	Grade 12
Papua New Guinea University of Technology (UniTech) Lae	Computer Science	2 Years	Diploma	Self-accrediting (University Academic Board	Grade 12
Papua New Guinea University of Technology (UniTech) Lae	Communication Engineering	2 Years	Diploma	Self-accrediting (University Academic Board	Grade 12
Papua New Guinea University of Technology (UniTech) Lae	Electronics Engineering	2 Years	Diploma	Self-accrediting (University Academic Board	Grade 12
Papua New Guinea University of Technology (UniTech) Lae	Land Administration	2 Years	Diploma	Self-accrediting (University Academic Board	Grade 12
Papua New Guinea University of Technology (UniTech) Lae	Survey Drafting	2 Years	Diploma	Self-accrediting (University Academic Board	Grade 12
Papua New Guinea University of Technology (UniTech) Lae	Surveying	2 Years	Diploma	Self-accrediting (University Academic Board	Grade 12
Papua New Guinea University of Technology (UniTech) Lae	Technology in Communication for Development	2 Years	Diploma	Self-accrediting (University Academic Board	Grade 12
Papua New Guinea University of Technology (UniTech) Lae	Forestry	3 Years	Diploma	Self-accrediting (University Academic Board	Grade 12
Papua New Guinea University of Technology (UniTech) Lae	Bachelor of Science (Agriculture)	4 Years	Degree	Self-accrediting (University Academic Board	Grade 12

TVET Provider	Course Provided	Duration	Award	Accrediting Agency	Contacts/ Entry Requirements
Papua New Guinea University of Technology (UniTech) Lae.					1. Deputy Vice Chancellor (Dr. Ora Renagi, Vice Chancellors Office), email; 2. John Tenakanai, Deputy Director (ATCDI), UniTech, email 3. John Dujambi, Director (ATCDI)
Papua New Guinea University	Bachelor of	2 Years	Degree	Self-accrediting	Diploma in Architecture

of Technology (UniTech) Lae	Architecture			(University Academic Board	
Papua New Guinea University of Technology (UniTech) Lae	Bachelor of Building	2 Years	Degree	Self-accrediting (University Academic Board	Diploma in Building
Papua New Guinea University of Technology (UniTech) Lae	Bachelor of Commerce (Accountancy)	2 Years	Degree	Self-accrediting (University Academic Board	Diploma in Commerce
Papua New Guinea University of Technology (UniTech) Lae	Bachelor of Commerce (Management)	2 Years	Degree	Self-accrediting (University Academic Board	Diploma in Commerce
Papua New Guinea University of Technology (UniTech) Lae	Bachelor of Commerce (Computing)	2 Years	Degree	Self-accrediting (University Academic Board	Diploma in Commerce
Papua New Guinea University of Technology (UniTech) Lae	Bachelor of Commerce (Business Economics)	4 Years	Degree	Self-accrediting (University Academic Board	Grade 12
Papua New Guinea University of Technology (UniTech) Lae	Bachelor of Engineering (Civil)	4 Years	Degree	Self-accrediting (University Academic Board	Grade 12
Papua New Guinea University of Technology (UniTech) Lae	Bachelor of Engineering (Electrical)	4 Years	Degree	Self-accrediting (University Academic Board	Grade 12
Papua New Guinea University of Technology (UniTech) Lae	Bachelor of Engineering (Mechanical)	4 Years	Degree	Self-accrediting (University Academic Board	Grade 12
Papua New Guinea University of Technology (UniTech) Lae	Bachelor of Engineering (Mining)	4 Years	Degree	Self-accrediting (University Academic Board	Grade 12
Papua New Guinea University of Technology (UniTech) Lae	Bachelor of Engineering (Mineral Processing)	4 Years	Degree	Self-accrediting (University Academic Board	Grade 12
Papua New Guinea University of Technology (UniTech) Lae	Bachelor of Science (Applied Chemistry)	4 Years	Degree	Self-accrediting (University Academic Board	Grade 12
Papua New Guinea University of Technology (UniTech) Lae	Bachelor of Science (Food Technology)		Degree	Self-accrediting (University Academic Board	
Papua New Guinea University of Technology (UniTech) Lae	Bachelor of Science (Forestry)	4 Years	Degree	Self-accrediting (University Academic Board	Grade 12
Papua New Guinea University of Technology (UniTech) Lae	Bachelor of Science (Forest Management)	4 Years	Degree	Self-accrediting (University Academic Board	Grade 12
Papua New Guinea University of Technology (UniTech) Lae	Bachelor of Cartography to Bachelor of GISci	4 Years	Degree	Self-accrediting (University Academic Board	Grade 12
Papua New Guinea University of Technology (UniTech) Lae	Bachelor of Land Studies to Bachelor of Property Studies	4 Years	Degree	Self-accrediting (University Academic Board	Grade 12
Papua New Guinea University of Technology (UniTech) Lae	Bachelor of Surveying	4 Years	Degree	Self-accrediting (University Academic Board	Grade 12
Papua New Guinea University of Technology (UniTech) Lae	Bachelor of Science in Computer Science	4 Years	Degree	Self-accrediting (University Academic Board	Grade 12
Papua New Guinea University of Technology (UniTech) Lae	Bachelor of Science in Applied Physics	4 Years	Degree	Self-accrediting (University Academic Board	Grade 12
Papua New Guinea University of Technology (UniTech) Lae	Bachelor of Technology in Communication for Development	4 Years	Degree	Self-accrediting (University Academic Board	Grade 12
TVET Provider	**Course Provided**	**Duration**	**Award**	**Accrediting Agency**	**Contacts/ Entry Requirements**
University of Goroka					1. Mr. Philip Baiwog, Director of TVET (University of Goroka), EHP, Email: baiwogp92399095@uog.ac.pg 2. Eron Hagunama, HOD – Design Technology.

					Email: hagunamae@uog.ac.ppg
Institute of TVET (Technical & Vocational Education) Technical Vocational Education Section offers general programs for TVET educators training in public and private sectors and customized programs for specific organizations	Diploma in Business Education and Training	2 yrs	Diploma	Self-accrediting (University Academic Board	Grade 12
	Diploma in Technical Vocational Education and Training	2 yrs	Diploma	Self-accrediting (University Academic Board	Grade 12
	Diploma in Physical Education	2 yrs	Diploma	Self-accrediting (University Academic Board	Grade 12
	Diploma in Teaching Physical Education	2 yrs	Diploma	Self-accrediting (University Academic Board	Grade 12
	Bachelor of Technical Vocational Education and Training – Tech Studies (B.TVET)	3 yrs	Degree	Self-accrediting (University Academic Board	Grade 12
	Bachelor of Technical Vocational Education and Training – Business Studies (B.TVET)	3 yrs	Degree	Self-accrediting (University Academic Board	Grade 12
	Bachelor of Applied Science (Hospitality & Tourism)	3 yrs	Degree	Self-accrediting (University Academic Board	Grade 12
	Bachelor of Applied Science (Home Economics)	3 yrs	Degree	Self-accrediting (University Academic Board	Grade 12
	Bachelor of Technical Vocational Education & Training (In-Service)	3 yrs	Degree	Self-accrediting (University Academic Board	Grade 12
	National Advanced Automotive Engineering (NAA)	1 yr	Diploma	Self-accrediting (University Academic Board	Grade 12
	Postgraduate Diploma in Technical Vocational Education and Training (PGD in TVET)	1 yr	PGDiploma	Self-accrediting (University Academic Board	Grade 12
	Customerized Programme				
	Diploma in Technical Teaching for PNG Correctional Services	2 yrs	Diploma	Self-accrediting (University Academic Board	Grade 12
	Diploma in Technical Vocational Education and Training for National Department of Education	2 yrs	Diploma	Self-accrediting (University Academic Board	Grade 12
	Diploma in Technical Vocational Education and Training Programs for OK TEDI Mines Ltd	2 yrs	Diploma	Self-accrediting (University Academic Board	Grade 12

TVET Provider	Course Provided	Duration	Award	Accrediting Agency	Contacts/ Entry Requirements
Pacific Adventist University					
Pacific Adventist University PAU is owned and operated by the South Pacific Division (SPD) of the Seventh-day Adventist church with its headquarters in Sydney Australia; it is authorised to operate by the Pacific Adventist University Act 1997, Papua New Guinea	Diploma of Business (Accounting & Management)	2 yrs	Diploma	Adventist Accrediting Association	Grade 12
	Diploma of Business (Computing)	2 yrs	Diploma	Adventist Accrediting Association	Grade 12
	Diploma of Business (Information Technology)	2 yrs	Diploma	Adventist Accrediting Association	Grade 12
	Diploma of Business Studies		Diploma	Adventist Accrediting Association	Grade 12
	Diploma of Education (Primary)	3 yrs	Diploma	Adventist Accrediting Association	Grade 12
	Diploma of Ministerial	3 yrs	Diploma	Adventist Accrediting	Grade 12

	Studies			Association	
	Diploma of Teaching (Primary)	2 yrs	Diploma	Adventist Accrediting Association	Grade 12
	Diploma in Theology	3 y	Diploma	Adventist Accrediting Association	Grade 12
	Bachelor of Arts		Degree	Adventist Accrediting Association	Grade 12
	Bachelor of Arts in Theology	4 yrs	Degree	Adventist Accrediting Association	Grade 12
	Bachelor of Business (Accounting)	4 yrs	Degree	Adventist Accrediting Association	Grade 12
	Bachelor of Business (Accounting & Computing)	4 yrs	Degree	Adventist Accrediting Association	Grade 12
	Bachelor of Business (Accounting & Management)	4 yrs	Degree	Adventist Accrediting Association	Grade 12
	Bachelor of Education (Primary)	4 yrs	Degree	Adventist Accrediting Association	Grade 12
	Bachelor of Education (Secondary)	4 yrs	Degree	Adventist Accrediting Association	Grade 12
	Bachelor of Midwifery BM	1 yr	Degree	Adventist Accrediting Association	Grade 12
	Bachelor of Nursing	4 yrs	Degree	Adventist Accrediting Association	Grade 12
	Bachelor of Science	4 yrs	Degree	Adventist Accrediting Association	Grade 12
	Bachelor of Science (Honours)	1 yr	Degree	Adventist Accrediting Association	Grade 12
	Graduate Diploma in Teaching	18 mths	Grad Diploma	Adventist Accrediting Association	Degree
	Graduate Diploma in Theology	2 yrs	Grad Diploma	Adventist Accrediting Association	Degree
	Postgraduate Diploma in Leadership and Development	1 yr Intensive	PGrad Diploma	Adventist Accrediting Association	Degree
	Postgraduate Diploma (Pastoral Ministry)	2 yrs Intensive	PGrad Diploma	Adventist Accrediting Association	Degree
	Master of Arts (Pastoral Ministry)	4 yrs Intensive	Masters	Adventist Accrediting Association	Degree
	Master in Leadership and Development	2 yrs	Masters	Adventist Accrediting Association	Degree
	Master of Philosophy	2 yrs	Masters	Adventist Accrediting Association	Degree
	Master of Theology	2 yrs	Masters	Adventist Accrediting Association	Degree

TVET Provider	**Course Provided**	**Duration**	**Award**	**Accrediting Agency**	**Contacts/ Entry Requirements**
Divine Word University					Ms. Cecilia N'Drower - Registrar
Faculty of Arts and Social Science	Bachelor of Arts (Social and Religious Studies)	4 yrs	Degree	Senate	Grade 12
	Bachelor of Arts (PNG Studies and International Relations	4 yrs	Degree	Senate	Grade 12
	Bachelor of Communication Arts (Journalism)	4 yrs	Degree	Senate	Grade 12
	Bachelor of Public Administration	80 crdt pts	Degree (DFL)	Senate	Grade 12
	Diploma in Project Management	80 crdt pts	Diploma (DFL)	Senate	Grade 12
	Diploma in Youth Development	150 crdt pts	Diploma (DFL)	Senate	Grade 12
	National Advanced Diploma in Government (NADG)	150 crdt pts	Diploma (DFL)	Senate	Grade 12
	Master in Leadership in	80 crdt pts	Master's degree	Senate	Undergraduate

	Development (MLD) - Flexible Learning				
	Master of Public Administration (MPAdmin.) - Flexible Learning	80 crdt pts	Master's degree	Senate	Undergraduate
Faculty of Business and Informatics	Bachelor of Business (Accounting)	4 yrs	Degree	Senate	Grade 12
	Bachelor of Business (Management)	4 yrs	Degree	Senate	Grade 12
	Bachelor of Information Systems	4 yrs	Degree	Senate	Grade 12
	Bachelor of Mathematics and Computing Science	4 yrs	Degree	Senate	Grade 12
	Bachelor of Tourism and Hospitality Management	4 yrs	Degree	Senate	Grade 12
	Bachelor of Management (DFL)	4 yrs	Degree	Senate	Grade 12
	Diploma in Business Studies (DFL)	2 yrs	Degree	Senate	Grade 12
	Diploma in Human Resources Management (DFL)	2 yrs	Degree	Senate	Grade 12
	Diploma in Management (DFL)	2 yrs	Degree	Senate	Grade 12
	Master of Business Administration (DFL)	2yrs	Master degree	Senate	Undergraduate
	Master of Leadership in Business Administration (DFL)	2 yrs	Master degree	Senate	Undergraduate
Faculty of Education	Diploma in Teaching - Primary	2 yrs	Diploma	Senate	Grade 12
	Diploma in School management and Leadership (DFL)	2 yrs	Diploma	Senate	Grade 12
	Master of Education Leadership				
	Diploma in Teaching (DFL)	2 yrs	Diploma	Senate	Grade 12
	Master of Education Leadership (DFL)	2 yrs	MEd	Senate	Undergraduate
	Postgraduate Cert in Higher Education Teaching and Learning (DFL)	1 yr		Senate	Grade 12
	Postgraduate Diploma in Education (DFL)	1 yr		Senate	Undergraduate
Faculty of Health Science	Bachelor of Environmental Health	4 yrs		Senate	Grade 12
	Bachelor of Health Management	4 yrs		Senate	Grade 12
	Bachelor of Health Science (Rural Health)	4 yrs		Senate	Grade 12
	Bachelor of Physiotherapy	4 yrs		Senate	Grade 12
	Advanced Diploma in Emergency Medicine (DFL)	2 yrs		Senate	Undergraduate
	Advanced Diploma in Care (DFL)	1 yr		Senate	Undergraduate
	Diploma in Health Services Management (DFL)	2 yrs		Senate	Nurses or Health Administrator
Faculty of Theology	Diploma in Religious Studies	Not conducted by DWU			
	Advance Diploma in Religious Studies	Not conducted by DWU			
TVET Provider	**Course Provided**	**Duration**	**Award**	**Accrediting Agency**	**Contacts/ Entry Requirements**

PNG University of Natural Resources and Environment					
	Diploma in Tropical Agriculture	2 yrs	Diploma	Self-accrediting	Grade 12
	Bachelor of Tropical Agriculture	3 yrs	Degree	Self-accrediting	Grade 12
	Diploma in Fisheries and Marine Resources	2 yrs	Diploma	Self-accrediting	Grade 12
	Bachelor in Fisheries and Marine Resources	3 yrs	Degree	Self-accrediting	Grade 12
	Graduate Certificate in Management Studies	1 yr	GradCert	Self-accrediting	Grade 12
	Masters in Management Studies	2 yrs	Master's	Self-accrediting	Undergraduate

The following TVET Providers are the Technical College operated by the National Education Department – TVET Division.

Port Moresby Technical College

The required module names and module codes for each National Certificate courses.
Contact: Allan Tira;
Email: pmtc09@daltron.com.pg /pmct09@ymail.com

National Certificate1 (NC1) in MAINTENANCE FITTING & MACHINING

SN	Module Code	Module Name	Nominal Hours
1	NBB 101	Engineering Foundation	20
2	HIV101-104	HIV/AIDS Awareness	40
3	NBB102	Material Handling	10
4	NBB103	Engineering Calculations	30
5	NBB104	Engineering Drawing	40
6	NBB105	Job Seeking Skills	10
7	KAB101	Know About Business	40
8	MFM101	Hand Tools – Non Cutting and Cutting	20
9	MFM102	Measuring and Marking	20
10	MFM103	Drilling and Reaming	30
11	MFM104	Threading by Hand	10
12	MFM105	Off – Hand Grinding	30
13	MFM106	Power Saws	30
14	MFM107	The Center Lathe – Level 1	40
15	MFM108	Milling – Level 1	40
16	MFM109	Engineering Project 1	40
		TOTAL HOURS	450

National Certificate 2 (NC2) in MAINTENANCE FITTING & MACHINING

SN	Module Code	Module Name	Nominal Hours
1	NBB201	Occupational Health & Safety	30
2	NBB202	Workplace Communication	20
3	NBB203	Engineering Calculations	30
4	NBB204	Engineering Drawing	40
5	NBB205	Computing in Engineering	30
6	MFM201	Portable Power Tools	10
7	MFM202	Oxy-Fuel Gas Cutting & Welding	30

8	MFM203	Manual Metal Arc Welding	30
9	MFM204	Fitting Techniques 1 – A	20
10	MFM205	Fitting Techniques 1 – B	20
11	MFM206	Centre Lathe 2	40
12	MFM207	Milling 2	40
13	MFM208	Surface Grinding Machine	40
14	MFM209	Engineering Project	40
15	MFM210	Work Placement (On-The-Job Training)	130
		TOTAL HOURS	550

National Certificate1 (NC1) in METAL FABRICATION & WELDING

SN	Module Code	Module Name	Nominal Hours
1	NBB 101	Engineering Foundation	20
2	HIV101-104	HIV/AIDS Awareness	40
3	NBB102	Material Handling	10
4	NBB103	Engineering Calculations	30
5	NBB104	Engineering Drawing	40
6	NBB105	Job Seeking Skills	10
7	KAB101	Know About Business	40
8	NF101	Measuring and Marking Out Tools	20
9	NF102	Hand and Power Tools	20
10	NF103	Types of Fabrication Materials	10
11	NF104	Drills and Drilling	20
12	NF105	Threading by Hand	10
13	NF106	Thermal Cutting and Welding	40
14	NF107	Structural Fabrication 1	30
15	NF108	Structural Welding LCS – MMAW	30
16	NF109	Basic Development Drawing	40
17	NF110	Engineering Project 1	40
		TOTAL HOURS	450

National Certificate 2 (NC2) in METAL FABRICATION & WELDING

SN	Module Code	Module Name	Nominal Hours
1	NBB201	Occupational Health and Safety	30
2	NBB202	Workplace Communication	20
3	NBB203	Engineering Calculations	30
4	NBB204	Engineering Drawing	40
5	NBB205	Computing in Engineering	30
6	NF201	Work and Planning	10
7	NF202	Properties of Engineering Materials	10
8	NF203	Assembly and Alignment Techniques	20
9	NF204	Oxy-Fuel Gas Cutting and Welding	30
10	NF205	Structural Welding LCS – MMAW2	30
11	NF206	Gas Metal Arc Welding	25
12	NF207	Gas Tungsten Arc Welding	25
13	NF208	Fabrication Machinery	10
14	NF209	Development Drawing	25
15	NF210	Basic Forming of Shapes	40
16	NF211	Structural Fabrication	25
17	NF212	Engineering Project 2	40
18	NF213	Work Placement (On-The-Job Training)	130
		TOTAL HOURS	550

National Certificate1 (NC1) in AUTOMOTIVE BODY REPAIR & FINISHING

SN	Module Code	Module Name	Nominal Hours
1	NBB 101	Engineering Foundation	20
2	HIV101-104	HIV/AIDS Awareness	40
3	NBB102	Material Handling	10
4	NBB103	Engineering Calculations 1	30
5	NBB104	Engineering Drawing 1	40
6	NBB105	Job Seeking Skills	10
7	KAB101	Know About Business	40
8	AUR101	Measuring and Marking Out Techniques	20
9	AUR102	Hand and Portable Power Tools	20
10	AUR103	Drills and Drilling	10
11	AUR104	Threading by Hand	20
12	AUR105	Identification of Vehicle Body Component Parts	10
13	AUR106	Remove and Tag Vehicle Body Parts	35
14	AUR107	Minor Repair on Vehicle Body	40
15	AUR108	Basic Prepare Surface for Painting	40
16	AUR109	Removal & Replacement of Vehicle Components	35
17	AUR110	Engineering Project 1	40
		TOTAL HOURS	450

National Certificate 2 (NC2) in AUTOMOTIVE BODY REPAIR & FINISHING

SN	Module Code	Module Name	Nominal Hours
1	NBB201	Occupational Health and Safety	30
2	NBB202	Workplace Communication	20
3	NBB203	Engineering Calculations 2	30
4	NBB204	Engineering Drawing 2	40
5	NBB205	Computing in Engineering	30
6	AUR201	Work and Planning	10
7	AUR202	Properties of Engineering Materials	10
8	AUR203	Oxy-Fuel Gas Cutting and Welding	30
9	AUR204	Manual Metal Arc Welding	30
10	AUR205	Spot Welding	20
11	AUR206	Automotive Body Repair	40
12	AUR207	Surface Preparation for Spray Painting	40
13	AUR208	Remove and Replace Vehicle Body Components	30
14	AUR209	Rust Prevention & Deadening Materials	10
15	AUR210	Window Tinting	10
16	AUR211	Engineering Project 2	40
17	AUR212	Work Placement (On-The-Job Training)	130
		TOTAL HOURS	550

National Certificate1 (NC1) in AUTOMOTIVE SERVICING – LIGHT VEHICLE

SN	Module Code	Module Name	Nominal Hours
1	BC 101 08	HIV/AIDS & STI Awareness	40
2	BC 102 08	Workplace Communication	3
3	BC 103 08	Work with Others	3
4	BC 104 08	Demonstrate Work Values	4
5	BC 105 08	Practice Basic Housekeeping Procedures	10
6	AUT 101 08	Apply Appropriate Sealant/Adhesive	3

7	AUT 102 08	Move and Position Vehicle	3
8	AUT 103 08	Perform Measurement and Calculation	2
9	AUT 104 08	Read, Interpret and apply specifications and manuals	2
10	AUT 105 08	Use and apply lubricants/coolants	5
11	AUT 106 08	Perform shop maintenance	5
12	AUT 107 08	Identify vehicle systems	40
13	AUT 108 08	Service Automotive battery	40
14	AUT 109 08	Service Ignition System	40
15	AUT 110 08	Use test instruments and repair wiring/lighting system	40
16	AUT 111 08	Perform diesel engine tune up	40
17	AUT 112 08	Perform gas engine tune up	40
18	AUT 113 08	Perform under chassis preventive maintenance	40
		TOTAL HOURS	360

National Certificate 2 (NC2) in AUTOMOTIVE SERVICING – LIGHT VEHICLE

SN	Module Code	Module Name	Nominal Hours
1	ASLV201 08	Engine	50
2	ASLV202 08	Clutch and Transmission	50
3	ASLV203 08	Electrical	50
4	ASLV204 08	Fuel	50
5	ASLV205 08	Brakes	40
6	ASLV206 08	Steering and Suspension	30
7	ASLV207 08	Drive line and Final Drive	30
8	ASLV208 08	Air Conditioning	20
9	ASLV209 08	Automotive Service Welding Operations	20
10	ASLV210 08	Perform Under Chassis Preventive Maintenance	50
11	ASLV211 08	Read, Interpret and Apply Specifications and Manual	20
12	ASLV212 08	Read and Interpret Engineering Drawing	20
13	ASLV213 08	Contribute to Workplace Communications	20
14	WP214 08	Work Placement (On-The-Job Training)	200
		TOTAL HOURS	650

National Certificate1 (NC1) in AUTOMOTIVE ELECTRICAL

SN	Module Code	Module Name	Nominal Hours
1	BC101 10	HIV/AIDS & STI Awareness	40
2	BC102 10	Workplace Communication Skills	20
3	BC103 10	Basic Computing Skills	20
4	AE100 10	Workshop Safety	40
5	AE101 10	Tools / Equipment	40
6	AE102 10	Electrical Fundamentals	20
7	AE103 10	Automotive Fundamentals	20
8	AE104 10	Soldering	20
9	AE105 10	Wire & wirings (Electrical Circuits)	10
10	AE106 10	Magnetism	10
11	AE107 10	Automotive Alternator	40
12	AE108 10	Automotive Starter Motor	20
13	AE109 10	Automotive Accessories	40
14	AE110 10	Ignition System – Conventional	20
15	AE111 10	Basic Instrumentation	20
16	WP214 08	Work Placement (On-The-Job Training)	200
		TOTAL HOURS	680

National Certificate 2 (NC2) in AUTOMOTIVE ELECTRICAL

SN	Module Code	Module Name	Nominal Hours
1	AE201 10	Electrical Principles and Circuits	20
2	AE202 10	Automotive Principles	20
3	AE203 10	Basic Electronics	40
4	AE204 10	Lead Acid battery	20
5	AE205 10	Types of DC Motors	40
6	AE206 10	Charging System	20
7	AE207 10	Starting System	20
8	AE208 10	Lighting System	20
9	AE209 10	Ignition System	20
10	AE210 10	Instrumentation	40
11	AE211 10	Basic EFI	20
12	AE212 10	Basic Air Conditioning	40
		TOTAL HOURS	420

National Certificate1 (NC1) in ELECTROTECHNOLOGY

SN	Module Code	Module Name	Nominal Hours
1	COM101 07	Basic Computing	40
2	DWG101 07	Drawing Interpretation and Sketching	40
3	ELE101 07	Electrical Fundamentals	40
4	ELE102 07	Basic Electrical Circuits	40
5	MAT101 07	Mathematics for Electrotechnology 1	40
6	MWP101 07	Mechanical Workshop Practice	40
7	OHS101 07	Occupational Health and Safety	40
8	PCS101 07	Parts and Components Selection	40
9	WOS101 07	Work Oriented Studies	40
10	WPC101 07	Workplace Communications	40
11	HIV101 07	Prevention of Aids/HIV and STD	40
		TOTAL HOURS	440

National Certificate 2 (NC2) in ELECTROTECHNOLOGY SERVICING (APPLIANCES – REFRIGERATION)

SN	Module Code	Module Name	Nominal Hours
1	ELE201 07	Safety in the Electrical Workplace	20
2	BO101 07	Business Operations	40
3	ELE210 07	Electrical Measuring Instruments	40
4	MAT201 07	Mathematics for Electrotechnology 2	40
5	ELE212 07	Cords, Cables and Applications	40
6	ELE213 07	Electrical Workshop Practice 'A'	80
7	MWP201 07	Welding and Brazing	60
8	ELE214 07	Domestic (Refrigeration) Appliance Principles	20
9	RAC201 07	Fundamentals of Refrigeration	40
10	RAC202 07	Refrigeration Tools, Equipment & Procedures	40
11	RAC203 07	Service Refrigerators, Equipment and Room Air Conditioners	60
12	WP101 07	Work Placement (On-The-Job Training)	200
		TOTAL HOURS	680

National Certificate 2 (NC2) in ELECTROTECHNOLOGY SERVICING (APPLIANCES – ELECTRICAL)

SN	Module Code	Module Name	Nominal Hours
1	ELE201 07	Safety in the Electrical Workplace	20

2	BO101 07	Business Operations	40
3	ELE210 07	Electrical Measuring Instruments	40
4	MAT201 07	Mathematics for Electrotechnology 2	40
5	ELE212 07	Cords, Cables and Applications	40
6	ELE213 07	Electrical Workshop Practice 'B'	80
7	MWP201 07	Welding and Brazing	60
8	ELE214 07	Domestic (Electrical) Appliance Principles	20
9	ELE216 07	Domestic Electrical Heating Appliances	60
10	ELE215 07	Basic Installation of Domestic Clothes Washers, Dishwashers, Dryers, Etc	80
11	WP101 07	Work Placement (On-The-Job Training)	200
		TOTAL HOURS	680

National Certificate 2 (NC2) in ELECTROTECHNOLOGY SERVICING (APPLIANCES – BUSINESS AND CONSUMER ELECTRONICS EQUIPMENT)

SN	Module Code	Module Name	Nominal Hours
1	ELE201 07	Safety in the Electrical Workplace	20
2	BO101 07	Business Operations	40
3	MAT201 07	Mathematics for Electrotechnology 2	40
4	ELR213 07	Electronics Workshop Practice	80
5	ELR206 07	Test Equipment	40
6	ELR202 07	Digital Electronics	40
7	ELR207 07	Operational Concepts of Business Machines	40
8	ELR208 07	Electro-mechanics of Business Machines	40
9	ELR209 07	PC Testing & Modification - Basic	40
10	ELR214 07	Introduction to Application Software	40
11	ELR216 07	Computer Peripherals	40
12	WP101 07	Work Placement (On-The-Job Training)	200
		TOTAL HOURS	680

ENTRY REQUIREMENTS AND ELIGIBILITY

No	Course	Eligibility
1	National Certificate in ELECTRTECHNOLOGY	Grade 12
2	Technical Training Certificate in PRINTING	Grade 12
3	Basic Training Certificate in CARPENTRY	Grade 10
4	Basic Training Certificate in ELECTRONICS	Grade 10
5	Basic Training Certificate in REFRIGERATION	Grade 10
6	Basic Training Certificate in AUTO ELECTRICAL	Grade 10
7	Basic Training Certificate in AUTO ELECTRICAL	Grade 10
8	National Certificate in METAL FAB & WELDING	Grade 10
9	National Certificate in MOTOR VEH MECHANIC	Grade 10
10	National Certificate in PANEL BEAT & SPRAY PAINTING	Grade 10

No	Course	Eligibility	Duration
1	National Certificate ONE/TWO in ELECTRTECHNOLOGY	Grade 12	40 WKS (1 year)
2	Technical Training Certificate in PRINTING	Grade 12	80 WKS (2 years)
3	Basic Training Certificate in CARPENTRY	Grade 10	20 WKS (6 months)
4	Basic Training Certificate in ELECTRONICS	Grade 10	20 WKS (6 months)
5	Basic Training Certificate in REFRIGERATION	Grade 10	20 WKS (6 months)
6	Basic Training Certificate in AUTO ELECTRICAL	Grade 10	20 WKS (6 months)
7	Basic Training Certificate in AUTO ELECTRICAL	Grade 10	20 WKS (6 months)
8	Basic Training Certificate in PRINTING GRAHICS	Grade 10	20 WKS (6 months)
9	National Certificate in MOTOR VEH MECHANIC	Grade 10	20 WKS (6 months)
10	National Certificate in PANEL BEAT & SPRAY PAINTING	Grade 10	20 WKS (6 months)

COURSES AT GLANCE

1. Electrical Department

NATIONAL CERTIFICATE 1 IN ELECTROTECHNOLOGY

NATIONAL CERTIFICATE 2 IN ELECTROTECHNOLOGY:

- Appliances – Electrical
- Appliances – Refrigeration
- Business & Consumer
- Electronics Equipment

BASIC TRADE COURSES

- Refrigeration
- Electronics

EXTENSION COURSES FOR APPRENTICES:

- Electrical Mechanics
- Refrigeration Mechanics
- Electronics Mechanic

2. Mechanical Department

NATIONAL CERTIFICATE 1 & 2 IN:

- Maintenance Fitting & Machining
- Metal Fabrication & Welding
- Auto Body Repair & Finishing
- Motor Vehicle Mechanic
- Automotive Electrical

INFORMATION TECHNOLOGY

- Certificate in Hardware & Networking
- Certificate in Web Design & Development
- Certificate in Java Programming

EXTENSION COURSES FOR APPRENTICES:

- Maintenance Fitting
- Metal Fabrication & Welding
- Auto Body Repair & Finishing
- Automotive Electrical
- Motor Vehicle Mechanic

3. Printing Department

BTC/NC 1 & 2 - 20 Weeks Each

- Printing / Graphics

EXTENSION COURSES FOR APPRENTICES: 8 Weeks

- Printing
- Computer Graphics

4. Building Department

BTC/NC 1 & 2 - 20 Weeks Each

EXTENSION COURSES FOR APPRENTICES - 8 Weeks

- Carpentry / Construction

TTC/PETT COURSE - 44 WEEKS

- Electrical
- ABR & R
- Printing/Graphics

The National Polytechnic Institute of Papua New Guinea

SN	Module Code	Module Name	Duration
		Diploma Courses	
		Diploma in Applied Science	80 weeks
		Diploma in Architectural Drafting	80 weeks
		Diploma in Building	80 weeks
		Diploma in Business Studies – Accounting	80 weeks
		Diploma in Business Studies – Computing	80 weeks
		Diploma in Business Studies - Management	80 weeks
		Diploma in Business Studies – Office Administration	80 weeks
		Diploma in Electrical Engineering	80 weeks
		Diploma in Hospitality management	80 weeks
		Diploma in Mechanical Engineering	80 weeks
		Certificate Courses	
		Technical Training Certificate in Drafting	80 weeks
		Technical Training Certificate in Science Technology	80 weeks
		Technical Training Certificate in Tourism and Hospitality	80 weeks
		Certificate of Higher Technical Education in Architectural Drafting	40 weeks
		Certificate of Higher Technical Education in Building	40 weeks
		Certificate of Higher Technical Education in Civil Engineering	40 weeks
		Certificate of Higher Technical Education in Mechanical Engineering	40 weeks
		Certificate in Applied Science	40 weeks
		Certificate in Business Studies - Accounting	40 weeks

		Certificate in Business Studies – Computing	40 weeks
		Certificate in Business Studies – Management	40 weeks
		Certificate in Business Studies – Office Administration	40 weeks
		NQF (National Qualification Framework) Courses	
		National Certificate 3 in Tourism (Tour Guiding)	20 weeks
		National Certificate 2 in Maintenance Fitting and Machining	20 weeks
		National Certificate 2 in Metal Fabrication and Welding	20 weeks
		National Certificate 1 in Maintenance Fitting and Machining	20 weeks
		National Certificate 1 in Metal Fabrication and Welding	20 weeks
		Other Courses	
		Extension Course in Commercial Cookery	10 weeks
		Extension Course in Meat Processing	10 weeks
		Introductory Civil Engineering	10 weeks
		Short Courses	
		AutoCAD (Intermediate)	
		Microsoft Word	
		Microsoft excel	
		Others by Inquiry – Institute can customize and conduct one for you such as estimating and Quantity Surveying/Contact Administration and Tendering/ Project Management	Depending

Madang Technical College

Contact: (675) 422 2877/422 2785; Email: mateco@datec.net.pg

No	Course	Eligibility	Duration
1	Diploma in Business Studies Stage 1	Grade 12	40 weeks (1 Years)
2	Diploma in Business Studies (Accounting) Stage 3	Grade 12	80 weeks (2 Years)
3	Diploma in Business Studies (Office Administration) Stage 3	Grade 12	80 weeks (2 Years)
4	Technical Training Certificate in Building Construction	Grade 12	80 weeks (2 Years)
5	Technical Training Certificate in Plumbing Sheet Metal	Grade 12	80 weeks (2 Years)
6	Technical Training Certificate in Furniture Timber Trade	Grade 12	80 weeks (2 Years)
7	Technical Training Certificate in Painting Sign Writing	Grade 10	80 weeks (2 Years)
8	National Certificate 1 & 2 in Office Administration	Grade 10	20 weeks (5 months)
9	National Certificate 1 & 2 in Plumbing	Grade 10	20 weeks (5 months)
10	National Certificate 1 & 2 in Carpentry	Grade 10	20 weeks (5 months)
11	National Certificate 3 in Tourism (Tour Guiding)	Grade 10	20 weeks(5 months)

PROPOSED COURSE - Year 2010 To 2015

No	Proposed Course
1	Diploma in Tourism & Hospitality Management
2	Diploma in Business Management

3	Diploma in Computing
4	Diploma in Building
5	National Certificate in Automotive Servicing
6	National Certificate in Electrical
7	National Certificate in Welding

* After completion of a stage the student either continues to the next stage or is sent out for employment training and then return for the next stage until completion of all stages.

Career Employment

Course	**Employment Career**	**Education Career Diploma/Degree in Higher Institutions**
Carpentry Construction	Carpenter, Block Layer, Tiling Plastering and or other building construction related jobs.	Building/Architecture
Painting & Decoration	Interior designer, Painter, Sign writer, Screen printer,	-TAFE College Aust.
Cabinet Making	Cabinet Maker, Wood Machinist and or other cabinet/furniture related jobs	-Building -TAFE College Aust.
Plumbing & Sheet Metal	Artisan Plumber, Sheet metal specialist and or other related jobs	-Building -Civil Engineering -Mechanical Eng

Tradesman\Tradeswoman

Specialized Tradesperson who have successfully completed all Extension course level here in Madang Technical College and had been certified by National Apprentice Training and Testing Board and Labor department. The college also has facility available for conducting Trade Testing to Certified specialized tradesperson who are not eligible for the College Extension Courses.

Business Studies

Course	**Employment Career**	**Education Career Diploma/Degree in Higher Institution**
Diploma in Business Studies -Accounting	Accounts Clerk/Officer, Junior Accountant and or other accounting related jobs	-Accounting -Management -Economics -Information System/IT
National Certificate /Diploma in Business Studies Office Administration	Office Administrator (Supervisor), Admin Officer, Admin Coordinator and or other related jobs	-Accounting -Management
Tourism & Hospitality	Travel Agent Officer, Hotel Front office Officer, Kitchen Supervisor, Tour Operator, Tour Guide Officer and or other Tourism related jobs	-Management in Tourism & Hospitality -APTC -Catering -TAFE Aust.

Kokopo Business College

Contact: Kokopo Business College
P.O.Box 504

Rabaul
East New Britain Province
Phone: 982 8556
Fax: 983 8557

Courses

There are two academic departments at the moment. One is the Diploma Studies Department and the other is TTC Business Studies Department. The Diploma Studies Department offers Diploma courses while the TTC Business Studies Department offers certificate courses. Plans are underway for the college to have three to four departments.

Currently the college offers five full time Diploma programmes in Business studies, two certificate courses, Diploma foundation studies and a range of short courses. In 2009 the college will introduce the National Certificate in Office administration and Tour Guide on modular basis followed by other courses on modular basis in 2010. The National Certificate is Competency Based Training from levels one to six that will be conducted parallel to the existing programmes.

Diploma Level Course

The Diploma Studies Department offers Diploma in Business Studies (Accounting), Diploma in Business Studies (Office Administration) and Diploma in Business Studies (Computing), Diploma in Business Studies (Management), and Diploma in Hospitality Management.

The duration of the course is two years for all diploma level courses. Students complete four stages in order to be awarded a Diploma in Business Studies. A Certificate in Higher Technical Education in Business Studies in conveyed to students who successfully passes stage two of the course.

The courses offered here are targeting the middle levels jobs in the public and private sector. After completing these courses student are employed. The new employees are placed on job as a starter undergoing training on the job and later they can be placed on high level positions. Some examples of starter's job categories that our courses are focusing at include the following:

1. Accounting Courses — Accounts Clerks, junior Accountants, Account Payable clerk, Cash Book Clerk, Payroll Officer, Inventory Controllers, creditors/debtors clerks etc...
2. Management — Marketing & sales executives or representatives, warehouse house clerks, Logistics officers, procurement officers, Human Resources officers, Recruitment officers, supervisor, trainee Managers and other broad job categories.
3. Office Administration – Receptionist, executives secretaries, Sales & Marketing Representatives, Purchasing Officers, Warehouse clerks, Production Planners, Human Resource Personals, etc...
4. Business Computing — Software techniques, Computer software consultants, junior computer programmers, data entry clerks, business analyst etc.
5. Hospitality and Tourism - Tour Guides, Travel Agents, Air Steward and Hostess, Waitress, Cooks, Hostel attendees, supervisor, trainee managers, airline ticket officers etc.

One-Year Technical Training Course (TTC)

The same subjects taught in Diploma stage 1 and 2 is used to teach this course.

After completing this course students are employed in both the private & the public.

No	Year 1 Subjects	No	Year 2 Subjects
1	Introductory Accounting	1	Accounting 2
2	Mathematics 1	2	Business Mathematics
3	Business Communication 1	3	Business Communication 2
4	Office Skills & Administration	4	Principles of Management
5	Computer & Information Systems 1	5	Small Business Management
		6	Computerized Accounting (MYOB)
		7	Computer Information System 2


KAMALIKI TECHNICAL VOCATIONAL
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P.O. BOX 107 GOROKA EHP
PH: 5322336/5329092 FAX: 5322480
MOTTO: SKILLS FOR LIFE
BUILDING & ELECTRICAL DEPARTMENT
MECHANICAL & ALLIED DEPARTMENT
BUSINESS STUDIES DEPARTMENT
TOURISM & HOSPITALITY DEPARTMENT
ENRICHMENT COURSES
SHORT COURSES
WELDING SECTION
BUILDING SECTION
MYM SECTION

Training Providers

The desktop study identified a number of training institutes within Papua New Guinea and survey forms were sent to 9 of them. Some of the contact e-mail addresses were incorrect. GSES did attempt to contact some of these Institutes, however only one responded directly (Unitech) and the APTC head office responded on behalf of the Port Moresby campus.

Table 17 lists all the training institutes identified. Some of these are Universities. Based on experience in Fiji, these are listed in case they also conduct technician training. Table 18 shows the response from Unitech.

Table 17: Institutes Identified in PNG

Institute	Contact	Position	E-mail	Phone
University of Technology PNG	Mr. John Dujambi	Director Appropriate Technology Centre	jdujambi@gmail.com	(675) 73916352
APTC PNG Campus			enquiries.png@aptc.edu.au	+675 321 3666 Fax. +675 321 3662
College of Distance Education				+675 323 0299
Divine Word University			info@dwu.ac.pg	+675 852 2937
Lae Technical College- Now Lae Poly Tech				+675 472 2555
Goroka Technical College			gkatechnical@gmail.com	
Mt Hagan Technical College				
The Lutheran University of PNG				+675 472 8432
Madang Technical College			All e-mails failed	,+675 422 2877,

Pacific Adventist University	Dr Darren Bito	Dean, School of Science and Technology	elisapesi.manson@pau.ac.pg	+675 328 0200
PNG Education Institute				+675 325 3511
Port Moresby Technical College			pmtc09@daltron.com.pg	+675 321 4311
Rabaul Technical College				+675 982 1155
University of Goroka			fuawem@uog.ac.pg	+675 731 1700
University of Natural Ressources and Environment			gbogarei@unre.ac.pg	+675 983 9144
University of PNG			all e-mails keep failing	+675 326 7200

Table 18: University of Technology PNG (UNITECH) Capabilities

Does your TVET have any department that could conduct any of the following types of courses	Yes or No?	If Yes, please state which department	Contact Person	Contact E-mail
Renewable Energy Technologies ?	Yes	Appropriate Technology Community Development Institute	John Dujambi	jdujambi@gmail.com
Grid Connect PV Systems?	Yes	Appropriate Technology Community Development Institute	John Dujambi	jdujambi@gmail.com
Off Grid PV Systems?	Yes	Appropriate Technology Community Development Institute	John Dujambi	jdujambi@gmail.com
Solar Hot water?	Yes	Appropriate Technology Community Development	John Dujambi	jdujambi@gmail.com

		Institute		
Wind Power Systems?	Yes	Appropriate Technology Community Development Institute	John Dujambi	jdujambi@gmail.com
Hydropower?	Yes	Appropriate Technology Community Development Institute	John Dujambi	jdujambi@gmail.com
Micro-Hydro Power?	Yes	Appropriate Technology Community Development Institute	John Dujambi	jdujambi@gmail.com
Biomass?	Yes	Appropriate Technology Community Development Institute	John Dujambi	jdujambi@gmail.com
Biogas?	Yes	Appropriate Technology Community Development Institute	John Dujambi	jdujambi@gmail.com
Geothermal	Yes	Appropriate Technology Community Development Institute	John Dujambi	jdujambi@gmail.com
Others technologies?	Yes	Appropriate Technology Community Development Institute	John Dujambi	jdujambi@gmail.com
Energy Efficiency?	Yes	Appropriate Technology Community Development Institute	John Dujambi	jdujambi@gmail.com
Refrigeration?	Yes	Engineering Department	John Dujambi	jdujambi@gmail.com
Air-conditioning?	Yes	Engineering Department	John Dujambi	jdujambi@gmail.com
Electrical wiring?	Yes	Engineering Department	John Dujambi	jdujambi@gmail.com
Efficient land and water transport systems?		Appropriate Technology Community Development Institute	John Dujambi	jdujambi@gmail.com
Energy sector planning and management?				

Note: GSES Team Member, Gavin Pereira, completed the survey form on behalf of Unitech and sent to them for confirmation: the form was returned unchanged.

During the VOCTEC project three trainers from the Unitech and one individual (former director of Unitech) were trained to conduct solar training courses: their details are provided in Table 19.

Table 19: Trainers trained under VOCTEC project

Institution	Name of Trainer	Email	Course Type	Date Trained
University of Technology PNG	John Dujambe Slio	jdujambi@gmail.com	Small Off Grid PV systems	Jan-14
University of Technology PNG	Bob Venantius Kamila	bkamila@atcdi.unitech.ac.pg	Small Off Grid PV systems	Jan-14
University of Technology PNG	Brian Ndrela	bndrelan@mech.unitech.ac.pg	Small Off Grid PV systems	Jan-14
Clean Energy Solutions PNG	Gafiye Garaio	cespng@gmail.com	Small Off Grid PV systems	Jan-14

From the experience of the project team and from the survey response, 5 training courses were identified as having been conducted in the last 5 years. Details are provided in Appendix 9.

In summary these were:

- VOCTEC Technician Course 1
- Household energy survey training for surveyors and power utility staff-
- ADB/GEF/Australia Promoting Energy Efficiency in the Pacific (phase 2)
- Light Vehicle Mechanical Technology
- Electrical.

The VOCTEC course had the intention of capacity building, while the 2 x APTC courses are continuing courses.

Pacific Community
Communauté du Pacifique

EUROPEAN UNION

USP
THE UNIVERSITY OF THE SOUTH PACIFIC

EU PacTVET

European Union Pacific Technical and Vocational Education and Training on Sustainable Energy and Climate Change Adaptation Project

Republic of the Marshall Islands Training Needs and Gap Analysis

Prepared by Helene Jacot des Combes
EU-PacTVET Senior Lecturer August 2015

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Acknowledgment

Organising a successful stakeholders consultation in a country is a complex exercise and requires an excellent knowledge of the country, in particular the 'who does what' aspects, and a broad communication and exchange network with the stakeholders. I was very fortunate to have the support of the USP EU-GCCA In-Country Coordinator in the Republic of the Marshall Islands, Mr. Dustin H. Langidrik, who arranged the logistics for this workshop and contacted the main stakeholders beforehand. The success of this workshop is the result of his hard work.

However, the key for the success of a consultation such as this one is the involvement and the enthusiasm of the participants. Once again, I was very fortunate with the level of engagement of the different participants and their interest for the project. The atmosphere of cooperation between the different stakeholders was also very supportive to identify the training needs and the best way to address them in the country. I would thus acknowledge the participants of the consultation workshop and give them many thanks for their hard work.

This consultation was also made easier by the support provided by the USP Campus in Majuro and I would like to thank the Campus Director, Dr. Irene Taafaki for her support and the Campus' staff for their warm welcome and their help.

1. Background

The EU-PacTVET (European Union Pacific Technical, Vocational Education and Training) is a European Union (EU) funded project under the broader Adaptation to Climate Change and Sustainable Energy Program (ACSE). It is component three (3) of this ACSE Program.

The Republic of the Marshall Islands as one of the Pacific- African Caribbean Pacific (P-ACP) countries and is affected by climate change in varying degree of adversity, from the erosion of coastlines up to the impacts on agriculture inland. Sea level rise, change in rainfall pattern, droughts, storm surges, higher temperature and extreme winds are the main future climate risks faced by the country.

In 2010, the Republic of the Marshall Islands' GHG emissions accounted for about 185 gigatonnes equivalent CO_2 ($GgtCO_2$-e), the energy sector representing 54% of this amount, the land and sea transport 12%, the waste processes 23% and other sectors 11% (Republic of the Marshall Islands, 2015). Although these emissions are negligible on the global scale, the Government of the Marshall Islands indicated in its Intended National Determined Contribution its commitment to reduce its GHG emissions to 32% below 2010 levels by 2025 and indicated its intention to reduce its emissions of GHGs to 45% below 2010 levels by 2030. This commitment is a response to the priorities of many governments in the region mentioned in different regionally endorsed frameworks, such as the wider Pacific Plan and the more specific Pacific Islands Framework Action on Climate Change (PIFACC) and the Framework Action on Energy Security in the Pacific (FAESP) and individual national policies.

Efforts in addressing energy security and climate change adaptation challenges are ongoing through various regional and national projects. Regarding climate change mitigation, the Republic of the Marshall Islands focuses on solar energy production, although they are not the main part of the electricity production. However, the Republic of the Marshall Islands committed to provision of 20% of electrical energy through indigenous renewable resources by 2020 and to improved efficiency of energy use in 50% of households and businesses, and 75% of government buildings by 2020. There is also a national target to reduce GHG emissions to 40% below 2009 levels by 2020.

Climate change adaptation projects are common in the Republic of the Marshall Islands, both regional and national. The Pacific Adaptation to climate change (PACC) and USP-EU-GCCA, are but examples of the regional programs.

1.1. Mission Objective

The purpose of the in-country-mission is to:

A. Identify the present and future market demand
B. Map out the existing training supply in RMI

2. Schedule of Consultation Events

The consultation in The Republic of the Marshall Islands took place from July 20th to July 24th 2015. The first two days were dedicated to face to face interviews or site visits (details in appendix 1) and the last two days hosted the national consultation workshop which brought together about 20 participants from different sectors

2.1. Project Outline and Presentation

During the various consultation meetings, including the one day consultation workshop, the opening, an outline of the EU-PacTVET was made, with emphasis on the following aspect of the project:

a. Rationale - current scenario with regards to SE and CCA in the P-ACPs and the issues emanating from those scenarios. It was focused down to the case of the Republic of the Marshall Islands (RMI), where there a lot of dependency on fossil fuel for power production and transportation. On the climate change side of the coin, the P-ACPs are more vulnerable to climate change, but have the least capacity to respond to these.
b. How the EU responded to these issues and the approach it took by focusing on building the capacity and empowering the capacities through benchmarking and the aim of setting standards of competencies and accreditation.
c. The objective and the purpose were state as being taken to try and address the issues
d. The Key Result Area. Each of the 4 KRAs were outline and it was made know to the stakeholders that one of the activities under KRA 1 is this in-country-assistance on consultative workshop and one-on-one consultation to do a training needs and gaps analysis (TNGA). Activities that need to be conducted in the hope of achieving each of these KRAs were briefly outlined.
e. A brief overview of the budget. This was to give the stakeholders a glimpse of the allocation from the €6.1 million
f. And finally, it was emphasized that the consultations are important in that the stakeholders need to identify it needs so that they could be noted as one of the activities that needs support.

3. Status Quo – Energy, Climate Change and TVET in RMI

This section is to establish the baseline as to what each of the sectors are engaged in and how does each of these sectors are affected by climate change and how sustainable energy practices are being part of their sectoral policies.

The training needs and gaps identified would be outlined in the latter sections, but outline below is the summary of the different sector's functions and relationships with SE and CCA.

3.1. Energy

In 2011, total energy produced in the Republic of the Marshall Islands was estimated at 102.68 kilo tonnes of oil equivalent. In 2009, more than 99% of the energy consumed in the Republic of the Marshall Islands was from imported oil. The rest was from solar and coconut oil. Today, the contribution of imported oil decreased to 90%, and the contribution from renewable energy sources in the electricity production sector is targeted to reach 20% in 2020.

Coordination and management of the energy sector is done by the Ministry of Resources and Development (MRD), through its Energy planning Division. The MRD also coordinates and implements the National Energy policy approved in 2009. Other government offices with energy responsibilities include the Economic Policy, Planning and Statistics Office (EPPSO), the key national development planning and statistics agency which was actively involved in developing rural electrification policy; and the Office of Environmental Planning and Policy Coordination (OEPPC) which is mandated to coordinate planning for and development of climate change policies (Government of the Republic of the Marshall Islands, 2009).

The Marshall Energy Company (MEC) is a government-owned company established in 1984. MEC is the dominant energy supplier in the RMI with a strong role in both policy and implementation. The board is appointed by Cabinet, chaired by the Minister of Public Works and includes both government (5) and private sector (5) members.

Other policy documents mention energy issues, especially the National Climate Change Policy framework (2011). The third strategic goal of this strategy focuses on: Energy Security and Low-Carbon Future (Government of the Republic of the Marshall Islands, 2011) and is directly including the targets defined in the National Energy Policy.

3.2. Climate Change

Climate change is an important issue for Small Island Developing States, especially for the Republic of the Marshall Island, a low-lying atoll state directly threatened by sea level rise (Government of the Republic of the Marshall Islands, 2011). This policy was built to develop resilience in partnership with regional and global partners and was developed through a series of consultations with the people of the Republic of the Marshall Islands (Government of the Republic of the Marshall Islands, 2011).

The main climate-related hazards currently experienced in the RMI that directly threaten the country's development are tropical storms and typhoons, high sea surges and prolonged drought periods. In addition to the direct effects there are indirect threats to the health of the people of the RMI and its ecosystems, particularly climate-related impacts on the availability of food and fresh water. Health is also affected through outbreaks of diarrhea

and other water-borne diseases and vector-borne diseases. RMI will face an increasing magnitude of impacts in multiple ways:

- Sea-level rise poses a definite and serious threat to the RMI's territorial integrity. Even less than half a meter rise in sea level could threaten the RMI's suitability for human habitation, due to impacts including increasingly scarce freshwater resources.

- Sea-level rise is expected to exacerbate inundation, storm surge, erosion and other coastal hazards (IPCC, 2007), which will threaten vital infrastructure, settlements and facilities that support the livelihood of island communities.

- A changing climate increases the potential for outbreaks of vector-borne disease, such as dengue fever, due to an increase in mosquito breeding sites associated with higher rainfall conditions, a warmer climate, particularly given the increasing trends of urban settlement and higher population densities.

- With the emerging scientific evidence, substantial impacts on coastal and marine ecosystems are likely. Rising temperatures and ocean acidification may have substantial adverse impacts upon coral reefs, coastal ecosystems, and migratory fish stocks such as tuna, which represent a substantial economic resource for RMI (Government of the Republic of the Marshall Islands, 2011).

Beside this specific policy, climate change issues are mentioned in the 'Vision 2018' under Strategic Goals 1: Operating in an Interdependent World and 10: Environmental Sustainability.

The agency in charge of the implementation of these objectives, especially those in relation with climate change adaptation and disaster risk reduction is the Office of Environmental Planning & Policy Coordination (OEPPC) under the President's Office, in coordination with other agencies and implementing partners. The framework will operate primarily via a National Committee on Climate Change (NCCC), which will link and work with existing committees, ministries and other stakeholders, such as: the Ministry of Resources & Development, the Ministry of Foreign Affairs, the Marshall Islands Marine Resources Authority, the Environment Protection Agency, the Ministry of Finance, the Ministry of Health, the Ministry of Education, acknowledging the separate mandate of these organizations and processes.

Examples of adaptation actions are presented in the PACC project and the EU-GCCA project reports. The main focus are on coastal protection, water and food security and resource conservation under the guidance of the Reimaanlok plan (2008).

3.3. Education Department – TVET Division

In the Republic of the Marshall Islands, Technical and Vocational Education and Training (TVET) is administered by the Ministry of Education, under secondary-level TVET programs and under programs from the College of the Marshall Islands and USP. The TVET issue has great urgency in the Marshall Islands because surveys and interviews with employers consistently reveal their dissatisfaction with the number and quality of applicants for position vacancies in the formal economy (Ministry of Education, 2014).

TVET providers in the Republic of the Marshall Islands are mostly secondary schools, as well as the College of the Marshall Islands and USP. No accreditation of the TVET programs are currently in place.

The main programs offered in secondary schools focus on: Auto Mechanics, Construction, Woodworking, Food Preparation, Agriculture, Sewing, Cooking, Accounting, Bookkeeping, Secretarial/IT, Computers, Keyboarding, Home Making, Traditional Skills, Health, and teaching. After having reduced its offer of TVET programs in the early 2000 (Ministry of Education, 2014), the College of Marshall Islands changed its strategy and is currently offering programs on nursing, public health, carpentry, maritime training and solar energy, based on the VocTec program. USP is offering weaving and Jaki Ed (special mats) programs and is developing a tourism and hospitality program as well as a sustainable sea transport program.

4. Consultation Methodologies

In trying to maximize output various methods of consultation were employed in this in-country mission. Determining which methodology to use depend on various factors ranging from availability, distance and timing. The following are the methods employed to capture the required data during the in-country mission:

4.1. Consultative Workshop/Meeting (TNGA)

A consultative workshop is a consultation with stakeholders in a venue where the agendum for discussion or consultation is done for all at once. This was the methodology employed for two days during this in-country mission. This methodology was employed because it used the forum to draw ideas and consolidates them.

4.2. One-to-one Consultations (Interview)

In a situation where stakeholders cannot make it to the consultative gatherings, due to other commitments, or in order to collect more precise information, a one-to-one or face-to-face meeting or interviews were done.

4.3. Internet – Online

This was used for searching for further information or publication of Reports or Policies. Not only that but to confirm or double-check on information given.

4.4. Desktop Literature Review

This forms the basis for evaluative report of information found in the literature related to technical, vocational education and training with the subject of sustainable energy and climate change as the content. Various literatures were consulted, within the education, energy and climate change sectors, on policy frameworks and national action plans or development strategic plans. Most Policy frameworks (regional and national) were reviewed and those were used as the basis for consolidating future SE and CCA demands or needs in the Republic of the Marshall Islands.

5. Relevant National Policies and Frameworks

At the regional level, the endorsement by the Forum Leaders of the Pacific Islands Framework for Action on Climate Change in 2005 and the Framework for Action on Energy Security in The Pacific (FAESP) in 2010, demonstrated that sustainable energy and climate change adaptation are therefore top priorities for Pacific Island governments.

Each country in the region also has national policy frameworks and their Action Plan that set out principles and suggested initiatives designed to guide and support the development and implementation of national activities consistent with the these policy frameworks' visions and goals.

5.1. Education Sector

In the Republic of the Marshall Islands, the education sector is guided by the Ministry of Education's Strategic plan for 2013-2016: Investing in Children: An agenda for change. However, most of the priorities from this strategic plan are aligned with the Education for All (EFA) goals, which were adopted by the Republic of the Marshall Islands at the World Education Forum in 2000 (Ministry of Education, 2014).

The report on the Education for All in the Republic of the Marshall Islands presents some of the issues regarding TVET in this country. TVET is often considered as a second choice for drop-out students. As a result, the integration of TVET programs in high school curriculum provoked a strong debate between the supporters of tis inclusion and its opponents. For the first group, it is important developing more TVET program will encourage students to continue their education, especially those who prefer 'learning-by-doing' and it helps the students to gain practical and soft skills (cooperation, teamwork, etc.). For the second group, TVET programs 'distract' students from more important topics, create a 'two tracks'

system with the less academically successful students pushed in the TVET programs and they also require large investment for teaching facilities (Ministry of Education, 2014).

Among the education priorities for 2015 and beyond identified in the report on the Education for All in the Republic of the Marshall Islands, the increase of female enrolment in the TVET programs is mentioned, as well as revitalizing TVET in secondary schools, based on a new policy statement on the role of TVET in secondary schools, course outlines for all TVET courses and a revision of the grades 9-12 social studies curriculum (Ministry of Education, 2014).

5.2. Energy Sector

As mentioned in a previous section, the energy sector in the Republic of the Marshall Islands is guided by the National Energy Policy endorsed in 2009, with the objective of: 'An improved quality of life for the people of the Marshall Islands through clean, reliable, affordable, accessible, environmentally appropriate and sustainable energy services' (Government of the Republic of the Marshall Islands, 2009). The goals of this strategy are:

- Electrification of 100% of all urban households and 95% of rural outer atoll households by 2015;
- The provision of 20% of energy through indigenous renewable resources by 2020;
- Improved efficiency of energy use in 50% of households and businesses, and 75% of government buildings by 2020; and
- Reduce supply side energy losses from Marshall Energy Company by 20% by 2015 (Government of the Republic of the Marshall Islands, 2009).

These objective and goals support the 'vision 2018', which is the strategic development plan for the country.

In complement with the National Energy Policy, the Republic of the Marshall Islands presented its Intended Nationally Determined Contribution for the UNFCCC Conference of the Parties in Paris in November-December 2015. In this document, the Republic of the Marshall Islands commits to a quantified economy-wide target to reduce its emissions of greenhouse gases (GHG) to 32% below 2010 levels by 2025 and communicates, as an indicative target, its intention to reduce its emissions of GHGs to 45% below 2010 levels by 2030. These targets put RMI on a trajectory to nearly halve GHG emissions between 2010 and 2030, with a view to achieving net zero GHG emissions by 2050, or earlier if possible (Government of the Republic of the Marshall Islands, 2015).

Mention of energy goals and targets are mentioned in other policies and frameworks, including the one focusing on climate change.

5.3. Climate Change

At present, the main strategy for actions against climate change in the Republic of the Marshall Islands is the National Climate Change Policy Framework, endorsed in 2011. This strategy has five strategic goals:

1. Strengthen the Enabling Environment for Climate Change Adaptation and Mitigation, including Sustainable Financing.
2. Adaptation and Reducing Risks for a Climate Resilient Future.
3. Energy Security and Low-Carbon Future.
4. Disaster Preparedness, Response and Recovery.
5. Building Education and Awareness, Community Mobilization, whilst being mindful of Culture, Gender and Youth.

The main sectors targeted under these strategic goals are:

- Food and Water Security
- Energy Security and Conservation
- Biodiversity and Ecosystem Management
- Human Resources Development, Education and Awareness
- Health
- Urban Planning and Infrastructure Development
- Disaster Risk Management
- Land and Coastal Management, including Land Tenure
- Transport and Communication (Government of the Republic of the Marshall Islands, 2011).

The Intended Nationally Determined Contribution for the UNFCCC Conference of the Parties in Paris in November-December 2015 also highlights that, due to the low contribution of the country to the global greenhouse gas emissions and the threats from climate change, it is essential for the country to implement adaptation actions. 'RMI has no choice but to implement urgent measures to build resilience, improve disaster risk preparedness and response, and adapt to the increasingly serious adverse impacts of climate change. RMI commits to further developing and enhancing the existing adaptation framework to build upon integrated disaster risk management strategies, including through development and implement of a national adaptation plan (and further integration into strategic development planning tools), protecting traditional culture and ecosystem resources, ensuring climate-resilient public infrastructure and pursuing facilitative, stakeholder-driven methods to increase resiliency of privately-owned structures and resources' (Government of the Republic of the Marshall Islands, 2015). The most appropriate policy and legal framework to reach these objectives and to complement the National Climate Change Policy Framework will be considered.

6. Consultation Analysis

During the consultations that were made in Majuro (in the Consultative workshop), face-to-face consultation and through online research, issues regarding technical, vocational education and training in the Republic of the Marshall Islands were raise. Common ones are summarized under four themes: training of trainers, inclusion of basic science in sustainable energy TVET programs, development of TVET programs on renewable energy, especially solar and biogas, development of TVET programs on climate change adaptation project management, with a focus on coastal management and protection and food security, and accreditation of TVET programs.

Most of these issues are similar to those encountered in other countries in the region and some of the solutions may be thus more relevant when implemented at the regional level, for example training of trainers programs.

The following are some of the issues, needs and gaps that were raised during the consultation to improve the TVET offer on climate change and sustainable energy by technical, vocational education and training institution in the Republic of the Marshall Islands and these are categorized under five different groups as present in the following matrix.

6.1. Training Needs and Gaps Analysis (TNGA)

This method was used to determine whether training needs related to sustainable energy and climate change exits or not in the Republic of the Marshall Islands. It is a systematic approach to identify status quo of TVET in the Republic of the Marshall Islands and to identify if the objectives/goal of TVET in the Republic of the Marshall Islands are forthcoming or not. If there are needs and gaps identify that could bring the present status of TVET to a desired state that will meet its goal, then there is a training need. In the case of the Republic of the Marshall Islands, the key points in terms of gap analysis were:

- Lack of basic science training in TVET curriculum, in particular in relation with renewable energy.
- Lack of project management skills, from data collection and lab analysis to grant application and M&E and also including soft skills such as negotiation, problem solving, teamwork, communication etc.
- Lack of specific training on coastal management and protection, food security, water management and crisis response (including counseling).
- Lack of understanding of entrepreneurship and what the real ‘working life’ is.
- Not enough technically skilled people to maintain sustainable energy projects and support the national target.
- Lack of qualified people in sustainable energy, including for different renewable energies, energy audit, site assessment, etc.

- Limited understanding of equipment utilization and removal/recycling of used equipment
- Limited number of trained TVET teachers.
- Lack of qualification and accreditation mechanisms in place.

6.2. Present and Future Market Demand

In consultation with the stakeholders in the Republic of the Marshall Islands, a list of workforce training needs and priority sectors for skill development were captured. This is best summarized table formats. The different types of skills (knowledge-based; skills based on ability or aptitude and those skills developed throughout lifetime and experience) required to be able to adapt to the adverse effects of Climate Change and use energy in a sustainable way are summarized in the following table. These skills were not associated with any particular subject within the TVET institutions but were given in general as some of the skills required. Due to time constraint, in-depth training needs and gaps analysis that is course-specific must be conducted, where each course contents must be analyzed.

Type of Skills	*Skills Description*		
	Sustainable Energy	*Climate Change Adaptation*	*Disaster Risk Management*
Knowledge-based Knowledge of specific subjects, procedures, and information necessary to perform particular tasks Such knowledge-based skills are acquired through education, training, and on-the-job experience			
	Grid connected systems maintenance skills	CC Adaptation data collection and analysis skills	Disaster risk reduction (DRR) skills
	Biofuel and biogas installation and maintenance skills	Resource management skills (incl. marine protection)	Crisis response skills
	Advanced mechanics for hybrid vehicles	Water management skills	First aid skills
	Equipment and meters usage and interpretation skills	Coastal management and protection skills	Counseling skills
	Solar PV system installation and maintenance skills	Crop resilience knowledge-based skills	Stress management skills
	Energy Auditing skills	Agriculture skills (incl. traditional food preservation)	Human right education and training skills
	Fuel quality control and fuel handling skills	Aquaculture skills	
	Battery and used equipment disposal skills	Traditional handicraft skills	
	Legal aspect of energy (price control, import, etc.)	Eco-tourism and hospitality skills	
	Site assessment/survey skills	Urban gardening skills	
Transferable/Functional Skills These are actions taken to perform a task, transferable to different work functions and industries and the skills are based on ability and aptitude		Project Concept or Proposal writing skills (incl. grant seeking).	
		Project Management skills	
		Communication Skills	
		Analyzing skills	
		Simple Bookkeeping, budget and marketing skills	
		Basic Maths and Physics	
		Community engagement skills (Reimaanlok process)	
		Entrepreneurship skills	
		Language skills (English and Marshallese) for trainers	
Personal Traits/Attitude Traits or personality		Interpersonal skills	
		Problem solving skills	
		Conflict management	

characteristics that contribute to performing work. Such skills are developed in childhood and through life experience		Negotiation skills
		Result-oriented skills
		Independence skills

6.3. The Training Supply: TVET Providers

The Republic of the Marshall Islands has secondary schools which offer TVET programs: the Marshall Islands High School, the Jaluit High School, the Northern Islands High School, the Laura High School and the Kwajalein Atoll High School. However, the main TVET supplier is the College of the Marshall Islands. The University of the South Pacific is also offering TVET programs at the Marshall Islands Campus. Both institutions are currently developing new programs to meet the needs of the country. The table in **Appendix 2** outlines some of the various Technical and Vocational Education and Training Institutions and the courses they offer.

6.4. The Identified Training Needs

During the consultation, specific training needs were highlighted and discussed by the participants. They include, for the sustainable energy sector:

Gap/Skill Needed	Level	Training type	Who	Content/Competencies
Applied maths and physics	basic	science academy	Island Eco CMI/USP NTC Private Sector	math concepts and skills necessary for PV/wind/biofuel technologies sustainability hands-on labs to demonstrate competencies
Awareness of jobs in the technical/vocational trades	basic	awareness programs career fair	MOE NTC Onestop centre	basic awareness, info on job availability, market requirements and salary levels
competent trainers (ToT) in Marshallese to bridge gap	advanced	SE basics SE advanced	CMI/USP Island Eco CMI/USP off island	can easily grasp scientific concepts in English and deliver them in Marshallese
Standard services Standard product equipment	basic	consultation, adaptation of international existing standards and codes	MEC - R&D	quality assessment quality standards raining inclusive of standards
ToT in solar systems	advanced	advanced knowledge and skill in solar systems	CMI/USP off island	SHS systems grid-connected systems solar components system design maintenance troubleshooting and repair
ToT in electrical and hybrid vehicles	advanced	advanced mechanical and electrical training	CMI/USP off island	repair, maintenance and troubleshooting of hybrid and electric vehicles
ToT in biodiesel/fuel/CNO	advanced	fuel handling fuel quality biodiesel manufacture	CMI/USP off island	fuel handling and quality testing design, maintain troubleshoot and repair equipment operated on biodiesel CNO

Because there is no qualification system in place, these gaps have been divided into three levels: basic, intermediate and advanced.

For the climate change sector:

Gap/Skill Needed	Level	Training Duration	Who	Content/ Competencies
Water Usage Survey	basic	2 weeks	MWSC MOE NTC	basic maths surveying skills reporting skills communication skills
Eco-tourism & Hospitality	basic	3-6 months	MIWA - THACA - NTC - CMI - USP - MOE - WAM	marketing skills finance management HRM
Food Security	Intermediate advanced	3-6 months 1-2 years	R&D Laura's farmers association CMI landcraft NTC Laura Farm (ROC)	local quality production farming competencies waste management food preservation and storage cultivation of climate resistant crops management skills
Coastal Management & Protection	advanced (engineer)	4 years	MOE - USP - CMI - PW (scholarships)	coastal profiling coastal planning assessment surveying designing (hard structures) M&E
Project Management	Basic	1-2 months	USP (MBA) CMI, NGOs JICA (advanced)	record keeping data collection report writing community consultation participatory management basic M&E time management problem solving OHS leadership

These training needs correspond to the identified skill gaps presented in the table in section 6.2.

Because of the geography of the republic of the Marshall Islands, and especially the number of small islands and atolls, it was discussed that innovative data collection method, such as the use of drones to take picture of coastline, could be beneficial, but there might be some regulation issues with this method.

7. Consultation Outcome

This in-country mission's objectives were to:

A. Identify the present and future market demand in SE and CCA; and
B. Map out the existing training supply for the Republic of the Marshall Islands.

Few TVET programs are offered at present in the Republic of the Marshall Islands by different providers, including secondary schools located in different islands. Moreover, there is currently no qualification and accreditation system in the Republic of the Marshall Islands for the TVET programs. As a result, the outcome of this consultation focuses more on the skill gaps and training needs. The outcomes of this in-country mission thus provided good indications on the priorities for TVET training in the Republic of the Marshall Islands.

Because most of the training focusing on climate change and sustainable energy is associated to projects and is not sustainably anchored in TVET institutions, the mapping exercise is incomplete but the main stakeholders to build on to develop a sustainable range of training have been identified and the discussions during the workshop indicates an atmosphere of cooperation between the different institutions that is very encouraging for the future.

Another outcome of the consultation is the request for the EU-PacTVET project to provide support for the setup of robust and relevant accreditation and qualification process in the Republic of the Marshall Islands, based on the experience and lessons learnt from other countries in the region.

Appendix 1: Schedule of Events

Day 1: 22nd June: Meetings with stakeholders

I met with the following stakeholders in Majuro on the first day:

i. USP – Dr. Irene Taafaki, Campus Director. An outline of the project was made and the weaving programs at the Marshall Islands USP Campus were presented. The plans to develop more programs on tourism and hospitality in relation with the new campus facilities were also discussed. Another project focusing on sustainable sea transport is also currently in development.

ii. Marshall Islands Conservation Society – Mr. Mark Stege, Director. An informal discussion took place on the climate change adaptation projects in place on the republic of the Marshall Islands and the associated training needs.

Day 2 – 23rd June: Training Needs and gaps Analysis – Stakeholders Workshop day 1

The workshop took place at the ICC in Majuro and brought together about 20 participants from the National training Council, different TVET providers, different ministries, the private sector and NGOs working on climate change. The first day focused on presentations from different stakeholders to set the scene and on discussions on the entry point for climate change and sustainable energy in the existing curriculum and an identifying the gaps.

Activities
Registration
Workshop Opening/Opening Prayer
Welcome and Introduction to Workshop ❖ Outline EU-PACTVET Project ➢ Outline Rationale ➢ Objectives/Purpose ➢ Country Expectation
Morning Tea Break
Activities
Gauging Linkages to SE and CCA
Stakeholders Presentations (5 – 7 minutes)
Discussion – "Aspects of each Sector relating to Sustainable Energy and Climate Change – Linkages

outlined”
Lunch Break
Continue Stakeholders Presentation
Discussion - “Aspects of each Sector relating to Sustainable Energy and Climate Change – Linkages outlined”
Discussion – “Aspects of each Sector relating to Sustainable Energy and Climate Change – Linkages outlined”
Activities
Afternoon Tea Break
Recap on Day 1
End of Day 1

Day 3 – 24th June: Training Needs and gaps Analysis – Stakeholders Workshop day 2

This second day continues the discussion started in the first day on the gaps and also focused on the existing programs and courses.

Activities
Training Needs and Gap Analysis
Presentation: (Training/Technical) Needs and Gaps Analysis – Basic Outline
Discussion
Plenary Session: *Creating National and Regional capacity and technical expertise to respond to CCA and SE challenges*
Morning Tea Break
Group Work: National training needs in SE and CCA.
Lunch Break
Group Work 1. Sustainable Energy: (RE/Electrical wiring/Energy Efficiency; Refrigeration and Air-conditioning and Sustainable Sea Transportation

2. Climate Change Adaptation: Food Security (Agriculture and Fisheries); Disaster Risk Reduction; Vulnerability and adaptation assessment; Water security and Forestry

Participants are divided into 3 Groups:

Tasks:

Group 1 Discussion Topic: "Gauge out the technical skills required/demanded by the industries in the Marshall Islands, present and future. Rank them in order , from HIGH DEMAND to LOW DEMAND

Group 2 Discussion Topic: "Identify technical Institutions in the country (formal and non-formal) that provide formal and informal technical skills in SE and CCA. List down the following:

i. Courses,

ii. Durations,

iii. Award/accreditation

iv. Equivalent course and accreditation in the region and internationally; and

v. Potential industry(ies) that needs such skills

Group 3: Discussion Topic: "Gauge out the technical skill and knowledge required for communities (both rural/ remote and urban) to be better equipped to adapt to the adverse effects of Climate Change"

Afternoon Tea Break

Matching the industries Demand to the Technical Skills Training Courses Supply

Group 1 Group 3

Group 2

Group 2 to split up between Group 1 and Group 3 and do the Demand and Supply matching

Group Reporting

i. Group 1

ii. Group 2

iii. Group 3

Matching Demand to Supply Reporting – SPC

END of Workshop

Day 5 – 26th June: Meetings with stakeholders

i. CMI – Mrs. Theresa Koroivulaono, President and Mr. William Reiher, Interim Vice President of Administration. The discussion included a presentation of CMI programs, including the TVET ones with a focus on renewable energy (following the VocTec training). This type of expertise and hands-on experience, together with the experience on teaching the solar technician training makes them a good place to offer more SE training programs. US recognizes this aspect. Potential collaboration and complementarity between CMI and USP were also mentioned.

ii. WUTMI (Women United Together Marshall Islands). This organisation proposes the 'parents for teachers' project. Trainers of trainers are certified each year to train lead educators who are trained but not certified and who train parents to give them skills in children's development and how to enhance children's ability' this includes brain development, healthy relationships in the family, substance abuse when pregnant, smoking near young children, etc. It is based on a US curriculum with some aspects supported by the Ministry of Health. Some other projects support the development of small business for handicraft and virgin coconut oil. Ideally, it would be good to train the women so they can get a certification (high quality and/or organic) for their products so they are more easily marketable

The participants' list is provided below

Name	Organisation
Allison J. Nashion	National Training Council
Tracey Inglis	National Training Council
Irene Taafaki	USP RMI Campus
Theresa Koroivulaono	College of Marshall Islands
William Reiher	College of Marshall Islands
Ywao Elanzo Jr.	Office of Environmental Planning and Policy Coordination (national CC focal point)
Raynard Gideon	Public Service Commission
Libotha J. kaminaga	Public Service Commission
Linus Kebus	Ministry of Public Works
Melanie Vicente	Ministry of Public Works
Rodrigo Hernandez III	Ministry of Public Works
Angeline C. Heine	Ministry of Resources and National Development
Ned T. Lobwij	Ministry of Resources and National Development/SPC
Jessica Zebedel	Environment Protection Authority
Mark Stage	Marshall Islands Conservation Society
Timmy Langrine	International Organisation of Migration
Aluka Rakin	Youth to Youth
Jorelik Tibon	Majuro Atoll Waste Company (Private Sector)
Riyad Mucadam	Island Eco (private sector)

Appendix 2: Table of Course Providers and Courses

TVET Courses offered in Secondary Schools

Course	MIHS	JHS	NIHS	LHS	KAHS
Auto Mechanics	✓				
Construction		✓	✓		
Woodworking	✓				
Food Preparation	✓				
Agriculture		✓	✓	✓	
Sewing	✓	✓	✓		
Cooking			✓		
Accounting	✓	✓			
Bookkeeping	✓				
Secretarial/IT	✓				
Computers	✓	✓	✓	✓	✓
Keyboarding		✓			
Home Making		✓			
Traditional Skills			✓		
Health Academy	✓	✓		✓	
Teacher Academy	✓				

MIHS=Marshall Islands High School; JHS=Jaluit High School; NIHS=Northern Islands High School;
LHS=Laura High School; KAHS=Kwajalein Atoll High School (Ministry of Education, 2014).

Course Provided	Duration	Award	Accreditation/Standard
College of the Marshall Islands	**Contact: Mrs. Theresa Koroivulaono**		
Certificate in Carpentry	1 Year	Certificate of Completion	
Standards of Training, Certification, and Watchkeeping (STCW) Certificate	2 Weeks	Certificate	IMO Requirements
Basic Crewmember Certificate	4 Weeks	Certificate	SPC Purse Seine Crew Course 2012
SPC Basic Fisheries Observer Certificate	6 Weeks	Certificate	Internationally recognized qualification under the IMO
Apprenticeship Certificate	6 Weeks	Certificate	Internationally recognized qualification under the IMO
Certificate in Public Health	1 Year	Certificate	

Agriculture programs are also proposed but need a review and reorganization.

The University of the South Pacific offers on its Marshall Islands Campus offers weaving programs (Jaki Ed and Weaver Apprenticeship Programs) but they do not lead to specific certificates.

Training Providers

Table TP1 provides information on the only training institutes identified in the desktop study and they did responded to the survey. Their response to the survey is shown in Table TP2.

Table TP1: Republic of Marshall Islands Training Institutes

Institute	Contact	Position	E-mail	Phone
College of Marshall Islands	Theresa Koroivulaono	Principal	tkoroivulaono@cmi.edu	(692) 6256895

Table TP2: College of Marshall Islands (CMI) Capabilities

Does your TVET have any department that could conduct any of the following types of courses	Yes or No?	If Yes, please state which department	Contact Person	Contact E-mail
Renewable Energy Technologies?	Yes	Physical plant	William Reiher	wreiher@cmi.edu
Grid Connect PV Systems?	Yes	Physical plant	William Reiher	wreiher@cmi.edu
Off Grid PV Systems?	Yes	Physical plant	William Reiher	wreiher@cmi.edu
Solar Hot water?	No			
Wind Power Systems?	No			
Hydropower?	No			
Micro-Hydro Power?	No			
Biomass?	No			

Biogas?	No			
Geothermal	No			
Others technologies?	Yes	Maritime, Carpentry	Edward Adiniwin	eadiniwin@cmi.edu
Energy Efficiency?	Yes	Physical plant	William Reiher	wreiher@cmi.edu
Refrigeration?	Yes	Jitok Kapeel	Imang Chong-gum	albertchongum@gmail.com
Air-conditioning?	Yes	Jitok Kapeel	Imang Chong-gum	albertchongum@gmail.com
Electrical wiring?	Yes	Jitok Kapeel	Imang Chong-gum	albertchongum@gmail.com
Efficient land and water transport systems?	No			
Energy sector planning and management?	No			

In the last 5 years, CMI has conducted courses in the following areas:

- Renewable energy technologies (e.g. solar PV, solar water heaters, biogas, wind power and micro-hydropower
- Energy efficiency (e.g. refrigeration and air-conditioning maintenance, motor mechanic, electrical wiring and rewiring of electric motors, efficient land and water transport systems)

CMI is planning to conduct the VOCTEC training twice a year.

During the VOCTEC project, two trainers from CMI were trained to conduct off-grid solar training courses. Details are provided in Table TP3.

Table TP3: Trainers trained under VOCTEC project

Institution	Name of Trainer	Contact Number	Email	Course Type	Date Trained
College of Marshall	Anthony Jason	Use Institution Contact	ajason@cmi.edu	Small Off Grid PV	Jan-14

Islands				systems	
College of Marshall Islands	William Reggie Roy Reiher	Use Institution Contact	wreiher@cmi.edu	Small Off Grid PV systems	Jan-14

From the experience of the project team and from survey response, 6 courses were identified as being conducted in RMI in the last 5 years. Information on these courses is contained in Appendix 10.

In Summary these included:

- Design and Install Grid connect PV Systems
- VOCTEC Technician Course 1
- VOCTEC Technician Course 2
- Solar Home Systems
- Jitok Kapeel Training
- Household energy survey training for surveyors and power utility staff-

The grid connect PV course was conducted by GSES, a company that is a Registered Training Organisation in Australia. Those who passed are eligible to apply for industry certification under the Pacific Power Association (PPA) and Sustainable Energy Association of Pacific Islands (SEIAPI) certification and accreditation program.

The VOCTEC course had the intention of capacity building.

Pacific Community
Communauté du Pacifique

EUROPEAN UNION

USP
THE UNIVERSITY OF THE SOUTH PACIFIC

EU PacTVET

European Union Pacific Technical and Vocational Education and Training on Sustainable Energy and Climate Change Adaptation Project

Samoa Training Needs and Gap Analysis

Prepared by Helene Jacot des Combes
EU-PacTVET Senior Lecturer August 2015

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Acknowledgment

Because Samoa is a very active country when it comes to climate change adaptation and mitigation, it is difficult for an outsider to identify the key stakeholders. Similarly, the TVET offer is broad and several providers are very active.

This introduction highlights the importance of the work of the USP EU-GCCA In-Country Coordinator, Mr. Tapulolu Tuailemafua. His network in Samoa and his knowledge of the different stakeholders was invaluable and he was able to organise the different interviews and a very successful workshop.

The stakeholders met during the interviews provided very useful information and the workshop participants were motivated and very active in their participation, although some of the issues discussed were difficult to grasp at the beginning. If competencies associated to sustainable energy are relatively easy to identify, climate change, with its cross-cutting characteristic is more difficult to associate with specific competencies. I wish to once again give all my thanks to all participants for their efforts and their participation.

1. Background

The EU-PacTVET (European Union Pacific Technical, Vocational Education and Training) is a European Union (EU) funded project under the broader Adaptation to Climate Change and Sustainable Energy Programme (ACSE). It is component three (3) of this ACSE Programme.
Samoa as one of the Pacific- African Caribbean Pacific (P-ACP) countries and is affected by climate change in varying degree of adversity, from the erosion of coastlines up to the impacts on agriculture inland. Based on Samoa Second national Communication (2010), sea level rise, change in rainfall pattern, including extreme rainfall events leading to flooding, higher temperature and extreme winds are the main future climate risks faced by the country.

In 2010, the Samoa GHG emissions accounted for 352.03 gigatonnes equivalent CO_2 ($GgtCO_2$-e), the energy sector representing 50% of this amount (MNRE, 2010). The agriculture, forestry and "other land use' sector represented 38% of emissions and the waste and industrial processes and product (PPU) sectors made up 9% and 3% of total CO2-e emissions respectively (MNRE, 2010). Although these emissions are negligible on the global scale, the Government of Samoa targeted to reduce the emissions from the energy sector by having 100% of the electricity production from renewable sources by 2017 (S. Foliaki, pers. Comm.). This is supported by the challenges posed to the Pacific Island countries by climate change and energy security, sustainable energy and climate change adaptation. These issues are priorities of many governments in the region, including in Samoa, as evident through regionally endorsed frameworks, such as the wider Pacific Plan and the more specific Pacific Islands Framework Action on Climate Change (PIFACC) and the Framework Action on Energy Security in the Pacific (FAESP) and individual national policies.

Efforts in addressing energy security and climate change adaptation challenges are ongoing through various regional and national projects. Regarding climate change mitigation, Samoa focuses on hydroelectricity and solar energy production, although they are not the main part of the electricity production. However, Samoa committed to an electricity production based only on renewable energy by 2017.

Climate change adaptation projects are common in Samoa, both regional and national. The Pacific Adaptation to climate change (PACC), USP-EU-GCCA, USAID funded C-CAP are but examples of the regional programmes present in Samoa. The presence of SPREP headquarters in Apia also supports several national initiatives.

1.1. Mission Objective

The purpose of the in-country-mission is to:

A. Identify the present and future market demand
B. Map out the existing training supply in Samoa

2. Schedule of Consultation Events

The consultation in Samoa took place from May 4th to May 8th 2015. The first two days were dedicated to face to face interviews or site visits (details in appendix 1) and the last two days hosted the national consultation workshop which brought together about 40 participants from different sectors

2.1. Project Outline and Presentation

During the various consultation meetings, including the one day consultation workshop, the opening, an outline of the EU-PacTVET was made, with emphasis on the following aspect of the project:

a. Rationale - current scenario with regards to SE and CCA in the P-ACPs and the issues emanating from those scenarios. It was focussed down to the case of Samoa, where there a lot of dependency on fossil fuel for power production and transportation. On the climate change side of the coin, the P-ACPs are more vulnerable to climate change, but have the least capacity to respond to these.
b. How the EU responded to these issues and the approach it took by focussing on building the capacity and empowering the capacities through benchmarking and the aim of setting standards of competencies and accreditation.
c. The objective and the purpose were state as being taken to try and address the issues
d. The Key Result Area. Each of the 4 KRAs were outline and it was made know to the stakeholders that one of the activities under KRA 1 is this in-country-assistance on consultative workshop and one-on-one consultation to do a training needs and gaps analysis (TNGA). Activities that need to be conducted in the hope of achieving each of these KRAs were briefly outlined.
e. A brief overview of the budget. This was to give the stakeholders a glimpse of the allocation from the €6.1 million
f. And finally, it was emphasised that the consultations are important in that the stakeholders need to identify it needs so that they could be noted as one of the activities that needs support.

3. Status Quo – Energy, Climate Change and TVET in Samoa

This section is to establish the baseline as to what each of the sectors are engaged in and how does each of these sectors are affected by climate change and how sustainable energy practices are being part of their sectoral policies.

The training needs and gaps identified would be outlined in the latter sections, but outline below is the summary of the different sector's functions and relationships with SE and CCA.

3.1. Energy

In 2012, total energy produced in Samoa was estimated at 117.2 kilo tonnes of oil equivalent. Of the total energy produced, 28.6% was met by biomass, 68.6% by petroleum products while the remaining 2.8% was met by hydropower, coconut oil bio fuel and other minor renewables. Contribution from new renewable energy sources contributed to 0.05% of total energy produced in 2012 a decrease of 0.02% from the 0.07% recorded in 2011. For the period from 2007 to 2012, there have not been many large scale renewable energy projects in Samoa. Notable inclusions to date include the 13.5 kW Apolima Solar PV mini grid, and the coconut oil biofuel blends and biodiesel which EPC and SROS have been trialling since 2009. However for 2012, no coconut oil blend for electricity generation was used by EPC. In spite of the decrease of the contribution of renewable energy sources in the total energy produced in Samoa in the recent years, the government targets electricity production to be based at 100% on renewable energy by 2017. The current proportion is around 50%.

Coordination and management of the energy sector is done by the Energy unit under the Ministry of Finance. In recognition of the importance of the energy sector for Samoa development, this unit oversees and coordinates national activities and donor-supported energy projects, developed, coordinates and implements the Samoa National Energy policy (SNEP) in collaboration with other stakeholders. The unit is also in charge of administrating the Petroleum Act, including issuing petroleum licence and rationalising the supply and distribution of petroleum products in the country. Other activities of the unit include the development of an energy supply and demand database. The National Energy Co-ordination Committee (NECC) was established in 2010 in recognition of the somewhat dispersed nature of decision making in the energy sector, and the need to achieve a coordinated pragmatic approach recognizing the substantial importance of the energy sector to the future of Samoa. Its objectives include:

- Advocating for energy as an essential enabling tool for realising the national development goals as well as to support the sustainable development issues;
- Promoting the mainstreaming of energy into all sectors and decision-making processes at all levels of government and society, including national planning and budgetary processes;
- Advising and contributing to the establishment of a strong governance framework for energy with clear policies, plans and legislations, accountable institutional and organisational arrangements, which are inter-linking all the various levels of government, sectors and communities;
- Promoting evidence and knowledge based decision-making, reflecting a shift away from the traditional ad hoc practices; and

- Creating an environment for sustained, coordinated and harmonised support from regional entities, international organisations and development partners.

The Electric power Corporation, a government-owned company, leads development in electricity production and distribution and has invested heavily in renewable energy and diesel generation to meet the increased energy demand in Samoa.

There are a number of key policy documents relevant to the Energy Sector Plan, the most important of which is the overarching Strategy for the Development of Samoa 2012 – 2016. Several sectoral plans include energy aspects; however, below are the ones focusing only on energy:

Strategy for the Development of Samoa (SDS) 2012 - 2016
The SDS 2012 – 2016 presents Samoa's development vision, its medium-terms national development goals, and the strategies to be implemented during four financial years 2012 – 2016 in order to achieve those goals. The SDS 2012 – 2016 framework is considered an appropriate basis for the development of the Energy Sector Plan.

Samoan National Energy Policy (SNEP) 2007 and its Strategic Action Plan (SAP) 2008
The Samoan National Energy Policy (SNEP) 2007, and its associated Strategic Action Plan (SAP) 2008, constituted the first energy sector policy aimed at providing a clear direction for all energy developments in Samoa. This Energy Sector Plan takes the opportunity to consolidate the SNEP 2007 and SAP 2008 into one document, targeting the strategic areas of: Transport, Electricity, and Heating, and embedding renewable energy and energy efficiency throughout.

3.2. Climate Change

Climate change is an important issue for Small Island Developing States, including Samoa, since it is a driver and a stressor of environment change.

According to the 2012 State of the Environment Report, in Samoa, the main sectors affected by climate change are: agriculture and food production, water supply and quality, biodiversity and conservation, health, forestry, infrastructures, energy production, tourism and housing and livelihoods both in urban and rural areas. And the main climate change impacts include: change in intensity and frequency of cyclones, coastal inundation and erosion, saline intrusion, and droughts.

In response to the threat of climate change, the government of Samoa, declared outcome 14 of the Strategy for the Development of Samoa 2012-2016 to be: climate and disaster resilience.

The Ministry in charge of the implementation of these objectives, especially those in relation with climate change adaptation and disaster risk reduction is the Ministry of Natural Resources and Environment (MNRE) and more specifically the meteorology division for climate change and the disaster management division for DRM.

Examples of adaptation actions, although related to a previous version of the SDS were provided in the Samoa NAPA in 2005 and the national Policy for Combatting Climate Change in 2007. They include: introducing new crop and animal varieties more adapted to the local conditions, put in place drought warnings, implement water tank programs and drill boreholes further inland, revegetating coastline and provide other coastline reinforcements where relevant, implement revegetation along streams and reforestation programmes, develop watershed management strategies, develop community-based marine resource management plans, etc.

3.3. Education Department – TVET Division

In Samoa, Technical and Vocational Education and Training (TVET) is administered by the Ministry of Education, Sports and Culture, under the Post School Education and training sub-sector. TVET programs and curriculum are evaluated and accredited by the Samoa Qualification authority (SQA) through a standardised process.

Several TVET providers in Samoa are members of Samoa Association of Technical and Vocational Education Training Institutions (SATVETI), a member of the PATVET, that provides a forum for discussion regarding TVET in Samoa but also work with SQA to support the recognition and accreditation of TVET programs, monitor curriculum changes in secondary schools and their impacts on post school education and training, develop proposals for entry criteria for students changing training institutions, and network with other organisations.

One of the major TVET institutions in Samoa is the National University of Samoa with several programmes on nursing and health science, tropical horticulture, maritime training, electrical engineering, construction, mechanical engineering. Other institutions include: Don Bosco Technical Centre in Alafua and Salelologa College in Savai'i, focusing on 2 year and a 4 year trades training courses specialising in welding, motor mechanics, woodwork, electronics and plumbing; the Methodist Technical and Creative Centre, focusing on Level 2 programmes on automotive mechanics, electrical engineering, moulding and fabrication, food and textile technology, computer studies, fine arts, carpentry and joinery; the Uesiliana Technical & Vocational Centre and the Leulumoega Fou Arts School.

4. Consultation Methodologies

In trying to maximise output various methods of consultation were employed in this in-country mission. Determining which methodology to use depend on various factors ranging

from availability, distance and timing. The following are the methods employed to capture the required data during the in-country mission:

4.1. Consultative Workshop/Meeting (TNGA)

A consultative workshop is a consultation with stakeholders in a venue where the agendum for discussion or consultation is done for all at once. This was the methodology employed for two days during this in-country mission. This methodology was employed because it used the forum to draw ideas and consolidates them.

4.2. One-to-one Consultations (Interview)

In a situation where stakeholders cannot make it to the consultative gatherings, due to other commitments, or in order to collect more precise information, a one-to-one or face-to-face meeting or interviews were done.

4.3. Internet – Online

This was used for searching for further information or publication of Reports or Policies. Not only that but to confirm or double-check on information given.

4.4. Desktop Literature Review

This forms the basis for evaluative report of information found in the literature related to technical, vocational education and training with the subject of sustainable energy and climate change as the content. Various literatures were consulted, within the education, energy and climate change sectors, on policy frameworks and national action plans or development strategic plans. Most Policy frameworks (regional and national) were reviewed and those were used as the basis for consolidating future SE and CCA demands or needs in Samoa.

5. Relevant National Policies and Frameworks

At the regional level, the endorsement by the Forum Leaders of the Pacific Islands Framework for Action on Climate Change in 2005 and the Framework for Action on Energy Security in The Pacific (FAESP) in 2010, demonstrated that sustainable energy and climate change adaptation are therefore top priorities for Pacific Island governments.

Each country in the region also has national policy frameworks and their Action Plan that set out principles and suggested initiatives designed to guide and support the development and implementation of national activities consistent with the these policy frameworks' visions and goals.

5.1. Education Sector

In Samoa, the education sector is guided by the Strategic Policies and Plan (2006-2015). This policy envisions "a quality holistic education system that recognises and realises the

spiritual, cultural, intellectual and physical potential of all participants, enabling them to make fulfilling life choices".

In this policy, TVET is located under the post-school education and training, or post-secondary education and training. The specific vision for TVET education is: Quality technical, vocational and applied educational programmes to enable people to be gainfully employed in order to meet the skills requirements of industry and commerce in Samoa.

TVET providers are encouraged to make use of new technology through open and distance learning; improve web pages to support research; expand satellite programs for classroom teaching and learning; improve networking for information sharing. In this context, networking and partnerships are expected to be developed and the creation of SATVETI is an important milestone.

Accessibility and initial investment for TVET infrastructures were still a problem when this policy was finalized.

In terms of curriculum development, training of trainers and accreditation, SATVETI was requested to work closely with SQA to support TVET providers in Samoa to provide and implement of the quality assurance measures for all programmes.

A special focus is also given in the 2006-2015 policy on non-formal education and envisions A strengthened non-formal education system that is recognised as a legitimate form of education providing integrated and coordinated programmes, aimed at improving the quality of life, and enabling individuals and communities to achieve a sustainable future. It might be useful, under the PacTVET project, and especially with regards to CC and DRM to include some aspects of the non-formal training into more institutionalized training programmes.

Samoa also has a National Curriculum Policy Framework, endorsed in 2006 but it does not mention TVET.

5.2. Energy Sector

As mentioned in a previous section, Samoa has a Samoan National Energy Policy (SNEP), endorsed in 2007 and the associated Strategic Action Plan (SAP), adopted in 2008. The SNP has as goals to: increase the share of mass production from renewable sources to 20% by 20030 and to increase the contribution of renewable energy to energy services and supply to 20% by 2030.

Beside this strategy, the Strategy for the Development of Samoa (SDS) 2012 – 2016 is also extremely important for the development of the Energy Sector Plan. The Key outcome 12 of this strategy focuses on sustainable energy supply and includes strategic areas on promoting

and increasing RE investment and generation and promoting energy efficiency practices in all sectors particularly the transport sector.

Other strategies related to energy include: the National Infrastructure Strategic Plan 2011-2021, the National Policy of Combating Climate Change 2007, and Greenhouse Gas Abatement Strategy 2008 – 2018 and the Water & Sanitation Sector Plan 2012 – 2016.

The regulatory framework associated to energy includes different Acts and strategies, directly related to energy such as the The Electric Power Corporation Act 1980, the Electricity Act 2010 and the Petroleum Act 1984, or focusing on other sectors but including aspects on energy such as: The Planning and Urban Management Act 2004, and the Land Transport Authority Act 2007.

5.3. Climate Change

At present, the main strategy for actions against climate change in Samoa is the National Policy of Combating Climate Change 2007, and Greenhouse Gas Abatement Strategy 2008 – 2018. However, climate and disaster resilience is also a key priority outcome in the Strategy for the Development of Samoa (SDS) 2012 – 2016. The strategic areas for this outcome include:

- Mainstream climate change and disaster risk management;
- Undertake climate change and hazard risks analysis and vulnerability assessments on sector plans and major investment initiatives to identify potential impacts to determine best options for implementation;
- Encourage the use of ecosystem based approach to adapt to potential climate change impacts;
- Strengthen awareness and consultation on climate change and disaster risk management;
- Strengthen disaster preparedness and response capacity;
- Improve provision of accurate and timely information and warnings;
- Improve monitoring of climate change through centralized collection of data;
- Develop an appropriate national mitigation plan for Samoa to meet carbon trading;
- Implement revised coastal infrastructure management plans; and
- Develop financing modalities for CCA and DRM.

Climate change is also mentioned in two of the key environment sector objectives of the Samoa National Environment and Development Sector Plan 2013-2016. More specifically, these key environment sector objective mention:

- To develop and implement a Nationally Appropriate Mitigation Action (NAMA) Programme towards a Low Carbon Energy Sector.
- To implement habitat/ecosystem-based strategies to support climate change adaptation and mitigation.

6. Consultation Analysis

During the consultations that were made in Apia (in the Consultative workshop), face-to-face consultation and through online research, issues regarding technical, vocational education and training in Samoa were raise. Common ones are summarized under four themes: training of trainers, inclusion of traditional knowledge and practices, inclusion of climate change into existing programmes, and accreditation of TVET programmes.

Most of these issues are similar to those encountered in other countries in the region and some of the solutions may be thus more relevant when implemented at the regional level, for example training of trainers programmes.

The following are some of the issues, needs and gaps that were raised during the consultation to improve the TVET offer on climate change and sustainable energy by technical, vocational education and training institution in Samoa and these are categorized under five different groups as present in the following matrix.

6.1. Training Needs and Gaps Analysis (TNGA)

This method as used to determine whether training needs related to sustainable energy and climate change exits or not in Samoa. It is a systematic approach to identify status quo of TVET in Samoa and to identify if the objectives/goal of TVET in Samoa are forthcoming or not. If there are needs and gaps identify that could bring the present status of TVET to a desired state that will meet its goal, then there is a training need. In the case of Samoa, the key points in terms of gap analysis were:

- Lack of mainstreaming of climate change and sustainable energy in curriculum. This includes: need for training of trainers and training material, including practical equipment where needed.
- Lack of inclusion of traditional knowledge and skills in curriculum. This includes identifying the traditional knowledge and skills custodian, training the trainers and updating curriculum and training material.
- Not enough technically skilled people to maintain sustainable energy projects and support the national target (100% electricity from renewable energy in 2017).
- Need to recognise prior learning and to harmonise the work of the different providers to ensure pathways between institutions.
- Limited number of trained TVET teachers for primary and secondary schools.
- High costs of new technologies, limiting capacities to get practical material for the training.

6.2. Present and Future Market Demand

In consultation with the stakeholders in Samoa, a list of workforce training needs and priority sectors for skill development were captured. This is best summarised table formats. The different types of skills (knowledge-based; skills based on ability or aptitude and those skills developed throughout lifetime and experience) required to be able to adapt to the adverse effects of Climate Change and use energy in a sustainable way are summarised in the following table. These skills were not associated with any particular subject within the TVET institutions but were given in general as some of the skills required. Due to time constraint, in-depth training needs and gaps analysis that is course-specific must be conducted, where each course contents must be analysed.

Type of Skills	*Skills Description*		
	Sustainable Energy	*Climate Change Adaptation*	*Disaster Risk Management*
Knowledge-based Knowledge of specific subjects, procedures, and information necessary to perform particular tasks Such knowledge-based skills are acquired through education, training, and on-the-job experience			
	Feasibility study skills	CC Adaptation assessment skills	Disaster risk reduction (DRR) skills
	Electrical wiring skills	Crop seasonal cycles knowledge-based skills	Fire management skills, especially for tourism
	Air conditioning and Refrigeration maintenance skills	Crop resilience knowledge-based skills	Firefighting skills, especially for tourism
	Motor re-winding to reduce emissions skills	Soil adaptability knowledge-skills	
	Solar PV system installation and maintenance skills	Inclusion of TK in seafaring skills	
	Energy Auditing skills	Inclusion of TK in nursing/midwifery skills	
	Energy efficiency for building skills	Feasibility study skills	
	Battery disposal skills		
Transferable/Functional Skills These are actions taken to perform a task, transferable to different work functions and industries and the skills are based on ability and aptitude		Project Concept or Proposal writing skills.	
		Project Management skills	
		Communication Skills	
		Analysing skills	
		Simple Bookkeeping skills	
		Budget and marketing skills	
Personal Traits/Attitude Traits or personality characteristics that contribute to performing work. Such skills are developed in childhood and through life experience		Interpersonal skills	
		Problem solving skills	
		Succession Planning skills	
		Resource Sharing skills	
		Result-oriented skills	
		Independence skills	

6.3. The Training Supply: TVET Providers

Samoa has several TVET suppliers. The main ones are: The National University of Samoa, Don Bosco Technical Centre in Alafua and Salelologa College in Savai'I; the Methodist Technical and Creative Centre; the Uesiliana Technical & Vocational Centre and the Leulumoega Fou Arts School. These providers are complementary because they all focus on different niches. The table in **Appendix 2** outlines some of the various Technical and Vocational Education and Training Institutions and the courses they offer.

6.4. The Identified Training Needs

During the consultation, specific training needs were highlighted and discussed by the participants. They include, for the sustainable energy sector:

Training Need	TVET program or qualification	Level	Key Competencies
Installation and maintenance of small scale biogas	RE Biogas technology ToT	1-6	Trades in plumbing, biomass feedstock study, safety, installation impact, maintenance
Energy audit	Promoting and controlling energy efficiency ToT	3-4 (certificate)	Analytical skills, electrical engineering background, lighting, air conditioning, electrical appliances
Installation and maintenance of solar panels	RE Solar PV ToT	1-6	Safety, solar PV installation and maintenance
Maintenance of wind turbines	RE wind energy ToT	7-8	Installation, safety, maintenance, mechanics
Promoting energy efficiency in communities (lighting, electric appliances, cooking)	Informal, awareness ToT	1-3	Promotion, presentation, sustainability
Biodiesel production	RE biofuel ToT	3-4	Oil production, safety, quality control

These training needs complement the skills identified in the existing programmes:

- Installation of AC unit:
    - Identify the relevant size of the unit
    - Identify the relevant location to mount the unit
    - Identify the correct type of cable and copper tubing
    - Follow the wiring diagram
    - Install a vacuum pump

- Installation of small biogas units:
    - Technical skills, multi skills
    - Research evidence based skills
    - Best practices
    - QA - OHS

For the climate change sector:

Training Need	TVET program or qualification	Level	Key Competencies
AGRICULTURE - HORTICULTURE			
Construction design – cooler houses	Construction NFL	2-3 N/A	Construction design, proper deign skills, construction skills
Awareness of food security	Horticulture NFL	3 N/A	Selection of crops, planting methods, crops, harvesting techniques, plant requirement, nutritional value
TOURISM & HOSPITALITY			
Training of TVET trainers	NFL	N/A	Design and organize training material, facilitate/assess/evaluate CCA/SE contents
Generic: develop basic knowledge of fire prevention and impacts	NFL	N/A	Elements of fire, fire prevention, impact of fire on CC
MARITIME			
Traditional navigation skills for fishermen	Nautical rating NFL	2 N/A	Ability to rig sails, read the stars, currents and the wind, traditional meteorology, skills
AUTOMOTIVE			
Develop knowledge on the effects of gas emission from vehicles	NFL	N/A	Ability to identify the types of gas emissions, identify the effects of the emissions
ELECTRONICS			
Develop skills in the proper disposal of batteries	NFL	N/A	Identify the types of batteries, identify disposal procedures

HEALTH & NURSING			
Traditional knowledge in midwifery	Diploma, Bachelor and post-Graduate Diploma	4-8	Identify traditional methods of child birth and newborn care, and apply them when relevant
Climate change-related health issues	Diploma, Bachelor and post-Graduate Diploma	4-8	Identify the health issues linked to climate change and the responses

These training needs are intended to fill the identified gaps:

- Horticulture:
    - Lack if design skills
    - Shortage of food in relation to CC
- Tourism & Hospitality:
    - Low/lack of capacity of TVET trainers
    - Limited knowledge of fire elements and fire prevention, no knowledge of the impacts of fire on CC
- Maritime:
    - No knowledge and skill in traditional navigation
    - No knowledge of gas emissions
- Automotive:
    - No knowledge of the effects of gas emissions from cars on the health and the environment, including CC
- Electronics:
    - No skill in the proper disposal of batteries

7. Consultation Outcome

This in-country mission's objectives were to:

A. Identify the present and future market demand in SE and CCA; and
B. Map out the existing training supply for Samoa.

Several TVET programmes are taking place at present in Samoa offered by different providers. Due to this broad offer, a two-day workshop is too short to collate the precise information on the different competencies associated with these programs. However, the information collected provided a good complement to what can be found online. The outcomes of this in-country mission might not be quite accurate but it holds indicative outcomes of the needs and gaps in the TVETs in Samoa.

The TNGA conducted through various methodologies and more specifically the group consultation done in Apia with different stakeholders identified SE and CCA present and future demands that were also discussed with regards to the courses and programmes already offered in Samoa and are outlined in the tables presented in the previous section.

Appendix 1: Schedule of Events

Day 1: Monday 4th May: Meetings with stakeholders

I met with the following stakeholders in Apia on the first day:

i. Samoa Qualification Authority – Ms. Easter Manila-Silipa, Ms. Tea Tepora Wright, Ms. Kovi Fonoti-Aiolupotea - qualification officers. An outline of the project was made to the SQA team and a presentation of the work of SQA was done as well. The SQA appreciated the objective of the project and is keen to have the project complementing their effort in building TVET capacity in the country.

ii. Samoa Ministry of Finance, Department of Energy – Mr. Sione Foliaki – Assistant CEO. An outline of the project was made and the Samoan Energy policy was discussed as well as the targets regarding the part of renewable energy in Samoa.

Day 2 – Tuesday 5th May: Meetings with stakeholders

i. Samoa Association of TVET Institutions (SATVETI) and National University of Samoa (NUS) – Ms Peseta Eseta Hope, President SATVETI and Dean Faculty of Applied Sciences, NUS; Leitufia F Lafoa; Galumalemana R Posini; Auimatagi James Ah Fook; Gauna Wong; .Poutasi Onesemo; Faamausili Pale Toelupe, NUS TVET teachers from different programmes. There was a discussion on the different programmes proposed by NUS and on how they could be partner to the project.

ii. Ministry of foreign affairs and trade, scholarship, training and bilateral division- Mrs Sharon Potoi. An outline of the project was made and the discussion focused on the scholarships proposed by the ministry to study abroad based on priority areas defined in the country. Some of these scholarships are dedicated to TVET graduates.

iii. Ministry of Education, Sports and Culture, Teacher Development Unit - Ms Jenny Lauano. After an outline of the project was made, the discussion focused on the TVET activities offered in primary school. It would be difficult to include climate change and sustainable energy in these programmes bur SPREP is already working on including Climate Change in primary and secondary school curriculum. The inclusion of climate change and renewable energy in TVET curriculum in secondary schools should follow the normal process not a specific one and should include the curriculum development unit.

iv. Ministry of Natural Resources and Environment, Energy Division – Mr Johnathan Yoshida. After an outline of the project was made, the discussion focused on the projects conducted by the division and the potential links to TVET. These projects are mostly pilots so there is no specific training associated with them.

v. Electric Power Corporation (EPC) – Mr. Tologata - CEO. The discussion focused on the projects conducted by EPC and their links to training needs. EPC and the government move in the direction to outsourcing these major works, including the maintenance to the local private sector. This is to build the capacity of the

private sector and not to rely on contractors from overseas. However, the private sector is not yet equipped with trained people, this is the gap.

Day 3 - 6th May: Meeting with stakeholders

i. Methodist Technical and Creative Centre - Rev Uale Misifosa. After an outline of the project was made, the discussion focused on the programmes offered by the school. There are 8 programmes (level 2 certificates) on automotive mechanics, electrical engineering, moulding and fabrication, food and textile technology, computer studies, fine arts, carpentry and joinery but only the first three are certified. This is a second chance for drop outs and this is the step they missed for upgrade. So this can be considered as a pre-school for NUS and APTC programs but there is no follow up process to follow that up and analyse the success of these students.

Day 4 - 7th May: Training Needs and gaps Analysis – Stakeholders Workshop day 1

The workshop took place at the Millenia Hotel and brought together about 40 participants from different TVET providers, different ministries, the private sector and NGOs working on climate change. The first day focused on presentations from different stakeholders to set the scene and on discussions on the entry point for climate change and sustainable energy in the existing curriculum and an identifying the gaps.

Activities
Registration
Workshop Opening
Welcome and Introduction to Workshop ❖ Outline EU-PACTVET Project ➢ Outline Rationale ➢ Objectives/Purpose ➢ Country Expectation
Morning Tea Break
Activities
Gauging Linkages to SE and CCA
Stakeholders Presentations (5 – 7 minutes)
Discussion – "Aspects of each Sector relating to Sustainable Energy and Climate Change – Linkages outlined"
Lunch Break

Continue Stakeholders Presentation
Discussion - “Aspects of each Sector relating to Sustainable Energy and Climate Change – Linkages outlined”
Discussion – “Aspects of each Sector relating to Sustainable Energy and Climate Change – Linkages outlined”
Activities
Afternoon Tea Break
Recap on Day 1
End of Day 1

Day 5 – 8th May: Training Needs and gaps Analysis – Stakeholders Workshop day 2

This second day continues the discussion started in the first day on the gaps and also focused on the existing programmes and courses

Activities
Training Needs and Gap Analysis
Presentation: (Training/Technical) Needs and Gaps Analysis – Basic Outline
Discussion
Plenary Session: *Creating National and Regional capacity and technical expertise to respond to CCA and SE challenges*
Morning Tea Break
Group Work: National training needs in SE and CCA.
Lunch Break
Group Work 1. Sustainable Energy: (RE/Electrical wiring/Energy Efficiency; Refrigeration and Air-conditioning and Sustainable Sea Transportation) 2. Climate Change Adaptation: Food Security (Agriculture and Fisheries); Disaster Risk Reduction; Vulnerability and adaptation assessment; Water security and Forestry **Participants are divided into 3 Groups:**
Tasks:

Group 1 Discussion Topic: "Gauge out the technical skills required/demanded by the industries in Samoa, present and future. Rank them in order , from HIGH DEMAND to LOW DEMAND

Group 2 Discussion Topic: "Identify technical Institutions in the country (formal and non-formal) that provide formal and informal technical skills in SE and CCA. List down the following:

i. Courses,
ii. Durations,
iii. Award/accreditation
iv. Equivalent course and accreditation in the region and internationally; and
v. Potential industry(ies) that needs such skills

Group 3: Discussion Topic: "Gauge out the technical skill and knowledge required for communities (both rural/ remote and urban) to be better equipped to adapt to the adverse effects of Climate Change"

Afternoon Tea Break

Matching the industries Demand to the Technical Skills Training Courses Supply

Group 1 Group 3

Group 2

Group 2 to split up between Group 1 and Group 3 and do the Demand and Supply matching

Group Reporting

i. Group 1
ii. Group 2
iii. Group 3

Matching Demand to Supply Reporting – SPC

END of Workshop

The participants' list is provided below

NAME	ROLE	ORGANISATION
Ms Tauoitala Lees	Head School of Nursing	National University of Samoa
Ms Elaine T Elu	Communication Instructor	Methodist Technical Centre(MTCC)APIA
Mr Faitele Puaina	Communication Instructor	Uesiliana Technical Vocational Centre(SAVAII Is)
Rev Lene Tariu	Principal	Uesiliana Technical & Vocational Centre
Ms Anarosa Faafuata	Computer Instructor	Uesiliana Technical & Vocational Centre Savaii Is
Rev Uale Misifosa	Principal	MTCC APIA
Mr Raponi Ioane	Member	Samoa Refrigeration and Engineering Assoc.
Mr Gauga Wong	Lecturer Agriculture	National University of Samoa (NUS)
Mr James Ah Fook	Lecturer Engineering	NUS
Mr Lavea Natoe Ieti	Methodist School Committee	MTCC
Mr Masoe Tovia Tufuga	-do-	MTCC
Mr Faamausili Pale Toelupe	Lecturer Tourism	NUS
Ms Poutasi Onesemo	Lecturer Hospitality	NUS
Mr Sam Aiono	President	Samoa Refrigeration/Engineering Association
Mr Nick Sam Yum		Samoa General Services
Ms Ame Sene Tanielu	Reporter/Journalist	Samoa Talofa FM News Broadcaster
Ms Peseta Eseta Hope	Head Faculty of Appl Sci	NUS
Mr Tevita Simeki	Trainer	Oloamanu Centre (NUS)
Mr Tauvaga Vaai	Senior Trainer	Oloamanu Centre (NUS)
Ms Faafetai Alisi	CEO SUNGO	Samoa Umbrella for Non- Government Organisation
Mr Ronnie Posini	Lecturer Engineering	NUS
Ms Flavia Vaai	Energy and Policy Officer	Ministry of Finance
Mr Sione Foliaki	ACEO Energy and Policy Planning	Ministry of Finance
Mr Tunai O Moli	Technical Lecturer	Don Bosco Training Centre
Ms Easter M Silipa	Qualification Officer	Samoa Qualification Authority (SQA)
Ms Kovi Aiolupoteas	Qualifications Officer	SQA
MsTepora Wright	Qualification Officer	SQA
Mr La Leaana	Education Trainer	Ministry Of Education Sports & Culture
Mr jonathan Yoshida	Renewable Energy Officer	Ministry of Natural resources and Environment
Mr Leutufia Fatu	Lecturer Marine	NUS
Mr Le Mamea Sia Matalavea	USP IT Manager	USP ALAFUA Campus
Mr Ulisese Tapuvae	Health Officer	Samoa Family Health Association
Ms Ilia Likai	Reporter	Samoa Observer Newspaper
Ms Pai Mulitalo Ale	Climate Change Reporter	Samoa Observer Newspaper
Mr Douglas Tomane	Energy Officer	Electric Power Corporation
Mr Dominic Misiolo Sofe	Foreign Affairs Officer	Ministry Foreign Affairs and Trade(MFAT)
Ms Faapito Opetaia	Community Trainer	SUNGO
Ms Leatuaolevao Ruby Vaa	Director	USP Alafua Campus
Mr Opapo Arona	Art instructor	Leulumoega Fou Arts School
Mr Solomona Chaoshing	Student	Leulumoega Fou Arts School
Ms Liai Siitia	Health Officer	Samoa Family Health Association
Ms Lealofi Toleafoai	Art Instructor	Leulumoega Fou Art School

Appendix 2: Table of Course Providers and Courses

Course Provided	Duration	Award	Accrediting Agency	Level
National University of Samoa	**Contact: Ms. Peseta Talalelei Eseta Faafeu-Hope e.hope@nus.edu.ws**			
Postgraduate diploma in tertiary teaching for nurses and health professionals	1 Year	Diploma	Self-accrediting (NUS Senate)	Level 8
Postgraduate diploma in nursing	1 Year	Diploma	West Pacific Competency Standards	Level 8
Postgraduate certificate in pacific health leadership and management development	1 Semester	Certificate	West Pacific Competency Standards	Level 8
Degree of bachelor of technical and vocational education and training	3 Years	Diploma	Self-accrediting (NUS Senate)	Level 7
Bachelor of health science	3 Years	Diploma	Self-accrediting (NUS Senate)	Level 7
Diploma in radio and electronics	2 Years	Diploma	Self-accrediting (NUS Senate)	Level 4
Diploma in nursing	2 Years	Diploma	West Pacific Competency Standards	Level 4
Intermediate certificate in welding and metal fabrication	2 Years	Certificate	Self-accrediting (NUS Senate)	Level 2
Intermediate certificate in refrigeration and air conditioning	2 Years	Certificate	Self-accrediting (NUS Senate)	Level 2
Intermediate certificate in plumbing and sheet-metal	2 Years	Certificate	Self-accrediting (NUS Senate)	Level 2
Intermediate certificate in fitting and machining	2 Years	Certificate	Self-accrediting (NUS Senate)	Level 2
Intermediate certificate in electrical engineering	2 Years	Certificate	Self-accrediting (NUS Senate)	Level 2
Intermediate certificate in construction and joinery	2 Years	Certificate	Self-accrediting (NUS Senate)	Level 2
Intermediate certificate in automotive engineering	2 Years	Certificate	Self-accrediting (NUS Senate)	Level 2
Certificate IV: master (class 5)	1 Semester	Certificate	International Standards/SQA	Level4
Certificate IV: marine engineer (class 5)	1 Semester	Certificate	International Standards/SQA	Level 4
Certificate III: able seafarer (engine)	1 Semester	Certificate	International Standards/SQA	Level 3
Certificate III: able seafarer (deck)	1 Semester	Certificate	International Standards/SQA	Level 3
Certificate II: maritime training	1 Year	Certificate	International Standards/SQA	Level 2
Certificate in tropical horticulture	1 Year	Certificate	Self-accrediting (NUS Senate)	Level 2
Certificate in panel-beating and spray painting	1 Year	Certificate	Self-accrediting (NUS Senate)	Level 2
Certificate of attainment: trades and health preparatory year	1 Year	Certificate	Self-accrediting (NUS Senate)	Level 1

Course Provided	Duration	Award	Accrediting Agency	Level
Don Bosco Technical Center			**Contact: Father Chris Ford cfordb@gmail.com**	
Certificate in Welding	2 Years	Certificate	Self-accrediting	Level I
Certificate in motor mechanics	2 Years	Certificate	Self-accrediting	Level I
Certificate in Woodwork	2 Years	Certificate	Self-accrediting	Level I
Certificate in Electronics	2 Years	Certificate	Self-accrediting	Level I
Certificate in Plumbing	2 Years	Certificate	Self-accrediting	Level I

Course Provided	Duration	Award	Accrediting Agency	Level
Methodist Technical and Creative Center			**Contact: Rev Uale Misifosa Secretary.mboe@samoaonline.ws**	
Certificate in Automotive Mechanics	2 Years	Certificate	SQA	Level I
Certificate in Electrical Engineering	2 Years	Certificate	SQA	Level I
Certificate in Moulding and Fabrication	2 Years	Certificate	SQA	Level I
Certificate in Food and Textile Technology	2 Years	Certificate	Self-accrediting	Level I
Certificate in Computer Studies	2 Years	Certificate	Self-accrediting	Level I
Certificate in Fine Arts	2 Years	Certificate	Self-accrediting	Level I
Certificate in Carpentry	2 Years	Certificate	Self-accrediting	Level I
Certificate in Joinery	2 Years	Certificate	Self-accrediting	Level I

Training Providers

Table TP1 provides information on the two training institutes identified in the desktop study. Based on his experience with the VOCTEC project, GSES project team member Mr Gavin Pereira completed the survey form on behalf of the National University of Samoa (NUS). This was sent to them for confirmation and, although they acknowledged receipt of e-mail, they did not respond directly to confirm the information in the survey. The NUS capabilities as estimated by Mr Pereira shown in Table TP2.

Table TP1: Training Institutes Identified in Samoa

Institute	Contact	Position	E-mail	Phone
National University of Samoa	Dr. Emma Kruse Va'ai	Deputy Vice Chancellor	e.krusevaai@nus.edu.ws	(685)21428
APTC Samoa Campus			enquiries.samoa@aptc.edu.au	685 26844 Fax +685 26871

Table TP2: NUS Capabilities as estimated by Gavin Pereira

Does your TVET have any department that could conduct any of the following types of courses	Yes or No?	If Yes, please state which department	Contact Person	Contact E-mail
Renewable Energy Technologies?	Yes	Engineering Department, Faculty of Applied Sciences	James Ah Fook	j.ahfook@nus.edu.ws
Grid Connect PV Systems?	Yes	Engineering Department, Faculty of Applied Sciences	James Ah Fook	j.ahfook@nus.edu.ws
Off Grid PV Systems?	Yes	Engineering Department, Faculty of Applied Sciences	James Ah Fook	j.ahfook@nus.edu.ws
Solar Hot water?	Yes	Engineering Department, Faculty of	James Ah Fook	j.ahfook@nus.edu.ws

		Applied Sciences		
Wind Power Systems?	Yes	Engineering Department, Faculty of Applied Sciences	James Ah Fook	j.ahfook@nus.edu.ws
Hydropower?	Yes	Engineering Department, Faculty of Applied Sciences	James Ah Fook	j.ahfook@nus.edu.ws
Micro-Hydro Power?	Yes	Engineering Department, Faculty of Applied Sciences	James Ah Fook	j.ahfook@nus.edu.ws
Biomass?	Yes	Engineering Department, Faculty of Applied Sciences	James Ah Fook	j.ahfook@nus.edu.ws
Biogas?	Yes	Engineering Department, Faculty of Applied Sciences	James Ah Fook	j.ahfook@nus.edu.ws
Geothermal	??	Engineering Department, Faculty of Applied Sciences	James Ah Fook	j.ahfook@nus.edu.ws
Others technologies?	Yes	Engineering Department, Faculty of Applied Sciences	James Ah Fook	j.ahfook@nus.edu.ws
Energy Efficiency?	Yes	Engineering Department, Faculty of Applied Sciences	James Ah Fook	j.ahfook@nus.edu.ws
Refrigeration?	Yes	Engineering Department, Faculty of Applied Sciences	James Ah Fook	j.ahfook@nus.edu.ws
Air-conditioning?	Yes	Engineering Department, Faculty of Applied Sciences	James Ah Fook	j.ahfook@nus.edu.ws
Electrical wiring?	Yes	Engineering Department, Faculty of Applied Sciences	James Ah Fook	j.ahfook@nus.edu.ws
Efficient land and water transport systems?		Engineering Department, Faculty of Applied Sciences	James Ah Fook	j.ahfook@nus.edu.ws

Energy sector planning and management?		No		

During the VOCTEC project, one of the trainers from NUS was trained to conduct off-grid solar training courses. Details are provided in Table TP3.

Table TP3: Trainers trained under VOCTEC project

Institution	Name of Trainer	Contact Number	Email	Course Type	Date Trained
National University of Samoa	James Ah Fook	Use Institution Contact	j.ahfook@nus.edu.ws	Small Off Grid PV systems	Jan-14

From the experience of the project team and from survey response, 5 courses were identified as being conducted in Samoa in the last 5 years. Information on the courses is contained in Appendix 11.

In Summary these included:

- Design and Install Grid connect PV Systems
- VOCTEC Technician Course
- Household energy survey training for surveyors and power utility staff- Part of 3 year program 2012-2015 The Pacific Appliance Labelling and Standards Program (PALS)
- ADB/GEF/Australia Promoting Energy Efficiency in the Pacific (phase 2)
- RAC

The grid connect PV course was conducted by GSES, a company which is a Registered Training Organisation in Australia. Those who passed are eligible to apply for industry certification under the Pacific Power Association (PPA) and Sustainable Energy Association of Pacific Islands (SEIAPI) certification and accreditation program.

The VOCTEC course had the intention of capacity building.

Pacific Community
Communauté du Pacifique

EUROPEAN UNION

USP
THE UNIVERSITY OF THE SOUTH PACIFIC

EU PacTVET

European Union Pacific Technical and Vocational Education and Training on Sustainable Energy and Climate Change Adaptation Project

Solomon Islands Training Needs and Gap Analysis

Prepared by Helene Jacot des Combes
EU-PacTVET Senior Lecturer August 2015

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1. Background

The European Union funded Pacific Technical, Vocational Education and Training (EU-PacTVET) is a project under the broader Adaptation to Climate Change and Sustainable Energy Programme (ACSE). It is component three (3) of this ACSE Programme.

It is of practical evidence that climate change is affecting the livelihoods of the Pacific Island communities in varying degree of adversity. These practical evidence are community-based assertion that take into account comparative measures of the present and past scenarios on various physical aspects, such as coastal line erosion and introduction of pest due to warming of cooler regions in the mountainous islands, to name a few.

Current total global greenhouse gas (GHG) emission stands at 36.9 gigatonnes of CO2 (GgtCO2). Of this global GHG emission, Pacific Islanders countries emit less than 0.03% yet they are amongst the most vulnerable to adverse effects of climate change since they are the first to be exposed and the least able to respond. Hence there is a moral obligation for the islands countries to start implementing measures in mitigating GHG. Down to the national level, Solomon Islands' annual GHG emission is more than 540 kilo-tonnes CO2, which on a global scale, is insignificant.

In spite of efforts to reduce Pacific ACP (P-ACP) countries reliance on fossil fuels and improve energy security, almost all Pacific Island countries are almost 100% dependent on imported petroleum products for energy generation and transportation, which are the two major petroleum consumption sectors in the region.

With the Pacific Island countries facing challenges pose by climate change and energy security, sustainable energy and climate change adaptation are undeniably ranked above all other sectors in the regional Governments priorities, as evident through regionally endorsed frameworks, such as the wider Pacific Plan and the more specific Pacific Islands Framework Action on Climate Change (PIFACC) and the Framework Action on Energy Security in the Pacific (FAESP) and individual national policies.

Efforts in addressing energy security and climate change adaptation challenges are ongoing through various regional and national projects. On climate change mitigation, there are some familiar project such as the Pacific Islands Greenhouse gas Abatement through Renewable Energy Project (PIGGAREP) that addresses mitigation and Pacific Adaptation to climate change (PACC) that focused on climate change adaptation. The PIGGAREP was focussing on complementing PICs initiatives in promoting the widespread use of renewable energy in the regions and PACC focuses its project on three thematic areas, namely, "Food security"; "Water Security" and "Coastal Management". This project focusses on assisting communities to implement activities that help them in these three areas.

Sustenance of such projects on mitigation and adaptation is very important. Now that these projects are coming to their end, it is important that knowledge and skills being acquired and/or hardware that were put in place continue to function and be beneficial to the targeted beneficiaries. Not only on the renewable energy side, but on the overall energy scene, where there are needs to be able to understand energy efficiency and conservation and what measures needs to be taken to use energy in a sustainable manner as compared to energy misuse and wastages.

Knowledge and skills on agricultural and fisheries best practices and other innovative approaches in addressing food security, water security and measures to reduction of vulnerability to disaster needs to be well established in rural and urban communities alike. Such knowledge and skills can only be acquired through strategic and systematic approaches such as capacity building which target the rural majority of the pacific island countries, especially in the Melanesian countries, and Solomon Islands is no exception. Such capacity building needs to be targeted at levels and strategic training providers within the countries that would have real impact to the rural communities and other level of communities.

Solomon Islands has a population of 515,870 (2009 Census) and about 85% of this population are rural and remote community dwellers, practising subsistence farming and have been using biomass for their energy needs, hence for livelihood sustenance. To further enhance their livelihood, knowledge and skills in agricultural and fishing best practices and energy security, including energy efficiency and conservation, needs to be passed on to community youth drop-outs that comprises of the majority of the population.

The purpose of the in-country-mission is to assess or more fittingly map out the baseline of the Technical, Vocational Education and Training (TVET) providers, including the rural training centres (RTCs) and the community-based learning centres (CBLC), in the country, by identifying these TVET or RTCs and what courses they provide, along with the awards given after completion of each programme.

2. Schedule of Consultation Events

Day 1:
The opening of the Consultative Workshop was done by H.E. Leonidas Tezapsidis (European Union Ambassador to the Solomon Islands). Even though not many stakeholders were present during the opening, the core of the consultation meeting was a success, because stakeholders were consulted either in the workshop, one-to one meetings or phone calls.

2.1. Project Outline and Presentation

After the opening, an outline of the EU-PACTVET was made, with emphasis on the following aspect of the project:

a. Rationale - current scenario with regards to sustainable energy (SE) and climate change adaptation (CCA) in the P-ACPs and the issues emanating from those scenarios. It was focussed down to the case of Solomon Islands, where there a lot of dependency on fossil fuel for power production and transportation. On the climate change side of the coin, the P-ACPs are more vulnerable to climate change, but have the least capacity to respond to these.
b. How the EU responded to these issues and the approach it took by focussing on building the capacity and empowering the capacities through benchmarking and the aim of setting standards of competencies and accreditation.
c. The objective and the purpose were state as being taken to try and address the issues
d. The Key Result Area (KRA). Each of the 4 KRAs were outline and it was made know to the stakeholders that one of the activities under KRA 1 is this in-country-assistance on consultative workshop and one-on-one consultation to do a training needs and gaps analysis (TNGA). Activities that need to be conducted in the hope of achieving each of these KRAs were briefly outlined.
e. A brief overview of the budget. This was to give the stakeholders a glimpse of the allocation from the €6.1 million
f. And finally, it was emphasised that the consultations are important in that the Solomon Islands (stakeholders) need to identify it needs so that they could be noted as one of the activities that needs support. It was noted that an activity under Component 1 was seen as an activity that Component 3 would be able to complement Component 1 supporting. The Energy Division was told to identify aspects within the requirements that Component 3 can support.

2.2. Stakeholders' Functions Outlines.

The Project outlining was followed by brief presentation from each of the stakeholders on the topic "Aspects of each Sector relating to Sustainable Energy and Climate Change – capacity and technical expertise on demand by industries and communities but lacking from the supply side". This was purposely to establish the baseline as to what each of the sectors are engaged in and how does each of these sectors are affected by climate change and how sustainable energy practices are being part of their sectoral policies.

The training needs and gaps identified would be outlined in the latter sections, but outline below is the summary of the different sector's functions and relationships with SE and CCA

<u>Energy</u>

The Energy Division of the Ministry of Mines Energy and Rural Electrification (MMERE) is responsible for Energy Policy, renewable energy (RE) resources development and renewable energy project implementation in the Solomon Islands. The Energy Division's role is quite extensive but the funding to match such extensive role is inadequate, though funding was slowly improving in the past 6 to 7 years.

Currently the Solomon Islands National Energy Policy (SINEP), it's evident to note that the electricity production is virtually dependent on fossil fuel. The policy in its National Energy Strategic Action Plan (NESAP) encourages:

- The widespread use of RET/resources;
- Promotes energy efficiency for sustainable development.

Currently there is no separate Renewable Energy Policy for the Solomon Islands. Regardless of this, the Energy Division went ahead and implement RET in the country, under the banner of the SINEP and its NESAP.

Since 2008/2009 the rural electrification programme of the SIG started. This programme saw the installations of solar PV system in various rural community high schools, rural health centres and some rural communities in the provinces. These installations were followed by on the job training of possible/potential technicians who are expected to maintain the operation of the systems.

In term of fossil fuel, supply to the country, the two national oil suppliers, Markwarth Oil Limited and South Pacific Oil Limited (SPOL). The price of petroleum oil from these two oil companies is regulated by the Price Control Unit of the Ministry of Commerce, Labour and immigration.

The Electricity Act (Cap128) of 1969 gave exclusive right to the Solomon Islands Electricity Authority (SIEA) to generate, distribute and sell power to its customers in Honiara and other provincial head centre in the Solomon Islands. The Act limits power production, distribution and sale by other entities. Currently SIEA have limited the capacity venture into RET. This capacity restriction was borne from technical and financial limitations.

Renewable Energy in the Solomon Islands is picking up at an accelerated pace since the last 7 -10 years. In evident is the Solar PV for lighting. But the way it was progressing was not done in a sustainable way, despite efforts by the Energy Division to coordinate its widespread use. The issue at hand is that no strict standards were employed in the importation and installations of these RET.

Mini and micro hydropower potential in the Solomon Island was barely tapped. The rivers and streams in the country are still showing lively signs of producing electricity for rural use. Issue or constraints could be the limited number of power users, hence less return in investments. But there could be possible means to go able addressing such issues, which needs collaborative effort between government ministries and other bodies, when it comes to long term goal. There are a number of micro hydropower schemes that were installed

through donor funded project, mainly in the Western and Malaita Provinces of the Solomon Islands. These are mainly community-based and managed schemes micro-hydropower scheme. This is a snapshot of these schemes:

Community	Province	Capacity	Year	Donor	Comments
Malu'u	Malaita	32 kW	1986	NZ Gov't	Non-operating due to land dispute
Buala	Isabel	150 kW	1996	GIZ	Non-operational due to technical problems
Iriri	Western	10 kW	1983	UNIDO/APACE	Out of Service
Vavanga	Western	12 kW	1994	AusAid/APACE	Refurbished to an 8 kW
Ghatere	Western	12 kW	1994	AusAid/APACE	Out of service
Manawai	Malaita	50 kW	1997	China/SIG	Operating and refurbished by SIG in 2009
Nari'ao'a	Malaita	25 kW	2004	China	Operating
Raeao	Malaita	25 kW	2002	China	Operating
Bulelavata	Western	29 kW	1999	AusAID	Operating

Source: Pacific Lighthouses - Renewable Energy opportunities and Challenges in the Pacific Island region, Solomon Islands Report

Energy Conservation and efficiency practices can be seen as means to adapt to the adverse effect of climate change in the urban and rural communities in the Solomon Islands.
Ozone depleting substances (ODS) handling and reporting in accordance to the Montreal Protocol – Greenhouse Gas (GHG) emission and Ozone depleting substances is an ongoing programme implemented by the energy Division, where data from various industries and Government Ministries were collected and compiled to be reported.

Climate Change

In the Solomon Island, there are very small changes in temperature from one season to another (with its only two distinct seasons – wet and dry seasons) and temperatures throughout the year is fairly constant. Such temperatures are strongly influenced by changes in the surrounding ocean temperature. The two seasons that is referred to in here are the wet season from November to April and a dry season from May to October.

An understanding of the climate and the changes in climate is crucial to the very survival of the people in the Solomon Islands (and the Pacific as a whole)

The annual maximum and minimum temperatures for Honiara had increased since the 1951. The maximum temperature had increased by 0.15^{0}C per decade since 1951, which are global-pattern consistent. Increase in temperature in usually cooler region of the islands mean introduction of pest (animal or plant) that could the agricultural productivity.

There is a show of substantial variation in rainfall from year to year for Honiara which clearly demonstrated no clear trend as alluded to earlier.

There is increase in sea level as warming of the sea continues on, giving rise to increased sea volume. Satellite data and tide gauges gave indications that the sea level in the Solomon Islands had risen by 8 mm per year since 1993. This is larger than the global average of 2.8 –

3.6 mm per year. Such scenario could be partly due to the ENSO. It is predicted that this trend will continue with sea level rising to 4-15 cm under high CO2 emission scenario[1].

The ocean as one of the major sinks for CO2 can absorb one quarter of carbon dioxide emitted through human activities. More CO2 absorption creates an imbalance of the oceans pH level. The ocean tends to be more acidic. Correspondingly, sea dwelling creature and the reef ecosystems will experience the imbalance and their survival is at stake. The level of acidity of the ocean is predicted to continue to rise, by three different CO2 emission scenarios.

Adverse effects of climate change would need to be known and understood so that any adaptation strategies or measures can be effective.

Changes in the climate and weather patterns affect the production and consumption pattern of energy. Wide-spread understanding on this is important as measure or strategic approaches can be taken to minimize energy losses and be able to meet the energy demand of the population in the Solomon Islands.

Ministry of Education and Human Resources Development – TVET Division

The vision of the TVET Division is to mainstream TVET as a vehicle for empowering Solomon Islanders, especially the youth, for sustainable livelihoods and also the socio-economic development of the nation. And the overall goal of the Division is to promote skills acquisition through competency-based training with proficiency testing for empowerment, sustainable livelihoods and responsible citizenship.

Through skill acquisition, TVET graduates would be able to understand that energy is the power to economic development. How to use energy efficiently and to conserve it needs to be mainstreamed into the courses taught at the TVETs and the vocational training centres or the Rural Training Centre in the Solomon Islands. The emphasis must be on how to be able to use different forms of energy in a sustainable way to achieve sustainable development and sustainable livelihood.

TVET management and administration is crucial to the overall goal of technical skills acquisition. It was stated in the Education Strategy Framework that TVET in the Solomon Islands is weak. Such weakness could be addressed by integrating TVET more firmly with the formal education system. Also, interventions like the AusAid funded project called "Financing TVET in the Pacific", could also address such weaknesses. It is purposely to identify TVET financing issues across the region and options to make future funding more efficient and effective at both national and regional levels. This demonstrated that both the instructors' technical knowledge and the TVET financial management need strengthening to achieve the overall goal.

[1] Pacific Climate Change Science – Current and Future Climate of the Solomon Islands

Climate change is a cross-cutting issue and of course it does affect the education sector in many ways. It is pivotal in the way we make decisions regarding educational matters, including course designing; teacher training; teaching facilities and the requirements from parents and the employers.

Incorporating climate change into the primary and secondary curriculum would see a more basic-climate literate early schooling pool of children that when they move up to the higher education and TVET level, their mind-sets have the baseline that would be easier to introduce climate change issues to.

Agriculture

Agriculture is regarded as the main driver of the Solomon Islands' economy, along with fisheries. Not only that, but for the 85% of the Solomon Islands population in the rural communities, subsistence agriculture is sustaining their day to day livelihood. Whether those agricultural practices are best/sustainable practices or not, it's a matter of having to secure food for tomorrow, or go hungry.

On a subsistence agriculture, the use of energy is not significant as it is not on a commercial level where machineries and other equipment are required. Regardless of that, subsistence agriculture still employs the traditional method of "slash and burn", where the burning of foliage as means of clearing the land for cultivation.

Energy from biomass (foliage) in this case of slash and burn is being wasted, as there is no point in harnessing it, as it not practical to do so. Other agricultural wastes such as livestock manure can be utilised for biogas production for cooking and lightings. This can be used in large commercial farms as means to supplement the farm's energy requirements.

The Ministry of Agriculture and Livestock in the Solomon Islands aim to promote best agricultural best practices in the rural community and means to enhance economic development and rural livelihood.

Changes in the weather and climate pattern will surely affect agriculture, in term of crop yield and new crop pests. This will affect the methods of farming, whether it is subsistence or commercial. That is to say that the adverse effects of climate change is prompting human beings, including Solomon Islanders to seek alternative methods that can still provide the same amount of food crop before the adverse effects of climate change – hence addressing the issue of food security.

In low lying atolls of the outer Islands in the Solomon Islands, saltwater intrusion into areas allocated for planting crops is causing secondary issues such as reliance on manufactured goods, resulting in lifestyle diseases such as diabetes and hypertension. To mitigate this, planting root crops or other "green-trees" for cabbage that can withstand the salinity or the brackish nature of the soil needs to be explored and promoted. Mitigating the problem

presented by low capacity of food crops productivity in these low lying coastal communities and atolls, in a nutshell can be seen as means to adapt to the adverse effects cause by the changes in climate. Revisiting 'greens-trees' used for food by our ancestors needs to be promoted, because these are not vines or shrubs but trees, which can withstand strong cyclonic winds – so they cannot be destroyed completely

These trees and others that bear fruits to be raised in a 'tree-bank' for safe-keeping, in case of a chance that some natural disasters might damage them to a point that none is left for replanting.

Fisheries

The Fishing sector in the Solomon Islands is also one of the main revenue earners for the country. The Solomon Islands exclusive economic zone (EEZ) is one of the richest fishing grounds for tuna in the Pacific region. Licensed foreign fishing boats from Japan, South Korea, People Republic of China, Republic of China (Taiwan) and the United States of America (USA) are earning foreign currency for the Solomon Islands, through payment of fishing rights.

The Ministry of Fisheries and Marine Resources (MFMR) is mandated to ensure that the harvesting practices of all marine resources are properly coordinated and monitored to ensure that certain resources are not depleted unnecessarily. It also coordinates the commercial harvesting of its sea resources to maximize incomes at a sustainable rate. The Ministry also strive to improve current fishing facilities to encourage local fishermen to effectively preserve and market their fish and other perishable marine products and.

The Tri-Marine Fishing Company, formerly known as National Fisheries Development, is a fishing company catching tuna for processing or loin export. The other one is the Solomon Fishing and Tuna Processing Company. These two companies are based in Noro town in the Western Province of the Solomon Islands and are employing a good number of men and women in the other provinces of the Solomon Islands and the nearby communities if Noro and Munda

Ocean poses a significantly large amount of secondary energy primarily from the sun. The ocean's energy can be harnessed through OTEC (Ocean Thermal Energy Conversion) that employs the differences in temperature down the depth of the ocean; ocean waves and tidal currents. In the Pacific region, these forms of renewable energy technologies (RETs) are yet to be economically proven to be viable. Technologically, they would work, but with the very small scales of the islands' economy to operate and maintain such RETs.

On the fisheries industry, operations and maintenance consumes significantly large amount of energy. Utilizing energy in a sustainable manner means methods or technics employed to fish must be effective and that safety measures must be taken into account when fishing operations are done.

Ocean is the largest CO2 sink. The Solomon Islands exclusive economic zone (EEZ) covers a total area of 1,632,964 km^2, and this much ocean surface is acting as the natural sink for CO2. CO2 is being absorbed by the ocean via the physicochemical and biological processes. In the Solomon Islands, slow increase in ocean acidification since the 18^{th} century[2], is slowly impacting on the coral reefs and the fish and other marine resources used as food (source of protein).

It was recorded for the Solomon Islands that the sea level-rise by 8 mm per year[3]. This is more than the global average. Low lying coastal areas are vulnerable and saltwater intrusion and inundation can happen, resulting in loss of properties and food crop. Coastal erosion can result in washing away of breeding grounds for fish and seashells. Coral bleaching due to increased ocean acidification – hence depletion of coral reef-fish species and other marine lives

School of Technology and Maritime Studies (STMS)

This school encompasses two institutions – he Institute of Technology, formerly the School of Industrial Development (SID) under the then Solomon Islands College of Higher Education (SICHE), and the Institute of Maritime Studies, formerly the school of Marine and Fisheries Studies. These two institutions had now come under one school. The Solomon Islands National University (SINU) was formally established under the Parliament Act 2013. The Institute of Technology conduct Apprentice Trade Course in that are taught in sandwich mode for a total of 4 years, plus short courses on small 2-stroke engines

The School also offers short Course on Solar PV Systems Designing and installation, outboard motors operation and maintenance and other 2-stroke engines maintenances. Currently these short courses are put on halt in response to an advice from the Pro-Vice Chancellor, because there needs to be proper facilities in place to coordinate and conduct such short courses

All of the courses offered by the School of Technology are competence-based hence there are practical components where students do a total of two years theory at the school and another two year practical at workplaces

The idea of mainstreaming sustainable energy into the existing trade courses at the school needs to be adopted and strengthened to include other trade course listed above. Mainstreaming of Climate Change aspects into the Core Courses such as Building Studies and Surveying is a way forward in getting climate change aspects studied alongside core courses.

[2, 3] Pacific Climate Change Science Program: Current and the Future Climate of the Solomon Islands

The Institute of Maritime Studies is the smallest institution within SINU, in terms of campus size and students enrolment per duration of a course. The Institute conduct course for seafarers and Fishing Technics. For the Cadets, the highest level of the competency award offered is Master Class 4.

Sustainable utilisation of energy in maritime and sustainable sea transportation can only be attained in practical term through keeping and applying high level of safety on board the ships. Apart from that the use of renewable energy to power lightings and electronics on board is the only way to use energy in a sustainable manner. Propulsion must be left for diesel only. It is a requirement by the International Maritime Organisation (IMO) that everyone working on board any ship registered in any country must undergo safety training. Only when all aspect of the operation on board, including the marine engineering and navigation, are up to the required level of safety, that sustainable sea transportation can be achieved

School of Natural Resources and Applied Science (SINU - SNRAS)

The School of Natural Resources and Applied Science aims to provide quality education and training to all to be able to utilize their natural resources in a sustainable manner.

The use of agricultural waste (livestock manure and biomass) to produce biogas can be used for cooking and fuel for power generation. This is an example of using energy from natural resources to cook food and generate power for household use.

Mainstreaming RE into the Certificate in Environmental Science Course and upgrading the Certificate programme to a Diploma in Environmental Science is on the planning agenda of the school.

The school offer courses in Certificate and Diploma in Tropical Agriculture; Certificate in Environmental Science and Certificate and Diploma in Forestry.

Mainstreaming Climate Change into the various courses in the School, including Certificate/Diploma in Tropical Agriculture and Certificate in Forestry would be a way forward in trying to mould and give a clear picture that climate change would be affecting agriculture, forestry and water in various ways so there is a need to have student understand how, why and what measures needs to be taken.

School of Education and Humanities (SINU)

The School had been offering Certificate in Teaching (Primary), Diploma in Teaching (Secondary) and had recently introduced Bachelor of Teaching (Secondary) for pre-service and in-service teachers who had been in the field for 10 or more years in areas of Early Childhood and Primary teaching.

The Schools aims to produce quality teachers who would be able to prepare children at the early ages (Primary schools) and mould them through the secondary school system, preparing them for post-secondary education that could be university or TVET. If sustainable use of energy and climate change are in-built into the School of Education and Humanities various programmes, teachers in secondary and primary are well equipped to talk 'sustainable energy' and 'climate change matter's, and would be able to pass on the same knowledge

Since the school is aimed at training of primary and secondary school teachers, the following could be considered:

- Mainstreaming sustainable energy, including RE and Climate change, into Diploma in Science Education Curriculum
- Mainstreaming sustainable energy including RE and Climate Change into Certificate in Primary Teaching Curriculum
- Mainstreaming of RE and climate change into Diploma in Social studies Curriculum
- Mainstreaming of RE and climate change into Diploma of Home Economic studies Curriculum

Solomon Islands Curriculum Development Division (SI-CDD)

Mainstreaming Sustainable Energy (including RE) and climate change into the SI Primary and Secondary Curriculum is seen as means to strengthen the TVET delivery. Nevertheless it is strongly felt that doing a survey within the various industries will give us a clear picture of actual needs, rather than putting forward assumption.

Disaster Management

There is a need for a sustainable consumption or utilisation of different forms of energy, so that energy is available for consumption during times of natural disaster.

The following are the goals for the National Disaster Management Office (NDMO) which will drive its focus and Work Plan. They reflect its immediate development needs to progress its Mission and move towards its Vision. The objectives and actions which follow reflect its core functions, challenges and priorities.

- The institutional frameworks of the National Disaster Risk Management Plan (DRM) Plan 2009 (N-DRM Plan) are supported by government and partners and are delivering credible DRM policy and Disaster Risk Reduction (DRR) outcomes;
- The operational arrangements for DRM are effectively addressing the impacts and operational demands of disaster events at the national, provincial and village levels;
- Disaster awareness programmes are reaching the population of Solomon Islands and village disaster risk programmes are leading to an expanding network of safe sustainable resilient villages across the Provinces;
- The NDMO has the skills and corporate and administration systems to effectively deliver on its functions.

Whilst the NDMO is doing a great task in disaster awareness programmes in the communities, a community-based DRR programme could aligned to the rural training centres (RTCs) to be incorporated into the subjects taught at these RTCs.

Forestry

The forest holds the feedstock for biomass for renewable energy production. Sustainable use of the forest resources will ensure future biomass feedstock availability.

It is known that deforestation and forest degradation release significant amounts of greenhouse gas to the atmosphere contributing to climate change. Many of the emissions from forestry and land use change activities come from developing countries. This led international policy makers, under the United Nations Framework Convention on Climate Change (UNFCCC), to design a global mechanism to provide positive incentive to developing countries to reward their effort to reduce emission from forestry and for enhancing and sustainably managing their forests. The mechanism is the REDD+ (Reducing Emissions from Deforestation and Forest Degradation+). The following activities are expected to be implemented:

- Reducing emissions from deforestation
- Reducing emission from forest degradation
- Conservation of forest carbon stock
- Sustainable Management of Forest
- Enhancement of forest carbon stock

When implementing these activities countries have to adhere to set UNFCCC guidelines.

Solomon Islands Chamber of Commerce and Industries

The Solomon Islands Chamber of Commerce and Industry (SICCI) is the peak representative organisation for the private sector in Solomon Islands.

SICCI currently has over 190 members as well as a number of affiliations to other national private sector organisations, covering approximately 80% of the Solomon Islands private sector workforce. SICCI continues to be a strong advocate of private sector interests – for both small and large companies alike; and aims to work constructively with the government, the Solomon Islands community and international donor organisations.

SICCI is driven by its vision for the Solomon Islands, its own mission and the values which govern the way it goes about its work to promote sustainable development in the Solomon Islands, but enhancing the sustainable use of energy which is seen the main driver of the business/private sector

SICCI would also want to see it members adopting business utilizing sustainable means to help promote sustainable development. Businesses should be adopting a green policy in their operation. This promotes sustainable development.

Amcor Electrical Company

Amcor is a private electrical and refrigeration/Air-conditioning Company. Task carry out are household electrical wirings (including solar PV installation), refrigerator repairs and air-conditioning repair and installations.

Managing Director of Amcor is the Interim President of Solomon Islands Refrigeration and Air-conditioning Committee (SIRAC), which was established under the Energy Division of the Solomon Islands. One of the ideas is to license qualified refrigeration and Air-conditioning technician to handle Ozone Depleting Substances (ODS) gases and established a refrigeration and Air Conditioning regulatory body that issue licenses only to competent refrigeration and air conditioning technicians. Front-liners like Customs and Excise could be training with ODS handling because they are front-liners at the ports of entry.

Willies Electrical

Willies do design; supply; training; installation and carry out back-up services of renewable energy projects. Its main focus is on solar PV – mainly stand along systems.

Willies is also trying to promote sustainable livelihood in the rural communities through the use of solar PV. Replacing kerosene lamps with solar PV is in itself enhancing. communities to adapt to climate change.

National Trade Testing and Training Unit

There is importance of having a regulatory institution that regulates the automotive and electrical industry. The National Trade Testing and Training Unit (NTTTU) is a body under the Ministry of Commerce and Labour.

Its function links to the labour market since the NTTTU must ensure that there automotive and electrical trade people that meet a set competency standard to be able to be employed by the automotive and electrical trades industries and be able to perform to meet those industries requirements.

The National Trade Testing and Training Unit (NTTTU) with its capacity to regulate automotive and electrical trades, though does not directly have functional relation to climate change, its area of concern do somehow translates to the climate change.

In dealing with electrical wiring and automotive, tradesperson who is competent in electrical trade would be able to install, operate and maintain solar PV systems in a rural or remote community. Having a solar PV to provide modern lighting not only amounts to

efforts in mitigating climate change but the provision of modern lighting to replace kerosene is in itself means to adapting to climate change.

Labour

The Labour Division is mandated to oversee the Labour Market in the country. That is to say that it coordinates the labour market to see if it can meet the workplace demand for skilled labour.

With regards to sustainable Energy, the Labour Division has a stake by coordinating with other relevant government departments the requirement to meet the demand from the industries on skilled labour that have knowledge and skills that would promote and progress efficient use of energy sources in work places. Skilled work force that can meet the requirement of the public and the private sector is of paramount important.

In Climate change, as it is a cross-cutting sector, the understanding of climate change and how its adverse effects are affecting the different sectors in the country is of paramount important. A labour market that has such knowledge is very important since policies and action plans relating to all the different sectors within the government are well covered with climate change issues. This could be on Climate Change awareness, including capacity building and adaptation measure. Information is power so people in all works of life need to be well informed of the knowledge about climate change including the challenges it poses to the physical and the social environment.

Don Bosco Technical, Vocational Education and Training Centre

As a bigger provider of TVET in the country, following SINU, Don Bosco can be seen as providing the link from the Rural Training Centres (RTCs) to the Schools in SINU or even the industries.

Don Bosco has 6 departments and offers vocational courses in the following areas:

i. Electrical
ii. Machine & Fitting Welding/Fabrication
iii. Life Skills (Agriculture; Business and other life skills courses)
iv. Carpentry
v. Automotive
vi. Information Technology

Electrical trade, Machine & Fitting, Welding/fabrication, Carpentry and Automotive, when there is element of energy conservation and efficiency moulded within each of these courses should be sufficient to promote sustainable use of energy within these industries.

Life Skills course such as Agriculture, Fisheries, and Small Business Operation and Management, teaches students the basic necessities in agriculture, fishing and business so that student when going out to work would be able to apply or transfer such skills to others.

They could be self-employed by doing small scale farming using sustainable farming practices and selling produces to earning money

Climate Change concepts are mainstreamed into the core course. This approach is seen as effective since the concepts in the core course will have some climate bearing to them so it would be give a clear picture of how climate change relates to a particular topic or area within a particular Unit or course.

USP- PaCE- SD

The Global Climate Change Alliance (GCCA) programme at USP in the Solomon Islands as coordinated under University of the South Pacific's Pacific Centre for Environment and Sustainable Development (USP PaCE-SD) has been overseeing community based project in the rural and remote communities in the Solomon Islands.

These projects are mainly in the water and agriculture sectors. An example of one rural community-based project is on water security and accessibility in the islands of Santa Catalina. Since it's a small coral raise island, supply of water is only through dug-out wells. Water security and access was being of concern so having some form of renewable energy to pump water to a storage tank is the approach to respond to the issue at hand.

Promoting life skills in communities as pillars to adapting to climate change is of paramount importance to the project. The project being implemented in the various communities are in their own right measures taken to equip the communities to be able to be resilient o the adverse effects of climate change.

Solomon Island Electricity Authority

The Solomon Islands Electricity Authority (SIEA) is a State-Own Enterprise (SOE). SIEA under the Electricity Act of 1969 became a state-owned-enterprise (SOE). It is mandated to generate, transmit, distribute and sell electricity throughout the Solomon Islands whilst providing a safe, reliable and affordable supply of electricity to meet the demands of its customers.

SIEA headquarter is in Honiara and its outstations are in Auki, Gizo, Buala, Noro, Munda, Tulagi, Malu'u, KiraKira and Lata.

In generating, transmitting and distributing electricity it has to do so in a more sustainable manner. Hence on the supply-side, clean fuel usage must be adhered to; efficient power generators needs to be used and efficient transformers be employed.

On the demand-side, the transmission losses must be minimised. Within the customers' household measures must be taken so that tampering with cash-power billing meter and other electricity billing meters be minimised or eliminated fully. SIEA is the only power

producer/generator in the country. The SIEA has a Board which is appointed by the Government and the Board.

Day 2:
A plenary session followed the presentation on "Training Needs and Gaps Analysis". The Plenary Session's topic is "*Creating National and Regional capacity and technical expertise to respond to CCA and SE challenges"*
An actual Training Needs and Gaps Analysis was done after the plenary session discussion. Discussion of the Plenary Session and the TNGA are outlined in Section 6.

A plenary Session: Topic, "*Creating National and Regional capacity and technical expertise to respond to CCA and SE challenges*"

Panelist:
SICCI; SINU; Energy Division and TVET Division

3. Consultation Methodologies

In trying to maximise output various methods of consultation were employed in this in-country mission. Determining which methodology to use depend on various factors ranging from availability, distance and timing. The following are the methods employed to capture the required data during the in-country mission:

3.1. Consultative Workshop/Meeting (TNGA)

A consultative workshop is a consultation with stakeholders in a venue where the agendum for discussion or consultation is done for all at once. This was the methodology employed for the first two days during this in-country mission. This methodology was employed because it used the forum to draw ideas and consolidates them.

3.2. One-to-one Consultations (Interview)

In a situation where stakeholders cannot make it to the consultative gatherings, due to other commitments, a one-to-one or face-to-face meeting or interviews are done. This was also employed where a number of stakeholders like the Permanent Secretaries for the Ministry of Environment Climate Change Disaster and Meteorology and the Ministry of Education and Human Resources Development cannot make it to the consultative workshop. Some members of the Interim Committee for Solomon Islands Refrigeration and Air-Conditioning SIRAC were also consulted through face-to-face which were more relevant since the agenda only warrants the presence of the members of a specific committee like the SIRAC.

3.3. Phone calls

In situations that thee stakeholders are busy (but virtually can respond to questions) and that I cannot make it due to travelling time constraints, as it was the case of Honiara, phone interviews is probably the best option. It is versatile because you can probe question at different angle and can ask supplementary or follow-up question.

3.4. Internet – Online

This was used for searching for further information or publication of Reports or Policies. Not only that but to confirm or double-check on information given.

3.5. Literature Review

This forms the basis for evaluative report of information found in the literature related to technical, vocational education and training with the subject of sustainable energy and climate change as the content. Various literatures were consulted, within the education, energy and climate change sectors, on policy frameworks and national action plans or development strategic plans. Most Policy frameworks (regional and national) were reviewed and those were used as the basis for consolidating future SE and CCA demands or needs in the Solomon Islands.

4. Solomon Islands' Concept Note – ACSE Component 1

Currently at the Institute of Technology of the SINU, the only accredited industrial tradesman courses are on electrical, mechanical, plumbing and carpentry tradesman disciplines. On the electrical trade side, the Solomon Island Electricity Act (Cap 128) gave right to the SIEA to regulate the electricity industry by issuing electrician's licenses to competent electricians (who had undergone the NTTTB competency test) to practice the trade in the country.

Refrigeration in the fishing industry and domestic homes and air-conditioning in large buildings saw the increasing services required from the refrigeration and air-conditioning industry. Despite this there are no accredited courses offered within the country to produce

qualified Refrigeration & Air-conditioning (RAC) technicians and likewise no licensing system for RAC technicians.. This warrants regulation of the sector

Recent influx of the solar technology into the country especially into our rural areas has involved under-qualified persons conduct unsafe wiring installations that resulted in serious accidents and poor operation & maintenance of systems that have rendered the solar systems malfunctioned well before their designed life-time is reached.

Most solar training courses conducted in the past in Solomon Islands were mostly on ad-hoc basis (provided through the Ministry of Mines, Energy & Rural Electrification) except for training provided by a private company (Willies Solar Power Company) to train its customers on basic operation & maintenance knowledge and solar technicians. The training provided by the private company was basically to fulfil the company's purpose of expanding its market into the rural areas. The SINU recently conducted a one-off solar training provided through the Vocational, Technical Education for Clean energy (VOCTEC). There is however no recognized accreditation system in place for qualified solar technicians that the Government would require in its future plans (currently in planning stage with the Asian Development Bank) to roll-out solar electrification in the rural areas on commercial-business terms .

The country's rural vocational training institutes do not run solar training courses. Recognizing this gap, the Ministry of Mines, Energy & Rural Electrification with financial assistance from the Government of Australia and the Asian Development Bank piloted a solar training for 20 village-based women technicians in West Are'Are constituency on Malaita earlier in 2014 to equip them with knowledge to maintain and service solar-home-systems installed under Pacific Environment Community (PEC) Fund in their district. Each woman was assisted to register a business name and the Ministry will contract these women as renewable energy service companies (RESCOs) to conduct servicing and maintenance of the installed solar home systems (SHSs).

The solar technical course is proposed to be developed with SINU with consideration given to resources provided under VOCTEC and SEIAPI (Sustainable Energy Industry Association of the Pacific Islands) to avoid duplication. The Project will also work closely with ACSE PacTVET (component 3).

4.1. Concept's Objective (s)

The objectives of this project are: i) have constant supply of qualified and licensed solar technicians available in the country over the coming years to provide the country with a pool of manpower for the Renewable Energy Services Company (RESCOs) Market to install, operate & maintain solar power stations for isolated mini-grids, main grid-connected solar farms and for servicing of individual solar-home-systems out in the remote rural areas of the country to maintain sustainability and consistent supply of power from solar energy; ii) have constant supply of qualified and licensed RAC technicians to effectively operate new RAC technology as the country phases-out use of hydrochloro-fluorocarbons (HCFC) refrigerants and adopt new environmentally sound and energy efficient technology within the country's refrigeration & air-conditioning industry.

The qualified and licensed solar technicians could be rural village-based women as experienced in our pilot solar training course conducted for women in West Are Are Constituency (Malaita province) to maintain solar-home-systems installed under PEC Fund in their district.

4.2. Concept's Expected project outcomes

The expected outcomes of the project are: i) qualified and well regulated manpower resource to install, operate and maintain solar systems; ii) qualified manpower within the refrigeration and air-conditioning industry; ii) creation of income-earning opportunities for Solomon Islands citizens; iv) protection of job markets for national citizens; v) effective regulation, monitoring and evaluation mechanism established for both solar industry and SIRAC industry; vi) monetary savings from energy efficiency applications in the SIRAC industry.

4.3. Concept's Target outputs

Targeted outputs are: i) Introduction of project to SINU, SIEA, SIRAC Industry stakeholders, RESCOs and signing of MoA completed; ii) conduct of study to determine the gaps and how to address the shortfall for both industries in terms of accredited training course and licensing mechanism; iii) conduct of consultation workshops; iv) develop course programmes at SINU for both trade disciplines together with appropriate accreditation system; v) develop and establish licensing system for practitioners in both solar technology and refrigeration & air-conditioning industry; vi) develop course materials for both course programmes for SINU.

4.4. Concept's Target group

The direct beneficiaries of the project are first intakes for the two course programmes, RESCOs, refrigeration & air-conditioning industry and SINU. Other beneficiaries include users of power generated from solar energy, users of refrigeration and air-conditioning systems, SIEA and the Government.

Rural village-based women who have set up companies to maintain SHSs installed under PEC Fund pilot project will be allocated spaces to attain accredited qualifications to effectively conduct their business operations.

Other key stakeholders for the project include: Ministry of Environment, Climate Change, Disaster and Meteorology (MECDM); Ministry of Mines, Energy & Rural Electrification (MMERE), Ministry of Development Planning & Aid Coordination (MDPAC), Ministry of Education & Human Resources Development (MEHRD), Ministry of Commerce, Industries, Employment & Immigration, SIEA and SINU.

5. Relevant National Policies and Frameworks

All national policy frameworks and their Action Plan set out principles and suggested initiatives designed to guide and support the development and implementation of national activities consistent with the these policy frameworks' visions and goals.

The Forum Leader's endorsement of the Pacific Islands Framework for Action on Climate Change in 2005 and the Framework for Action on Energy Security in The Pacific (FAESP) in 2010, demonstrated that sustainable energy and climate change adaptation are therefore top priorities for Pacific Island governments.

5.1. Education Sector

Since the education sector is one of the major actors in this project, relevant national education policies and frameworks have to be visited to be sure of being guided by their bounds.

Within the education sector there are various policies, frameworks and action plans. These are some of the documents[4]:

a. Education Strategy Framework – The Solomon education system's strategic direction and oversight is being guided by the Education Strategy Framework. Specifically on TVET, the concern is on strengthening the delivery so that there is an undeniable stock-up of skill-base of the Solomon Islands work force and to provide alternative pathways for young people.
b. National Education Action Plan - This action plan envisaged that all individual will 'develop and posse knowledge, skills and attitude needed to earn a living and to live in harmony with others and their environment', which is in line with the objective of the project on sustainable livelihood
c. Teacher Training and Development Policy - to contribute to improvement in accessibility to education, management and the quality of education through training and developing quality teachers.
d. National Skills Training Report – This contains the updated skill level required of the workforce in the Solomon Islands. Solomon Islands has a small formal economy that employed about 43,500 employees[5]. Demand for internationally accredited skills in the Solomon Islands is shaped by the size and nature of the formal economy
e. Solomon Islands National Qualification Framework (SIQF)- The Ministry of Education and Human Resources Development is proposing to set up a skeletal body to start the Solomon Islands Qualification Authority (SIQA) as it awaits the tabling of the Education Bill (revised Education Act) around July/August Parliament session 2015. The Solomon Islands Qualification Framework has been finalised with some small final touch to before actually approval be the Parliament.

   The SIQF can be seen as a response to so many developments within the education and training system in the Solomon Islands and those of other ministries. This response is timely, or if not, overdue, as the SIQF can coordinate the education and training accreditation and can augment flexible pathways that will explore future education and training opportunities, employability and of course raising standards of living in communities.

[4] Education Strategy Framework; National Education Action Plan; Teacher Training and Development Policy; National Skills Training Report ; Solomon Islands National Qualification Framework (SIQF)

[5] 2009 National Census

Or to put this in another context, skills for employability are an important concern and a lack of a national qualifications framework, competency standards, and associated quality assurance mechanisms means the content and quality of skills training provision varies greatly between providers and there are no clear pathways between different forms of skills development. The EU has a long delayed program of support focusing on the non-formal rural training centres which has not yet made significant progress. Solomon Islands National University (SINU) needs to improve the quality of its graduates. Governance, management, policies, staffing and facilities all need review and support.

5.2. Energy Sector

The Solomon Islands Electricity Act (Cap 128) was outdated and a review was done to the Act in 2006. The Act needs reviewing since it cannot address most of the recent energy development need, in the country.

The Solomon Islands National Energy Policy was completed in 2006 the government of the Solomon Islands. The Policy aims to address clear coordination of energy consumption in the country. Particular emphasis was on the uptake and widespread use of renewable energy that must be affordable, clean and safe. With the accelerated rate (which in most cased not coordinated through the Energy Division) in the uptake of RET it is a must to build the capacity of the existing technician in the energy sector to be able to support the booming intake of RET (in particular, solar PV)

5.3. Climate Change

The Solomon Islands National Climate Change Policy was developed and endorsed by Parliament in 2007. The Climate Change Policy highlight that need for communities to be trained or build their capacities as mean to be equipped with the tools to adapt to adverse effects of Climate.

The policy is seen as a framework that can enable the Solomon Islands National Development Strategy (NDS, 2011-2020) and other regional and international policies and frameworks, to have their climate considerations implemented to achieve their goals.
It is also a guiding document that ensures that the people of Solomon Islands, the natural environment and resources and the economy are resilient and be able to adapt to the predicted impacts of climate change.

From the predictions[6] on continual sea level rises; increase in temperature and increasing ocean acidification, there would be new and additional challenges faced by the Solomon Islands. This would require additional efforts and resources in building their capacity to be able to face these challenges, hence building the capacities of TVETs to be able to deliver to

[6] Pacific Climate Change Science Program: Current and the Future Climate of the Solomon Islands

the rural communities the relevant knowledge and skills to be well equipped to face the challenges of the predicted effects of climate change is crucial.

6. Consultation Analysis

6.1. Training Needs and Gaps Analysis (TNGA)

The TNGA was preceded by a Plenary Session where selected panelist gave their view on the topic, "*Creating National and Regional capacity and technical expertise to respond to CCA and SE challenges – what are the constraints"*

The following are some point raised regarding the topic of discussion and these are categorized in four different groups as present in the following matrix

Support Training facilities and Course designing	Instructor qualified	Strategic Pathway	Management/Financial and Administrative
No relevant and up-to-date practical equipment	Vanga Vocational Teachers Training need reviving	No pathway from RTC to TVET and SINU	PALS – Compliances (Energy Division and Customs) to reinforce the regulations
Lack of mainstreaming SE and CC into curriculum	Lack of Qualified teachers	Need Common Curriculum/Uniform Curriculum	SICCI to help Energy and Customs by raising the compliance with members
How and where SE and CCA be accommodate in the curriculum	Lack of ODS monitoring due to lack of expertise, in the case of Energy and Customs Officers	SIQF/SIQA could be the solution to enforcing pathways	Training and education be coordinated and incentivised to ensure support for relevant training
Design new courses on RAC and RET	Don Bosco could be use as teacher/trainers institution	Common Curriculum is not really required. RTC's have own type of course they want to teach	Improved Information flow through networking
Limited Regional and national expertise	RTC instructors are TRC graduate	HR and Labour market in Solomon Islands is supply driven – Should be Demand response	Migration of qualified Instructors to town in search for better paid job
Limited funding support to RTCs for Training Facilities	Need more qualified local RTC instructors to enhance learning		
	Local capacity to designing micro-hydropower		

The matrix provided the issues raised and discussed during the meeting. They are summarised under four unifying headings as follows:

i. Support Training facilities and Course designing
ii. Instructor qualified
iii. Strategic Pathway
iv. Management/Financial and Administrative

6.2. The Training Supply

The table shows the various Technical and Vocational Education and Training Institutions along with the courses they provide and the awards. The course providers were arrange in the order from higher level to lower level.

Course Provider	Courses	Duration	Award	Accreditation Body	Remarks
University of the South Pacific –SI Campus **P.O. Box 460** **(Mr Moses Asitarau)** **asitarau_m@usp.ac.fj**	Computer skills -	2 weeks	Short course certificates (attainment)	USP	Basic Keyboard, typing Basics of Word documents
	Skills in managing Early Childhood	1 ½ yrs	Certificate (full time award cert.)	USP	
	Project management courses	1 week	Short course certificates (attainment)	USP	
Solomon Islands National University (SINU)					
School of Technology and Maritime Studies **P.O.Box R113, Honiara** **(Mr. Solomon Pita – Acting Dean)** **dit@sinu.edu.sb** **(677-7496166)**	Carpentry and Joinery	4yrs	Certificate (full time award cert.)	SINU	Trade Cert. 1 – Trade Cert. 4
	Plumbing and Allied trades	4yrs	Certificate (full time award cert.)	SINU	Trade Cert. 1 – Trade Cert. 4
	Electrical Trade	4yrs	Certificate (full time award cert.)	SINU	Trade Cert. 1 – Trade Cert. 4
	Automotive Heavy and Light Vehicle	4yrs	Certificate (full time award cert.)	SINU	Trade Cert. 1 – Trade Cert. 4
	Advance Technology – Marine Engineering	4yrs	Certificate (full time award cert.)	SINU	Up to Class 4
	Certificate Industrial Drafting	1.5yrs	Certificate (full time award cert.)	SINU	Institute of Technology
	Diploma of survey	2yrs	Diploma	SINU	Institute of Technology
	Diploma in construction management	1yr	Diploma	SINU	Institute of Technology
	Master class 6, 5, 4	6 month	Certificate (full time award cert.)	SINU	Maritime Studies
	Basic Safety	3 weeks	Certificate (full time award cert.)	SINU	Maritime Studies
	Intermediate Safety	6 weeks	Certificate (full time award cert.)	SINU	Maritime Studies
	Advance Safety	6 weeks	Certificate (full time award cert.)	SINU	Maritime Studies
	Fishing Technics	6 weeks	Certificate (full time award cert.)	SINU	Maritime Studies

School of Business and Management **Contact: Dean (School of Business and Management)** **Email: dsbm@sinu.edu.sb**	Certificate in Tourism	2yrs	Certificate (full time award cert.)	SINU	
	Certificate in business	1 yr	Certificate (full time award cert.)	SINU	
	Certificate in Secretarial Studies	2yrs	Certificate (full time award cert.)	SINU	
	Dip of Business - Finance	2yrs	Diploma	SINU	
	Dip of Business - Administration	2yrs	Diploma	SINU	
	Dip of Business - Banking	2yrs	Diploma	SINU	
				SINU	
School of Natural Resources and Applied Science. **Contact: Dean (School of Natural Resources and Applied Science)** **Email: dsnras@sinu.edu.sb**	Dip of Applied Science – Agriculture	3 yrs	Diploma	SINU	
	Dip of Agriculture business	3yrs	Diploma	SINU	
	Cert. Environmental Science	2yrs	Certificate (full time award cert.)	SINU	
	Cert. Forestry Plantation	2yrs	Certificate (full time award cert.)	SINU	
	Cert. Paravet	2 yrs	Certificate (full time award cert.)	SINU	
	Dip of Climate Change	New	Diploma	SINU	
	Bachelor in Agriculture	New	Degree	SINU	
School of Education and Humanities	Madarine Language	2 wks	Certificate	SINU	
Contact: Dean (School of Education and Humanities) **Email: dseh@sinu@edu.sb**	Certificate in in Early Childhood	1 yrs	Certificate (full time award cert.)	SINU	
	Certificate in Teaching Primary	2 yrs	Certificate (full time award cert.)	SINU	
	Diploma in Secondary Teaching (Science)	2 yrs	Diplomas	SINU	
	Diploma in Secondary Teaching (Social Science)	2 yrs	Diplomas	SINU	
	Diploma in Secondary Teaching (Business/Maths)	2 yrs	Diplomas	SINU	
	Diploma in Secondary	2 yrs	Diplomas	SINU	

	Teaching (Home Economic)				
Don Bosco- Private Provider and the Rural Training Centres (RTC) **Fr. Srimal Priyanga (Principal – Don Bosco)** **principal@donbosco.org.sb** **Phone: (677) 7312444** **Mr Benedict Kausua – Director (Ag) TVET Division, MEHRD.** **bkausua@mehrd.gov.sb** **(677) 20314/7415056** **Dr. Franco Rodie (Permanent Secretary) MEHRD** **ps@mehrd.gov.sb** ***Offered at a few RTC and Don Bosco**	Carpentry and building	2yrs	Certificate (full time award cert.)	None	
	Mechanics	2yrs	Certificate (full time award cert.)	None	
	Agriculture	2yrs	Certificate (full time award cert.)	None	
	Welding and Fabrication*	2yrs	Certificate (full time award cert.)	None	
	Electrical trade	2yrs	Certificate (full time award cert.)	None	
	Life skills	2yrs	Certificate (full time award cert.)	None	
	Business studies	2yrs	Certificate (full time award cert.)	None	
	Eco Tourism	2yrs	Certificate (full time award cert.)	None	
	Plumbing	2yrs	Certificate (full time award cert.)	None	
Private Providers (MASE) **Mr. Martin Housanau**	Business Studies	1 – 3 wks		None	
	Computer Skills	1 – 3 wks		None	

6.3. Present and Future Market Demand

In consultation with the stakeholders in the Solomon Islands a list of workforce training needs and priority sectors for skill development were captured. This is best summarised table formats. For Climate Change the different types of skills required for communities to be able to adapt to the adverse effects of Climate Change are summarised in the following table:

Type of Skills	*Description*		
	Sustainable Energy	*Climate Change Adaptation*	
Knowledge-based *Knowledge of specific subjects, procedures, and information necessary to perform particular tasks Such knowledge-based skills are acquired through education, training, and on-the-job experience*	• Operation and & Maintenance Skills of electrical appliances • Building/Construction Design Skills • Water pumping and purification skills. • Electrical wiring skills • Air conditioning and Refrigeration maintenance skills • Motor re-winding skills • Solar PV system sizing skills • Solar PV systems O&M skills • Energy Auditing skills • A good knowledge of different types of renewable energy Resources • Computer Skills	1. CC Adaptation assessment skills. 2. Disaster risk reduction (DRR) skills. 3. Agriculture and security ▪ Crop resilience knowledge-based skills ▪ Soil adaptability knowledge-skills. ▪ Crop seasonal cycles knowledge-based skills ▪ Knowledge-based skill on best crops for certain ecosystem – example: Low lying atoll islands, mountains, grassland. ▪ Crop/food preservation skills – example: Tikopia people (far Eastern Solomons) trim cassava garden stalks during strong wind and cyclone to prevent the root-crop being uprooted. ▪ Pest/weed control skills ▪ Knowledge-based and implementation skills on agro-forestry ▪ General food handling and hygiene skills	4. Fisheries and food security ▪ Basic marine conservation skills ▪ Sea-food processing and preservation skills ▪ Knowledge-based skills on fish species and breeding cycles. ▪ Knowledge-based skills on sustainable fishing methods. ▪ Aquaculture design and management knowledge skills. 5. Budget and marketing skills 6. Simple Bookkeeping skills 7. Water security ▪ Water collection and preservation skills ▪ Rainwater harvesting skills
Transferable/Functional Skills *These are actions taken to perform a task, transferable to different work functions and industries and the skills are based on ability and aptitude*	• Communication Skills • Analyzing skills • Public Speaking skills • Organizing skills • Writing skills • Promotional skills • Coaching & Mentoring skills • Project Management		
Personal Traits/Attitude *Traits or personality characteristics that contribute to performing work. Such skills are developed in childhood and through life experience*	• Safety skills • Interpersonal skills • Process Driven skills • Succession Planning skills • Resource Sharing skills • Language awareness skills • Patience Skill • Diplomatic Skills • Result-oriented skills • Independence skills		

6.4. The Demand and Supply Matrix

The matrix presented here provides some of the skills on demand by the Industries and course provided by the TVETs. Skills could be categorized into three distinct types as presented in section 6.3. The matrix is presented in such a way that the skills on demand are placed horizontally on the matrix header whilst the supplies (courses) are place on a left-side column of the table. Since the correct approach is a demand-driven approach, the demands have to be matched to the supply. If the required skill is not part of the course being supplied and there is a sense of need to have some elements of such skills incorporated into the course, then a corresponding cell in the matrix is coloured. A cell that is colour-coded 'red' signifies that the required skill is not supplied by the course itself and that it should do so. Where there is no colour coding it signifies that skill required is part of the course supplied anyway, hence there is no need for colour-coding. When there is a grey colour-coded in the cell, it means that the skills required are understandably cannot be met by the corresponding course in the matrix. It could mean, "not applicable".

From the matrix it could be found whether a particular skill on demand can be met by a particular course. Those cells colour-coded 'orange' means the required skill it not supplied by the corresponding courses, and that it can do so but to a lesser extent, meaning that some elements of the required skills can be incorporated into the corresponding courses. A yellow colour-coding means the same but to an even lesser extent.

The Demand and Supply Matrix. (1st Matrix)

Training Supply	Present and Future Demand Market										
	CC and V&A	DRR Technique	Extreme even resistant crop	Soil type	Variation in session for cultivation	Knowledge on best crop for different session	Knowledge on food hygiene	Basic marine conservation knowledge	Knowledge of aqua-culture and agro-forestry	smoking and direct drying of fish	Basic knowledge on fish species and breeding cycles
USP- SI Campus											
Computer skills											
Skills in managing Early Childhood											
Project management courses											
School of Technology and Maritime Studies - SINU											
Carpentry and Joinery											
Plumbing and Allied trades											
Electrical Trade											
Automotive Heavy and Light Vehicle											
Advance Technology – Marine Engineering											
Certificate Industrial Drafting											
Diploma of survey											
Diploma in construction management											
Master class 6, 5, 4											
Basic Safety											
Intermediate Safety											
Advance Safety											
Fishing Technics											
School of Business and Management - SINU											
Certificate in Tourism											
Certificate in business											
Certificate in Secretarial Studies											
Dip of Business - Finance											
Dip of Business - Administration											
Dip of Business - Banking											
School of Natural Resources and Applied Science											
Dip of Applied Science – Agriculture											
Dip of Agriculture business											
Cert. Environmental Science											
Cert. Forestry Plantation											
Cert. Paravet											
Dip of Climate Change*											
Bachelor in Agriculture*											

(1st Matrix continue…..)

Training Supply	Present and Future Demand Market										
	CC and V&A	DRR Technique	Extreme even resistant crop	Soil type	Variation in session for cultivation	Knowledge on best crop for different session	Knowledge on food hygiene	Basic marine conservation knowledge	Knowledge of aqua-culture and agro-forestry	smoking and direct drying of fish	Basicknowledge on fish species and breeding cycles
School of Education and Humanities											
Certificate in Early Childhood teaching											
Cert Primary Teaching											
Diploma in Secondary Teaching (Science)											
Diploma in Secondary Teaching (Social Science)											
Diploma in Secondary Teaching (Business/Maths)											
Diploma in Secondary Teaching (Home Economic)											
Diploma in Secondary Teaching (Industrial Arts)											
Don Bosco- Private Provider and the Rural Training Centres (RTC											
Carpentry and building											
Mechanics											
Agriculture											
Welding and Fabrication											
Electrical trade											
Life skills											
Business studies											
Eco Tourism											
Plumbing											
Private Providers (MASE)											
Business Studies											
Computer Skills											

2nd Matrix

Training Supply	Present and Future Demand Market											
		Crops suitability to certain ecosystem	Sustainable fishing methods	Aquaculture design and management knowledge	Budget and marketing knowledge	Water collection and preservation skills	Nutritional skills	Fish farming	Water pumping and purification skills.	Knowledge on Electrical wiring	Knowledge on Air conditioning and Refrigeration	Knowledge on motor re-winding
	USP- SI Campus											
	Computer skills											
	Skills in managing Early Childhood											
	Project management courses											
	School of Technology and Maritime Studies - SINU											
	Carpentry and Joinery											
	Plumbing and Allied trades											
	Electrical Trade											
	Automotive Heavy and Light Vehicle											
	Advance Technology – Marine Engineering											
	Certificate Industrial Drafting											
	Diploma of survey											
	Diploma in construction management											
	Master class 6, 5, 4 (Cadets)											
	Basic Safety											
	Intermediate Safety											
	Advance Safety											
	Fishing Technics											
	School of Business and Management - SINU											
	Certificate in Tourism											
	Certificate in business											
	Certificate in Secretarial Studies											
	Dip of Business - Finance											
	Dip of Business - Administration											
	Dip of Business - Banking											
	School of Natural Resources and Applied Science											
	Dip of Applied Science – Agriculture											
	Dip of Agriculture business											
	Cert. Environmental Science											
	Cert. Forestry Plantation											
	Cert. Paravet											
	Dip of Climate Change*											
	Bachelor in Agriculture*											

2nd Matrix Continue….

Training Supply	Present and Future Demand Market										
	Crops suitability to certain ecosystem	Sustainable fishing methods	Aquaculture design and management knowledge	Budget and marketing knowledge	Water collection and preservation skills	Nutritional skills	Fish farming	Water pumping and purification skills.	Knowledge on Electrical wiring	Knowledge on Air conditioning and Refrigeration	Knowledge on motor re-winding
School of Education and Humanities											
Certificate in Early Childhood teaching											
Cert Primary Teaching											
Diploma in Secondary Teaching (Science)											
Diploma in Secondary Teaching (Social Science)											
Diploma in Secondary Teaching (Business/Maths)											
Diploma in Secondary Teaching (Home Economic)											
Diploma in Secondary Teaching (Industrial Arts)											
Don Bosco- Private Provider and the Rural Training Centres (RTC											
Carpentry and building											
Mechanics											
Agriculture											
Welding and Fabrication											
Electrical trade											
Life skills											
Business studies											
Eco Tourism											
Plumbing											
Private Providers (MASE)											
Business Studies											
Computer Skills											

2nd Matrix continue….

	Present and Future Demand Market								
		Operation and & Maintenance Skills	Design Skills	Solar PV system sizing skills	Solar PV System O&M skills	Energy Auditing skills	RET knowledge and understanding		
Training Supply	**USP- SI Campus**								
	Computer skills								
	Skills in managing Early Childhood								
	Project management courses								
	School of Technology and Maritime Studies - SINU								
	Carpentry and Joinery								
	Plumbing and Allied trades								
	Electrical Trade								
	Automotive Heavy and Light Vehicle								
	Advance Technology – Marine Engineering								
	Certificate Industrial Drafting								
	Diploma of survey								
	Diploma in construction management								
	Master class 6, 5, 4								
	Basic Safety								
	Intermediate Safety								
	Advance Safety								
	Fishing Technics								
	School of Business and Management - SINU								
	Certificate in Tourism								
	Certificate in business								
	Certificate in Secretarial Studies								
	Dip of Business - Finance								
	Dip of Business - Administration								
	Dip of Business - Banking								
	School of Natural Resources and Applied Science								
	Dip of Applied Science – Agriculture								
	Dip of Agriculture business								
	Cert. Environmental Science								
	Cert. Forestry Plantation								
	Cert. Paravet								
	Dip of Climate Change*								
	Bachelor in Agriculture*								

7. Consultation Outcome

This in-country mission's objectives are to:

- Identify the present and future market demand
- Map out the existing training supply for the Solomon Island
- Consolidate Component 1 and Component 3 complementing each other to progress SI Activity on SIRAC and RET Course designing and facility support at Institute of Technology in SINU.

The question is, does the objectives being achieved? Looking at the first objective on identifying the present and future market demand, the present market demand by the communities and the various industries in the Solomon Islands is based on small economy of the country. Currently for the Solomon Islands, the demand for skills depend on the workplace settings, including an organisation's objectives, the logistical support services used in workplaces and the tools employed in execution of core tasks. The skills in demand also depend on the product specifications, as required by the local or international markets. For instance, the production and successful marketing of Solomon Taiyo (canned tuna flakes made by Solomon Islands Tuna Processing Company), depend on the skills employed at various stages from tuna hunting to catching, handling/preservation and cooking and final canning. These processes need skilful people. These processes need support services from the refrigeration technicians; electricians; heavy vehicle and plants mechanics; fishing boats' fishing masters and captains for their knowledge on fish stock and boat navigation. Take another example: the high rate of influx of solar PV systems into the domestic market that is created by the so called "seat-cementing" MPs. Some are genuine whilst others find their way to the Solomon Islands unregulated renewable energy market. They were sold at distinctively two very different prices – cheaper price and expensive, indicating that one is a genuine made and the other is "Chinese-made" of poor quality. This created a need for skilful solar PV technicians who can install such appliance to households. It also needs skilful solar PV sales person, who should also know about basic operations and maintenance of solar PV systems

So in a nutshell, such scenario brought about skills that need to be met. A skilled labour market that can be able to know the difference between the genuine and non-genuine RET; a skilled labour market that can do system designing of solar home systems of various loads; and a skilled labour market that can procure, install and commissioned.

With the current rate of influx of RET and other related technologies in various industrial settings in the Solomon Islands, there is no doubt the future market demand for skills of all kind would be experienced. RET through bilateral means or from the non-governmental organisation or Civil services organisations (NGO/CSO) and through the members of Parliament will surely increase. Technological modification in the features of the equipment is sure to come about. This scenario again warrants upgraded knowledge-based skills to be in place, which will surely require more skilled labour force.

The Solomon Islands National Energy Policy promotes the widespread uptake on safe, clean and affordable renewable energy resources, hence the influx of RET in the country. But there is a need to control and monitor their disbursement as means to keep account of the amount of renewable energy used in the country.

The second objectives require the mapping out of the Training Supply for Solomon Islands. For the purpose of this mission, table in section 6.2 (Training Supply) should detail the TVET providers and the courses they provided.

The proposal by the Energy Division of the Ministry of Mines Energy and Rural Electrification (MMERE), seeking funding assistance from ACSE Component 1, in establishing a new programme to be called Trade Certificate in Solar PV and Refrigeration and Air Conditioning within the Institute of Technology's Electrical Department. A concept note entitled, "*Development of Accredited Technical Course Programmes for Solar Technicians and Refrigeration & Air-Conditioning Technicians at the Solomon Islands national University (SINU) and Establishment of Licensing System for the Industry Practitioners*".

Seeing that this concept fall in well with Component 3, PACTVET, a discussion on the idea of Component 3 complementing Component 1 to support Solomon Islands to progress this proposal through was welcomed by the Energy Division and it was agreed during a meeting with the SIRAC Committee, the Director of Energy and the Dean (acting) of the School of Technology and Maritime Studies that they will come up with components within the Concept that PACTVET would be able to support. The Concept Note is due at the end of March.

8. General Outlook of TVET in the Solomon Islands

It was identified in the Education Strategy Framework (2007-2015) that TVET in the Solomon Islands is weak and that a more strategic approach needs to be taken to strengthen it, after realising from the decades prior to the advent of the millennium, that there was a lack of knowledge-based skills and functional skills that are required for a more skilled tasks-oriented industries in the country.

In its TVET Policy that aims at creating more opportunities for school dropout to be trained to acquire employable skills, the European Union since 2010 had been supporting the Solomon Islands Government programme in integrating the technical and vocational education and training (TVET) into the formal and non-formal education system in the Solomon Islands. This is an intervention that aims at addressing the seemingly weak TVET programme in the Solomon Islands. Now that the Ministry of Education and Human Resources Development had established a TVET Division, that aims to "promote skills acquisition through competency-based training with proficiency testing for empowerment, sustainable livelihoods and responsible citizenship", TVET in the Solomon Islands might be looking good in producing graduates that are work-ready and that such employable mass of TVET graduates will contribute in shaping the job market in the country by inducing the businesses and industries in creating new jobs, in a hope to increase productivity, hence increase economic activities and a broad tax-base for the country.

The Solomon Islands Chamber of Commerce and Industries had encouraged its members to promote low-carbon growth policies. That would involve reviewing their energy consumption patterns (energy audit) and recommend and implement measures to reduce energy wastage whilst maximising productivity, such as promoting in-house energy conservation measures like the use of energy efficient appliances.

Appendix 1: Solomon Islands Association of Rural Training Centres

(Adapted from: http://www.siartc.org.sb/

Solomon Islands Association of Rural Training Centres (SIARTC) is the umbrella body for Rural Vocational Training Centres (RTCs), non-formal educational institutions for young men and women. RTC trainees graduate with the appropriate knowledge and practical skills for self-sufficiency, productivity and responsible citizenship within the rural community. SIARTC was established in March 1992 by the controlling authorities of RTCs. Today, SIARTC has a total of 34 member RTCs, spread through eight provinces of the Solomon Islands. The Association's aim is to improve the standard of vocational training in the Solomon Islands, and to seek development partners to help it achieve this.

SIARTC currently with its current 34 member centres, spread throughout the eight provinces of the Solomon Islands, is coordinated by a Steering Committee, consisting of a President; Chairman; Secretary; Treasurer; an Association Coordinator and six (6) different Churches representative. To qualify for full membership of SIARTC, RTCs must devote 75% of their timetabled activities to practical vocational training as defined by the association's constitution.

The Solomon Islands Association of Rural Training Centre (SIARTC) in partnership with a the European Union funded project, worked on the following areas: Curriculum Development; Training of Rural Training Centres (RTC) Instructors and Principals; Upgrading of Infrastructure at RTCs; promotion of Enterprise Development at RTCs; funding of RTC short courses; construction and initial running of Vanga Teachers College; Media Promotion.

In 2002 – 2003 the European Union project is making small grants available to RTCs to stimulate enterprise developments, increasing prospects of self-sufficiency, as well as grants for infrastructure improvements and the purchase of hand tools for training purposes. The project is making a big push to upgrade the instructors at RTCs.

SIARTC membership divides into two groups - church controlled residential RTCs and community led village based RTCs. Residential RTCs which offer full time courses are full members and SIARTC village based RTCs offering occasional short courses in vocational training for various target groups are associate members. Some RTCs also run outreach programmes to surrounding communities.

Currently, about 30% of the trainees at full member RTCs are female, and 3 of these RTCs have a female only intake. SIARTC actively encourages those RTCs that strive to improve the lives of rural women in the Solomon Islands.

The majority of SIARTC full-member RTCs offers 2 or 3-year full-time vocational training courses. Facilities at centres vary - some centres have permanent buildings, others use local-style buildings of natural materials; some have no electricity. SIARTC village based RTCs usually make use of one or two community buildings.

The enrolment capacity of full member RTCs varies from 20 to 200 trainees. The total numbers of students currently in RTCs is around 1,300 - up from 850 in 2000 at the height of the ethnic tension. Due to the nature of their courses, SIARTC village based associate-member RTCs have an untapped potential. Most of these centres have a mixed intake.

Appendix 1.1: List of Rural Training Centres

Rural Training Centres	Courses	Duration	Award
Afutara Adventists Vocational Schools The training centre is in West Are'Are, on coastal Malaita. It have use of 120 acres of flat, fertile land, set between two rivers. Afutara Village surrounds the centre, and the Su'u National Secondary School and farm are nearby. Entry requirement : Grade 6 up to Grade 11 (18 years old)	Agriculture Business Studies Carpentry & Building Construction Development Studies Electrical wiring Life Skills/Typing Mechanics Sea Safety	2 – 3 years	Certificate 1
Airahu Rural Training centre The training centre is in West Kwara'ae, Malaita Province, just 30 minutes' drive south of Auki. It is close to the mountains, but have ten acres of flat agricultural land available for farming. This RTC is run by the Anglican Church of Melanesia. Entry Requirements: Grade 6 up to Grade 11 (18 years old) Can accommodate up to a maximum of 120 students with 10 staff	Agriculture English Business/ Bookkeeping Carpentry Current Affairs First Aid General Science Life Skills Mechanics Music Religious Instruction	3 years	Certificate 1
Batuna Rural training Centre Batuna is at the tip of Vangunu island, a small peninsula in Morovo Lagoon. It is close to a village community who offer great support. The centre is controlled by the Western Solomon Islands Mission of the Seventh Day Adventist Church, who founded the original headquarters of the Church (in the 1960s), on the site of the Batuna Sawmill. Entry Requirements: Form 3 - 6, and above 16 years of age. Can accommodate 16 staff and 200 students.	Agriculture Building Construction Business/Typing Carpentry Electrics Homiletics Life Skills Mechanics.	3 years	Certificate 1
DIVIT Development Village and Rural Training Centre. DIVIT stands for 'Distant Village Training Centre'. DIVIT a residential rural training centre in Visale, West Guadalcanal, and a Full Member of SIARTC. The centre is under the authority of the Daughters of Mary Immaculate Congregation - a religious order of the Roman Catholic Church. Entry requirement – 17 years old of age and over Can accommodate 9 staff and up to 60 students	Agriculture Bee-keeping Business Studies/Maths Crafts/Weaving English Health Life Skills Music Religious Studies Sports Typing	2 years	Certificate 1
Don Bosco Technical Institute RTC Don Bosco is a Secondary Technical School of the Catholic Church, Salesian community, and a full member of SIARTC. The Institute is new and young, located close to town, but separate from it - a good flat site, within a few minutes of the Henderson Domestic Airport in Guadalcanal, (just outside Honiara). Entry requirement – Forms 3 to 6	Agriculture Business studies Carpentry and building Eco Tourism Electrical trade Life skills Mechanics Plumbing Welding and Fabrication	2 years 2 years 2 years 6 months 2 years 6 months 2 years 3 years 2 years	Certificate Certificate Certificate Certificate Certificate Certificate Certificate Certificate Certificate
Garanga Rural Training Centre Garanga Rural Training Centre is in the north of Ysabel Province, close to the Garanga River. It is a boarding rural training centre, owned jointly by the Ysabel Provincial Government and the Church of Melanesia, Diocese of Isabel. The centre was transferred from Tasia Island to the present site in 2001.	Agriculture Business Carpentry Christian Education Cultural Studies Life Skills Maths	3 years	Certificate

Entry requirement – Grade 6 to 12	Mechanics Music		
Kaotave Rural Training Centre The centre is on the Guadalcanal plains, sandwiched between the Balasana River and the oil palms of Guadalcanal Plains Palm Oil Limited (GPPOL). It is under the authority of the South Seas Evangelical Church. Entry Requirement – Grade 6 to Grade 11	Agriculture Business Studies Carpentry English Life Skills Maths Mechanics Pastoral Studies Typing	2 years	Certificate
Kolombangara Rural Training Centre The centre is under the authority of the United Church and Lauru Community Development Trust. The centre was started by the United Church and Lauru Land Conference of Tribal Communities (LLCOTC), a non-governmental organisation established in January 1981. Entry Requirement – Grade 6 to Grade 11	Agriculture, Business Studies, Health and Sanitation, Leadership, Life Skills, Music	Up to a max of 2 years	Certificate
Luesalo Rural Training Centre Luesalo (which means 'safe anchorage' in the Santa Cruz indigenous language) is a residential rural training centre, under the authority of the Church of Melanesia, Diocese of Temotu. The site is a flat piece of coastland in Graziosa Bay. Some areas have been land-filled and planted with orchids and flowering shrubs. It is not far from the market and commercial centre of Lata. Entry Requirement – From 3 to Form 6	Agriculture, Bee-keeping, Carpentry, English, Health, Life Skills, Maths, Public Speaking, Reading, Study Skills, Theology and Catechism.	3 years	Certificates
Manivovo Rural Training Centre Manivovo is a residential rural training centre owned by the Roman Catholic Church, Honiara Diocese. It's situated at the side of a mangrove-fringed lagoon and calm harbour, on the south coast of Makira island, not far from Star Harbour. The site is flat, but surrounded by forested hills. Entry Requirement – Age 18 - 26	Agriculture Carpentry/Woodwork Leadership Life skills Two-stroke motor mechanics. The centre also runs an outreach programme, where trainees pass on their skills to the surrounding communities. Workshops (up to one week) include rice planting, plumbing, basket weaving and shell money making.	2 years max	Certificates
Nawote Rural Training Centre Nawote (which means "paddle") is located east of Kirakira, in Makira Province. It is a boarding rural training centre, managed by the South Seas Evangelical Church Wainoni Association. The centre was founded in 1996, to offer Bible teaching to pastors and lay people. Entry Requirement – 20 years and above	Agriculture Bible Studies/Pastoral Courses, Business Studies Carpentry/Joinery Life Skills.	Varies up to 2 years	Certificate
Ngaligaragara Ngaligaragara is a boarding training centre in Central Malaita, under the authority of the South Seas Evangelical Church. It was built by locals in 1991, without outside funding. It is situated just 18km from Auki, in a beautiful forest area, close to two rivers, and between two high mountains. Entry Requirement – 20 years and above	Agriculture Biblical Theology Carpentry	2 years	Certificate

Pamua Vocational Training Centre At Pamua, school leavers become good citizens, skilled to make a difference. Pamua Vocational Centre, also known as St. Stephen's, is part of Pamua Community College, a residential rural training college of the Church of Melanesia (Diocese of Hanuato'o). Entry Requirements -	Agriculture Business Communication Skills Electrical Life Skills Mechanics Mathematics Music Religious Studies Secretarial Youth studies.	4 years	Certificate
St Anne's RTC St. Anne's RTC is a female only residential centre at Nila in the Shortland islands in Western province, about 45 minutes by outboard motor boat from Ballalae Island. This mission site overlooks the lagoon, but nestles within a forest and village environment. It's a residential training centre of the Catholic Church. Entry Requirement: Completion of Grade 6	Agriculture Bookkeeping Literacy English Food And Nutrition Health Home Care Religious Instruction Leadership Business Management Mathematics Sewing Machine Maintenance Mother Crafts Typing Fabric Dyeing	2 years	Certificate
St Dominic's Rural Training Centre St. Dominic's is located at Vanga Point on the west coast of Kolombangara Island, Western Province. The site is 1 square km of fertile coastal land, reaching into the hills of the island (an extinct volcano). The centre is a boarding rural training centre of the Roman Catholic Church, run by the Fraternal Marist Scholars. Entry Requirement – All schools drop outs Courses have cycles of 13 days. The centre also runs an outreach programme to assist villagers and women's groups within the local area and other provinces.	Agriculture Bee-Keeping Carpentry/Building Fibreglass Repair Food Technology Mechanics Net Repair Perfume Making Piggery Management Poultry Management Screen Printing, Sewing & Sewing Machine Repair Soap Making, Vegetable Farming Coconut Oil Production	2 years	Certificate
St Mark's Rural Training Centre St. Mark's is a residential training centre in East Malaita, owned by the South Seas Evangelical church, and consisting of eight buildings on a hilltop overlooking a peaceful lagoon. Entry Requirement : Grade 6 and Grade 9 completion (aged between 15 – 25 years old)	Agriculture Biblical Studies Carpentry Home Craft Life Skills	2 years	Certificate
St. Martin's Rural Training Centre St. Martin's is located at Tenaru, on East Guadalcanal, run by the Marist community. A well-established residential training centre, St. Martin's is looking to promote outreach to young men in Guadalcanal. Our site is on flat and fertile land area, by the side of a river. St. Martin's is among the longest running, and in the past most successful, RTCs in the country. Entry Requirement: Students of age between 17 – 20 years old	Agriculture Business Carpentry, Mechanics Human Development	1 year	Certificate

Stuyvenberg Rural Training Centre Stuyvenberg is a boardingrural training centre of the Roman Catholic Church, (Marist, Society of Mary), on the north coast of eastern Makira. The centre is situated on fertile coastal land, close to a natural water source. Its mission is to provide vocational skills to standard six school leavers, to be used in the rural area. Entry Requirement: Grade 6 and above	Agriculture Building, Business Carpentry Carving Chainsaw Maintenance English Maths Home Economics Christian Education Sports	4 years	Certificate
Suva Rural Training Centre Suva is a well-established residential RTC on the East Guadalcanal Plains, owned by the South Seas Evangelical Church. Our site is situated on a flat, fertile area surrounded by small villages, a 5 minutes drive from the main highway, and a short 4-minutes walk to a primary school. Entry Requirement: Completion of Grade 6 or grade 11	Agriculture, , Biblical Studies Carpentry Life Skills Mechanics	2 years	Certificate
Tabaka Rural Training Centre Tabaka is a residential rural training centre, run by the United Church. Located just 20 minutes by outboard motor boat from Munda, winding through a coral reef, the site is on flat, coastal, fertile land. Tabaka began as a convention centre for youths. Became a vocational training centre in 1992. Entry Requirement: Grade 6 and above	Agriculture Carpentry Bible Studies Life Skills	2 years	Certificate
Taylor Rural Training Centre Taylor is a residential rural training centre of the South Seas Evangelical Church, situated in the Korokarako ward of North-East Guadalcanal. The site is mountainous, on a hilltop overlooking the large Moga river. Due to the location it is a rainy place, making it difficult to plant and plan production, although they do produce vegetables such as cabbage. Entry Requirement: Grade 6 or Grade 9 completion	Agriculture Biblical Studies Carpentry & Woodwork Life Skills	2 years	Certificate
Vatu Rural Training Centre Vatu (meaning 'stone' or 'black') is a residential centre, formerly operating as Corpus Christi, at a different site. It is owned by the Family Community School Committee on North East Guadalcanal, and supervised by the Catholic Church.	Agriculture, Carpentry, Life Skills, Mechanics	2 years	Certificate
Belanimanu Rural Training Centre Belanimanu is a residential village-based centre at Marau Sound, on the Weathercoast of (East) Guadalcanal. The centre is controlled by the Catholic Church, but it was developed by our community for returning Grade 6 school drop-outs.	Bookkeeping Carpentry Life Skills Mechanics Bible Studies English and Mathematics.	Varies	
Mana'abu Rural Training Centre Mana'abu, which means 'holy place' in an indigenous language, is a village-based centre in North Malaita, owned by the community of Mana'abu residential area. The coastal village with its white sand beach, nice bay and lovely large	Agriculture, Business, Early Child Development, Food and Nutrition, Health, Home Economics, Literacy, Mechanics, Youth and Community Development. We also run short	Varies	

trees. Entry Requirement: Formal school Dropouts	outreach and community workshops.		
San Isidoro Rural Training Centre The centre's mission is to advocate for basic human rights for people with disabilities, the right to education and an opportunity to build their skills and self-esteem to enable a life of dignity and well being. The centre empowers the disabled through training of basic academic and skilled subjects, of which they were deprived because of their disabilities. The Centre also addresses gender balance and the right to be heard and contribute positively to society. The handicapped are also given the opportunity to live in a community of boys and girls with common attribute. Entry Requirement: Disable 14 years or above	English, Maths, Business, Sign Language, Agriculture, Life Skills, Carpentry, Woodwork, and Practical Trade and Skills	3 years	

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European Union Pacific Technical and Vocational Education and Training on Sustainable Energy and Climate Change Adaptation Project

Timor-Leste Training Needs and Gap Analysis

Conducted and Compiled by: Leigh-Anne Buliruarua and Tessa Koppert

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1.0 Background

The 10th European Development Fund European Union Pacific Technical and Vocational Education and Training on Sustainable Energy and Climate Change Adaptation (European Union PacTVET) project is component three within the broader regional Adapting to Climate Change and Sustainable Energy (ACSE) programme.

The project builds on the recognition that energy security and climate change are major issues that are currently hindering the social, environmental and economic development of Pacific - African Caribbean and Pacific (P-ACP) countries.

1.1 EU PacTVET Objectives

The general objective of this project is to enhance sustainable livelihoods in P-ACPs. Sustainable livelihoods are a high priority for Pacific Island communities and governments alike. They are central to current development policy including resource management and conservation but also in emerging policy to meet threats such as climate change. The project aims to enhance Pacific regional and national capacity and technical expertise to respond to climate change adaptation (CCA) and sustainable energy (SE) challenges.

The project is being implemented by the Secretariat of the Pacific Community (SPC) in partnership with the University of the South Pacific (USP) over a period of 53 months from August 2014 with an overall budget of EUR 6.1 million. It will achieve the following results:

1. Assess national training needs in SE and CCA and existing informal and formal TVET training courses and training and education providers are identified and strengthened
2. Develop and implement benchmarks, competency standards and courses on Training of Trainers (ToT) and create a pool of national trainers
3. Develop and establish training courses and support facilities within TVET institutions
4. Strengthen networking in SE and CCA

The project is being implemented in a sequential approach. Result 1 activities will provide a more detailed/clearer understanding of countries' needs and their requirements from the project. The activities under Results 2 and 3 will be then be tailored to the country needs. This report feeds into result area 1.

1.2 Location

The EU PacTVET project will be implemented in the Pacific region comprising of 15 Pacific ACP countries: Cook Islands, Federated States of Micronesia (FSM), Fiji, Kiribati, Nauru, Niue, Palau, Papua New Guinea, Republic of Marshall Islands (RMI), Samoa, Solomon Islands, Timor-Leste, Tonga, Tuvalu and Vanuatu.

Climate change is affecting the livelihoods of the P-ACP communities causing varying degrees of adversity depending on location.

1.3 Context

Current total global greenhouse gas (GHG) emissions stand at 36.9 gigatonnes of CO_2 ($GgtCO_2$). Of this global GHG emission, Pacific Island countries emit less than 0.03% yet they are amongst the most vulnerable to adverse effects of climate change - the first to be exposed and the least able to respond. Hence there is a moral obligation for the island countries to start implementing measures to not only mitigate GHG but also adapt to climate imposed environmental change, and prepare for future adaptation measures. At the national level, the Timor-Leste's annual GHG emission is insignificant on a global scale.

In spite of efforts to reduce Pacific-African Caribbean and Pacific (P-ACP) countries reliance on fossil fuels and improve energy security almost all Pacific Island countries remain highly dependent on imported petroleum products for energy generation and transportation, which are the two major petroleum consumption sectors in the region.

With the Pacific Island countries facing challenges posed by climate change and energy security, sustainable energy and climate change adaptation are undeniably ranked above all other sectors in regional priorities, as evident through regionally endorsed frameworks, such as the wider Pacific Plan and the more specific Pacific Islands Framework Action on Climate Change (PIFACC) and the Framework Action on Energy Security in the Pacific (FAESP) and individual national policies.

Efforts in addressing energy security and climate change adaptation challenges are ongoing through various regional and national projects. On climate change mitigation, there were some familiar projects such as the Pacific Islands Greenhouse Gas Abatement through Renewable Energy Project (PIGGAREP) that addresses mitigation and Pacific Adaptation to Climate Change (PACC) that focused on climate change adaptation. The PIGGAREP was focussing on complementing PICs initiatives in promoting the widespread use of renewable energy in the regions and PACC focused on three thematic areas, namely, "Food security"; "Water Security" and "Coastal Management" - assisting communities to implement activities that help them in these three areas. Additionally the University of the South Pacific's European Union Global Climate Change Alliance project has been active in all 15 P-ACPs enabling climate change adaptation by formal and informal education, direct community engagement and applied research. Sustainability of such projects is very

important. Now that these projects are coming to their end, it is important that knowledge and skills being acquired and/or hardware that were put in place continue to function and be beneficial to the targeted beneficiaries. Not only on the renewable energy side, but on overall energy services, where there needs to be awareness and improvements to energy efficiency and conservation and what measures needs to be taken to use energy in a sustainable manner as compared to energy misuse and wastage.

In May 2002, Timor-Leste (formerly known as East Timor) became an independent nation after about 24 years of being ravaged by conflict between 1975 – 1999. Violence had left the country and its families torn apart, with nearly 70 percent of all buildings, homes and schools destroyed, and an estimated 75 percent of the population displaced.

Over the past decade, Timor-Leste has created the conditions for successful development. It has credibly emerged from a crisis of internal violence and political instability in 2006/2007 and increased tangible services for the population, creating hard-won political stability, absence of conflict and a new confidence in the state. Largely peaceful democratic elections for President (March and May 2012) and Parliament (June 2012) reflect these achievements.

After 13 years of independence, Timor-Leste has achieved tremendous progress since being ravaged by conflict – With major revenues from the Oil and Gas sector and donations from international funding agencies, significant gains have been made in health and education; economic growth to rival regional neighbours; increasing citizen participation, and the gradual strengthening of state institutions such as Ministry of Finance, Ministry of Defence, the police, courts and the judiciary (World Bank, 2015).

With a total population of approximately 1.12 million (2011 Census), Timor-Leste is quite a large country, about 15,000 square kilometres in size and stretches about 270 kilometres from East to West. It has only two islands, Atauro and Jaco, and an enclave in Indonesia which is called ‘Oecussi’. The problem isn’t actually its size but mainly its topography. The terrain is mountainous with steep slopes interspersed with large and wide rivers. Furthermore, the road infrastructure in the country is largely of poor quality often constructed with inexpensive materials causing many bridges and roads to collapse, especially during the rainy season. All these factors contribute to inaccessibility of communities to many basic services such as access to clean drinking water, health and electricity.

With 60 percent of the population under 25 years of age, Timor-Leste is one of the youngest countries in the world. Benefitting from high global oil prices, Timor-Leste achieved lower middle-income status in 2011, but poverty remains persistently high, particularly in rural areas, where the majority of the population lives.

To create job opportunities for youth, sustain inclusive growth, and prepare for a future of potentially declining natural resource returns, Timor-Leste needs to diversify its economy and sources of revenue, elevate the quality of health and education services, and equip the population with viable skills. These efforts must be underpinned by capable institutions with a strong and consistent focus on quality of spending and policies that nurture private investment.

2. Schedule of Consultation Events

The in-country consultative workshop was held on 23rd September, 2015, under the following schedule:

TIME	ACTIVITIES	FACILITATOR
08.00-08.30	Registration	-DNAC
08.30-09.00	➢ Open Workshop and welcome participants ➢ Introduction of the PacTVET delegation from Fiji	-Director General for Environment -PacTVET Regional Coordinator, University of the South Pacific (USP)
09.00-09.30	➢ Introduction about the workshop ➢ Information about the EU-PACTVET project: ▪ Outline rational ▪ Objectives/purpose ▪ Country expectations	-PacTVET Regional Coordinator (USP) -PacTVET Finance Officer, Secretariat of the Pacific Community (SPC)
09.30-10.00	**COFFEE/TEA BREAK**	**HOTEL TIMOR**
10.00-10.45	Presentations: ➢ Challenges to Climate Change Adaptation (CCA) and Sustainable Energy (SE) in Timor-Leste ➢ Training Needs and Gap Analysis presentation (Basic Outline) ➢ Creating National and Regional capacity and technical expertise to respond to CCA and SE challenges	-DNAC Director -PacTVET Regional Coordinator (USP)
10.45-11.45	Exercise: ➢ Divide participants in 4 groups (CCA and SE) ➢ Fill-out the Training Needs and Gaps Analysis forms and discuss in groups about CCA and SE	-USP EU-GCCA In-Country Coordinator
11.45-12.45	Presentation: ➢ Presentation of the results of the Group Discussions	-USP EU-GCCA In-Country Coordinator
12.45-13.45	**LUNCH**	**HOTEL TIMOR**
13.45-14.45	Exercise: ➢ Discuss in 4 groups: ▪ Group 1 & 2 will identify skills and capacity needed in the 9 NAPA sectors (CCA) and for Sustainable Energy (SE) ▪ Group 3 & 4 will identify institutions (formal and non-formal) in Timor-Leste that supply training or education related to the 9 NAPA sectors (CCA) and Sustainable Energy (a. name and address, b. courses, c. duration, d. accreditation / award)	-USP EU-GCCA In-Country Coordinator -PacTVET Regional Coordinator (USP)
14.45-15.45	Presentation: ➢ Presentation of the results of the Group Discussions ➢ Connect the supply of TVET with the demand	-PacTVET Regional Coordinator (USP)
15.45-16.15	**COFFEE/TEA BREAK**	**HOTEL TIMOR**
16.15-16.30	Identification of PacTVET activities in the future	-PacTVET Regional Coordinator (USP)
16.45-17.00	Conclusion and close workshop	-Director General for Environment

2.1. Project Outline and Presentation

The workshop was held at the Hotel Timor complex, and attended by about 70 participants from key agencies of government, education training providers, Development partners, non-government agencies and communities. The workshop was primarily conducted in the local Tetum language.

Summary of Presentations:

1. An overview of the PacTVET project was presented, with emphasis on the following aspects:

- Rationale - current scenario with regard to sustainable energy (SE) and climate change adaptation (CCA) in the P-ACPs and the issues. At a national level there is dependency on fossil fuel for power production and transportation. On the climate change side, the P-ACPs are more vulnerable to climate change, but have the least capacity to respond to these.
- How the EU PacTVET project intends to respond to these issues by focussing on building the capacity based on country needs - recognising skills acquisition by benchmarking and defining country-requested competencies and accreditation.
- The Key Result Area (KRA). Each of the 4 EU PacTVET KRAs were outlined and it was made known to the stakeholders that one of the activities under KRA 1 is this in-country consultative workshop and one-on-one consultations for the training needs and gaps analysis (TNGA). Activities that need to be conducted in the hope of achieving each of these KRAs were briefly outlined.
- A brief overview of the budget. This was to give the stakeholders an outline of the allocation from the €6.1 million.
- And finally, it was emphasised that the consultations are important to aid the Timor Leste stakeholders in identifying national needs to frame future EU PacTVET activities.

2. The Director of the National Directorate for Climate Change, Mr. Mario Francisco Correia Ximenes provided an overview to the main challenges for Timor-Leste in the areas of Climate Change Adaptation and Sustainable Energy. These included:
    1. Topography and infrastructure
    2. Gender inequality
    3. Climatic and weather conditions
    4. Communication (various languages, low literacy, low access to information, lack of education)
    5. Poverty
    6. Lack of stakeholder coordination

3. A basic outline of the Training Needs and Gaps exercise was then presented setting the scene for group discussions in the ensuing sessions of the workshop.

3.0 Consultation Methodologies

In trying to maximise output, various methods of consultation were employed in this in-country mission. Determining which methodology to use depend on various factors ranging from availability, distance and timing. The following are the methods employed to capture the required data during the in-country mission:

3.1 Consultative Workshop/Meeting (TNGA)

A consultative workshop is a consultation with stakeholders in a venue where the agendum for discussion or consultation is done for all at once. This was the methodology employed for one-day workshop during this in-country mission. This methodology was employed because it used the forum to draw ideas and consolidates them.

3.2 Internet – Online

This was used for searching for further information or publication of Reports or Policies. Not only that but to confirm or double-check on information given.

3.3 Literature Review

This forms the basis for evaluative report of information found in the literature related to technical, vocational education and training with the subject of sustainable energy and climate change as the content. Various literatures were consulted, within the education, energy and climate change sectors, on policy frameworks and national action plans or development strategic plans. Most Policy frameworks (regional and national) were reviewed and those were used as the basis for consolidating future SE and CCA demands or needs in country.

3.4 Limitations

Due to tight project schedules and other administrative processes that were beyond the project's control, the mission did not make provision for more one to one consultations with key stakeholders in Timor-Leste for more in-depth information as that on specific programmes offered by the many training providers in-country.

Obtainable literature surrounding educational strategy and labour and sector statistics was mostly out of date – at least 5 to 10 years old.

Limited availability and/or access to information on current/updated capacity development needs for TVET. In addition, resources available online or otherwise were mainly in the local language.

Participation/input from some key stakeholders on these matters – it was not possible to consult with all potential stakeholders in the time allowed for the in-country mission.

However, it is anticipated that the project will continue follow up and engage with relevant key stakeholders through the In-country Coordinator based within the National Directorate for Climate Change.

4.0 Status Quo - Relevant National Policies and Frameworks and Sectoral Review

All national policy frameworks and their associated action plans set out principles and suggested initiatives are designed to guide and support the development and implementation of national activities consistent with the these policy frameworks' visions and goals.

The Forum Leader's endorsement of the Pacific Islands Framework for Action on Climate Change in 2005 and the Framework for Action on Energy Security in The Pacific (FAESP) in 2010, demonstrated that sustainable energy and climate change adaptation are therefore top priorities for Pacific Island governments.

4.1 Climate Change

The most important Climate Change policy document currently in existence for Timor-Leste is the National Adaptation Programme of Action (NAPA, 2010) on Climate Change Adaptation. In the NAPA climate change stakeholders from different sectors in Timor-Leste identified urgent and immediate priority areas in the following order: 1. Food Security; 2. Water Resources; 3. Human Health; 4. Natural Disasters; 5. Forests, Biodiversity and Coastal Ecosystems; 6. Livestock Production; 7. Physical Infrastructure; 8. Oil and Gas Infrastructure; and 9. National Institutional Capacity for Climate Change. The ninth priority area is not the least important priority but is rather seen as "underpinning all others" and necessary to ensure "overarching programme level coherence".

Another important document that not only identifies climate risks but also recommends adaptive actions to be taken to respond to these risks is the Initial National Communication (INC) to the United Nations Framework Convention on Climate Change (UNFCCC) (2014). In the INC the main Green House Gas (GHG) emitting sectors have been identified alongside measures to mitigate these emissions in the future. A map indicating the most vulnerable areas of Timor-Leste to various climate change impacts has also been included in the INC.

4.2 Renewable Energy

In the National Strategic Development Plan 2011-2030 (SDP, 2011) it is stated that electricity consumption needs in Timor-Leste will rise from around 160 GWh currently to 800 GWh by 2020. Therefore, one of the main goals related to renewable energy is that: "By 2020, at least half of Timor-Leste energy needs will be met from renewable energy sources ... and approximately 100,000 families will have access to solar powered electric light".

According to the Initial National Communication (INC) to the United Nations Framework Convention on Climate Change (UNFCCC) (2014) the development of renewable energy (RE) in Timor-Leste has good potential and can be seen as a good option to mitigate GHG emissions as well. It also stated that development of renewable energy in Timor-Leste started in 2005 and that the Government of Timor-Leste implemented a number of renewable energy technologies, such as hydropower, solar PV and biogas. Before 2012 the Government had installed pico hydro (hydroelectric power generation of under 5 kW) in for 733 HH; about 9,300 Solar PV systems with a total capacity of approximately 0.465 MW; and biogas systems for 270 HH and a school.

In the Program of the 6th Constitutional Government 2015-2107, by the Presidency of the Council of Ministers (2015) (Presidencia do Conselho de Ministros (2015) Programa Do VI Governo Constitucional 2015-2017) it is stated that the Government will upgrade and expand the electrical grid in Timor-Leste in order to be able to ensure that reliable electricity is supplied 24 hours a day to the whole country. The Government feels that complete rural electrification is one of the foundations for Timor-Leste's economic growth and that it will provide massive social benefits to its citizens.
The other pillar of the Government's electricity agenda is "renewable energies" that will need to be applied based on a detailed costs and benefit analysis. The Government plans to continue to set up solar and wind power energy facilities, mainly in remote rural areas as these are easy to install and can provide up to 10% of Timor-Leste's energy needs. It is also planning to construct wind farms in Ossu and Bobonaro, and to connect these to the National Grid. A Solar Centre will be built in Hera as well to reduce dependency on fuel.
As part of the Programme on Forests and Land and Sea Conservation Zones the Government aims to replace firewood use with alternative energy sources such as the "fugaun rai-mean"/ fuel efficient cooking stove project.

4.3 TVET Education

One of the main pillars of TVET Education Policy in Timor-Leste is the National Qualifications Framework "Estrutura Kualifikasaun Nasionál" that provides qualifications for accredited training and training providers. National Certificates provided are in the areas of Administration, ICT, Financial management, Agriculture, Automotive, Training and Assessment, Construction, Carpentry, Plumbing, Tourism, Media and Communication, Electricity, Hospitality, Tourism, Small-scale Solar Systems, Rural Clean Water Supply, etc.
A Technical and Professional Education and Training Plan (Plano de Formação e Educação Técnica e Profissional para Timor-Leste, 2012) was endorsed and implemented in 2012, to develop the TVET Education sector. This training system will give Timorese the skills to take up job opportunities in the petroleum, tourism and hospitality, agriculture, construction, maritime and vehicle sectors.
In the Program of the 6th Constitutional Government 2015-2107 (2015) it is stated that the Government strives to continue to:

I. Support the National Traineeship System with the support of the new National Council for Skills, Employment and Productivity. This system will place students training in companies, while encouraging those companies to develop a skilled workforce.

II. Support a training system that encourages the delivery of quality training by government, industry, community and non-government accredited providers.

III. Expand the national qualifications standards to include all major occupations and ensuring national curricula and materials for all registered training programmes.

Besides this a Learning Resource Development Centre has been instated and is working to "raise professional standards of trainers and provide teaching and learning materials to accredited training providers, including Technical High Schools and Polytechnics."

The Government also plans to establish Government and non-Government Municipal Skill Centers providing accredited training, career guidance and vocational advice, etc., as well as Secondary Technical and Vocational Schools for secondary students and by means of forming partnerships with strategic development sectors such as agriculture, fisheries, tourism and energy.

Related with Higher Education the Government plans to:

1. "Implement standards and criteria ensuring the quality of higher education, guaranteeing that every national qualification is recorded in the National Qualifications Framework.
2. Continue to develop and support the National Agency for Academic Assessment and Accreditation (ANAAA), which is responsible for determining standards and criteria that guarantee quality higher education.
3. Establish three Higher Polytechnic Institutes, as well as a Fishing Academy.
4. Implement a sound quality assurance system, recording all national qualifications in the National Qualifications Framework.
5. Build a modern compound for the Faculty of Engineering, in Hera.
6. Develop and support the activities of the National Science and Technology Institute to carry out investigations and research involving applied sciences.
7. Promote the connection between Technical and Vocational Secondary Education and Technical Higher Education.
8. Develop the Institute for Training of Teachers and Education Professionals (INFORDEPE), centered on the continuous training of teachers.
9. Regulate the equivalence regime for academic degrees and other qualifications in terms of national courses.
10. Promote the participation by national authorities in academic and school activities at every level."

(Programa Do VI Governo Constitucional 2015-2017, 2015)

5.0 Consultation Analysis

5.1 Training Needs and Gaps Analysis (TNGA)

The following table summarises the needs identified based on group discussions:

Sustainable Energy Sector	**Skills identified –Group 3**	**Identified Institutions offering/capable of offering trainings in SE related areas:- Group 4**
1, Solar PV 2. Biogas 3. Biofuel 4. Wind energy 5. Hydro-energy 6. Community training	• Technical management and institutional training for SE technologies • Technical – manufacturers for SE • Analysis skills to analyse which energy sector is most appropriate • Engineering skills Technical knowledge • Research and Development • Training for Government Staff	Accreditation is provided by The National Labour Force for Development Institute (INDMO) under the Secretariat of State of Professional Training and Employment (SEPFOPE) holds mandate (as decreed by Timor-Leste law in 8/2008) for the development and implementation of Vocational training policies, and the definition of standards of skills and national certification system • EDTL/ DNR (National Directorate for Energy) • CNFPB (ex. SENAI) (National Centre for Professional Training Becora) • Centro Nacional de Emprego e Formação Profissional (CNEFP - TIBAR) (National Centre for Employment and Professional Training) • STVJ (5) Sentru Treinamento Vokasional Juventude (Youth Vocational Training Centres) • CT. Visaun Foin Sae (biogas and biofuel) Youth Training Centre • CT bamboo/ Training Centre for Bamboo (furniture and handicrafts) • Centro Treinamento Don Bosco Comoro (Don Bosco Training Centre, Comoro 'religious') http://www.donbosco.tl/donbosco//node/41 and http://www.dbtimorleste.org/ • LABEH (Labeh Vocational School of Languages and Humanities) • ETDA (East Timor Development Agency) Training Centre http://www.etda.tl/ • DIT (Dili Institute of Technology) http://dit.tl/ • Haburas Hera Community based training

		centre • IADE (Institute for Assistance to Business Development)
Climate Change Adaptation Sector	**Skills identified–Group 1**	**Identified Institutions offering/capable of offering trainings in CCA related areas:- - Group 2**
1. Food Security 2. Water Security/Watershed management 3. Human Health 4. Natural Disasters 5. Forestry, Biodiversity, Marine Ecosystems 6. Livestock 7. Infrastructure 8. Oil and Gas 9. Capacity Development	1. Food Security - Extension workers specific for food security, management skills, Technical skills 2. Water Security/Watershed management - GMF (community groups), SDF, water specialist/ engineer, laboratory specialist 3. Human Health - Environmental health skills and knowledge, knowledge on how to prevent spread of climate change related diseases 4. Natural Disasters - TOT for disaster risk management at community level, focal points at all levels (national to local), weather forecasting skills 5. Forestry, Biodiversity, Marine Ecosystems – Management skills for	Ministry of Agriculture (MAF) • UNTL (agriculture) (National University of Timor-Leste) • CNFPB (ex. SENAI) (National Centre for Professional Training Becora) • ETDA (East Timor Development Agency) Training Centre http://www.etda.tl/ • UNPAZ (University da Paz) • DIT (Dili Institute of Technology) http://dit.tl/ • Centro Treinamento Don Bosco Comoro (Don Bosco Training Centre, Comoro 'religious') http://www.donbosco.tl/donbosco//node/41 and http://www.dbtimorleste.org/ • STVJ (Sentru Treinamento Vokasional Juventude (Youth Vocational Training Centres) • SDC – Centro de Ensino e Treinamento "Servos de Cristo" "religious" (Centre for School and Training SDC) • ISAT – Industry, Safety, Assessment and Training. Povider of training and employment http://isat.tl/

	marine management, forestry engineers 6. Livestock – Skills to secure animal health 7. Infrastructure – Bio-engineering expertise 8. Oil and Gas – Expertise to reduce oil and gas production 9. Capacity Development – ToT for AC/refrigeration	
Project Management/administration skills were also identified across both areas.		

5.2 Discussions and Recommendations

- Need to obtain more information from training providers regarding programmes currently offered.
- National and internationally accredited programmes already overseen by INDMO in Timor-Leste – issue was raised on relevance/need for mutual recognition across countries. 26 training centres have been accredited by INDMO and SEPFOPE so far, and their data is available at INDMO.
- Watershed management training is very important to achieve climate change adaptation.
- Soft skills such as gender sensitive approaches should also be included in trainings.
- When we talk about Climate Change Adaptation, youths need to be involved as much as possible.
- Need to follow the education and training standards that are there already. If we want to develop new trainings, we need to work together with INDMO (for accreditation, qualifications, certificates), because there are processes and standards in place already.
- Need to gauge sustainability of future training programmes and also link supply to demand.
- Important to consider language barriers as an important issue to overcome in any vocational or technical education and training program.
- Involve as much as possible staff in consultations and also as beneficiaries of training/ capacity development since they are steering national level climate change initiatives
- Collaborate with the LMCCAP (Locally Managed Climate Change Adaptation Program) Network, or Climate Change Adaptation Working Group to identify synergies with INGO's, GO's and Local NGO's informal training programmes.

5.3 Consultation Outcome:

Present and future market demand for TVET in Timor-Leste has been identified and existing training supply initially identified but needed for further elaboration. The priorities for future project activities will need to be narrowed at the Regional Inception Meeting.

EU PacTVET could help with specific issues related to CCA and SE as well as up-skilling identified training provider(s) in Timor-Leste. It will move training away from "ad-hoc" project based "participation" to a more sustainable model where training is embedded in qualifications and linked with existing educational providers. However, this will clearly need to be done closely under the oversight of the National Accrediting body, The National Labour Force for Development Institute (INDMO) under the Secretariat of State of Professional Training and Employment (SEPFOPE).

By providing a "skill-set" approach to CCA and SE training EU PacTVET could go some way to providing educational linkages to economic priorities and job creation – especially in the areas of renewable energies such as solar and in project management and conservation as funding for projects in these areas is set to continue. EU PacTVET can also help with food security issues from a community-based subsistence living to resource management and conservation on a professional level.

Appendix 1: Participants' List

REPÚBLIKA DEMOKRÁTIKA TIMOR-LESTE
Ministériu Komérsiu, Indústria no Ambiente
Diresaun-Jéral Ambiente

No	Name	Organization	Position
1	Paulo Amaral	Halarae	Director
2	Roni Pati Tpoi	World Vision	Technical Specialist
3	Letigia H. Corbafo	DRBFC/ MPTWC	Technical Professional Engineer
4	Tessa Koppert	USP	ICC
5	Basilio F. Mendonca	CNFP-Becora	Chief of Department
6	Olimpia G. Pinto	CNFP-Becora	Staff
7	Emiliano D. Lemos	LABEH	Staff
8	Ipolito da Costa	MAP	National Director
9	Isabel F. De Lima	SEPFOPE-INDMO	Director
10	Antonio Deo Da Cruz	MAP/DNIGA	Staff
11	Yusuke Fujiwata	JICA/MCIE	International Advisor
12	Hugo Trindade	CAMOES/GCCA-TL	General Coordinator

13	Luciano Hornay	DNER/EDTL	National Director for Renewable Energy
14	Hermingildo M. Gomes	DGSE-ME	Staff
15	Nonato Soares	DGA	Advisor
16	Graciana Sarmento	Luta Hamutuk	Staff
17	Gilberto Soares	Luta Hamutuk	Staff
18	Mario Ximenes	DNAC	National Director
19	Augusto da Costa	STL (Suara Timor-Lorosae)	
20	Zelia A. Maria	DNAC	Staff
21	Joao Corbafo	Oxfam	Staff
22	Ana Paula Da C. Xavier	ISAT	Training and Business Coordinator
23	Domingas da Silva	SEPFOPE-DNRH	Vocational Training
24			
25	Luis da Cunha	Mercy Corps	PM
26	Adalfo da Costa	DNGD	
27	Julito Maia	DNGD	

28	Angela Magalhaes	DNAC	Staff
29	Josefina Clara	DNAC	Staff
30	Natalia Sarmento	DNAC	Staff
31	Ana Blandina dos Santos Ximenes	UNITAL	Staff
32	Grace Natalia Lopes	UNITAL	Staff
33	Isabel Fernandes	Radio Timor Leste	Journalist
34	Faustina B. Araujo	Radio Timor Leste	Journalist
35	Francisco Cancio	Youth Vision	Director
36	Matius Soares Maia	Raebia TL	Program Director
37	Mateus Pinto	UNITAL	Vice-Rector II
38	Joao do Carmo de Fatima	MAE-DNTOP	Official -NPUC
39	Andreas Bambang N	STJV Bario-Pite	Trainer
40	Abilio A. L. Sarmento	MAP-Irrigation	Staff
41	José Domingos Martins	DNER/EDTL	
42	Isac Fontes P.	DNCQA	Staff

43	Peter Pechacek	MCIA/DNPRB	Advisor
44	Domingas S. Nunes	Luta Hamutuk	Staff
45	Ivone Dikson G. Ximenes	Fundasaun Alola	Coordinator of teacher training
46	Lucia Ximenes	Media	Journalist
47	Lidvina T. P. Tilman	INDMO/SEPFOPE	Project Officer
48	Erfina F. Soares	LABEH-YTC	Director
49	Martinus Nahak	DNSA-MOPTC	Chief of Department for Technical Assistance Programme
50	Acacio C. Amaral	FA-UNTL	Dean
51	Graziela Xavier	Mercy Corps	Project Manager
52	Abrao J. de Sa	DNAC	Staff
53	Domingos Pedro D. Santos	IOB	Teacher
54	Agustinho Ximenes	NAO/MOFAC	Program Officer Rural Development
55	Leonora da C. da Cruz	Raebia TL	Assistant Program Director
56	Jose de Jesus	ACF	Assistant Program Director
57	Torrey Peace	CRS	Country Manager
58	Gil H. Boavida	REDE HASATIL	General Coordinator

59	Benjamin dos Santos	Tempo Semanal	Journalist
60	Amenica M. Fernandes	DNCPIA	Chief of Department for Environmental Education and Awareness
61	Mario da Silva	HASATIL	
62	Carlito Sarmento	DNAC	Staff
63	Auxiliadoro Coelho	DNM-MPRM	Staff
64	Hugo L. Cat	UNDIl	Chief of Research
65	Mirko Gamez	GCCA-GIZ	Program Coordinator
66	Mericio Perreira	Matadalan	Journalist
67	Lorenso F. Martins (?)	DNCN	Staff ABD
68	Luis Belo	Ozone Unit	Secretary
69	Expedito Belo	Second National Comm. - UNDP	
70	Shanti Karanjit	UNDP	Climate Change Advisor
71	Marcia Kelly	ISAT	Project Director
72	Augusto M. Pinto	MCIA-DNAC	NFP-CBD
73	Nelson Madeira	DNAC-MCIA	Chief of Climate Change Dept.

Pacific Community
Communauté du Pacifique

EUROPEAN UNION

USP
THE UNIVERSITY OF THE SOUTH PACIFIC

EU PacTVET

European Union Pacific Technical and Vocational Education and Training on Sustainable Energy and Climate Change Adaptation Project

Tonga Training Needs and Gaps Analysis

Prepared by Helene Jacot des Combes
EU-PacTVET Senior Lecturer August 2015

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Acknowledgment

Organising a successful stakeholders consultation in a country is a complex exercise and requires an excellent knowledge of the country, in particular the 'who does what' aspects, and a broad communication and exchange network with the stakeholders. I was very fortunate to have the support of the USP EU-GCCA In-Country Coordinator in Tonga, Mr. Tevita Fakaosi, who arranged the logistics for this workshop and contacted the main stakeholders beforehand. The success of this workshop is the result of his hard work.

However, the key for the success of a consultation such as this one is the involvement and the enthusiasm of the participants. Once again, I was very fortunate with the level of engagement of the different participants and their interest for the project. The atmosphere of cooperation between the different stakeholders was also very supportive to identify the training needs and the best way to address them in the country. I would thus acknowledge the participants of the consultation workshop and give them many thanks for their hard work.

1. Background

The EU-PacTVET (European Union Pacific Technical, Vocational Education and Training) is a European Union (EU) funded project under the broader Adaptation to Climate Change and Sustainable Energy Program (ACSE). It is component three (3) of this ACSE Program.

Tonga as one of the Pacific- African Caribbean Pacific (P-ACP) countries and is affected by climate change in varying degree of adversity, from the erosion of coastlines up to the impacts on agriculture inland. Based on Tonga Second national Communication (2012), temperature, changes in rainfall patterns, tropical cyclone frequency and intensity as well as sea level rise are the main future climate risks faced by the country.

Based on Tonga's second national communication to UNFCCC, in 2000, the Tonga GHG emissions accounted for about 94.93 Gigatonnes equivalent CO_2 ($GgCO_2$-e), "Transportation" accounted for 41.89%, "Residential" was 32.19%, "Energy Transformation" sector accounted for 19.66%, "Agriculture, Forestry & Fishing" was accounted for 3.97, 1.22% and 1.07% for the "Commercial & Institutional" and "Manufacturing & Construction" respectively (Kingdom of Tonga, 2012). Although these emissions are very low at a global scale, the Kingdom of Tonga committed in its Joint National Action Plan to a 10% reduction of GHG emissions based on 2000 levels by 2015 (Kingdom of Tonga, 2010a) and to achieving 50% of grid-based electricity supply from renewable energy by 2012 in its Tonga Energy Road Map (Kingdom of Tonga, 2010b). This commitment is a response to the priorities of many governments in the region mentioned in different regionally endorsed frameworks, such as the wider Pacific Plan and the more specific Pacific Islands Framework Action on Climate Change (PIFACC) and the Framework Action on Energy Security in the Pacific (FAESP) and individual national policies.

Efforts in addressing energy security and climate change adaptation challenges are ongoing through various regional and national projects. Regarding climate change mitigation, Tonga focuses on solar energy production. Climate change adaptation projects are common in the Kingdom of Tonga, both regional and national. The Pacific Adaptation to climate change (PACC) and USP-EU-GCCA, are but examples of the regional programs.

1.1. Mission Objective

The purpose of the in-country-mission is to:

A. Identify the present and future market demand
B. Map out the existing training supply in Tonga

2. Schedule of Consultation Events

The consultation in Tonga took place from August 11th to 13th 2015. The first two days were dedicated to the national consultation workshop which brought together about 20 participants from different sectors and the remaining day focused on face to face interviews or site visits (details in appendix 1).

2.1. Project Outline and Presentation

During the various consultation meetings, including the one day consultation workshop, the opening, an outline of the EU-PacTVET was made, with emphasis on the following aspect of the project:

a. Rationale - current scenario with regards to SE and CCA in the P-ACPs and the issues emanating from those scenarios. It was focused down to the case of Tonga, where there a lot of dependency on fossil fuel for power production and transportation. On the climate change side of the coin, the P-ACPs are more vulnerable to climate change, but have the least capacity to respond to these.
b. How the EU responded to these issues and the approach it took by focusing on building the capacity and empowering the capacities through benchmarking and the aim of setting standards of competencies and accreditation.
c. The objective and the purpose were state as being taken to try and address the issues
d. The Key Result Area. Each of the 4 KRAs were outline and it was made know to the stakeholders that one of the activities under KRA 1 is this in-country-assistance on consultative workshop and one-on-one consultation to do a training needs and gaps analysis (TNGA). Activities that need to be conducted in the hope of achieving each of these KRAs were briefly outlined.
e. A brief overview of the budget. This was to give the stakeholders a glimpse of the allocation from the €6.1 million
f. And finally, it was emphasized that the consultations are important in that the stakeholders need to identify it needs so that they could be noted as one of the activities that needs support.

3. Status Quo – Energy, Climate Change and TVET in RMI

This section is to establish the baseline as to what each of the sectors are engaged in and how does each of these sectors are affected by climate change and how sustainable energy practices are being part of their sectoral policies.

The training needs and gaps identified would be outlined in the latter sections, but outline below is the summary of the different sector's functions and relationships with SE and CCA.

3.1. Energy

According to Tonga's second national communication (2012), in 2000, the total greenhouse gas emissions were 255.33Gg, 95% of this amount being carbon dioxide (CO2). At the same time, the net removals were 1735.36Gg of CO2, reflecting that Tonga was a net sink of CO2 in 2000. In 2000, imported petroleum products accounted for 75% of Tonga's energy supply, with 25% coming from biomass and off-grid solar PV. All grid-supplied electricity, which accounts for over 98% of electricity used in Tonga, was generated using imported diesel fuel (Kingdom of Tonga, 2012).

Coordination and management of the energy sector is done by the Ministry of Environment, Energy, Climate Change, Disaster Management, Meteorology, Information and Communication through its energy division. This Ministry coordinated and monitor the implementation of the Tonga Energy Road Map 2010-2020 (TERM). However, following the approval of the target of 50% for the part of electricity produced by renewable energy, of the Prime Minister established a Cabinet Sub-Committee on Renewable Energy (CSCRE), which he also chaired. The CSCRE was tasked with evaluating renewable options and to pursue possible funding sources with the country's development partners. The membership of the Committee comprised the Prime Minister (Chairman), Minister of Lands (responsible Minister for Energy), and the CEOs of the Ministries of Finance, Lands, and Environment, together with the Chairman of the Electricity Commission, the Prime Minister's Economic Advisor and the Renewable Energy Coordinator.

For on-grid electricity services, Tonga Power Limited (TPL), a company fully own by the Government of Tonga, has the concession and operates four independent grids in Tonga: the largest on Tongatapu, and three smaller grids on the main islands of the Vava'u, Ha'apai and Eua island groups (Kingdom of Tonga, 2010b).

Other policy documents mention energy issues, especially the Joint National Action Plan (JNAP, 2010a). This JNAP, under its fifth goal: Technically reliable, economically affordable and environmentally sound energy to support the sustainable development of the Kingdom, identifies targets regarding the greenhouse gas emissions in Tonga. Based on this strategy, the target is a 10% reduction of GHG emissions based on 2000 levels by 2015 through implementing Renewable Energy and Energy Efficiency programmes (Kingdom of Tonga, 2010a).

3.2. Climate Change

Climate change is an important issue for Small Island Developing States, including Tonga. Tonga has a National Climate Change Policy which was approved by Cabinet in 2006 and is currently ready for reviewing by stakeholders from Government, the private sector and non-government organizations. In parallel to this policy, Tonga was the first country in the region to develop a Joint National Action Plan integrating climate change and Disaster risk management issues (Kingdom of Tonga, 2010a).

Based on Tonga Second national Communication (2012), temperature, changes in rainfall patterns leading to droughts and floods, tropical cyclone frequency and intensity as well as sea level rise are the main future climate risks faced by the country. The main sectors affected by these impacts are the water sector, agriculture, a major economic sector in the country, coastal areas, fisheries and health (Kingdom of Tonga, 2012). It is important to note that Tonga is also exposed to several natural hazards, including geological hazards, making some of the sectors mentioned earlier even more vulnerable to climate change impacts. This was the rational for the JNAP.

3.3. Education Department – TVET Division

In Tonga, Technical and Vocational Education and Training (TVET) is administered by the Ministry of Education and Training. TVET is seen as one of the highest priorities in Tonga, and as such is included in the Tonga Education Lakilaki Policy Framework 2012-2017 (Tonga Ministry of Education, 2012).

There are several TVET providers in Tonga, either under the government system, under the Free Wesleyan Church, the Catholic Church or managed by private providers. They include: the Tonga Institute for Science and Technology (TIST), the Tonga Institute of Higher Education (TIHE), the Tonga Maritime Polytechnic Institute, The Tupou Tertiary Institute (TTI), the Áhopanilolo Technical Institute, the Queen Salote Nursing Institute, and USP through its Pacific TAFE program. Some TVET programs are accredited by the Tonga National Qualification and Accreditation Board (TNQAB). All TVET providers are members of the Tonga Association of TVET (TATVET).

The main TVET programs offered in Tonga focus on: solar energy, carpentry, plumbing, refrigeration and air conditioning maintenance, electrical engineering, automotive (TIST), maritime training, agriculture training (TIHE), architectural technology, IT, automotive engineering, hospitality and carpentry (TTI), commercial cookery, hospitality, fashion and design, arts and culture, age care and community care (Áhopanilolo Technical Institute) and Administrative Management (USP).

4. Consultation Methodologies

In trying to maximize output various methods of consultation were employed in this in-country mission. Determining which methodology to use depend on various factors ranging from availability, distance and timing. The following are the methods employed to capture the required data during the in-country mission:

4.1. Consultative Workshop/Meeting (TNGA)

A consultative workshop is a consultation with stakeholders in a venue where the agendum for discussion or consultation is done for all at once. This was the methodology employed for two days during this in-country mission. This methodology was employed because it used the forum to draw ideas and consolidates them.

4.2. One-to-one Consultations (Interview)

In a situation where stakeholders cannot make it to the consultative gatherings, due to other commitments, or in order to collect more precise information, a one-to-one or face-to-face meeting or interviews were done.

4.3. Internet – Online

This was used for searching for further information or publication of Reports or Policies. Not only that but to confirm or double-check on information given.

4.4. Desktop Literature Review

This forms the basis for evaluative report of information found in the literature related to technical, vocational education and training with the subject of sustainable energy and climate change as the content. Various literatures were consulted, within the education, energy and climate change sectors, on policy frameworks and national action plans or development strategic plans. Most Policy frameworks (regional and national) were reviewed and those were used as the basis for consolidating future SE and CCA demands or needs in Tonga.

5. Relevant National Policies and Frameworks

At the regional level, the endorsement by the Forum Leaders of the Pacific Islands Framework for Action on Climate Change in 2005 and the Framework for Action on Energy Security in The Pacific (FAESP) in 2010, demonstrated that sustainable energy and climate change adaptation are therefore top priorities for Pacific Island governments.

Each country in the region also has national policy frameworks and their Action Plan that set out principles and suggested initiatives designed to guide and support the development and implementation of national activities consistent with the these policy frameworks' visions and goals.

5.1. Education Sector

In Tonga, the education sector is guided by the Tonga Education Lakalaka Policy Framework (TELPF) 2012-2017. However, there is a very limited mention of TVET in this policy. As a result, a specific policy framework for TVET, the Draft National TVET Policy Framework 2013–2017, is in place to complement the TELPF with regards to TVET. This specific policy framework for TVET may also be related to the importance given to TVET education in the Tonga Strategic Development Framework (TSDF) 2011–2014 that has for its fifth objective: **Appropriately skilled workforce to meet the available opportunities in Tonga and overseas,** by delivering improved Technical and Vocational Education and Training'.

In the TELPF, TVET is not considered as a specific sector but is included in higher education. Similarly, the importance of the TVET sector indicated in the Tonga Strategic Development Framework is not translated in the TELPF. These issued are addressed in the TVET Policy Framework, the need to increase accessibility of disadvantaged groups is also highlighted as one of the key goals in this framework

Goals for TVET education in Tonga are listed in the Draft National TVET Policy Framework 2013–2017 and include:

- training focused on improving national productivity;
- strong partnerships with employers and industry;
- resource allocations based on the best investments of public funds;
- increased participation and equity in training;
- development of the quality of training outcomes; and
- management of TVET as a national system.

5.2. Energy Sector

As mentioned in a previous section, the energy sector in Tonga is guided by the National Renewable Energy Policy Framework adopted in 2006 and the Tonga Energy Road Map (TERM), endorsed in 2010. The full title of the TERM: 'Tonga Energy Road Map 2010-2020: Ten Year Road Map to Reduce Tonga's Vulnerability to Oil Price shocks and Achieve an Increase in Quality Access to Modern Energy Services in an Environmentally Sustainable Manner' highlights the main objective of this policy. Several approaches are used to reach this objective, including:

- Improvements in Petroleum Supply chain to reduce the price and price fluctuation of imported petroleum products;
- Efficiency of conversion of petroleum to electricity (i.e. increases in efficiency and reduced losses at TPL);
- Efficiency of conversion of electricity into consumer electricity services (Demand Side Management measures);
- Replacing a portion of current or future grid-based generation with renewable energy.

The energy sector, and more precisely the importance of increasing renewable energy in electricity production in Tonga is also mentioned in other policies such as: the Tonga Climate Change Policy (2006); The Tonga Joint National Action Plan (JNAP, 2010a).

I terms of reduction of GHG emissions and increase of renewable energies in electricity production in Tonga, the TERM and the JNAP are clear on the objectives:

- Reduction of GHG emissions based on 2000 levels by 10% by 2015 through implementing Renewable Energy and Energy Efficiency programmes.
- 50% of electricity produced by renewable energy by 2013 (Kingdom of Tonga, 2010a).

The goal 5 of the JNAP: 'Technically reliable, economically affordable and environmentally sound energy to support the sustainable development of the Kingdom' has the following objectives:

- 10% reduction of GHG emissions based on 2000 levels by 2015 through implementing Renewable Energy (RE) and Energy Efficiency (EE) programmes.
- •Improve energy security through improved planning and response mechanisms.

5.3. Climate Change

Although Tonga has a National Climate Change Policy since 2006, the objectives are listed six goals of the JNAP are listed in the Joint National Action Plan (JNAP, 2010a). Six goals have been identified:

1. Improved good governance for climate change adaptation and disaster risk management (mainstreaming, decision making, organizational and institutional policy frameworks).
2. Enhanced technical knowledge base, information, education and understanding of climate change adaptation and effective disaster risk management.
3. Analysis and assessments of vulnerability to climate change impacts and disaster risks.
4. Enhanced community preparedness and resilience to impacts of all disasters.

5. Technically reliable, economically affordable and environmentally sound energy to support the sustainable development of the Kingdom.
6. Strong partnerships, cooperation and collaboration within government agencies and with Civil Societies, Non-Government Organisations and the Private Sector.

Other policies are available, focusing on specific aspects such as: the National Biodiversity Strategic Action Plan (NBSAP), adopted in 2006, and the National Invasive Species Strategy and Action Plan (NISSAP) that addresses much of the issue towards invasive species in Tonga and was adopted in 2013. Other specific plans focusing on mangrove management, as well as an environment management act are also in place

6. Consultation Analysis

During the consultations that were made in Nuku'Alofa (in the Consultative workshop), face-to-face consultation and through online research, issues regarding technical, vocational education and training in Tonga were raise. Common ones are summarized under four themes: training of trainers, communicating climate change causes and impacts, using Tongan culture and references, development of TVET programs on renewable energy, especially solar and biogas, and development of TVET programs on climate change adaptation project management, with a focus on training the communities to manage their own projects. There is also a strong demand to work whenever possible to include these new topics in already existing programs.

Most of these issues are similar to those encountered in other countries in the region and some of the solutions may be thus more relevant when implemented at the regional level, for example training of trainers programs.

The following are some of the issues, needs and gaps that were raised during the consultation to improve the TVET offer on climate change and sustainable energy by technical, vocational education and training institution in Tonga and these are categorized under five different groups as present in the following matrix.

6.1. Training Needs and Gaps Analysis (TNGA)

This method was used to determine whether training needs related to sustainable energy and climate change exits or not in Tonga. It is a systematic approach to identify status quo of TVET in Tonga and to identify if the objectives/goal of TVET in Tonga are forthcoming or not. If there are needs and gaps identify that could bring the present status of TVET to a desired state that will meet its goal, then there is a training need. In the case of Tonga, the key points in terms of gap analysis were:

- Lack of good communicators on climate change, able to use Tongan culture and context and to adapt their message to the target audience.
- Lack of project management skills, from data collection to implementation, monitoring and grant application, including for community people so they can implement their own projects.

- Not enough technically skilled people to maintain sustainable energy projects and support the national target. This is particularly true for PV systems, a main renewable energy source for Tonga but with very limited accredited PV installers.
- Lack of trained people to support bioenergy projects.
- Lack of qualified people in energy efficiency, energy audit, etc.
- Lack of qualified people for automotive engine tuning to reduce emissions.
- Limited number of trained TVET teachers.
- Lack of skilled people to support policy enforcement (building codes, energy efficiency, etc.)
- Lack of pathways to recognize and better use skills developed at community level.
- Not enough sustainable training, mostly ad hoc ones. For example, it would be very useful to assess community training programs and include the most relevant aspects in one sustainable training programme

6.2. Present and Future Market Demand

In consultation with the stakeholders in Tonga, a list of workforce training needs and priority sectors for skill development were captured. This is best summarized table formats. The different types of skills (knowledge-based; skills based on ability or aptitude and those skills developed throughout lifetime and experience) required to be able to adapt to the adverse effects of Climate Change and use energy in a sustainable way are summarized in the following table. These skills were not associated with any particular subject within the TVET institutions but were given in general as some of the skills required. Due to time constraint, in-depth training needs and gaps analysis that is course-specific must be conducted, where each course contents must be analyzed.

Type of Skills	*Skills Description*		
	Sustainable Energy	*Climate Change Adaptation*	*Disaster Risk Management*
Knowledge-based Knowledge of specific subjects, procedures, and information necessary to perform particular tasks Such knowledge-based skills are acquired through education, training, and on-the-job experience			
	Grid connected systems maintenance skills	CC Adaptation data collection and analysis skills	Disaster risk reduction (DRR) skills
	Biofuel and biogas installation and maintenance skills	Resource management skills	Disaster Management skills
	Advanced mechanics for hybrid vehicles	Water management skills	
	Equipment and meters usage and interpretation skills	Coastal management and protection skills	
	Solar PV system installation and maintenance skills	Skills to assess the impacts of CC on different sectors	
	Energy Auditing skills		
	Battery and used equipment disposal skills		
	Legal aspect of energy (policy enforcement)		
	Livestock farming		
Transferable/Functional Skills These are actions taken to perform a task, transferable to different work functions and industries and the skills are based on ability and aptitude		Project Concept or Proposal writing skills (incl. grant seeking).	
		Project Management skills	
		Communication Skills	
		Analyzing skills	
		Decision-making skills	
		Community engagement skills	
		Planning skills	
		Finance management skills	
Personal Traits/Attitude Traits or personality characteristics that contribute to performing work. Such skills are developed in childhood and through life experience		Interpersonal skills	
		Problem solving skills	
		Conflict management	
		Negotiation skills	
		Leadership skills	
		Meeting facilitation skills	

6.3. The Training Supply: TVET Providers

Tonga has several TVET providers, including the Tonga Institute for Science and Technology (TIST), the Tonga Institute of Higher Education (TIHE), the Tonga Maritime Polytechnic Institute, The Tupou Tertiary Institute (TTI), the Áhopanilolo Technical Institute, the Queen Salote Nursing Institute, and USP through its Pacific TAFE program The table in **Appendix 2** outlines some of the various Technical and Vocational Education and Training Institutions and the courses they offer.

6.4. The Identified Training Needs

During the consultation, specific training needs were highlighted and discussed by the participants. They include, for the sustainable energy sector:

Gap/Skill Needed	Level	Duration	Who	Content / Competencies
SOLAR PV installer Carpentry skills Solar system design Solar system maintenance	certificate	short	TIST	• electrical theory and safety • PV (DC) design • building code • grid connected PV standards
WIND O&M technicians Weather forecasting Data analysis	certificate level 3	short to medium	TIST	• wind data interpretation • mechanical theory • turbine maintenance • electrical theory
BIO ENERGIES Fuel crops Livestock farming for biogas Piggery design	certificate	short	TIST HANGO	• crop selection and sustainability • carpentry • waste collection • fuel production • plumbing • gas fitting
ENERGY EFFICIENCY Ventilation design Lighting design Building maintenance	certificate	short	TIST TTI	• energy efficient ventilation • energy efficient lighting selection • optimal building operation • financial return analysis
TRANSPORTATON Vehicle tuning/servicing Oil disposal/recycling Electric/hybrid vehicle maintenance	certificate	short	TIST POUONO	• engine servicing • battery management • safe & environmentally friendly oil disposal • emission analysis
APPLICATION/APPLIANCES MEPS awareness Appliance servicing/safety Spare parts sourcing Energy auditing	certificate	short	TIST	• MEPS promotion • marketing awareness • energy auditing • safety of appliances • payback calculation
POLICY & MANAGEMENT Building inspectors Electrical inspectors Standards and regulations Zoning and mapping Payback calculations	Certificate Diploma	short to medium	TIST USP	• anti-corruption • survey/geo-spatial mapping • develop and maintain national standards • enforcement

For the climate change sector:

Gap/Skill Needed	Level	Training Duration	Who	Content / Competencies
leadership & Good governance in community qualification: Pacific TAFE Certificate on climate change level 3	adult certificate level 3	3 months (40 credits)	Pacific TAFE	• negotiation skills • communication skills • decision-making skills • leadership skills
		3 months (40 credits)	Pacific TAFE	• finance skills • energy use • institutional building
leadership & Good governance in community qualification: Pacific TAFE Diploma on climate change level 35	diploma level 5	3 months (40 credits)	Pacific TAFE	• conduct meetings • problem solving • project proposal writing • planning

These training needs correspond to the identified skill gaps presented in the table in section 6.2.

7. Consultation Outcome

This in-country mission's objectives were to:

A. Identify the present and future market demand in SE and CCA; and
B. Map out the existing training supply for the Republic of Tonga.

Varied TVET programs are offered at present in Tonga by different providers located in different islands. Several of these programmes are accredited by the Tonga National Qualification and Accreditation Board. However, short courses (less than 3 months cannot be accredited under this system. Some programmes are also accredited through USP or recognized by trade associations in New Zealand. The outcomes of this in-country mission thus provided good indications on the priorities for TVET training in Tonga and highlighted the needs for TVET trainings to be accredited.

Because most of the training focusing on climate change and sustainable energy is associated to projects and is not sustainably anchored in TVET institutions, the mapping exercise is incomplete but the main stakeholders to build on to develop a sustainable range of training have been identified and the discussions during the workshop indicates an atmosphere of cooperation between the different institutions that is very encouraging for the future.

One important outcome for this consultation was the clear need for climate change communicators to clearly explain the causes of climate change and the impacts in the different sectors. These trained communicators would be able to use Tongan context and culture to link climate change impacts to the daily situation met by the people.

Similarly, although the need to more trained people to install and maintain renewable energy systems, energy efficiency and the linkages between this issue and the building codes was highlighted.

Finally, the need to recognize the skills of the communities and to sustain the community trainings was mentioned.

Appendix 1: Schedule of Events

Day 1: 11th August: Training Needs and gaps Analysis – Stakeholders Workshop day 1

The workshop took place at the USP Campus in Nuku'Alofa and brought together about 20 participants from the Tonga National Qualification and Accreditation Board, different TVET providers, different ministries, the private sector and NGOs working on climate change. The first day focused on presentations from different stakeholders to set the scene and on discussions on the entry point for climate change and sustainable energy in the existing curriculum and an identifying the gaps.

Activities
Registration
Workshop Opening/Opening Prayer
Welcome and Introduction to Workshop Outline EU-PACTVET Project Outline Rationale Objectives/Purpose Country Expectation
Morning Tea Break
Activities
Gauging Linkages to SE and CCA
Stakeholders Presentations (5 – 7 minutes)
Discussion – "Aspects of each Sector relating to Sustainable Energy and Climate Change – Linkages outlined"
Lunch Break
Continue Stakeholders Presentation
Discussion - "Aspects of each Sector relating to Sustainable Energy and Climate Change – Linkages outlined"
Discussion – "Aspects of each Sector relating to Sustainable Energy and Climate Change – Linkages outlined"
Activities
Afternoon Tea Break
Recap on Day 1
End of Day 1

Day 2 – 12th August: Training Needs and gaps Analysis – Stakeholders Workshop day 2

This second day continues the discussion started in the first day on the gaps and also focused on the existing programs and courses.

Activities
Training Needs and Gap Analysis
Presentation: (Training/Technical) Needs and Gaps Analysis – Basic Outline
Discussion
Plenary Session: *Creating National and Regional capacity and technical expertise to respond to CCA and SE challenges*
Morning Tea Break
Group Work: National training needs in SE and CCA.
Lunch Break

Group Work

1. Sustainable Energy: (RE/Electrical wiring/Energy Efficiency; Refrigeration and Air-conditioning and Sustainable Sea Transportation
2. Climate Change Adaptation: Food Security (Agriculture and Fisheries); Disaster Risk Reduction; Vulnerability and adaptation assessment; Water security and Forestry

Participants are divided into 3 Groups:

Tasks:

Group 1 Discussion Topic: "Gauge out the technical skills required/demanded by the industries in the Tonga, present and future. Rank them in order , from HIGH DEMAND to LOW DEMAND

Group 2 Discussion Topic: "Identify technical Institutions in the country (formal and non-formal) that provide formal and informal technical skills in SE and CCA. List down the following:

i. Courses,
ii. Durations,
iii. Award/accreditation
iv. Equivalent course and accreditation in the region and internationally; and
v. Potential industry(ies) that needs such skills

Group 3: Discussion Topic: "Gauge out the technical skill and knowledge required for communities (both rural/ remote and urban) to be better equipped to adapt to the adverse effects of Climate Change"

Afternoon Tea Break

Matching the industries Demand to the Technical Skills Training Courses Supply

Group 1 ⇖ Group 2 ⇗ Group 3

Group 2 to split up between Group 1 and Group 3 and do the Demand and Supply matching

Group Reporting

i. Group 1
ii. Group 2
iii. Group 3

Matching Demand to Supply Reporting – SPC

END of Workshop

Day 3 – 13th August: Meetings with stakeholders

i. TIST – Mr. Talanoa Hafoka, Principal, Head of the Engineering and Construction School. This was a visit to the TIST campus. In fact, three institutes are sharing the campus and some of the facilities: TIST, the Tonga Institute of Higher Education (TIHE) and the Tonga Maritime Polytechnic Institute (TMPI). For example, some pieces of equipment needed for the training at the TMPI are prepared in the TIST workshop. The TIST campus was built under German aid and some of the machines used for training are also German. Different programmes are offered (carpentry, plumbing, electricity, including PV installation and maintenance, automotive, wielding). There was also a refrigeration and air conditioning program but it has stop because there is no teacher.

The participants' list is provided below

Name	Organisation
Setefano Selui	Catholic Technological Centre
Claude Tupou	Ministry of Education
Roderick Bing	Vavatau Technology
Feteleni Lemani	Vavatau Technology
Mafilate Taufa	Vavatau Technology
Maasi Lepa	Ministry of Environment, Energy, Climate Change, Disaster Management, Meteorology, Information and Communication
Metuisela Falesiva	Ministry of Agriculture, Food , Forestry & Fisheries
Viliami Sisifa	Ministry of Internal Affairs
Sione Nuku Kata	Ministry of Internal Affairs
Talanoa Hafoka	Tonga Institute of Science and Technology
Talo Fuliva'i	Ministry of Environment, Energy, Climate Change, Disaster Management, Meteorology, Information and Communication
Na'a Taiala	Tonga Trust
Ana Koloto	USP Tonga, Campus Director
Fatai Soakai	Ministry of Internal Affairs
Ana Vee'hala	USP Tonga
Nikolasi Fonua	Tonga Power Limited
Vika Fusimatohi	USP Tonga
Solomone Fifita	SPC, Deputy Director Energy
Pauline Moa	Tonga National Qualification and Accreditation Board
Rev. Fisii'hoi	Higher Education & TVET FWC Education System
Tevita Tukunga	Ministry of Environment, Energy, Climate Change, Disaster Management, Meteorology, Information and Communication

Appendix 2: Table of Course Providers and Courses

Course Provided	Duration	Award	Accreditation/Standard
Tonga Institute of Science and Technology (TIST)			
Trade Certificate in Carpentry - Stage 1	14 Weeks	Certificate Level 4	TNQAB
Trade Certificate in Carpentry - Stage 2	13 Weeks	Certificate Level 4	TNQAB
Trade Certificate in Carpentry - Stage 3	13 Weeks	Certificate Level 4	TNQAB
Certificate in Automotive - light vehicle	12 Weeks	Certificate	TNQAB
Plumbing	16 Weeks	Certificate Level 3	TNQAB
Trade Certificate in Electrical Engineering - Stage 1	14 Weeks	Certificate Level 4	TNQAB
Trade Certificate in Electrical Engineering - Stage 2	14 Weeks	Certificate Level 4	TNQAB
Trade Certificate in Electrical Engineering - Stage 3	14 Weeks	Certificate Level 4	TNQAB
PV installation & maintenance (VOCTEC)	1 Week	Certificate of completion	

Course Provided	Duration	Award	Accreditation/Standard
Tupou Tertiary Institute			
National Diploma in Architectural Technology	2 Years	Diploma Level 6	New Zealand Institute of Building Design Association of New Zealand
Certificate in Information Technology	6 Months	Certificate Level 5	
Diploma in Information Technology	1 Year	Diploma Level 5	
Diploma in Information Technology	1 Year	Diploma Level 6	
Certificate in Business	1 Year	Certificate Level 4	
Certificate in Computing	1 Year	Certificate Level 4	
Certificate in Music	1 Year	Certificate Level 4	
Certificate in Architectural Technology	1 Year	Certificate Level 4	
Certificate in Teaching Studies	1 Year	Certificate Level 4	
Diploma in Teaching Studies	2 Years	Diploma	
Vavau Campus			
Certificate in Automotive Engineering	1 Year	Certificate Level 2	
Certificate in Hospitality	1 Year	Certificate Level 2	
Certificate in Carpentry	1 Year	Certificate Level 3	

Course Provided	Duration	Award	Accreditation/Standard
Áhopanilolo Technical Institute			
Commercial Cookery	1 Year	Certificate III and IV	
Accommodation Services	1 Year	Certificate III and IV	
Fashion & Design	1 Year	Certificate III and IV	
Art, Design and Culture	1 Year	Certificate III and IV	
Aged care and home & community care	1 Year	Certificate III and IV	

Course Provided	Duration	Award	Accreditation/Standard
Tongan Institute of Higher Education			
Diploma in Information Systems	1 Year	Diploma	USP
Certificate in Information Systems	1 Year	Certificate	USP
Diploma in Computer Science	1 Year	Diploma	USP
Certificate in Computer Science	1 Year	Certificate	USP
Diploma in Accounting	1 Year	Diploma	
Certificate in Accounting	1 Year	Certificate	
Diploma in Agricultural Sciences		Diploma Level 5	
Certificate in Agricultural Sciences		Certificate Level 4	

Training Providers

Table TP1 provides information on the two training institutes identified in the desk top study. Based on his experience with the VOCTEC project GSES project team member Mr Gavin Pereira completed the survey form on behalf of the Tonga Institute of Science and Technology (TIST)). It was sent to them for confirmation but they did not respond. The TIST capabilities as estimated by Mr Pereira shown in Table TP2.

Table TP1: Training Institutes Identified in Tonga

Institute	Contact	Position	E-mail	Phone
Tonga Institute of Science and Technology	Mr. Nonga Soakai	Principal	soakai.n@gmail.com	(676)21213
APTC Tonga campus			ofa.kiutau@aptc.edu.au	+676 25648

Table TP2: TIST Capabilities estimated by Gavin Periera

Does your TVET have any department that could conduct any of the following types of courses	Yes or No?	If Yes, please state which department	Contact Person	Contact E-mail
Renewable Energy Technologies ?	Yes	Electrical	Emeline Vakalahi	linekioa@gmail.com
Grid Connect PV Systems?	Yes	Electrical	Emeline Vakalahi	linekioa@gmail.com
Off Grid PV Systems?	Yes	Electrical	Emeline Vakalahi	linekioa@gmail.com
Solar Hot water?	Yes	Electrical	Emeline Vakalahi	linekioa@gmail.com
Wind Power Systems?	Yes	Electrical	Emeline Vakalahi	linekioa@gmail.com
Hydropower?	Yes	Electrical	Emeline Vakalahi	linekioa@gmail.com
Micro-Hydro Power?	Yes	Electrical	Emeline Vakalahi	linekioa@gmail.com
Biomass?	Yes	Electrical	Emeline Vakalahi	linekioa@gmail.com
Biogas?	Yes	Electrical	Emeline Vakalahi	linekioa@gmail.com
Geothermal	??	Electrical	Emeline Vakalahi	linekioa@gmail.com

Others technologies?	Yes	Electrical	Emeline Vakalahi	linekioa@gmail.com
Energy Efficiency?	Yes	Electrical	Emeline Vakalahi	linekioa@gmail.com
refrigeration?	Yes	Mechanical	Emeline Vakalahi	linekioa@gmail.com
air-conditioning?	Yes	Mechanical	Emeline Vakalahi	linekioa@gmail.com
Electrical wiring?	Yes	Electrical	Emeline Vakalahi	linekioa@gmail.com
efficient land and water transport systems?	no			
Energy sector planning and management?	no			

During the VOCTEC project three trainers from TIST were trained to conduct off-grid solar training courses and they have since conducted the VOCTEC course. Details are provided in Table TP3.

Table TP3: Trainers trained under VOCTEC project

Institution	Name of Trainer	Contact Number	Email	Course Type	Date Trained	Trainings Delivered
Tonga Institute of Science and Technology	Emeline Vakalahi	+ 676 776-3844	linekioa@gmail.com	Small Off Grid PV systems	Jan-13	1
Tonga Institute of Science and Technology	Maka Lelenoa	+ 676 776 3129	lelenoam@gmail.com	Small Off Grid PV systems	Jan-13	1

From the experience of the project team and from survey response 6 courses were identified as being conducted in Tonga in the last 5 years. Information on the courses is contained in Appendix 14.

In Summary these included;

- Design and Install Grid connect PV Course
- VOCTEC Technician Course 2
- Household energy survey training for surveyors and power utility staff-
- ADB/GEF/Australia Promoting Energy Efficiency in the Pacific (phase 2)
- Operations and Maintenance of Grid connect Systems
- Tonga Energy Roadmap workshop

The grid connect PV course was conducted by GSES, a company which is a Registered Training Organisation in Australia. Those who passed are eligible to apply for industry certification under the Pacific Power Association (PPA) and Sustainable Energy Association of Pacific Islands (SEIAPI) certification and accreditation program.

The VOCTEC course had the intention of capacity building.

Pacific Community
Communauté du Pacifique

EUROPEAN UNION

USP
THE UNIVERSITY OF THE SOUTH PACIFIC

EU PacTVET

European Union Pacific Technical and Vocational Education and Training on Sustainable Energy and Climate Change Adaptation Project

Tuvalu Training Needs and Gap Analysis

Conducted and Compiled by: Sarah Hemstock
& Teuleala Manuela-Morris

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Acknowledgment

Organising a successful stakeholders consultation in a country is a complex exercise and requires an excellent knowledge of the country, in particular the 'who does what', and a broad communication and exchange network with the stakeholders. We were very fortunate to have the support of the Ministry of Education, the Department of Energy, the Department of Agriculture, and the Department of Environment. Thanks also to the unfailing support for this project from the USP Tuvalu Campus. Thanks also to Betty Seluka Vave TVET Officer from the Department of Education who helped Teu arrange the logistics for this workshop and contact the main stakeholders beforehand. The success of this workshop is the result of their work.

However, the key to the success of this consultation was really down to the involvement and the enthusiasm of the participants. Once again, we were very fortunate with the level of engagement of the different participants and their interest in the project. The atmosphere of cooperation between the different stakeholders was reassuring and an essential element in the identification of training needs and the best way to address them in the country. I would thus acknowledge the participants of the consultation workshop and give them many thanks for their hard work and support.

1. Background

The 10th European Development Fund European Union Pacific Technical and Vocational Education and Training on Sustainable Energy and Climate Change Adaptation (European Union PacTVET) project is component three within the broader regional Adapting to Climate Change and Sustainable Energy (ACSE) programme.

The project builds on the recognition that energy security and climate change are major issues that are currently hindering the social, environmental and economic development of Pacific - African Caribbean and Pacific (P-ACP) countries.

1.1 EU PacTVET Objectives

The general objective of this project is to enhance sustainable livelihoods in P-ACPs. Sustainable livelihoods are a high priority for Pacific Island communities and governments alike. They are central to current development policy including resource management and conservation but also in emerging policy to meet threats such as climate change. The project aims to enhance Pacific regional and national capacity and technical expertise to respond to climate change adaptation (CCA) and sustainable energy (SE) challenges.

The project is being implemented by the Secretariat of the Pacific Community (SPC) in partnership with the University of the South Pacific (USP) over a period of 53 months from August 2014 with an overall budget of EUR 6.1 million. It will achieve the following results:

1. Assess national training needs in SE and CCA and existing informal and formal TVET training courses and training and education providers are identified and strengthened
2. Develop and implement benchmarks, competency standards and courses on Training of Trainers (ToT) and create a pool of national trainers
3. Develop and establish training courses and support facilities within TVET institutions
4. Strengthen networking in SE and CCA

The project is being implemented in a sequential approach. Result 1 activities will provide a more detailed/clearer understanding of countries' needs and their requirements from the project. The activities under Results 2 and 3 will be then be tailored to the country needs. This report feeds into result area 1.

1.2 Location

The EU PacTVET project will be implemented in the Pacific region comprising of 15 Pacific ACP countries: Cook Islands, Federated States of Micronesia (FSM), Fiji, Kiribati, Nauru, Niue, Palau, Papua New Guinea, Republic of Marshall Islands (RMI), Samoa, Solomon Islands, Timor-Leste, Tonga, Tuvalu and Vanuatu.

Climate change is affecting the livelihoods of the P-ACP communities causing varying degrees of adversity depending on location.

1.3 Context

References: -
Chung, M. (2006) Asia Development Bank Poverty Assessment: Tuvalu. ADB, 2006.
Government of Tuvalu (2009). Tuvalu National Energy Policy. Energy Department, Government of Tuvalu and South Pacific Geosciences Commission (SOPAC), under the Pacific Island Energy Policies and Strategic Action Plans (PIEPSAP).
of Tuvalu. An Alofa Tuvalu Report for the Government of Tuvalu. The French Ministry for Foreign Affairs (Pacific Fund); ADEME – Agence de l'Environnement et de la Maîtrise de l'Energie
Government of Tuvalu (2009b). International Aid for Tuvalu Statistical Summary 2001-2008. Planning and Budget Section, Ministry of Finance, Govt of Tuvalu: Funafuti.
Hemstock, S. L. (2005). Bioenergy for Tuvalu: Natural Resource Availability & Management. Government
Hemstock SL, Smith R. (2012). The impacts of international aid on the energy security of small island developing states (SIDS): A case study of Tuvalu. Central European Journal of International & Security Studies. 6(1): 81-102
Hemstock, S., Manuella-Morris, T. Pacific voices : local government and climate change / Ropate Qalo, editor. -- Suva, Fiji : USP Press, 2014.ISBN 978-982-01091-4-8
SPC (2012). Tuvalu Country Energy Security Indicator Profile 2009. Prepared by the Energy Programme, Economic Development Division, Secretariat of the Pacific Community, Suva, Fiji. 333.79099682 AACR2. ISBN: 978-982-00-0579-2

Current total global greenhouse gas (GHG) emissions stand at 36.9 gigatonnes of CO2 (GgtCO2). Of this global GHG emission, Pacific Island countries emit less than 0.03% yet they are amongst the most vulnerable to adverse effects of climate change - the first to be exposed and the least able to respond. Hence there is a moral obligation for the island countries to start implementing measures to not only mitigate GHG but also adapt to climate imposed environmental change, and prepare for future adaptation measures. At the national level, Tuavlu's annual GHG emission is insignificant on a global scale.

In spite of efforts to reduce Pacific-African Caribbean and Pacific (P-ACP) countries reliance on fossil fuels and improve energy security almost all Pacific Island countries remain highly dependent on imported petroleum products for energy generation and transportation, which are the two major petroleum consumption sectors in the region.

With the Pacific Island countries facing challenges posed by climate change and energy security, sustainable energy and climate change adaptation are undeniably ranked above all other sectors in regional priorities, as evident through regionally endorsed frameworks, such as the wider Pacific Plan and the more specific Pacific Islands Framework Action on Climate Change (PIFACC) and the Framework Action on Energy Security in the Pacific (FAESP) and individual national policies.

Efforts in addressing energy security and climate change adaptation challenges are ongoing through various regional and national projects. On climate change mitigation, there were some familiar projects such as the Pacific Islands Greenhouse Gas Abatement through Renewable Energy Project (PIGGAREP) that addresses mitigation and Pacific Adaptation to Climate Change (PACC) that focused on climate change adaptation. The PIGGAREP was focussing on complementing PICs initiatives in promoting the widespread use of renewable

energy in the regions and PACC focused on three thematic areas, namely, “Food security”; “Water Security” and “Coastal Management” - assisting communities to implement activities that help them in these three areas. Additionally the University of the South Pacific’s European Union Global Climate Change Alliance project has been active in all 15 P-ACPs enabling climate change adaptation by formal and informal education, direct community engagement and applied research. Sustainability of such projects is very important. Now that these projects are coming to their end, it is important that knowledge and skills being acquired and/or hardware that were put in place continue to function and be beneficial to the targeted beneficiaries. Not only on the renewable energy side, but on overall energy services, where there needs to be awareness and improvements to energy efficiency and conservation and what measures needs to be taken to use energy in a sustainable manner as compared to energy misuse and wastage.

Tuvalu is a small island developing state (SID) with least developed country (LDC) status. Presently, Tuvalu is close to being a totally oil dependent economy (83% of primary energy), whose energy security is dependent upon foreign aid to ensure its ability to pay international oil companies. The Tuvaluan Government has made a commitment to become 100% renewable – “being carbon neutral” - by 2020.

“For Tuvalu, the lack of access to adequate, affordable, reliable, safe and environmentally benign energy is a severe development constraint. Located 1100km north of Fiji, Tuvalu consists of 9 atolls, with a total landmass of 26 km2 spread over an EEZ of around 1,000,000km2. These physical characteristics have enormous consequences for Tuvalu’s economy. For example, there is no economy of scale for land-based production and, due to transportation costs, by the time any goods for export reach the international market they are very expensive. In addition, again due to high costs of transportation, any goods which are imported are also expensive. Two inter-island boats service the 8 outer-island settlements. Tuvalu’s total population is around 11,000: with around 4,500 on Funafuti – the administrative centre. The population density is high with around 423 people per km2 across Tuvalu as a whole and 1,610 in Funafuti. Many NGO’s and international organisations have run climate change awareness campaigns in Funafuti and people are generally alert to climate change issues.

The country’s main food resource is the ocean, agriculture is in no way self-sufficient and consists primarily of coconut and banana trees. Pig keeping is part of Tuvaluan culture and a food source for many households. Taro (staple root crop), has lost its economic importance over recent years due to climate change related seawater encroachment of Taro pits and disinterest in traditional farming techniques amongst the younger generations.

The remoteness of these islands has four major effects – all of which exacerbate Tuvalu’s vulnerability to climate change: 1) Very expensive imported goods due to shipping costs; 2)

A lack of exports; 3) A limited potential for tourism development; 4) Supply disruptions of all imported goods – especially food and fuel to outer islands.

In 2008, Tuvaluan imports (totalling Aus$26 million) were 186 times greater than exports. This situation is unsustainable. Foodstuffs represent around 25% of imports and fossil fuels around 19%. 76% of households on outer islands are in the bottom fifth of the income scale. The other quarter of the poorest households are on Funafuti and are often worse off in the more monetary economy there with no access to land on which to produce food or access to traditional biomass, cooking using plastic bottles as fuel is not uncommon. In addition, they have less access to water, electricity and other energy sources, sanitation and waste disposal services, and insecure tenure - they are more exposed to poor living standards and the conventional correlates of poverty. The copra market collapsed in 2002 leaving subsistence farming households in outer islands increasingly reliant on remittances from family members working overseas. Across Tuvalu, mode and average income per day ranges from 1.8A$ to 4.0A$." (Pacific Voices, 2014). Around 35% of the population have mobile phones and 40% have access to the internet. However, services are sporadic and expensive with 250MB costing 10Aus$.

Economic overview of Tuvalu:

Year	**2000**	**2003**	**2005**	**2008**
GDP: Gross Domestic Product (million current US$)	12	-	25	32
Development aid contribution to GDP (million US$)	4	6	9	16
Development aid as a % of GDP	33	-	36	50
GNI: Gross National Income per capita (current US$)	1204	-	2383	3213
Available average income per capita (US$)	806	-	1525	1607
Exports (million US$)	-	0.15	0.1	0.1
Imports (million US$)	-	24	18.5	26

Sources: http://data.un.org/CountryProfile.aspx?crname=Tuvalu (World Statistics Pocket Book, 2009); (UNCCA, 2005); (Chung, 2006); OECD international development statistical database (http://stats.oecd.org/qwids); (GoT, 2008)

1.4 Consultation purpose – links with ACSE Component 1

It should be mentioned at the outset that the in-country consultation decided to link SPC-GIZ Adapting to Climate Change and Sustainable Energy (Component 1) project on biogas in Tuvalu to the SPC-USP EU PacTVET project activities for Tuvalu.

ACSE Component 1 Project Title: Sustainable Community-Based Biogas Schemes for Domestic Energy and Improved Livelihoods

This project builds on the success of the Alofa Tuvalu biogas project in Nanumea and that of the USP EUGCCA project in Nanumaga. The project concept note has followed the normal EU-NAO Tuvalu approvals procedure (last quarter 2014). The project aims to strengthen the capacity of communities' to adapt to the adverse effects of climate change and to enhance the use of appropriate biogas technologies regionally. This scheme will increase access to energy services by using pig waste to make cooking gas. The scheme is culturally, environmentally and economically sustainable. Long-term sustainability will be achieved by providing training & a base for technical& operational support (TMTI, PWD and USP Campus) – improving Tuvalu's autonomy. The project will provide nationally available training and biogas systems (including pig pens, fresh water collection systems and family gardens) to 40 households across Tuvalu.

The project will also link with the EU PacTVET, SPC GCCA and USP EU GCCA projects and have close ties with the Department of Agriculture. SPC will be the contracting agency and the national implementing partner will be the Department of Energy under the Ministry for Public Utilities and Infrastructures working alongside the Department of Rural Development under the Ministry of Home Affairs.

With regard to the ACSE Component 1 project 10 government stakeholders attended the government consultation in June with representation from Departments of Energy, Environment and Agriculture, Ministry of Finance and USP.

Around 12 people, including PS Energy, Directors of Agriculture, Environment, Home Affairs and Education; and private sector, disability and DRM reps attended the final high level National Stakeholders meeting (10/8/2015) in conjunction with the EU PacTVET consultation meeting (participants listed in section below) findings were presented to the PM Tuvalu on 11/8/2015 and are outlined below:

a) Project Sites: a total of 40 household biogas units will be distributed amongst the seven islands and the distribution will be as follows:

Vaitupu will have 8 households to include 2 for Motufoua Secondary School (proposed by Director of Education); Niutao, Nui, Nukufetau, Nukulaelae and Funafuti will have 6 each and Niulakita will have 2 biogas units. Nanumea and Nanumaga already have these systems. This was done in order to distribute resources fairly to all communities that do not yet have biogas systems. The recommendations made on the concept note were rejected because

they could lead to political criticism if an opportunity was not given to all communities to participate fairly.

b) A strict and fair selection criteria for the selection for households and institutions (e.g. Motufoua) will be developed and applied.

c) The Department of Agriculture will provide planting materials for the home gardens under the project using its current initiatives for food security in the country (in partnership with ROC Taiwan Farm project).

d) Consultation with the communities in June 2015 highlighted the need for all construction materials to be imported - Nukulaelae no longer allow gravel to be excavated. Therefore the project has government stakeholder support in place to use remaining materials (cement and gravel) from the road project.

e) Endorse the activities under the PacTVET project implemented by SPC and USP to establish training on the installation, maintenance and uses of biogas systems and the use and manufacture and safety of biogas compressors. This will support project activities and was originally requested by Nanumaga Falekaupule after installing 7 biogas units under the USP EU GCCA Project.

These findings were based on extensive community consultations as follows:

The touring consultation team consisted of Sioata Lota from the Department of Rural Development under the Ministry of Home Affairs, Tele Siaumua from the Department of Energy (Ministry of Public Utility and Infrastructure) and the GIZ Technical Assistant for the PDD Teuleala Manuella-Morris.

Consultations with Niutao (30+ attendees), Nukulaelae (30 attendees) and Funafuti (27 attendees) focussed on energy security problems that community members face and possible solutions to addressing them. For Funafuti the participants included the Kaupule members, Kaupule Secretary, Kaupule Planner and Community Worker, the Chief of the Island and the Pastor, leaders from the two main villages (Alapi and Senala), Women's President and women and youth from the community, with similar representation in Niutau and Nukulaelae.

Additionally, around 30 households per island (total of 240 households across Tuvalu) participated in 3 different sets of questionnaires. One set of questionnaires assessed the status of the 11 biogas digesters on Nanumea and Nanumaga so lessons learned could be identified and incorporated into the proposed activities – these lessons learned are incorporated in the various sections below.

For the PacTVET project Teu Manuella and Betty Seluka Vave held consultation meetings in Funafuti in July.

The purpose of the EU PacTVET in-country-mission was to:

- Identify present and future market demand in Tuvalu;
- Map existing training supply in Tuvalu;
- List priorities for future project activities – including selection of partner TVET institutions.

USP Tuvalu Open Day 2015

2. Schedule of Consultation Events

The August stakeholder consultation was held in conjunction with the ACSE Component 1 meeting.

It is evident that interventions in country should be customised to ensure consistency with what has begun or is already in place in country. There should be no "re-inventing of the wheel" and synergies between existing interventions must be identified and acted upon. The consultation template used for other in-country consultations was re-structured to match local requirements.

Discussion groups were broken down into identified sectors – Food Security, Water Security, Health and Agriculture. Results are presented according to these groups (Section 5.2 below).

2.1. Project Outline Presentation

An outline of the EU-PACTVET was made, with emphasis on the following aspects of the project:

a. Rationale - current scenario with regard to sustainable energy (SE) and climate change adaptation (CCA) in the P-ACPs and the issues. At a national level there is dependency on fossil fuel for power production and transportation. On the climate change side, the P-ACPs are more vulnerable to climate change, but have the least capacity to respond to these.
b. How the EU PacTVET project intends to responded to these issues by focussing on building the capacity based on country needs - recognising skills acquisition by benchmarking and defining country-requested competencies and accreditation.
c. The Key Result Area (KRA). Each of the 4 EU PacTVET KRAs were outlined and it was made know to the stakeholders that one of the activities under KRA 1 is this in-country consultative workshop and one-on-one consultations for the training needs and gaps analysis (TNGA). Activities that need to be conducted in the hope of achieving each of these KRAs were briefly outlined.
d. How the project is partnering with the Fiji Higher Education Commission with regard to competency development in the areas of CCA and SE.
e. How the project is partnering with USP and the Board of Educational Quality Assessment (formally SPBEQ) on accreditation of qualifications.
f. A brief overview of the budget. This was to give the stakeholders an outline of the allocation from the €6.1 million.
g. And finally, it was emphasised that the consultations are important to aid the stakeholders in identifying national needs to frame future EU PacTVET activities.

2.2. Stakeholders' Functions Outlines.

Stakeholder Presentations were given at the meetings in July and can be found here: http://prdrse4all.spc.int/production/node/4/content/pactvet-tuvalu-national-stakeholders-consultative-workshop-august2015

Participating Stakeholders August 2015 Meeting:

Firstly, thanks to the stakeholders for their commitment to the EU PacTVET project and for their insight and input into the needs and gap analysis process. Their enthusiasm and willingness to share their knowledge and experience to ensure that Tuvalu participates fully in the project was much appreciated. Their comprehension and identification of the various issues impacting CCA and SE TVET education in Tuvalu will form the basis of future project activities.

NAME	TITLE	ORAGNIZATION
Tavau Teii	Chairman	NPAC for the USP EU GCCA Project
Itaia Lausaveve	Director	Department of Agriculture, Ministry of Natural Resources
Mafalu Lotolua	Director	Tuvalu Electric Corporation (TEC), Ministry of Public Utility & Infrastructure.
Nielu Mesako	Energy Officer	Department of Energy, Ministry of Public Utility & Infrastructure.
Temetiu Maliga	Director	Department of Rural Development, Ministry of Home Affairs.
Malofou Sopoaga	PWD Officer	Department of Public Works, Ministry of Public Utility & Infrastructure
Falealili Feagai	Health Inspector	Health Department, Ministry of Health.
Dr Miliama Simeona	National Coordinator	Tuvalu Family Planning and Parenthood (TuPHA) Association.
Katalina Taloka	Director for Education	Department for Education, Ministry of Education, Youth and Sports.
Betty Seluka Vave	TVET Officer	Department for Education, Ministry of Education, Youth and Sports.
Jenny Teo	Labour Officer	Office of the Prime Minister
Katepu Laoi	Personnel Officer	Office of the Prime Minister
Teo Sopoaga	Energy Officer	Department of Energy, Ministry of Public Utility & Infrastructure.
David Manuella	Director	University of the South Pacific, Tuvalu Campus.

Day 1:
A plenary session followed the presentation on "Training Needs and Gaps Analysis". The Plenary Session's topic is "*Creating National and Regional capacity and technical expertise to respond to CCA and SE challenges*"
Day 2:
An actual Training Needs and Gaps Analysis was done after the plenary session discussion. Discussion of the Plenary Session and the TNGA are outlined in Section 5.

A plenary Session: Topic, "*Creating National and Regional capacity and technical expertise to respond to CCA and SE challenges*"

3. Consultation Methodologies

In trying to maximise output various methods of consultation were employed in this in-country mission. Determining which methodology to use depend on various factors ranging from availability, distance and timing. The following are the methods employed to capture the required data during the in-country mission:

3.1. Consultative Workshop/Meeting (TNGA)

A consultative workshop is a consultation with stakeholders in a venue where the agendum for discussion or consultation is done for all at once. This was the methodology employed for the first two days during this in-country mission. This methodology was employed because it used the forum to draw ideas and consolidates them.

3.2. One-to-one Consultations (Interview)

In a situation where stakeholders cannot make it to the consultative gatherings, due to other commitments, a one-to-one or face-to-face meeting or interviews are done. This was also employed where for a number of stakeholders who could not attend the consultative workshop.

3.3. Internet – Online

This was used for searching for further information or publication of Reports or Policies. Not only that but to confirm or double-check on information given.

3.4. Literature Review

This forms the basis for evaluative report of information found in the literature related to technical, vocational education and training with the subject of sustainable energy and climate change as the content. Various literatures were consulted, within the education, energy and climate change sectors, on policy frameworks and national action plans or development strategic plans. Most Policy frameworks (regional and national) were reviewed and those were used as the basis for consolidating future SE and CCA demands or needs in country.

3.5 Limitations

The mission was carried out in Funafuti and did not make provision for travel to any of the outer islands.

Not all invited stakeholders attended the consultation and it was not possible to visit all stakeholders in the time allowed for the mission.

Obtainable literature surrounding some policy documents and strategies was out-of-date.

It was not possible to engage all stakeholders in the time given for the consultation.

4. Status Quo - Relevant National Policies and Frameworks and Sectoral Review

All national policy frameworks and their associated action plans set out principles and suggested initiatives designed to guide and support the development and implementation of national activities consistent with the these policy frameworks' visions and goals.

The Forum Leader's endorsement of the Pacific Islands Framework for Action on Climate Change in 2005 and the Framework for Action on Energy Security in The Pacific (FAESP) in 2010, demonstrated that sustainable energy and climate change adaptation are therefore top priorities for Pacific Island governments.

4.1. Education Sector

"Primary education is compulsory in Tuvalu and covers Year 1 to Year 8. The subjects currently offered in primary schools include English, Mathematics, Social Science, Basic Science, Business Studies, Art & Craft, Physical Education, Health Education, Writing and Printing. At the end of Year 8, students sit the Year Eight examination which is an entrance examination to secondary schools.

Secondary education in Tuvalu is from Year 9 to Year 13. Year 9 and Year 10 fall within the compulsory education policy. Of the two secondary schools in Tuvalu, one is government run and operated. " (Source: NCPF, 2013)

Tuvalu has a NCPF - National Curriculum Policy Framework (quality education for sustainable living for all) that was endorsed in 2013. It is the guiding framework in all curriculum requirements from pre-school to Year 13. It demonstrates Tuvalu's determination to create a philosophy of education that is underpinned by traditional values and beliefs. The setting up of a national assessment and qualifications agency and qualifications framework is underway.

Tuvalu is a member of the Pacific Islands Forum. As such the NCPF is bound by a number of regional frameworks. The Pacific Education Development Framework (PEDF) (2009) addressed the special needs of Small Island States (SISs) including Tuvalu. These educational priorities are embedded in the Pacific Plan and also the Millennium Development Goals (MDG's), Sustainable Development Goals (SDG's) and Education For All (EFA) agenda which address key strategic goals of: access & equity; quality; efficiency and effectiveness.

In Tuvalu's National Strategy for Sustainable Development 2005 – 2015, Te Kakeega II, Education and Human Resources were identified as one of the eight strategic areas. The ten key policy objectives which addressed the issues relevant for education in Tuvalu, were based on the overall objective for education that was articulated and adopted by the National Education Forum (NEF) in 2002; 'To provide a system of quality education which

endows people with knowledge, skills and attributes necessary to achieve a higher degree of self-reliance in a rapidly changing world, and one that is consistent with Tuvalu's spiritual values'.

The Te Kakeega II, identified four key objectives relevant to education for sustainable development and the EU PacTVET project:
(i) Install sound, consistent and more appropriate curriculums that better target the needs of students and the economy;
(ii) Expand and improve technical and vocational training opportunities;
(iii) Make Math, English , Science subjects, Entrepreneurship Education, Tuvalu Studies and Technical and Vocational Training the central parts of the school curricula;
(iv) Expand services and facilities for special needs students, including pre-scholars and the disabled.

The first Tuvalu Education Strategic Plan 2006 – 2010 recommended that a more concise approach was to be taken to address the priority areas and led to the development of a new curriculum: "Quality education for sustainable living for all" .
The vision of this new curriculum addresses these 5 key areas.
(i) Curriculum and assessment
(ii) Increased student participation
(iii) Improving the quality and efficiency of management
(iv) Human resource development
(v) Strengthen partnerships and develop a culture of working together.

The NCPF recognises "Education for Sustainable Development" and "Climate Change" as 2 of 6 cross-cutting themes – integrated into all aspects of the curriculum. Climate change is recognised as "… an underpinning perspective across the curriculum in Tuvalu. This is a central theme and has a special place in the educational journey of every Tuvaluan child. Integrating aspects of climate change adaptation into the curriculum aims to build resilience among the young population as they seek ways to manage and deal with the everyday issues of rising sea levels, food and water security, and livelihoods in the 8 islands of Tuvalu."

4.2. Energy Sector

Lack of access to modern energy services has been identified as a severe development constraint for Tuvalu. A comprehensive National Energy Policy Framework (including Strategies and Activities) was developed by the Ministry of Works and Energy, Government of Tuvalu and National Workgroup, as part of the Pacific Islands Energy Policies and Strategic Action Planning (PIEPSAP, 2003) project. This project was facilitated regionally by SOPAC (from 2003 to 2006), and cost over US$1,800,000. Funding agencies included UNDP-GEF and the Government of Denmark via a partnership between the Pacific Islands Forum

Secretariat and the European Union Energy Initiative for Poverty Eradication for Sustainable Development (EUEI). Tuvalu recieved 16.2 million US$ in development aid payments in 2008 – which accounts for half of its GDP (Table in section 1.3). From 2003-2007 JICA provided 9 million Aus$ for installation of three 600kW diesel electricity generators, new grid & connection to all houses in Funafuti. Since 2006 JICA have provided between one and two million Aus$ to pay for diesel for the generators.

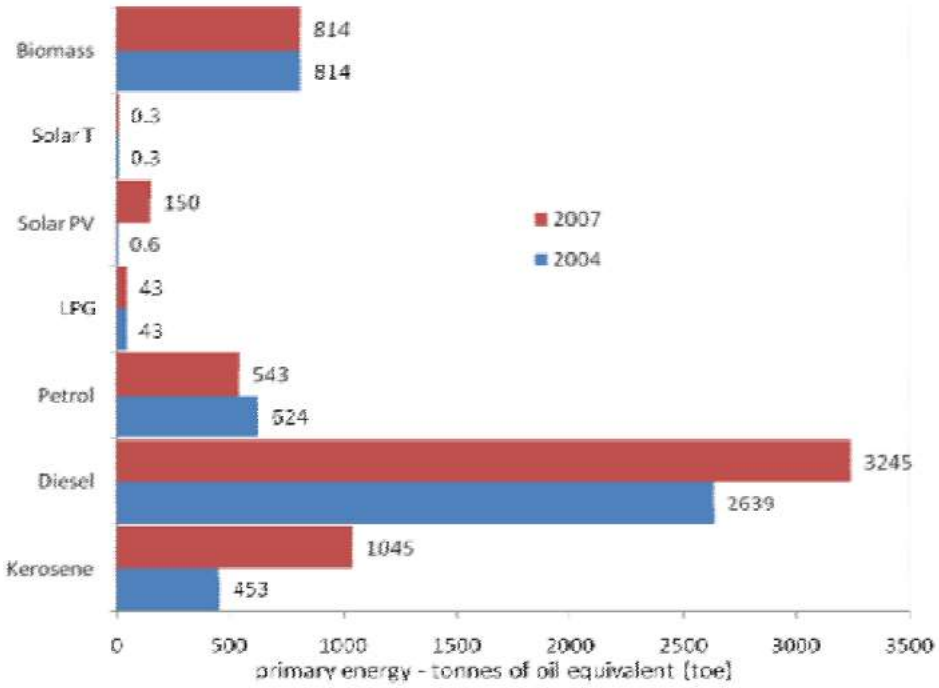
Bilateral donors, such as RoC-Taiwan, JICA, New Zealand Aid, AusAid and Canada Aid have tended to fund GoT or community requested "concrete" projects and infrastructure. In contrast to this, over the past decade, regional and international organisations (such as United Nations Development Program (UNDP) & Global Environment Facility (GEF), South Pacific Applied Geosciences Commission (SOPAC), Pacific Islands Forum Secretariat (PIFS), South Pacific Regional Environment Programme (SPREP), etc. which all rely on multilateral aid), appear to have focused their development assistance on the formulation of policy frameworks and energy policy development. Since 1999, energy policy efforts have had some degree of coordination via the regional organisation CROP - Council of Regional Organisations of the Pacific Energy Working Group.

Figure 4 shows that in 2004, the total energy consumption was 4.6 ktoe, with oil accounting for 3.8 ktoe (82%) and biomass for 0.8 ktoe (18% of the total primary energy consumption). This includes diesel charged by the two inter-island vessels (Nivaga II and Manu Folau) in Suva, Fiji. Annual energy consumption in 2004 was approximately 0.4 toe per capita.

By 2007, the total energy consumption had increased to 5.8 ktoe, with oil accounting for 4.8 ktoe (83%), biomass for 0.8 ktoe (14%) and solar 0.1 ktoe (2%) (Figure below). Annual energy consumption in 2007 was approximately 0.5 toe per capita. The kerosene use of 1045 toe in 2007 accounts for refuelling of the Air Pacific plane in Funafuti. From 2004 to 2007, petrol use has decreased by 13%. This is mainly due to the impact of increased retail fuel prices. This has resulted in an increased use of "traditional" fishing canoes, rather than a large reduction in road vehicle use. The use of toddy ethanol to fuel small fishing boats could provide a viable role for toddy production.

In 2004, a total of 1170 toe (36% of total national energy consumption) was used for domestic purposes, 91% of it (1070 toe) was for cooking & boiling water. Biomass provided 64% (746 toe) of total domestic energy use, kerosene 23% (263 toe), electricity 10% (118 toe), and LPG 4% (43 toe). Solar energy provided 0.6 toe mainly for lighting & electrical appliances. These values have been estimated from in-country survey. By 2007, a total of 1383 toe (25% of total national energy consumption) was used for domestic purposes, 88% of it (1213 toe) was for cooking & boiling water. Biomass provided 54% (746 toe) of total domestic energy use, kerosene 29% (401 toe), electricity 14% (193 toe), and LPG 3% (41 toe). Solar energy provided 0.6 toe mainly for lighting & electrical appliances (on Nuilakita the only electricity source is solar pv). These values have been estimated from incountry

survey. However, despite these increases in primary energy, there is relatively little impact for those living on outer-islands, who remain up to 80% biomass energy dependent.



Tuvalu is currently importing the vast majority of its energy (83%) in the form of fossil fuel which is a major drain on foreign exchange resources. Without the annual 2 million Aus$ subsidy from JICA, electricity production on Funafuti would be economically unsustainable. Tuvalu's small size, remoteness, diseconomies of scale and the manner in which electricity tariffs are structured all contribute to an over-reliance on external aid programmes. Obviously, in order for Tuvalu to improve its energy security situation, it must use its indigenous energy resources such as biomass, solar and wind. However, as with fossil fuel technologies, renewable energy technologies (RETs) will require the capital costs of equipment to be covered by donor agencies.

Renewable Energy Technology Implementation (Tuvalu)

Tuvalu has had experience with renewable energy technologies (excluding traditional uses of biomass energy) since the early 1980's when 12v stand-alone solar photovoltaic (pv) systems were installed for domestic use. These systems ran well initially, but fell into disrepair when replacement components were needed. A "pay-to-hire" mechanism was implemented at the same time as the pv systems, with some families providing 100 coconuts per month for use of their system. However, these payments did not produce the revenue required to buy replacement components. In addition, safe disposal of spent batteries from solar systems was also problematic. Lessons have been learnt from this. For example, the USP EUGCCA project and the NGO Alofa Tuvalu have installed low-tech domestic energy systems, such as biogas, along with extensive training for users so that repair and maintenance of systems can be carried out on site using available materials. In

addition, new solar installations are grid connected and run by Tuvalu Electricity Corporation (E8, 2009). Tuvalu's capacity for wind generation is currently being assessed. For these recent renewable energy installations various approaches have been taken to ensure long-term sustainability of such as: capacity building via training and strengthening service provision; tariff setting; community involvement from the outset; appropriate technology which does not require the continuing intervention of foreign agency "Technical Assistance"; the build-up of a critical mass of similar apparatus throughout Tuvalu, so systems maintenance is cost effective; an integrated multi-disciplinary and multi-sector approach which builds on Tuvalu's existing infrastructure and institutions for service provision; and rigorous assessment of the natural resource base which can be sustainably accessed and harvested for use in the case of biomass energy projects.

Biomass is a fuel that people are familiar with and currently provides 64% of energy to the domestic sector. However, although continued use of traditional biomass will provide for basic needs, it will not solve the problem of providing the modern energy services required for economic growth and improved living standards. It is apparent that the modernisation of biomass energy use, via biogas, biodiesel and gasification, will involve some social and cultural changes; in addition further political and techno-economic changes will be required for successful implementation of the biomass energy initiatives discussed. The successful implementation of sustainable modern biomass energy schemes is certainly a major, but achievable, challenge for Tuvalu. The constraints and strategies are outlined in section 5.1 below.

Tuvalu's decision-makers are aware of the value and potential of Tuvalu's indigenous energy resources. Unfortunately, they do not control the capital or have the capacity to capitalise on indigenous resources as a means of sustainable energy provision (Hemstock, 2008). At the UNFCC Cop16/CMP6 (Bangkok, July 2009), the then Minister for Public Utilities & Industry, the Hon. Kausea Natano, declared "We look forward to the day when our nation offers an example to all - powered entirely by natural resources such as the sun and the wind," and set a goal of having all Tuvalu's energy from renewable resources by 2020. Clearly, there is political backing of renewable energy technologies - at least intellectually. In practice, however, the picture is very different (Figure above). Tuvalu's balance of payments, and resulting dependency on overseas aid programmes, makes it very difficult to translate the well-intentioned aspiration of a fossil fuel-free future into a reality. Failures are not due to a lack of political will, and successes (though limited) are not due to policy formulation. Tuvalu's energy security is aid dependent – the majority of recent energy sector infrastructure has been paid for by external development aid.

Subsidies, which encourage the use of fossil fuels, are also currently in place such as the JICA donation to cover fuel costs of diesel for electricity generation. To improve energy security, aid has to be spent in line with "needs", and with a view towards sustainability. In addition, multilaterally funded regional efforts to encourage renewables have previously placed much

of their emphasis on policy and "market development" rather than practical help and actual RET installations, such as the e8 (which comprises ten leading electricity companies from the G8 countries) 40 kW grid-connected solar system in Funafuti (E8, 2009) and the recent installation of solar on the roof of the government building and at Motafoa School have ensured that around almost 8% of Tuvalu's electricity demand is now met by solar. These are all moves in the right direction.

4.2.1 Linking EU PacTVET activities with ACSE Component 1 (Biogas)

Tuvalu's National Energy Policy calls for the development of "local expertise in the installation, operation, management and maintenance of technically and economically proven renewable energy systems". Combining all these issues here it was decided that the ACSE Component 1 project on biogas would link with the EU PacTVET project to provide training on biomass energy installation, operation and maintenance – linked with horticulture and livestock husbandry training. Biogas has been proven to be effective in Tuvalu, and training has been identified via community consultation, as the most effective intervention for the success of renewable energy technology projects - linkages with Tuvalu National Energy Policy, the ACSE Component 1 Biogas project and EU PacTVET are outlined in the table below.

National and sector policies, strategies, action plan or goals.	ACSE Component 1 and EU PacTVET alignment
In the TNE Policy under section 5 on the Renewable Energy Policies which states to: 1.1 Promote and implement the use of appropriate, proven, affordable and cost effective renewable energy technologies both for urban and rural applications; 1.2 Establish and maintain a knowledgebase for all available and appropriate renewable energy sources and technologies; 1.3 Ensure Tuvalu's limited biomass, copra bio-fuel and other renewable energy resources are used efficiently, in an economically, environmentally and culturally sustainable manner; 1.4 Develop local expertise in the installation, operation, management and maintainence of technically and economically proven renewable energy systems; 1.5 Develop partnerships with potential foreign and local investors, donors and agencies in seeking funding sources for the development of renewable energy programmes. Develop an implementation plan to realize the target of 100% of electricity generation through renewable energy technologies by 2020.	Response to TNE Policy 5.1 – the digesters are appropriate, proven (the systems of pig pen, water tank, family garden and digester are already in place in Nanumea since 2010 and Nanumaga since 2013), affordable and cost effective. They will be installed in rural outer islands and in urban Funafuti. Response to TNE Policy 5.2 Lessons learned and all relating documents will be available on the SPC, EDD Energy for All database and also available on the USP knowledge centre. Response to TNE Policy 5.3 The activities will use available pig manure as a renewable energy resource. This will be done in an efficient, culturally acceptable and environmentally sustainable manor that will bring improvements to livelihoods. Response to TNE Policy 5.4 Courses will be developed and delivered in partnership with EU PacTVET. They will cover operation, maintenance, horticulture, animal husbandry and safety aspects of biogas systems. Response to TNE Policy 5.5 A "Biogas Toolkit" will be developed which will examine all aspects related to duplication of project activities. It will be written for local planners and it will examine financial aspects, role of the Kaupule/ governance and funds available for set-up of similar initiatives from regional donors. It is estimated that participating households will displace *4,800 litres of kerosene (over 3 tonnes of carbon) and 160 bottles of liquefied gases (over 2.7 tonnes of carbon) per year*. (Also refer to PDD Section 8). While these figures may be regarded as minimal, they provide support to Tuvalu's commitments to reducing the use of non-renewable energy sources.
Framework for Action on Energy Security in the Pacific 2010-2020	All project activities are in line with this framework: '…all people at all times have access to sufficient sustainable sources of clean and affordable energy and services…'
How does the project align to national development policies/strategies? All planned project activities fall within the following declaration from Tuvalu's Energy Policy and Energy Policy Strategy and Activities Paper & PIEPSAP regional goals: "By the year 2020 guided by the principles in the "Te Kakeega II" (the National Strategy for Sustainable Development 2005-2015) and the "Malefatunga Declaration", where Tuvalu shall attain a prosperous living standard via the provision of "socially, financially, economically, technically, politically and environmentally sustainable energy systems", within the framework of the Tuvalu Initial National Communication Under the United Nations Framework on Climate Change (Oct 1999).	

4.3 Climate Change

At the United Nations Climate Change Conference, held in Copenhagen in December 2009, Tuvalu was described as being at serious risk of becoming the first state to become uninhabitable due to the impacts of climate change. The majority of the land area is less than 3m above sea level.

Tuvalu ratified the UNFCCC in 1993 and the Kyoto Protocol (as a non-Annex I country) in November 1998. Tuvalu's first national communication under the UNFCCC was in 1999 and its second national communication is currently in preparation. It is a member of the Alliance of Small Island States (AOSIS) and participates in Secretariat of the Pacific Regional Environment Programmes such as the Pacific Adaptation to Climate Change project.

"The Ministry of Natural Resources, Energy and Environment was the main government ministry responsible for climate change, it then moved to Foreign Affairs. In 2014 a National Advisory Council on Climate Change was launched by the Prime Minister to provide advice on how to effectively co-ordinate a whole of government response to the challenges of climate change, known as the National Climate Change Response Process. The main functions of the National Advisory Council on Climate Change are to identify actions or strategies to achieve energy efficiencies, to increase the use of renewable energy, to encourage the private sector and NGOs to reduce GHG emissions, to ensure a whole of government response to adaptation and climate change-related disaster risk reduction, and to encourage the private sector and NGOs to develop locally appropriate technologies for adaptation and climate change mitigation.

Two main documents, both published in 2012, drive climate change policy in Tuvalu – Te Kaniva: Tuvalu National Climate Change Policy, and the National Strategic Action Plan for Climate Change and Disaster Risk Management (NSAP). The NSAP recommended that the National Climate Change Advisory Committee and the National Disaster Committee should merge to co-ordinate and drive the plan's implementation. The merged committee is known as the National Strategic Action Plan Co-ordinating Committee and is supported by a specific NSAP Management Team within the Department of Environment." (Source: London School of Economics, Grantham Institute, 2015).

EU PacTVET supports the overarching vision of the Te Kaniva (2012): "To protect Tuvalu's status as a nation and its cultural identity and to build its capacity to ensure a safe, resilient and prosperous future." And the goals:

- Strengthening Adaptation Actions to Address Current and Future Vulnerabilities
- Improving Understanding and Application of Climate Change Data, Information and Site Specific Impacts Assessment to Inform Adaptation and Disaster Risk Reduction Programmes.
- Enhancing Tuvalu's Governance Arrangements and Capacity to Access and Manage Climate Change and Disaster Risk Management Finances

- Developing and Maintaining Tuvalu's Infrastructures to Withstand Climate Change Impacts, Climate Variability, Disaster Risks and Climate Change Projection
- Ensuring Energy Security and a Low Carbon Future for Tuvalu.
- Planning for Effective Disaster Preparedness, Response and Recovery
- Guaranteeing the Security of the People of Tuvalu from the Impacts of Climate Change and the Maintenance of National Sovereignty

Given the considerable overlap between disaster risk reduction and climate change adaptation, the policy is aiming to integrate both in terms of policy, institutional arrangements and capacity building, and in the technical tools and risk-reduction disaster management methods utilised as set out in the National Strategic Action Plan for Climate Change and Disaster Risk Management (NSAP).

"Tuvalu actively participates in both adaptation at the nation-state level and encouraging international co-ordination on adaptation activities. Locally, the 2012 National Strategic Action Plan for Climate Change and Disaster Risk Management (NSAP) identifies 141 specific actions to bolster adaptation and better prepare for disaster. Projects include increasing water storage capacity on four of Tuvalu's islands with the help of the United Nation Development Programme's Least Developed Countries Fund and AusAID, as well as work carried out by the Tuvalu Association of Non-Governmental Organizations, a network of grassroots NGOs, on initiatives such as environmental awareness campaigns and tree-planting projects. A national water policy is also being developed.

Internationally, in 2008 Tuvalu presented an International Blueprint on Adaptation to the UNFCCC Bali COP which argues for predictable and adequate international funding instruments to support adaptation in less developed countries. Tuvalu has spoken publicly about the challenges of receiving development funding for adaptation projects, such as from the UN Kyoto Protocol Adaptation Fund." (Source: London School of Economics, Grantham Institute, 2015).

From the predictions on continual sea level rise; increase in temperature and increasing ocean acidification, there would be new and additional challenges. This will require additional efforts and resources in building Tuvalu's capacity to be able to face these challenges, hence building the capacities of TVETs to be able to deliver to the rural communities the relevant knowledge and skills to be well equipped to face the challenges of the predicted effects of climate change and natural disasters is crucial. Although Tuvalu has historically experienced few major disasters, the effects of climate change on the frequency and magnitude of disasters around the world has served as a catalyst to increase its preparedness for future disasters, especially as a Pacific microstate prone to cyclones and storms. Since 2005 the Tuvalu's government has been taking measures to strengthen its national disaster risk management. Tuvalu was recently affected by Cyclone Pam – causing an estimated 10 million USD of damage – equivalent to just less than 50% of Tuvalu's GDP.

Shifting weather patterns in recent years have caused droughts – one of which was so severe that a "state of emergency" was declared. Additionally, increased demand for water, ground pollution, and climate change effects such as drought and sea level rise, no mean there are no fresh water lenses in Funafuti, and the number across the rest of Tuvalu has decreased dramatically over the last decade.

5. Consultation Analysis

5.1 Training Needs and Gaps Analysis (TNGA) - Plenary

The TNGA was preceded by the 4CT meeting and a Plenary Session where participants gave their view on the topic, "*Creating National and Regional capacity and technical expertise to respond to CCA and SE challenges – what are the constraints"*

Constraints to renewable energy development:

Constraints	Strategy
Lack of appropriate technology selection – mainly due to a reliance on outside aid which has dictated technology options.	Technology selection must follow energy policy strategies and activities. Aid for energy applications must take into account PIGGAREP, PICCAP, PIREP & PIEPSAP recommendations and GoT Energy Policy/Strategy. Only appropriate and established RET's should be implemented. An international agreement signed by all UN members and bilateral funders, such as RoC Taiwan, which states that all funded projects will be in accordance with national and regional policy.
Lack of technical expertise and institutional structure to plan, manage and maintain RE programs.	Training is the key to this barrier. Any RE intervention must have an associated training program. In addition, Tuvalu's existing facilities (TMTI, Amatuku) should be strengthened to provide ongoing training & back-up. All interventions should have an agreed management & economic plan, possibly with the set-up of a dedicated or strengthening of an existing (Tuvalu Electricity Corporation) service provider, as part of any project exit strategy.

- Technology changes have tended to be donor driven and reactive so it has been difficult to predict future markets for skills.
- In order to engage youth, the role of education in the process of job creation needs to be emphasised.

- Integration of renewables, particularly solar, to the grid can result in instability and reduced power. Systems need to be designed and managed – skills are needed to do this.

Other constraints:

- Ad-hoc training given to and by NGO's leads to no qualification and has no status.
- Gaps identified in current project management training were specific to CCA and DRR projects and included: proposal writing and project planning, accessing funds – CC & DRR finance, logistical frameworks, CC and DRR budgeting at national and sector levels, using assessment toolkits.

5.1.1 General findings from the Plenary session and links to existing initiatives:

The meeting agreed that the first EU PacTVET priority should be to support training for compressor manufacture and use with biogas and for training on biogas installation, operation and maintenance as this will benefit energy and food security. Additionally, ensuring local delivery of training and education should be an EU PacTVET priority. Participants requested all training to be done in-country, whether as part of programme/project delivery, or for technical, communication or awareness-raising.

DRM: With respect to disaster response training (including training on post-disaster assessment), the participants were very interested in getting DRM and disaster relief training built into competencies and qualifications. If people in communities were equipped with these skills already it would negate the wait for assessors to visit communities post disaster and disaster responses could be faster. Recognised qualifications in disaster response would provide a professional aspect to the training currently offered. It was concluded that all training should be aligned toward the overall "professionalization" of disaster response and management, including an identifiable career paths with sequential learning stages. (This is in agreement with the findings of Analysis of Disaster Response Training in the Pacific Island Region Provisional Version September 2012, United Nations Office for the Coordination of Humanitarian Affairs, Regional Office for the Pacific, September 2012).

Data analysis: The Climate Change and Disaster Risk Management Policy (2012) has an increasing desire to ensure and continually improved evidence-based decision making – meteorological services are mentioned specifically.

EU PacTVET could support these actions by providing training on data collection and analysis for natural resource management (GIS) and SE planning.

Knowledge and skills for project management: General project management skills were identified as a major constraint.

This is something that could be delivered by the EU PacTVET project, possibly as a regional initiative.

Traditional knowledge is to be emphasised and used wherever possible.

5.2 Training Needs and Gaps Analysis (TNGA) – Group Work

5.2.1 Sectors identified for priority action

5 clusters/sectors were identified and groups were formed accordingly

NO.:	CLUSTERS' INPUTS
1	*Energy security:* • Solar &wind for electricity • Household appliances - that is: gas kerosene, refrigerators, lights. • Transportation -that is: motorbikes, trucks, ships, cars, bikes etc. • Biogas-COMPRESSORS &SAFETY • Energy intervene into the school curriculum
2	*Food security* 1. Agriculture • Agroforestry –growing of plants that use water less (banana, fig,cassava, sweet potatoes, talo tanna, pulaka in concrete pits, chicken &pig farming, plants for retension from coastal erosion, ornamentals;use of compost; • Conservation of land • Aquaponics (fish and agriculture)-small scale for households. 2. Fisheries a) Methods of fishing b) Preparation of fishing gears c) Conservation of marine life d) Canoe making traditionally e) Boat making ie catamaran etc where using less fuel. 3. Food processing ie jam making. 4. Food preservation (drying, frozen, cooking) 5. Food safety
3	*Water security* • Water catchment -roofing, gutters, plastic &concrete tanks maintance. • Water management -recycling of water, rationing of water (number of people by households due to urbanization),COMPOST TOILET • Ground water/rainwater -water testing for portable water, building of ground water catchments.
4	*Health and safety related to disaster risk reduction and management* • Care for the Elderly & Disabled people in disaster periods • Occupational safety – proper gears • Waste management that are health hazards ie energy waste(like no proper areas for dumping batteries, diesel etc) • Sanitation – toilets, sewage waste, solid waste,portable water, WASH program • Good Nutrition - affected during disaster periods.
5	*Project Management for climate change and adaptation & sustainable Energy Project* Project cycle - identification through situational analysis; planning, implementation, monitoring and evaluation.

Feedback from group work:

Health and safety related to disaster risk reduction

No	Cluster Inputs *Health Security*	**Technical Skills Required by Private Sectors** (Current & Future Demand)	**Technical Skills Required by Community Sector** (Current & Future Demand)
1	**Nutrition & food safety:** • Safety of food quality • Promote nutritionist diets	• Training skills to: - Train the trainers on food quality. - Provide stakeholders with a better understanding on food quality.	• Food processing • Food handling • Food preparation • Food storage • Food transportation
2	**Care taking** • Old People • People with Special Needs • Pregnant Mothers • Children	• Appropriate skills and knowledge in care taking for the target groups in the areas of: - Handling - supporting - Managing - Tolerating - Apply sanitation	Care-taking skills for the following: - Old people - People with Special Needs - Pregnant mothers - Children
3	**Sanitation** - Water - Toilet Sanitation - Water And Sanitation Hygiene (WASH)	• Acquire skills and knowledge on: - Water - Toilet sanitation - WASH	• Provide awareness programmes on sanitation for: - All households - Island Communities - Church - Youth groups - Schools - Workplace
4	**Waste Management** - Liquid Waste - Solid Waste - Hazardous Waste	• Train trainers to acquire skills and knowledge on waste management; - Dumping - Storage	• Awareness programmes for: - Households - Island Communities - Church - Youth groups - Schools - Workplace

	Cluster Health Security	Constraints
1	Nutrition / Food Safety	• Lack of financial support • Lack of resources • Lack of relevant equipments/ facilities • Endorsement of food security regulations • Lack of training for high level officials • Lack of fair distribution trained trainers on all islands • No building allocated for training programmes • No proper transport designed for food transportation.
2	Care Taking for: - Old People - People with Special Needs - Pregnant Mothers - Children	• Lack of proper equipments & facilities to enable easy access for target people • Lack of financial support • No special building allocated for the target groups of people.
3	Sanitation	• Lack of proper toilet sanitation for all households. • Lack of financial support for households and communities.
4	Waste Management	• Lack of knowledge on waste management, i.e. sorting of waste. • Lack of labour force to strengthen proper waste management. • Lack of facilities to sort out waste, i.e. solid waste, hazardous waste, and liquid waste.

Water Security:

1. <u>WATER STORAGE – HARVESTING:</u>
• Concrete Water Cistern
• Plastic Water Tank
• Guttering
• Piping and fittings
	2. <u>WATER SANITATION</u>
	• Water testing – good water quality
	• Septic Tank – protect underground water & sea-wage
	• Waste water recycle
	  ○ Livestock
	  ○ Gardening

3. <u>BUILDING CODES</u> • Guide for infrastructure • Everybody to adhere for every construction	4. <u>UNDERGROUND WATER</u> • Not all islands have good quality of underground water • Underground water testing • How to construction of underground water

5. <u>WATER MANAGEMENT</u>
• Water Authority
  ○ Rationing of water
  ○ Govt and Kaupule contributions to water cistern
• Repair and fixing of water leaks and piping's
• Basic needs including livestock needs.
  ○ Food and drinks, cookings
  ○ Washing /Shower
• Control of movement
	6. <u>URBANIZATION</u>
	• Negative impact to livelihood and water security
	  ○ Domestic migration
	  ○ Overcrowded
	  ○ Epidemic-spread of disease
	  ○ Informal Settlement
	  ▪ Housing
	  ▪ Land Tenure
	Access to services and utilities

NO:	CLUSTER'S INPUT	SKILLS REQUIRE BY THE PRIVATE SECTOR (Current & Future Demand)	SKILLS REQUIRE BY COMMUNITIES (Current & Future Demand)
.	Water Security • Water Catchment ○ Roofing ○ Gutters ○ Plastic & concrete tanks ○ Maintenance	• Procurement of suitable facilities • Design of house • Design of water tank • Training of Trainers	• Construction work • Carpentry • Plumbing • Plastering • Maintenance process
	• Water Management ○ Water recycle ○ Water rationing ○ Compost toilet	• Water recycle process/treatment • Season cycle • Enhancement of water system • Awareness program • Increase Government grant • Training of Trainers	• Awareness program • Design of toilet • Construction • Partnership
	• Ground Water/Rain Water ○ Water testing ○ Construction of underground water catchments	• Water testing • Construction	• Water testing • Construction • Sanitation and hygiene •

CLUSTER	CONSTRAINTS
Water Security	• No proper training • No appropriate equipment • Lands space • Opportunities • Resource Management ○ Lack of resources • Proper Planning • Funding • Conflict of technology ○ Flush Toilets-village ○ Compost- outside village

Energy security

NO.:	MAIN ENERGY SOURCES	TECHNICAL SKILLS REQUIRED BY PRIVATE SECTOR (Current & Future Demand)	TECHNICAL SKILLS REQUIRED BY COMMUNITIES (Current & Future Demand)	SET OF PRIORITY
1	Solar, wind, electricity	Design; Installation; Maintance; Monitoring; Operation & Maintance; Data collection. Manufacture and use of compressors (Need to cover in school curriculum)	Operation, Appreciate the technology, safety measures.	1=
2	Household appliances	Energy efficiency; cost and analysis (appliances) Energy audit. (Need to cover in school curriculum)	Change their mindset on the use of energy wisely. Compare of appliances	Cross cutting issue 1-4
3	Transportation	Operation&Maintance; Cost and Analysis.	Cost and Analysis; O&M, safety (in driving)	3
4	Biogas & Compressor (Human, Animal & Rubbish waste)	Home system/power generation, Design; Installation, Operation, Maintance, Cost and Benefits analysis, Monitoring, Data collection, Safety, Power generation. (Need to cover in school curriculum)	Safety, cost and analysis, operation, maintance of equipment, data collection	1=
5	Biofuel	Design, Installation, Operation, Maintance, Cost and benefit Analysis, Monitoring, data collection, safety. (Need to cover in school curriculum)	Safety, knowledge in using by-product of technology, date collection, Operation.	4

CLUSTER	**Constraints identified:**
Energy security	O &M (Operation and Maintenance) Knowledge and skills (design, installation, maintenance, data collection, cost and benefit analysis). Monitoring, Data collection, Safety, Funds required, Intermittent technology (solar/wind), High cost of spare parts Isolation of the islands, High seawater spray

Clusters Inputs (Food security)	Technical Skills required by Private & Community Sector (Current & Future Demand)	Challenges
AGRICULTURE How to raise these food crops including floriculture; (refer to competency skills) <u>Traditional food trees</u> Coconut, Breadfruit Pandanus, Felo Banana, Pawpaw <u>Traditional Root crops</u> Pulaka, Talo (colocassia) <u>Annual Crops</u> Sweet potato, Cassava Talo n tana, Tamu Cabbages, Cucumber Tomato, Capsicum Hot pepper <u>Floriculture plants</u> Frangipani, Hibiscus Tiale/tiare, Talotalo Temili	• Site selection • Selection of planting materials • Propagation of planting materials • Preparation of planting materials • Compost making • Filling of planting holes/beds/containers, etc • Plant spacing • Crop protection/pest control (organic) • Harvesting • Post harvests • Marketing	• Land availability / land tenure • Lack of trainers • Access to adequate water • Lack of information in local language • Access to funds • Training facilities • Lack of Equipment • Lack of community interest/commitment • Lack of labour force at household / community levels • Lack of transport in agr marketing from outer islands to capital market and inter island.
LIVESTOCK Pigs, Chickens, Ducks	• Breeds • Housing • Feeding • Breeding • Slaughtering • Butchering	As above
Food processing /preservation	• Jam making • Pickles • Breadfruit chips • Banana chips • Dried pulaka chips • Breadfruit dried chips • Dried felo	As above
Conservation of Biodiversity areas	• Wild life conservation skills; turtle breeding • Farming land crops • Milkfish farming • Bird harvesting and control • Coconut crab harvesting and control • Turtle breeding, harvest and control	• Lack of awareness • Lack of resources • Lack of finance • Lack of training • Loss of traditional knowledge

5.3 The Training Supply and TVET Providers

This section outlines the various educational, tertiary and Technical and Vocational Education and Training Institutions in the Cook Islands along with the courses and awards they provide.

5.3.1 Non-formal Training

For the Tuvalu, training delivered through ad-hoc project delivery or general training events has resulted in little longer term sustainable capacity. Climate change awareness has increased, but genuine capacity building for climate change adaptation by communities in the outer islands has not improved significantly. The Taiwan Mission (agriculture), Government of Tuvalu Departments, Alofa Tuvalu and the USP EUGCCA project are the only initiatives that have translated to anything effective in the outer islands, despite a multitude of efforts.

Some of the areas that were the focus of prior training and education have also been identified by participants in this needs and gap analysis – including the following:

- Climate change awareness
- Biodiesel
- Bioethanol
- Biogas (building, operating and maintaining camatec digesters; installing, operating and maintaining plastic digester systems)
- Home gardening
- Agriculture
- Vulnerability capacity assessment
- Processes and tools associated with vulnerability and adaptation assessment
- Community planning
- Identifying the barriers to renewable energy use
- Global, regional and national long-term observing systems
- Greenhouse gases inventory assessment
- International negotiations
- Disaster risk management (various topics related to this)

5.3.2 Formal Training

Motufoua Secondary School (MSS) is a co-educational boarding school. Government provides all the running costs including those for teachers and support staff. It charges a small tuition fee of fifty Australian dollars a term on a three term academic year. MSS offers the following subjects: English, Mathematics, Chemistry, Physics, Biology, Agriculture Science, History, Geography, Accounting, Economics, Design Technology, Woodwork, Home Economics, Computer Science, and Commercial Studies. At the end of Year 10, students sit the Tuvalu Junior Certificate examination (TJC), the Tuvalu Senior Secondary School

Certificate (TSSC) at the end of Year 12 and the South Pacific Form Seven Certificate at the end of Year 13 The school also offers vocational and technical learning programs.

The other secondary school, **Fetuvalu Secondary School (FSS)** is a faith-based school run and operated by the Congregational Church of Tuvalu. FSS, although follows a different curriculum, offers quality secondary education to all its students. It provides education equivalent to that offered at MSS from Year 9 to Year 12.
Students from FSS may proceed to Year 13 at the government Form Seven program or at the Foundation program offered through the Tuvalu USP Campus.

On each of the islands there is a **Community Training Centre (CTC)**. These centres offer learning programmes for students who cannot access secondary education and who would also like to pursue more hands-on learning. These centres offer vocational learning programmes as well as basic trade courses to match their respective communities' needs. These programmes are made available with assistance from the EdDep in partnership with Kaupule.

Maretta Kabane Typing and Computer School (MKH) is a privately owned vocational training institution specialising in office skills situated in Funafuti. It was established in 1996 and mostly trains women in office and secretarial skills. It was opened to provide career paths for women as they were not allowed to enter Tuvalu Maritime Training Institute. Subjects include: typing technology; specialized typing; secretarial skills; audio typing; small business calculations; MSWord; MSExcel; and accounting & book-keeping.

Tuvalu Maritime Training Institute (TMTI) courses are taught in accordance with International Maritime Organisation Standards of Training, Certification and Watchkeeping (STCW) Standards. Courses include:
1. Pre-sea Training Program
For new entrants, young men and women between 17-25 years of age.
18 months per course
Divided into 3 stages, Junior (shorebased training), Intermediate (shipboard phase) and Seniors (shorebased training) at 6 months per stage
20 trainees per course intake (60 trainees in training any of the year).

2. Upgrade, Revalidation and Refresher courses
For experienced seafarers
Course duration varies from 1 day courses (Security Familiarization) to 2 week courses (Basic Sea Safety revalidation/refresher courses).

TMTI also run pre-sea training courses in the following areas:
SHOREBASED STAGE
TR01 Introduction & Orientation

TR02 Basic English
TR03 Prevention & Control of Shipboard Fires
TR04 Proficiency in Survival Craft (ST)
TR05 Occupation Health and Safety
TR06 Elementary First Aid for Seafarers
TR07 Safe Operation of Small Craft & Engines
TR08 Deck Watch keeping Preparation (BBP)
TR09 Basic Seamanship
TR10 Basic Engine-room Practices
TR11 Engine-room Watch keeping Preparation
TR12 Basic Catering Practices

SHIPBOARD STAGE

TR13 Seamanship Practices Aboard Ship
TR14 Deck Watch keeping Aboard Ship
TR15 Engine-room Practices Aboard Ship
TR16 Engine-room Watch keeping Aboard Ship
TR17 Catering Practices Aboard Ship

SHOREBASED STAGE

TR18 Vocational English
TR19 Advanced Seamanship Practices
TR20 Deck Watch Rating
TR21 Advanced Engine-room Practices
TR22 Engine Watch Rating
TR23 Advanced Catering Practices
TR24 Tanker Familiarization
TR25 Final Review & Pre-departure Routine

Revalidation and Refresher Courses
Basic Sea Safety (STCW Reg. VI/I); Survival techniques
Prevention and Control of Shipboard fires; Elementary First Aid
Personal Safety and Social Responsibility; Tanker Familiarization (STCW Reg. V/I)

Upgrade Courses
Deck Watch Rating (AS Deck, STCW Reg. II/4)
Engine Watch Rating (AS Engine, STCW Reg. III/4)
Qualified Steward Certificate

NEW COURSE
Purseine Crew Training

Designed to equip already qualified seafarers to be able to man and operate Purseine Fishing vessels within our oceans.
Newly introduced course (started 27th July, 2015)
Funded by NZ Aid
Target students: Experienced seafarers without job opportunities overseas
Meets STCW F standards
Course intake is 20 per course

UPCOMING COURSES
Certificate in Hospitality (Upgrade of the TMTI Qualified Steward Course)
Basic Welding and Fitters Course

1. TMTI upcoming audit (2016)

- TMTI is currently in preparation for the upcoming IMO audits on the newly amended STCW Convention (STCW 95 – STCW 2010) expected next year (date TBC).
- TMTI is currently complying with the STCW 95 Convention which only lasts till end of next year, 2016.

A. Gaps

- Provide training for TMTI trainers in order to meet the STCW Reg. I/6
- Provide audit training for TMTI staff in order to be able to conduct internal audits as required by IMO.

Accreditation of TMTI Courses

- Although most courses offered at TMTI are STCW approved, some still need accreditation by a recognised Institution or body, national or international (like the upcoming **Certificate in Hospitality Course, Engine Welding and Fitters Course** and any future courses.

Improving the mentioned gaps will greatly assist TMTI in;

Gap 1:

Its preparation for the upcoming IMO audits.

Improve TMTI's reputation in the world seafaring industry

Maintain and improve the employment of Tuvalu Seafarers

Gap 2:

Accrediting all TMTI Courses

USP:

www.uap.ac.fj

The University of the South Pacific is the premier institution of higher learning for the Pacific region, uniquely placed in a region of extraordinary physical, social and economic diversity. Established in 1968, USP is one of only two universities of its type in the world. It is jointly owned by the governments of 12 member countries: Cook Islands, Fiji, Kiribati, Marshall Islands, Nauru, Niue, Solomon Islands, Tokelau, Tonga, Tuvalu, Vanuatu and Samoa. The University has campuses in all member countries. The main campus, Laucala, is in Fiji. The Alafua Campus in Samoa is where the School of Agriculture and Food Technology is situated, and the Emalus Campus in Vanuatu is the location for the School of Law. The academic Schools, Institutes and Centres at the University of the South Pacific are organised into three faculties: the Faculty of Arts, Law and Education; the Faculty of Business and Economics; and the Faculty of Science, Technology and Environment. Each faculty comprises of a number of schools which offer a wide range of academic programmes and courses at the undergraduate and postgraduate levels.

The University also offers programmes through distance and flexible learning in a variety of modes and technologies throughout USP's 14 campuses.

Advanced communication technologies through USPNet are used to reach distance and flexible learning students.

The University has set a high standard for quality in its research. Major research commitments include business management, teacher education, Pacific studies, marine studies, agriculture, science and technology.

USP is a self-accrediting university registered with the Fiji Higher Education Commission.
All courses offered by USP as blended or on-line can be offered at the Tuvalu Campus.

Students in Tuvalu are currently enrolled in 74 different courses from foundation to PhD level in-country. Details of courses offered at USP can be found here: http://www.usp.ac.fj/fileadmin/scripts/OtherReport/Prospectus_2015/Prospectus_2015/index.html#/30

Full programmes delivered in regional campuses include MBA, Bachelor of Commerce, Diploma in Early Childhood Education, Bed Primary, B Ed ECE, Masters in Education, PGDip International Affairs, PGDip Climate Change. Project Management – USPCI hosts a Graduate Certificate in Project Management in conjunction with AUT University.

5.4 Suggested priorities for future EU PacTVET activities

As outlined at the beginning of this report – Tuvalu identified its main priority for EU-PacTVET intervention is the support for the community biogas project (SPC-GIZ ACSE Component 1). It is anticipated that EU –PacTVET will provide training on compressor manufacture and maintenance and installation, maintenance and operation of household digesters. Training will also be given on safe operation of compressor and digester, animal husbandry and associated agricultural production and use of digestate.

The table below shows current and planned activities that will integrate with this action:

Existing or planned programmes, projects and initiatives at the national level	**Complementarity / Lessons**
The University of the South Pacific European Union Global Climate Change Alliance project. (USP EUGCCA) Ref: Hemstock, S.L., Manuella Morris, T. (2015). Biogas as a renewable technology option for small islands. Case Study 9.1. In "The Biomass Assessment Handbook: Energy for a sustainable environment." Second edition. Edited by Frank Rosillo-Calle, Peter de Groot, Sarah L. Hemstock and Jeremy Woods. Routledge: Earthscdan pp 255-262	The successful USP-EU GCCA project in Nanumaga has been use as a blue-print for this type of activity in Tuvalu. Project outputs outlined above should ensure the successful expansion of appropriate biogas installations across the outer islands of Tuvalu.
Alofa Tuvalu "Small is Beautiful" project. Ref: Hemstock, SL; Manuella-Morris, T. (2014) 'Small is Beautiful: An analysis of the NGO Alofa Tuvalu's 10 year renewable energy project in Tuvalu.' In: Pacific Voices: Local Government and Climate Change (USP Press).	This project successfully introduced biogas to Nanumea (Tuvalu) and was used as the blueprint for USP-EU GCCA activities in Nanumaga. This project scales up these initiatives.
The Secretarial of the Pacific Global Climate Change Alliance project. (SPC GCCA)	One of the lessons learned from the SPC GCCA project has led to the inclusion of "project management" training in this project. This project builds on the findings of the SPC GCCA.
Taiwan Technical Mission – improve agricultural production and food security.	Will be engaged to provide support for establishing family gardens. Will work towards achieving food secure outer islands.
Tuvalu National Adaptation Programme of Action 2 (NAPA2). "…to strengthen fair and inclusive development through this project. We are looking at how we can contribute to the development of rural sectors, outer islands and communities, which are in need of development." The Min. of Foreign Affairs, Trade, Tourism, Environment and Labour, HonTaukelina	The proposed activities will complement those of NAPA2 as they will build capacity of outer island communities in the areas of food and energy security. The activities should also improve livelihoods for the outer island communities.

Existing or planned programmes, projects and initiatives at the national level	Complementarity / Lessons
SPC-USP EU PacTVET project aims to enhance Pacific – African, Caribbean and Pacific's (P-ACPs) regional and national capacity and technical expertise to respond to climate change adaptation (CCA) and sustainable energy (SE) challenges.	As described in the wider text, EU PacTVET will partner with all capacity building and linked activities. Capacity building for CCA and SE in outer island communities will also lay the groundwork for other initiatives such as USP EU GCCA Phase 2 and NAPA2.
There are a range of TVET initiatives regionally that this project will complement. For example: SPBEQ and FHEC "mutual recognition of qualifications" initiatives, and APTC, VOCTEC, PPA and the Sustainable Energy Industries Association of Pacific Islands (SEIAPI) training. Additionally, a new UNDP/UNESCO TEVET and migration project is just beginning in Tuvalu.	22 Tuvaluan participants recently benefited from USP EU GCCA, VOCTEC and APTC TVET Training of Trainers initiatives (2010-2014). This project will hopefully use personnel trained in these to implement some of the proposed capacity building activities. Networks and partnerships will be pursued and established with similar activities in Tuvalu and across the region.

Sustainable energy:

Gap/Skill Needed	Level	Training type/ intervention	Who	Content/Competencies
ToT for Solar PV system design skills Solar PV system installation skills Solar PV systems O&M skills	Advanced	Technical training for existing TEC staff – couls TEC be a registered training organization? Train existing staff at TMTI – could TMTI provide solar PV training?	EU PacTVET supported – TEC and TMTI	Trained to international industry standards (grid connected and stand-alone systems)
Solar PV system design Solar PV system installation Solar PV systems O&M	Basic to advanced	Course design and implementation	Courses offered at TEC or TMTI	Content based on international standards for grid connected and stand-alone systems
Energy auditing and efficiency	Basic to advanced	Course design and implementation	Courses offered at USP Tuvalu Campus – on-line mode	Energy audit Rational use of energy Labelling and appliance standards
Biogas system design, installation, operation and maintenance	**Basic**	**Course design and implementation**	**Courses offered by NGO sector**	**Safety, installation, operation and maintenance, feedstock mixing, animal husbandry, use of digestate – associated water management and food security/agriculture trainig**

Climate change:

Gap/Skill Needed	Level	Training type/ intervention	Who	Content/Competencies
Disaster risk reduction and disaster response	Basic to advanced	TOT and Course design and implementation	Courses offered at Tuvalu Red Cross and in NGO sector	Various – to be determined
Climate science and meteorological services	Basic to advanced	ToT & Course design and implementation	Courses offered at USP Tuvalu – on-line	Basic climate science, competencies based on International Meteorological Service standards – World Met Org support
Agriculture and food security – linked to biogas progect (ACSE Component 1)	Basic to advanced	Course design and implementation – integration into existing USP/TMTI/ Taiwan mission/ Ministry of Agriculture programmes	Courses offered by NGO sector and USP/ TMTI	Crop resilience knowledge-based skills; Soil adaptability knowledge-skills; Crop seasonal cycles knowledge-based skills; Crop/food preservation skills – traditional skills; Pest/weed control skills; Knowledge-based and implementation skills on agro-forestry; General food handling and hygiene skills
Water security	Associate Degree & Certificate of Achievement	Course design and implementation - Integrate in existing courses at CITTI	USP with SPC support	Plumbing; Water collection and preservation skills; Water purification and testing skills; Watershed management; Enforcement of regulations

Participants identified all these priorities, however those identified as immediate priorities are in red text

Transferable Skills:

Gap/Skill Needed	Level	Training type/ intervention	Who	Content/Competencies
Project Management	Basic-Advanced	Course design and implementation - Integrate in existing courses at USP	USP with SPC support	Project design skills; Community engagement; Audit/ accountability; Monitoring and evaluation; Sourcing funding; Networking skills; Planning and time management skills
Business skills	Basic to Advanced	Course design and implementation - Integrate in existing courses at USP & ILO	USP with SPC support – can be offered in NGO sector	Costing and pricing; business analysis and planning; marketing plan creating; enterprise operations and management; product development, value-adding, and branding skills
Data analysis	Basic to advanced	Course design and implementation - Integrate in existing courses at CITTI	USP with SPC support – can be offered in government sector	Types of data, sources of data, questionnaire design, research skills, data analysis, data entry, basic statistics

Participants identified all these priorities, however those identified as immediate priorities are in red text

6. Consultation Outcome

Present and future marked demand for TVET in Tuvalu has been identified and existing training supply mapped.

Tuvalu identified its main priority for EU-PacTVET intervention is the support for the community biogas project (SPC-GIZ ACSE Component 1).

Current TVET and tertiary education generally in Tuvalu has been highlighted as not fulfilling the countries development needs.

By providing a “skill-set” approach to CCA and SE training EU PacTVET could go some way to providing educational linkages to economic priorities and job creation – especially in the areas of renewable energies such as solar and in project management and DRM as funding for projects in these areas is set to continue.

SPC Secretariat of the Pacific Community

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EU PacTVET

European Union Pacific Technical and Vocational Education and Training on Sustainable Energy and Climate Change Adaptation Project

Training Providers

Table TP1 provides information on the only Tuvalu training institutes identified in the study. GSES project team member Geoff Stapleton interview Mr Toma Mesako from Tuvalu Maritime Training Institute (TMTI) while in Tuvalu conducting a training course. Mr Mesako indicated that TMTI would be interested in conducting solar training courses; he indicated that he would complete the survey, however it was not returned. Based on the interview GSES estimates their capabilities as shown in Table TP2.

Table TP1: Training Institutes Identified in Tuvalu

Institute	Contact	Position	E-mail	Phone
Tuvalu Maritime Training Institute	Mr Toma Mesako	Chief Officer	tmesako@gmail.com	

Table TP2: TMTI Capabilities estimated by GSES

Does your TVET have any department that could conduct any of the following types of courses	Yes or No?
Renewable Energy Technologies?	Yes
Grid Connect PV Systems?	Yes
Off Grid PV Systems?	Yes
Solar Hot water?	No
Wind Power Systems?	??
Hydropower?	
Micro-Hydro Power?	
Biomass?	Yes
Biogas?	Yes
Geothermal	
Others	

technologies?	
Energy Efficiency?	Yes
Refrigeration?	Yes
Air-conditioning?	Yes
Electrical wiring?	Yes
Efficient land and water transport systems?	
Energy sector planning and management?	

Based on the project team's experience and the survey response, 4 x solar related courses were identified as having been conducted in Tuvalu in the last 5 years. Information on the courses is contained in Appendix 15.

In summary these included;

- Solar PV Mini-Grid Training Workshop
- Training Workshop on SMA Off-Grid Inverters and Save Controller
- Household energy survey training for surveyors and power utility staff-
- Design and Install Grid connect PV Course

In addition to these courses, 4 staff members of the Tuvalu Electricity Company have undertaken the GSES online courses and travelled to Australia to undertake the practical training.

The grid connect PV course was conducted by GSES, a company which is a Registered Training Organisation in Australia. Those who passed are eligible to apply for industry certification under the Pacific Power Association (PPA) and Sustainable Energy Association of Pacific Islands (SEIAPI) certification and accreditation program.

The VOCTEC course had the intention of capacity building

Biogas, biodiesel, bioethanol, solar powered transportation and gasification equipment are all installed at TMTI by the NGO Alofa Tuvalu. Training of trainers on all these technologies was provided and equipment installed at TMTI. Some TMTI students, and around 500 people in Tuvalu have received training on biogas, gasification and biodiesel.

Pacific Community
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EU PacTVET

European Union Pacific Technical and Vocational Education and Training on Sustainable Energy and Climate Change Adaptation Project

Vanuatu Training Needs and Gap Analysis

Conducted and Compiled by: Nixon Kua

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Acknowledgement

One person cannot achieve everything. It takes a team to do that. This is true about the Vanuatu consultation. I did not do this by myself. There are people in different sector that put in their time and ideas that made up this report.

In this gesture, it is fitting to acknowledge the time and effort given by the In-Country Coordinator for the PacTVET, Mr. William Arudovo Bani. His time in doing the logistics and assisting me in doing the face-to-face consultation and in conducting the workshop is really valuable.

I would also like to thank that following in their very positive attitude in progressing the CCDRR course forward. Their eagerness from the beginning still radiates when PacTVET want to take onboard the course and progress it forward. Thanks to:

- Dr. Christopher Bartlet (SPC/GIZ CCCPIR)
- Mr. Jerrol Arnambart (VRDTCA)
- James Melteres (Curriculum Development Center)

The following people and organization for their very positive outlook in collaborating with PacTVET to progress the overall goal of TVET in Vanuatu:

- Mr. Robert Kalowie (AusAID TVET)
- Johnson Toa (Education Department)
- Vanuatu Qualification Authority
- Charles Pierce (The CCDRR Course Consultant)
- Jesse Benjamin (Director of Energy Department)

And lastly but not the least, to the workshop participants and those that we had met and consult face-to face during my consultations in Port Vila, thank you so much for your time and knowledge. Without these, we would not be able to come up with this comprehensive report

With such positive attitude being shown, such endeavor will surely pay off in the long run.

Thank you

1. Background

The European Union funded Pacific Technical, Vocational Education and Training (EU-PacTVET) is a project under the broader Adaptation to Climate Change and Sustainable Energy Programme (ACSE). It is component three (3) of this ACSE Programme.

It is of practical evidence that climate change is affecting the livelihoods of the Pacific Island communities in varying degree of adversity. These practical evidence are community-based assertion that take into account comparative measures of the present and past scenarios on various physical aspects, such as coastal line erosion and introduction of pest due to warming of cooler regions in the mountainous islands, to name a few.

Current total global greenhouse gas (GHG) emission stands at 36.9 gigatonnes of CO2 (GgtCO2). Of this global GHG emission, Pacific Islanders countries emit less than 0.03% yet they are amongst the most vulnerable to adverse effects of climate change since they are the first to be exposed and the least able to respond. Hence there is a moral obligation for the islands countries to start implementing measures in mitigating GHG. Down to the national level, Vanuatus' annual GHG emission is more than 610 kilo-tonnes CO2, which on a global scale, is insignificant.

In spite of efforts to reduce Pacific ACP (P-ACP) countries reliance on fossil fuels and improve energy security, almost all Pacific Island countries are almost 100% dependent on imported petroleum products for energy generation and transportation, which are the two major petroleum consumption sectors in the region.

With the Pacific Island countries facing challenges pose by climate change and energy security, sustainable energy and climate change adaptation are undeniably ranked above all other sectors in the regional Governments priorities, as evident through regionally endorsed frameworks, such as the wider Pacific Plan and the more specific Pacific Islands Framework Action on Climate Change (PIFACC) and the Framework Action on Energy Security in the Pacific (FAESP) and individual national policies.

Efforts in addressing energy security and climate change adaptation challenges are ongoing through various regional and national projects. On climate change mitigation, there are some familiar project such as the Pacific Islands Greenhouse gas Abatement through Renewable Energy Project (PIGGAREP) that addresses mitigation and Pacific Adaptation to climate change (PACC) that focused on climate change adaptation. The PIGGAREP was focussing on complementing PICs initiatives in promoting the widespread use of renewable energy in the regions and PACC focuses its project on three thematic areas, namely, "Food security"; "Water Security" and "Coastal Management". This project focusses on assisting communities to implement activities that help them in these three areas.

Sustenance of such projects on mitigation and adaptation is very important. Now that these projects are coming to their end, it is important that knowledge and skills being acquired and/or hardware that were put in place continue to function and be beneficial to the targeted beneficiaries. Not only on the renewable energy side, but on the overall energy scene, where there are needs to be able to understand energy efficiency and conservation and what measures needs to be taken to use energy in a sustainable manner as compared to energy misuse and wastages.

Knowledge and skills on agricultural and fisheries best practices and other innovative approaches in addressing food security, water security and measures to reduction of vulnerability to disaster needs to be well established in rural and urban communities alike. Such knowledge and skills can only be acquired through strategic and systematic approaches such as capacity building which target the rural majority of the pacific island countries, especially in the Melanesian countries, and Vanuatu is no exception. Such capacity building needs to be targeted at levels and strategic training providers within the countries that would have real impact to the rural communities and other level of communities

Vanuatu has a population of 259,642[1] according to the current projection and according to World Bank, about 75%[2] of this population are rural and remote community dwellers, practising subsistence farming and have been using biomass for their energy needs, hence for livelihood sustenance. To further enhance their livelihood, knowledge and skills in agricultural and fishing best practices and energy security, including energy efficiency and conservation, needs to be passed on to community youth drop-outs that comprises of the majority of the population.

The purpose of the in-country-mission is to assess or more fittingly map out the baseline of the Technical, Vocational Education and Training (TVET) providers, including the rural training centres (RTCs) and the community-based learning centres (CBLC), in the country, by identifying these TVET or RTCs and what courses they provide, along with the awards given after completion of each programme.

2. Schedule of Consultation Event

Day 1-3: Monday 22nd – Wednesday 24th June 2015
Stakeholders One-to- one Consultations
Day 4 &5: Thursday 25th – Friday 26th June 2015
The opening of the Consultative Workshop was done by the Director of Energy Mr. Jesse Benjamin. This is followed by the introduction of the Workshop, its outline and objectives, the outline of the project and the project objective. The Consultation Workshop went on for 2 days. See attached Programme (Annex 1)

[1] www.countrymeters.info/en/Vanuatu

[2] www.tradingeconomics/vanuatu/rural-population-percent-of-total-population-wb-data-.html

Day 1: Monday 22nd June: Stakeholder one-to-one consultation

9:00 am – Dr. Christopher Bartlet (SPC/GIZ Climate Change Vanuatu)

Discussion centred on:

- 7 Climate Change Disaster Risk Reduction (CCDRR) Module developed under GIZ. This was developed for piloting at one Rural Training Centre (RTC) in Tanna called Lume RTC.
- The CCDRR Modules has been developed and were trialled out in SANMA Province;
- There is value adding by including mitigation in the modules;
- Application for accreditation was forwarded to Vanuatu Qualification Authority (VQA), but Vanuatu Qualification Authority (VQA) is yet to do the accreditation;
- Charles Pierce with 9 other stakeholders developed the course. These are from the following sectors: Infrastructure; Health; Water; Forestry; Curriculum Development Unit (CDU); Fisheries; National Advisory Board on Climate Change (NABCC); Agriculture; Vanuatu Rural Development and Training Centres Association (VRDTCA).

The CCDRR Course was developed for Certificate I level. It was spelt out by Dr. Chistopher that community consultation indicated a need to build the capacity on CCDRR Course. The CCDRR Course was developed and trialled in the Banks, Sola Province. It was discussed that after VQA's approval, PacTVET can roll it out, with the Chamber of Commerce. Further discussion on this was done with the Education Department; VRDTCA; Vanuatu Institute of Technology (VIT) and VQA on this matter.

9:30 am – Mr. Jotham Napat (Director General – Department of Climate Change)

The Project was outlined to the Director General and it was emphasized that there is a need to have the project established through the Ministry's Project Management Unit. The project was welcomed by the Director General and looking forward to working closely with the In-country Coordinator (ICC) and the project team members in Fiji.

10 am – Carol Dover (NZ-MFAT Consultant on TVET)

Carol is a NZ-MFAT Consultant who was to identify concepts that the NZ-MFAT will use to support Vanuatu's Rural Training Centres (RTC) for the next 5 years. There was a 1 day workshop on this day where Carol use the workshop to review Concepts, presented in draft form proposing opportunities for support to RTCs. The various OPTIONS or opportunities as a way forward to strengthening TVET in Vanuatu were presented. One of the 7 Options was on Capacity Building for the RTCs

2 pm – Johnson Toa (Education Director)

Discussion on the idea of taking on board the Climate Course (CCDRR Course) developed already by the consultant) was discussed. The following points were discussed:

- Identifying 1 RTC from each of the 6 province (Provincial RTC). From each of the PRTC identify an instructor that can be able to attend a Training of the Trainers (ToT) Course to be conducted maybe at the VIT or Vanuatu Institute for Teacher Education (VITE).

- Prior to this, the Sustainable Energy component of the 7 modules must be developed through the same process that needs to be vetted by the VQA. Incorporating sustainable energy (SE) into the existing CCDRR Course is recommended by Dr. Christopher (SPC/GIZ CCCPIR Vanuatu office)
- The Concept or Model:
    1. Develop or adopt existing Renewable Energy (RE)/SE Course or Competency standards (from VQA) and develop and SE Course through the normal process
    2. Adopt the CCDRR Course developed by SPC/GIZ CCCPIR Vanuatu
    3. Select 1 Trainer from each of the 6 selected Provincial Training Centres (PTC) to attend the Training of the Trainers on the SE/ CCDRR Course. Since the Course is developed for level 1 or Certificate 1 level, the trainers must be Certificate II and above holders. The Training of trainers course is to be conducted at VIT or VITE
    4. Select 2 trainers from VIT to attend this ToT course. The ToT would be conducted by a consultant who developed the CCDRR Course (Mr. Charles Pierce). The duration of the course depend on what was approved by Vanuatu Qualification Authority (VQA). The idea of having 2 trainers from VIT attending this ToT is for sustainability or continuity of the program after the project is over.
    5. The Course copyright belongs to Lume RTC in Tanna (1 trainer from Lume must also attend). The other 5 PRTC can conduct the SE/CCA Course upon approval by Lume PTC.
    6. VRDTCA to take over the ownership and have the course delivered at its RTCs who are accredited to do so.

3 pm: Consultation with the Deputy Principal of Vanuatu Institute of Technology (VIT)

The Project was introduced and outline to the Deputy Principal. The objective and purpose of the project stated and discussed further the Concept discussed with the Education Department (as previously stated).

The Deputy Principal welcomes the concept and will further discuss this with the Principal and will be ready to discuss any further development.

4 pm: Consultation with Sam Samuel (Qaulity Assurance Officer – Vanuatu Qualification Authority); David Lambukly (OIC – Vanuaty Qualification Authority).

The Project was introduced and emphasized the need and importance of accreditation. This leads on to the above mentioned Concept that was discussed with the Department of Education and VIT. The Concept was discussed and the VQA welcome the idea. The only issue here is the course developers need to submit and "Intend to Accredit", which according to the SPC/GIZ CCPIR Vanuatu that initial stage was done already. But VQA realised that the submission of "Intend to Accredit" was done after the CCDRR Course was developed.

The VQA is yet to consult and conduct a meeting to vet all the "Intend to Accredit" submissions. To speed up the process, funds need to be made available to have the VQA conduct a vetting meeting to look through the CCA course

Day 2 – Tuesday 23rd June: Continue Stakeholder one-to-one consultation

8:15 am – Consultation with the Curriculum Development Unit (CDU).

William made an Introduction.

Project outline and Object was made to James the Curriculum Development Officer. It was noted that the CDU was one of the stakeholders that was instrumental in developing the CCDRR Course. It was noted that during the 1st Workshop that was conducted by SPC/GIZ CCPIR Vanuatu, the standards for CCDRR Course that were done by CDU. The 2nd workshop was conducted to develop the course. The CCDRR Course Course was developed to level I Certificate.

9:30 am: Consultation with the Jerrol (Director – Vanuatu Rural Development Training Centres Association – VRDTCA)

Mr. Jerrol Arnhambat is the new Director for VRDTCA. The Concept that was initiated from Johnson Toa from the Department of Education whereby the CCDRR Course from SPC/GIZ CCCPIR and have the Energy component developed was totally in favour of by the Director.

Since it was the Lume RTC's initiative, Lume will have the copyright and to have it rolled out and conducted in other 5 RTCs or even in other registered RTCs in the future, they have to have permission from Lume RTC in Tanna.

Mr. Jerrol Arnhambat was the former Director of VQA, then Vanuatu National Training Council (VNTC). The process of VQA was outlined in relation to the CCDRR Course submission on Intend to accredit. The submission is based on the needs analysis done by SPC/GIZ CCCPIR. A form needs to be filled out and submitted. It was seen that SPC/GIZ CCCPIR was proactive in going ahead to develop the course then submit it Application of Intention.

After VQA's approval on its "Intend", the course plus its assessment tools are developed and presented for approval.

It must be noted that it the Vanuatu Industries Standards Advisory Committee (ISAC) is there to advice on the needs of the industries before any competencies standards are set out. The Concept that was floated during the consultations was seemingly likeable.

To have the course rolled out there needs to be a Sustainable Energy component developed as it was identified during the Training Needs Analysis. Prior to this the VQA needs to be check for any approved course on SE/RE. If there is one, then there is no need to develop a new course on SE/RE. Having to roll out the CCDRR and SE course needs trainers to undergo the training of the trainers course. These trainers must be certified. The trainers must be under the scope of registration in the RTCs.

The idea is to have 6 Provincial RTC plus Lume to undergo a course on training of the trainers Course on CCA, which will resource or equip Lume and those other 3 PRTCs to

conduct the CCA Course. Slowly train the remaining 3 PRTCs to be able to conduct the course. Lume has the copyright to this course at this stage.

10:30 am – Consultation with Cofrey Ltd

A consultation was made with the General Manager of Cofely. GDF SUEZ group has been present in Pacific region for more than 70 years (New Caledonia, Wallis & Futuna, and French Polynesia). Since a long time, renewable energy take part of production means. Nowadays, it runs centrals of renewable electric energy production: hydroelectricity, wind power, photovoltaic and more recently bio fuel oil (used vegetable oil and copra oil). COFELY VANUATU presents the actual situation of renewable for the group in New Caledonia and in Vanuatu, and also its perspective of evolution.

Cofely works towards renewable energy and environmental activities. It supply coconut oil (CNO) to UNELCO (a private enterprise and the utilities concessionaire for the production, transport and supply of electricity and water); operates the windfarm in Efate and a hybrid system (solar/diesel) in Santo.

Some of the activities that Cofely is engaged in are water testing in it lab; refinery of CNO at Lakatoro (Malekula) and Takabe (Port Vila). In Port Vila UNELCO owns the power plants and it is Cofely that is operating the plants.

A brief on the power consumption in Port Vila had stated that in a working day at around 12 noon 80% of the power produced and consumed is from renewable energy source. The demand in for Efate is 7.4 megawatts (MW).

There are graduates from VIT who are working with Cofely. These graduates are from the electrical and mechanical departments. The Cofely will further train them to be specialised in the different field in electrical and mechanical trades. Graduates that cannot cope will have to leave the company after a trial period of 3 years.

The General Manager of Cofely emphasised the need to produce more copra to be processed to CNO for power generation. To do so, the government should engage TVET to build their capacity in producing more copra to be supplied to Cofely.

According to the General Manager for Cofely, the RE Target is 50% RE by 2025. Currently it is about 20% RE but 50% can be met now ass it was shown that 80% RE at 12 noon that day.

Day 3 - 24th June: Continue Stakeholder one-to-one consultation

9:30 am – Consultation with AusTVET Director (Mr Robert Kalowie)

The Project was introduced with its objective to the Director. There seems to be a need to collaborate so that maximum benefit can be attained.

AusTVET is a Vanuatu TVET Sector Strengthening Programme (VTSSP) through AusAID.

TVET has been with the Ministry of Education, but little attention was given to it. AusTVET programme was set up by AusAID to strengthen TVET in the country – hence the VTSSP. The Vanuatu Technical and Vocational Education and Training (TVET) Sector Strengthening Program aims to support economic development, through targeted skill development services in the rural communities of Vanuatu. The Program encourages a more responsive and better quality training system that is able to meet the skill demands of the productive sectors in provincial communities.

Pic. 1. Office of the Vanuatu TVET Programme

Pic 2. Meeting with the TVET Coordinator Robert Kalowie

1:30 pm – Consultation with the Climate Change Office's Project Management Unit

The Project Management Unit (PMU) Officer Mr. Malcom was consulted. The consultation is crucial as there needs to be an establishment of all projects coming into the country with the PMU, so that they are taken account of and proper planning can be done.

2:30 pm – Workshop Venue preparation

Set up of Workshop venue was done after 2 pm

Day 4: Thursday 25th June – Training Needs and Gap Analysis

(Venue: Meteo Conference Room)

A brief outline of the role of each stakeholder was made. This noted down in the Full Scoping Mission Report.

To start off the TNGA, a brief presentation on what a TNGA is was made to give an overview of what is expected from the stakeholder during the TNGA that will follow from mid-morning until the end of day 4 and will continue on on the next day Friday 26th. The Project overview was presented as given in the Programme (refer to Annex 1)

The Plenary session was conducted prior to the actual TNGA session. This was moderated by Principal of Vanuatu Agriculture College (Timothy Joe).

The session discussed about the importance of building local capacity to face the challenges posed by CC and energy security. The approach is to go down to the rural community level, through the RTCs, which is what the Project's emphasis is on.

2.1. Project Outline and Presentation

After the opening, an outline of the EU-PACTVET was made, with emphasis on the following aspect of the project:

a. Rationale - current scenario with regards to sustainable energy (SE) and climate change adaptation (CCA) in the P-ACPs and the issues emanating from those scenarios. It was focussed down to the case of Vanuatu, where there a lot of dependency on fossil fuel for power production and transportation. On the climate change side of the coin, the P-ACPs are more vulnerable to climate change, but have the least capacity to respond to these.
b. How the EU responded to these issues and the approach it took by focussing on building the capacity and empowering the capacities through benchmarking and the aim of setting standards of competencies and accreditation.
c. The objective and the purpose were state as being taken to try and address the issues
d. The Key Result Area (KRA). Each of the 4 KRAs were outline and it was made know to the stakeholders that one of the activities under KRA 1 is this in-country-assistance on consultative workshop and one-on-one consultation to do a training needs and gaps analysis (TNGA). Activities that need to be conducted in the hope of achieving each of these KRAs were briefly outlined.
e. A brief overview of the budget. This was to give the stakeholders a glimpse of the allocation from the €6.1 million
f. And finally, it was emphasised that the consultations are important in that the Vanuatu (stakeholders) need to identify its needs so that they could be noted as one of the activities that needs support. It was noted that SPC/GIZ CCCPIR had developed Climate Change and Disaster Risk Reduction Course targeting rural training Centre in Vanuatu at Level I (Certificate I). This course will need a "sprinkle" of renewable energy and energy conservation into it by adding one more module.

3. Stakeholders Functions Brief Outlined

The Project outlining was followed by brief presentation from each of the stakeholders on the topic "Aspects of each Sector relating to Sustainable Energy and Climate Change – capacity and technical expertise on demand by industries and communities but lacking from the supply side". This was purposely to establish the baseline as to what each of the sectors are engaged in and how does each of these sectors are affected by climate change and how sustainable energy practices are being part of their sectoral policies.

The training needs and gaps identified would be outlined in the latter sections, but outline below is the summary of the different sector's functions and relationships with SE and CCA

3.1. Energy

The Energy Department of the Ministry of Climate Change is responsible for Administration, Renewable Energy (Off Grid (RE/Mini-grids and On Grid - Concession Areas); Petroleum/LPG and Energy Efficiency and Conservation.

The Vanuatu endorsed it Vanuatu Energy Road Map in 2013. This demonstrated that Vanuatu places great importance on ensuring sustainable development in the energy sector. Energy is an important driver of economic growth, and will make a significant contribution to improving the living standards of the people of Vanuatu. A reliable and efficient energy sector will help local businesses to grow and will ensure that consumers can access the goods and services they demand. Modern energy sources provide a key platform for achieving the Government's vision of "an educated, healthy and wealthy national". So it is evident that education and training is of paramount important in and sustainable development.

Given here is a snapshot of the energy situation in Vanuatu:

a. **Accessibility:** It was notice that there is an increasing connection rates
    i. Grid Areas: Currently it is 68% and by 2020 it is projected to be about 90%;
    ii. Close to Grid Areas: Currently stands at 0% and it is projected to be closer to 90% by 2020;
    iii. Off-grid Areas: Current stands at less than10%, and by 2020, it is projected to be around 100%;
    iv. Public Institutions: 100% access by 2020

b. **Petroleum Supply:** Reduce the cost of distributing all petroleum Products by10% by 2020; Improvements in Health, safety and Environmental Standards by 2020 for all Operators
c. **Affordability:** Address consumers' current ability to pay for connection, explore options to increase affordability;
    i. 65% of renewable energy 2020;
    ii. 20% Improvement in diesel efficiency by 2020

Whilst trying to improve accessibility, affordability and safety and decrease dependency on fossil fuel, Vanuatu is also facing some challenges with it regards to it sustainable use of energy. These are some of the challenges[3]:

- Grid extension deemed uneconomical due to low population density;
- No capacity nor financial resources to develop and implement renewable energy technologies that are seems viable like solar, wind and hydropower;
- Lack of standard specification for renewable energy components, designing and installation to be sure that RET are suitable for Vanuatu's environment;
- Lack of locally trained person to design, install, operate and maintain (and manage) renewable energy projects

[3] https://www.irena.org/DocumentDownloads/Publications/Vanuatu.pdf

- RE and Climate change projects are exposed to natural disaster. Example are the feedstock for biofuel

3.2. Climate Change and Disaster Risk Management

The Ministry for Climate Change was established in April 2013 as part of efforts to streamline Vanuatu's climate change response. It houses the Vanuatu Meteorological and Geo-hazards Department (VMGD) and the National Disaster Management Office (NDMO) in a newly constructed government-funded complex. The Ministry for Climate Change and the National Advisory Board on Climate Change and Disaster Risk Reduction (NAB) are mandated with coordinating all government and non-government initiatives addressing climate change and disaster risk reduction in the country.

There is an body that is set up within the Climate Change ministry, called the National Advisory Board for Climate change and disaster risk reduction (NAB).The NAB acts as the Vanuatu supreme policy making and advisory body for all disaster risk reduction and climate programs, project, initiatives and activities in Vanuatu. The PacTVET has to be established through the NAB - Project management Unit (PMU). In a nutshell, it is a climate change and DRR advisory and policy making body in all aspects to do with CC and DRR.

With regards to the physical aspects of climate and weather situations in Vanuatu, there are very small changes in temperature from one season to another (with its only two distinct seasons – wet and dry seasons) and temperatures throughout the year is fairly constant. Such temperatures are strongly influenced by changes in the surrounding ocean temperature.
An understanding of the climate and the changes in climate is crucial to the very survival of the people in Vanuatu (and the Pacific as a whole)
The annual maximum and minimum temperatures for Port Vila had increased since the 1950. The maximum temperature had increased by 0.18^{0}C per decade since 1950, which are global-pattern consistent. Increase in temperature in usually cooler region of the islands mean introduction of pest (animal or plant) that could the agricultural productivity.

There is a show of substantial variation in rainfall from year to year for Port Vila which clearly demonstrated no clear trend as alluded to earlier. There is increase in sea level as warming of the sea continues on, giving rise to increased sea volume. Satellite data and tide gauges gave indications that the sea level in Vanuatu had risen by 6 mm per year since 1993. This is larger than the global average of 2.8 – 3.6 mm per year. Such scenario could be partly due to the ENSO. It is predicted that this trend will continue with sea level rising to 3-17 cm under high CO2 emission scenario[4].

[4] Pacific Climate Change Science – Current and Future Climate of Vanuatu

The ocean as one of the major sinks for CO2 can absorb one quarter of carbon dioxide emitted through human activities. More CO2 absorption creates an imbalance of the oceans pH level. The ocean tends to be more acidic. Correspondingly, sea dwelling creature and the reef ecosystems will experience the imbalance and their survival is at stake. The level of acidity of the ocean is predicted to continue to rise, by three different CO2 emission scenarios.

Adverse effects of climate change would need to be known and understood so that any adaptation strategies or measures can be effective.

Changes in the climate and weather patterns affect the production and consumption pattern of energy. Wide-spread understanding on this is important as measure or strategic approaches can be taken to minimize energy losses and be able to meet the energy demand of the population in Vanuatu.

There is a need for a sustainable consumption or utilisation of different forms of energy, so that energy is available for consumption during times of natural disaster.

The following are the goals for the National Disaster Management Office (NDMO) which will drive its focus and Work Plan. They reflect its immediate development needs to progress its Mission and move towards its Vision. The objectives and actions which follow reflect its core functions, challenges and priorities.

- The institutional frameworks of the National Disaster Risk Management Plan (DRM) Plan 2009 (N-DRM Plan) are supported by government and partners and are delivering credible DRM policy and Disaster Risk Reduction (DRR) outcomes;
- The operational arrangements for DRM are effectively addressing the impacts and operational demands of disaster events at the national, provincial and village levels;
- Disaster awareness programmes are reaching the population of Solomon Islands and village disaster risk programmes are leading to an expanding network of safe sustainable resilient villages across the Provinces;
- The NDMO has the skills and corporate and administration systems to effectively deliver on its functions.

Whilst the NDMO is doing a great task in disaster awareness programmes in the communities, a community-based DRR programme could aligned to the rural training centres (RTCs) to be incorporated into the subjects taught at these RTCs. And it is intriguing to see a course on CCDRR being developed to be used in the RTCs.

3.3. Ministry of Education

The goal of the Ministry of Education is to provide content that will be useful and attractive to all our major stakeholders: students, parents, teachers, school administrators, education officials, and the public.

The Ministry of Education and Training (MoET) is the largest service deliverer and employer in Vanuatu. It is responsible for delivering the education aspects of the Millennium Development Goals and international agreements such as Education for All and respect for the rights of children.

This includes the Government of Vanuatu's commitment to achieving universal primary completion (UPC), improving literacy, and to developing skills for the productive sectors (rural and urban) through technical, vocational education and training (TVET).

The MoET faces the challenges of responding to a fast growing population, and growing demands and expectations from parents and students and communities, and from the formal economy.

The MoET is the largest and most complex of the Ministries, with services delivered across Vanuatu. This brings with it the special challenges and costs of supporting and monitoring services and school infrastructure to rural and remote areas. The Ministry of Education and Training is structured as follows:

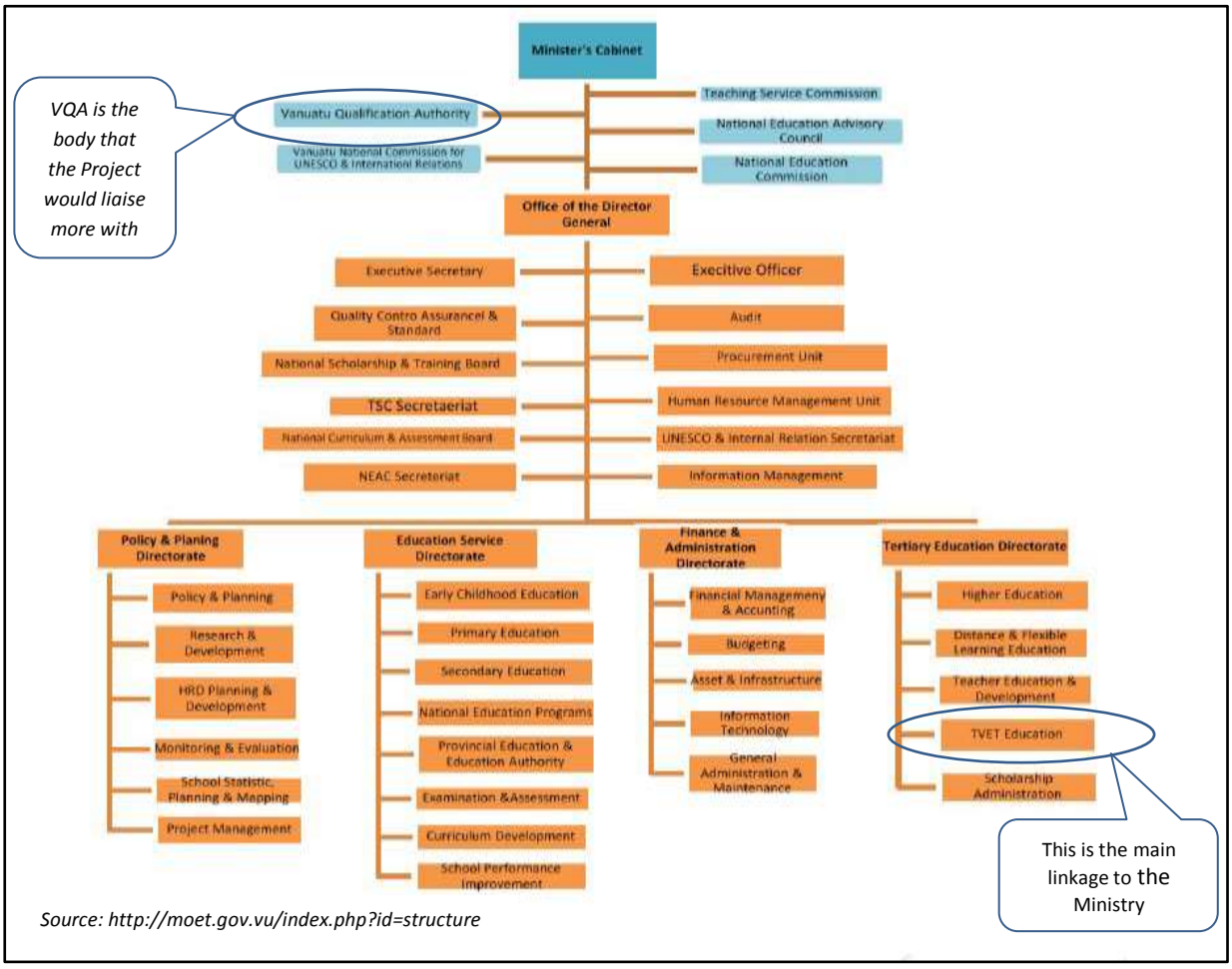

***Chart 1**: Ministry of Education Organisational structure*

Climate change is a cross-cutting issue and of course it does affect the education sector in many ways. It is pivotal in the way we make decisions regarding educational matters, including course designing; teacher training; teaching facilities and the requirements from parents and the employers.

Incorporating climate change into the primary and secondary curriculum would see a more basic-climate literate early schooling pool of children that when they move up to the higher education and TVET level, their mind-sets have the baseline that would be easier to introduce climate change issues to.

3.4. Other Stakeholders

3.4.1. Agriculture

Agriculture provides for two-third of Vanuatu's population[5]. That is about 170,000 people. Not only that, but for the 75% of Vanuatu's population in the rural communities, subsistence agriculture is sustaining their day to day livelihood. Whether those agricultural practices are best/sustainable practices or not, it's a matter of having to secure food for tomorrow, or go hungry.

The following are the main agricultural products produce in Vanuatu for commercial and subsistence purposes: copra, coconuts, cocoa, coffee, taro, yams, fruits, vegetables; beef; fish.

Picture 3: Coconut, beef, Root crops and fruit provides daily needs of the communities in Vanuatu

The use of energy is not significant in subsistence agriculture as it is on a commercial level where machineries and other equipment are required. Regardless of that, subsistence agriculture still employs the traditional method of "slash and burn", where the burning of foliage as means of clearing the land for cultivation.

Energy from biomass (foliage) in this case of slash and burn is being wasted, as there is no point in harnessing it, as it not practical to do so. Other agricultural wastes such as livestock manure can be utilised for biogas production for cooking and lightings. In Vanuatu there is abundant feedstock for biogas production from cattle manure. This can be used in large commercial farms as means to supplement the farm's energy requirements.

Changes in the weather and climate pattern will surely affect agriculture, in term of crop yield and new crop pests. This will affect the methods of farming, whether it is subsistence or commercial. That is to say that the adverse effects of climate change is prompting human

[5] http://www.indexmundi.com/vanuatu/economy_profile.html

beings, including Ni-Vanuatu to seek alternative methods that can still provide the same amount of food crop before the adverse effects of climate change – hence addressing the issue of food security.

In low lying Islands and coasts in Vanuatu, saltwater intrusion into areas allocated for planting crops is causing secondary issues such as reliance on manufactured goods, resulting in lifestyle diseases such as diabetes and hypertension. To mitigate this, planting root crops or other "green-trees" for cabbage that can withstand the salinity or the brackish nature of the soil needs to be explored and promoted. Mitigating the problem presented by low capacity of food crops productivity in these low lying coastal communities, in a nutshell can be seen as means to adapt to the adverse effects cause by the changes in climate. Revisiting 'greens-trees' used for food by our ancestors needs to be promoted, because these are not vines or shrubs but trees, which can withstand strong cyclonic winds – so they cannot be destroyed completely. These trees and others that bear fruits to be raised in a 'tree-bank' for safe-keeping, in case of a chance that some natural disasters might damage them to a point that none is left for replanting. These are some of the recommendations from the "Lessons Learnt" after cyclone PAM that devastated Vanuatu in March 2015.

3.4.2. Fisheries

The Fisheries sector is also one of the revenue earners for the country, but not as much as Solomon Islands. Subsistence fishing provides alternative protein for the Ni-Vanuatus.

The Vanuatu Fisheries Department (VFD) is mandated to implement and enforce fisheries management laws, policies, regulations and principles under the Ministry of Agriculture, Livestock, Forestry, Fisheries and Biosecurity (MALFFB). The Fisheries Department (VFD) of Vanuatu is envisioned "to ensure sustainable management, development and conservation of fish resources in order to achieve maximum social and economic benefits to Vanuatu for the present and future generations".

Ocean poses a significantly large amount of secondary energy primarily from the sun. The ocean's energy can be harnessed through OTEC (Ocean Thermal Energy Conversion) that employs the differences in temperature down the depth of the ocean; ocean waves and tidal currents. In the Pacific region, these forms of renewable energy technologies (RETs) are yet to be economically proven to be viable. Theoretically, it would work, but with the very small scales of Vanuatu's economy, it would be difficult to predict whether it will function or not.

On the fisheries industry, operations and maintenance consumes significantly large amount of energy. Utilizing energy in a sustainable manner means methods or techniques employed to fish must be effective and that safety measures must be taken into account when fishing operations are done.

Ocean is the largest CO2 sink. Vanuatu's exclusive economic zone (EEZ) covers a total area of 668,220 km^2, and this much ocean surface is acting as the natural sink for CO2. CO2 is being absorbed by the ocean via the physicochemical and biological processes. In Vanuatu,

slow increase in ocean acidification since the 18th century[6], is slowly impacting on the coral reefs and the fish and other marine resources used as food (source of protein).
Coastal erosion can result in washing away of breeding grounds for fish and seashells. Coral bleaching due to increased ocean acidification – hence depletion of coral reef-fish species and other marine lives

3.4.3. Vanuatu Agricultural College

The Vanuatu Agricultural College aims to provide quality education and training in the field of Agriculture to all to be able to utilize their natural resources in a sustainable manner.
The Vanuatu Agriculture College is offering course in the following subject areas: i) Horticulture; ii) Livestock; iii) Forestry; iv) Aqua Culture and v) Business Studies.

3.4.4. Vanuatu Institute for Teacher Education and Curriculum Development Unit

The Vanuatu Institute for Teacher Education (VITE) had been offering Diploma in Teaching (Primary), Diploma in Teaching (Secondary). These two programmes are for 3 years. The year is a common year where all take the same subjects. The second and third years, saw them splitting into Certificate and Diploma. Teacher graduate will take up teaching in Primary and Secondary schools in Vanuatu
The Schools aims to produce quality teachers who would be able to prepare children at the early ages (Primary schools) and mould them through the secondary school system, preparing them for post-secondary education that could be university or TVET. If sustainable energy and climate change themes are in-built into the VITE various programmes, or as subjects of their own, teachers in secondary and primary would be well equipped to talk 'sustainable energy' and 'climate change matter's, and would be able to pass on the same knowledge.
Currently there is a course developed for junior secondary school students, targeting year 7 – 10, on climate change and disaster risk reduction (CCDRR). There are teaching and learning resources developed to be used as part of the resources materials. This course is developed by the SPC/GIZ Coping with Climate Change in the Pacific Island Region (SPC/GIZ CCCPIR). The Vanuatu Curriculum Development Unit had been instrumental in the designing processes in collaboration with the consultant who was hired to develop the course. The trialling out of the CCDRR course to trainers at VITE was done in August and plans to train teachers in secondary and primary schools is underway and there it is likely that would happen towards the end of 2015 or on the first quarter of 2016.

[6, 3] Pacific Climate Change Science Program: Current and the Future Climate of Vanuatu

3.4.5. Vanuatu Institute of Technology

The Vanuatu Institute of Technology (VIT) is a tertiary technical training institute under the TVET section of the Ministry of Education. VIT is the center of excellence for public technical, vocational, business, hospitality, and continuing education in Vanuatu; contributing to the economic and social development of all its islands and citizens. VIT offers a variety of courses and regular training take place in the different islands of Vanuatu.

VIT houses those technical and vocational training course like carpentry, electrical wiring, automotive mechanics plus similar trades. VIT graduate are working in various industries in the country and are making a positive impact on the islands,

3.4.6. Forestry

The forest holds the feedstock for biomass for renewable energy production. Sustainable use of the forest resources will ensure future biomass feedstock availability.

It is known that deforestation and forest degradation release significant amounts of greenhouse gas to the atmosphere contributing to climate change. Many of the emissions from forestry and land use change activities come from developing countries. This led international policy makers, under the United Nations Framework Convention on Climate Change (UNFCCC), to design a global mechanism to provide positive incentive to developing countries to reward their effort to reduce emission from forestry and for enhancing and sustainably managing their forests. The mechanism is the REDD+ (Reducing Emissions from Deforestation and Forest Degradation+). The following activities are expected to be implemented:

- Reducing emissions from deforestation
- Reducing emission from forest degradation
- Conservation of forest carbon stock
- Sustainable Management of Forest
- Enhancement of forest carbon stock

When implementing these activities countries have to adhere to set UNFCCC guidelines.

Forests are home for a wide range of important environmental, social and biological diversity. The above mentioned key important functions of the forests needs to be safeguarded, as well as the contribution that forests has made to human existence. There needs to be consideration to strike a balance between human needs for sustainable livelihood, and the ecological functions of this resource. Forests are important for the daily livelihood of people of Vanuatu. Forests provide greenery to our environment and housed the nation's rich ecological biodiversity. Forests provide food, clean water, building materials and fuel wood for sustaining life in the rural communities. Forests are part of Ni-Vanuatus' culture and are a source of traditional medicine. Forests form an important source of income generator to rural communities, and have the potential to develop some products into a significant industry which has the ability to provide jobs for many Ni-Vanuatus.

3.4.6. Vanuatu Rural Development Training Centres Association (VRDTCA)

Vanuatu Rural Development Training Center Association (VRDTCA) as the umbrella organization for 27 Rural Training Centers in Vanuatu. It is a network of vocational based schools designed for young people who have been pushed out of the formal educational system and provides them with training in specific skills to improve the quality of life in rural areas.

VRDTCA's vision is “Improved economy, leading to less poverty and malnutrition, better standard of living, improved status for women, better access to vocational training and improved governance and leadership in communities.”

Over the past 19 years, VRDTCA has grown from 12 to 40 Rural Training Centres (RTCs). Established under the Foundation for the People of the South Pacific (FSP), VRDTCA became independent of FSP and now works with 40 RTCs across Vanuatu's six provinces to create opportunities for income generation and self-reliance.

Communities around RTCs are engaged in projects from their inception. They take part in the design of suitable courses: building, sourcing local materials, and managing infrastructure construction; and establishing groups to address health and hygiene and disaster risk reduction in their areas.

The general objective of VRDTCA’s RTC Policy is to provide training in the skills needed to improve the quality of life in rural and urban areas. The specific objectives are:

- VRDTCA is providing communities with the skills that will last them a lifetime.
- Develop further non-formal programmes with a holistic approach to training and which are needed as preparations for self-employment in the rural/urban sector
- Meet demands of the increasing numbers entering RTCs
- Ensure a more equal gender balance in RTCs and the provision of follow-up support for graduates.

There currently 32 RTCs in Vanuatu. 27 of these are active, whilst and 16 are registered. The RTCs are intended to help rural communities to improve their quality of life. They raise the awareness of village health issues, income generation opportunities and use of local materials in non-traditional ways or modification of traditional methods to improve efficiency. RTCs are teaching the skills for creative, inexpensive solutions to many of the problems that rural areas face. Some examples are teaching students not only how to build ventilated toilets, but how they help improve village health by eliminating flies (Health and sanitation) or drying manioc flour and other food preservation techniques that help families to be prepared for natural disasters, addressing the issue of food security and disaster risk reduction.

3.4.7. Cofely

Cofely work towards promoting renewable energy and sustainable infrastructure development activities. It supply coconut oil (CNO) to UNELCO (a private enterprise and the utilities concessionaires for the production, transport and supply of electricity and water); operates the windfarm in Efate and a hybrid system (solar/diesel) in Santo.
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The General Manager of Cofely emphasised the need to produce more copra to be processed to CNO for power generation. To do so, the government should encourage TVET to build their capacity in producing more copra to be supplied to Cofely.

3.4.8. AusAID TVET Programme

The Program works to strengthen national and provincial structures within the TVET sector and builds the capacity of local training providers to deliver courses focused on employment and income-generation outcomes within a nationally recognised framework.

TVET Centres have been established in Sanma, Malampa, Torba and Tafea provinces which coordinate a range of demand-driven training and business development support services. The TVET Centres have now been formally integrated within the structure of the Ministry of Education and Training.

The TVET Centre coordinates modular training courses accredited by the Vanuatu Qualifications Authority (VQA) in line with provincial economic development priorities in Sanma, Malampa, Torba and Tafea provinces.

It finances local training providers across Vanuatu registered with the VQA to deliver courses to provide skills to enable trainees to gain employment, increase their income levels or start and/or develop livelihood projects and small businesses. These trainings are delivered in the communities where the target participants live and work.

As these courses are accredited and quality-assured by the VQA, all trainees - upon successful completion of the training - receive a nationally recognised certificate which allows them to build towards a full qualification over time, if this is their professional development aspiration.

VTSSP support VQA to set up their quality management system (QMS). It also assist the VQA to implement course. For instance, it support Torgil RTC on it course development at VIT. In the construction sector it support development of course by VIT and trial/pilot at Lume and Lorakau.

The Concept that was discussed with the Department of Education, VRDTCA; VQA; VIT to pick up the CCA and develop SE Course to Certificate I and have 6 PTC trained to deliver the course on CCA and SE was seen as a favourable approach by the Director, Robert Kalowie. This concept should complement VTSSP's (possibly NZ MFAT's) idea of setting up of the 6 PTC in each of the 6 provinces.
The meeting ended around 12 O'clock.

4. Consultation Methodologies

In trying to maximise output various methods of consultation were employed in this in-country mission. Determining which methodology to use depend on various factors ranging from availability, distance and timing. The following are the methods employed to capture the required data during the in-country mission in Vanuatu:

4.1. Consultative Workshop/Meeting (TNGA)

A consultative workshop is a consultation with stakeholders in a venue where the agendum for discussion or consultation is done for all at once. This was the methodology employed in the last two days during this in-country mission. This methodology was employed because it used the forum to draw ideas, discuss and consolidates them.

4.2. One-to-one Consultations (Interview)

In a situation where stakeholders cannot make it to the consultative gatherings, due to other commitments, a one-to-one or face-to-face meeting or interviews are done. This was also employed where a number of stakeholders like the Directors, Director Generals and others cannot attend the Consultative workshop. This methodology was employed on the first 3 days, where a schedule was made for the 3 days to meet various stakeholders like the Director General of Climate Change, SPC/GIZ CCCPIR director and various other stakeholders.

4.3. Phone calls

In situations that thee stakeholders are busy (but virtually can respond to questions) and that one cannot make it due to travelling time constraints, phone interviews is probably the best option. It is versatile because you can probe question at different angle and can ask supplementary or follow-up question.
In Vanuatu this method was done to consolidate or confirm what was not clear.

4.4. Internet – Online

This was used for searching for further information or publication of Reports or Policies and Strategies. It was also employed to confirm or double-check on information given.

4.5. Desktop Literature Review

This forms the basis for evaluating report or information found in the literature related to technical, vocational education and training with the subject of sustainable energy and climate change as the content. Various literatures were consulted, within the education, energy and climate change sectors (and all climate change related sectors), on policy frameworks and national action plans or development strategic plans. Most Policy frameworks (regional and national) were reviewed and those were used as the basis for consolidating future SE and CCA demands or needs in Vanuatu.

5. Relevant National Policies and Frameworks

All national and regional policy frameworks and their Action Plan set out principles and suggested initiatives designed to guide and support the development and implementation of national activities and programmes consistent with the these policy frameworks' visions and goals. This is the true for regional island countries, including Vanuatu

The Forum Leader's endorsement of the Pacific Islands Framework for Action on Climate Change in 2005 and the Framework for Action on Energy Security in The Pacific (FAESP) in

2010, demonstrated that sustainable energy and climate change adaptation are therefore top priorities for Pacific Island governments.
The 9th Pacific Forum Education Ministers' Meeting in May 2012 in Port Vila, on the session of Regional Framework for TVET Development, contextualised that TVET could be the solution to key issues/challenges pelts out in the Pacific Education Development Framework (PEDF), Education for All, MDG and cross-cutting regional and national development issues.

5.1. Education Sector

Since the education sector is one of the major actors in this project, relevant national education policies and frameworks have to be visited to be sure of being guided by their bounds.
Under the Pacific Plan, the Forum Leaders recognise that a majority of youth population in the Pacific has not gained sufficient employment skills to lead productive lives. TVET could provide an opportunity for these young people to gain these productive skills.

Within the education sector there are various policies, frameworks and action plans. These are the two of the existing relevant documents:

a. Vanuatu Education Sector Strategy (VESS) 2007 – 2016: To expand places and equity of participation in secondary and TVET scholarship in line with the Priorities and Action Agenda (PAA) and National Human Resources Development Plan
b. Vanuatu Qualification Framework – Seeking to ensure quality education and pathway for trainees to progress to higher education and employment in Vanuatu or to put this in another context, skills for employability are an important concern and a lack of a national qualifications framework, competency standards, and associated quality assurance mechanisms means the content and quality of skills training provision varies greatly between providers and there are no clear pathways between different forms of skills development. The EU has a long delayed program of support focusing on the non-formal rural training centres which has not yet made significant progress.
c. Priorities and Action Agenda (PAA) – Emphasises in a broader sense the need for an "educated, healthy and wealthy Vanuatu" that can drive the progress of the country forward.

5.2. Energy Sector

The Vanuatu Energy Road Map (VERM) was endorsed in 2013. The VERN envisioned to "Energise Vanuatu's growth and development through the provision of secure, affordable, widely accessible, high quality, clean energy services for an Educated, Healthy, and Wealthy nation."

There are 5 energy sub-sectors that the VERM has focused on as priorities. These are:

a. Access to secure, reliable and affordable electricity for all Citizens by 2030. Within concession areas; 75% household connected by 2015, 90% by 2020 and 100% by 2030 and close to concession areas; 33% household connected by 2015, 90% by 2020 and 100% by 2030. Off-grid grid areas; 100% households having access to modern electricity via individual homes systems and basic power products by 2020.
b. Reliable, Secure and Affordable Petroleum Supply throughout Vanuatu, by reducing reliance on imported diesel and petroleum products through efficiency improvements in the transport sector and through investment in renewable energy in the power generation sector and strengthening the legislative and regulatory framework.
c. A more affordable and low cost of energy services in Vanuatu, by addressing consumers' current ability to pay for connection and on-going tariffs; exploring options (financial and technical) to increase affordability for both on-grid and off-grid consumers; and promoting least cost investment in the electricity sector.
d. An Energy Secure Vanuatu at all times, by trying to achieve a greater diversity of energy sources; provide a framework for investment and developing petroleum energy security policy and work with industry to optimize petroleum storage capacity and shipping schedules to ensure national energy security is maintained.
e. Mitigating climate change through renewable energy and energy efficiency. This can be done by examining options for increasing renewable energy and improving energy efficiency and conservation

5.3. Climate Change

The National Climate Change Adaptation Strategy (NCCAS) was developed to support the ongoing implementation of existing national and regional policies and strategies that concerns climate change adaptation. The following national and regional policies and plans are relevant in the context of the NCCAS:

a. Priorities and Action Agenda (PAA) 2006-15.
b. PAA 2006-2010 Supplementary for mainstreaming Disaster Risk Reduction and Disaster Management
c. Disaster Risk Reduction and Disaster Management National Action Plan 2006-16
d. Planning Long, Acting Short: The Government's Policy Priorities for 2009-2012
e. National Adaptation Program for Action (NAPA)
f. Land Sector Framework 2009-18
g. National Biodiversity Conservation Strategy

h. Physical Planning Act of 1986
i. Environmental Management and Conservation Act No. 12 of 2002
j. Foreshore Development Act 1976
k. The Vanuatu and the Secretariat of the Pacific Community Joint Country Strategy 2011-2015
l. Climate Change Policy and Implementation Strategy

And on the regional and international platforms such as:

a. United Nations Framework Convention on Climate Change
b. United Nations Convention on Biodiversity
c. Pacific Island Framework for Action on Climate Change 2006-2015 (PIFACC)
d. Regional Framework for Action for Disaster Risk Reduction and Disaster Management 2005 -2015 (status/document?)
e. The Pacific Plan for Strengthening Regional Cooperation and Integration

All these Policies, strategies and action plans were advocating on the tune of safeguarding the natural resources for present use and for the future generation so that the Vanuatu people would be less exposed and more resilience to the impact of climate change.

From the predictions[7] on continual sea level rises; increase in temperature and increasing ocean acidification, there would be new and additional challenges faced by Vanuatu. This would require effective policies and resources in building their capacities to be able to face these challenges, hence building the capacities of TVETs to be able to deliver to the rural communities the relevant knowledge and skills to be well equipped to face the challenges of the predicted effects of climate change is crucial.

6. Consultation Analysis

6.1. Plenary Session

The TNGA was preceded by a Plenary Session where selected panelists gave their view on the topic, "*Creating National and Regional capacity and technical expertise to respond to CCA and SE challenges – what are the constraints"*

The following are some points raised regarding the topic of discussion and these are categorized in five different groups as follows:

- Deteriorating Training facilities and Course designing
- Lack of qualified Instructors in the Rural Training Centres (RTCs)
- Need to clarify Strategic Pathway through the TVET system
- Lack of Training of the Trainers – needs upskilling
- School Finance Managements

[7] Pacific Climate Change Science Program: Current and the Future Climate of Vanuatu

- Administrative and financial management skill
- Limited funding support to TVETs for Training Facilities
- No relevant and up-to-date practical equipment in RTCs and technical colleges
- Lack of innovative ideas to venture into establishment of industrial or business partnership
- Lack of confidence at workplace
- Lack of Innovative skills
- No equitable staffing allocation to technical and vocational centres
- Less in-house mentoring
- Minimal awareness and less sense of the values underpinning technical, vocational education and training, resulting in less productivity and no professionalism at work
- Limited teaching breadth – less cost effective
- Difficulty in putting theory into practice
- Migration of qualified Instructors to town in search for better paid job
- No improved Information flow through networking
- Training and education be coordinated and incentivised to ensure support for relevant training
- Sustainability of RTCs - Lack of proper Infrastructure, Tools and Human Resources.
- Lack of Provincial Government support to RTCs. (resources, pathways, employment opportunities etc…)
- Some RTC Managers and Trainers work voluntarily, only few are paid by the Gov. funding
- Sustainability of VRDTCA Office – There is no funding to develop the office land (Buildings and others)

6.2. Training Needs and Gaps Analysis (TNGA)

This is a method of determining if training needs exits or not. It is a systematic approach to identify status of RTCs and technical institutions in Vanuatu to identify if the objectives/goal to meet the needs of the industries in Vanuatu were forthcoming or not. If there are needs and gaps identify that could bring the present status of TVET to a desired state that will meet its goal, then there is a training need.

The Training Needs Analysis was conducted and tabulated in the Matrix shown in Annex 2. This is the Demand and Supply Matrix for Climate Change. The data from the Demand and Supply Matrix was analysed and a summary of the finding was presented in the following charts:

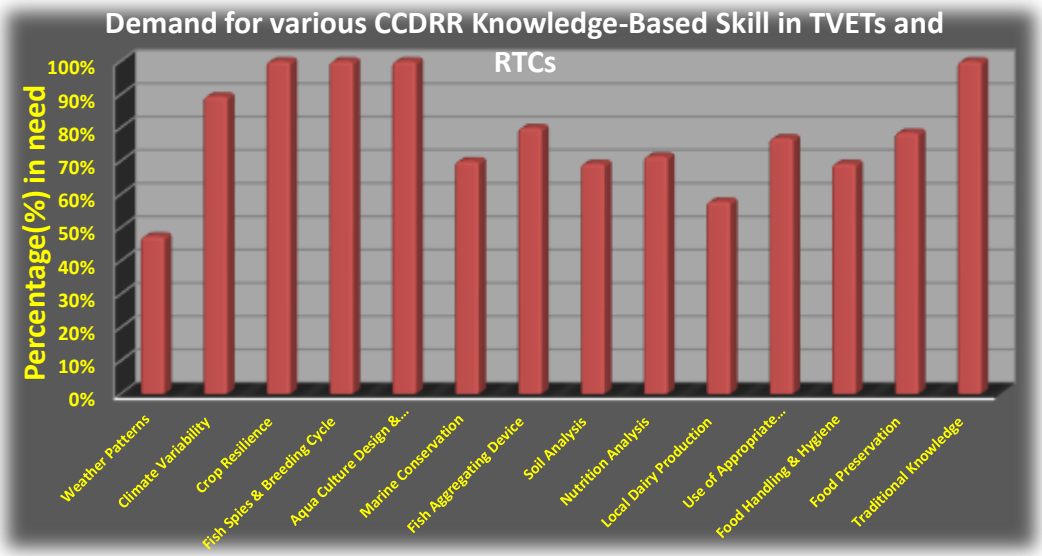

Chart 2: Knowledge based Skills that are on demand for the climate change/DRR sector

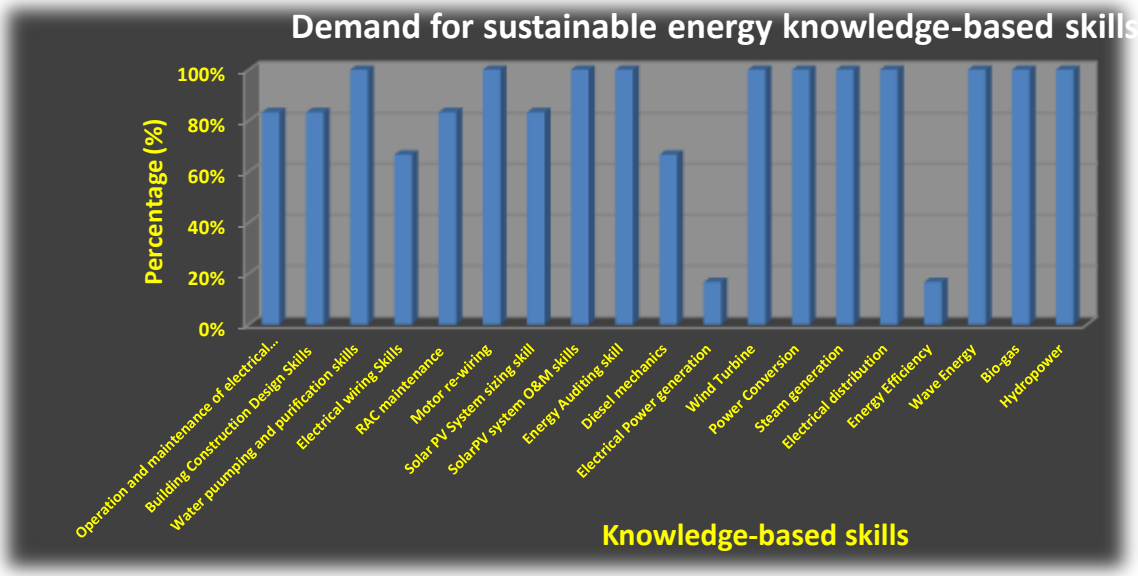

Chart 3: Knowledge based Skills that are on demand for the sustainable energy sector

6.3. The Training Providers (Supply)

The table in Annex 3 shows the various Technical and Vocational Education and Training Institutions along with the courses they provide and the awards.

6.4. Present and Future Market Demand

In consultation with the stakeholders in Vanuatu, a list of workforce training needs and priority sectors for skill development were captured. The matrix presented here provides some of the skills on demand by the Industries and course provided by the TVETs. Skills could be categorized into three distinct types as presented in the following table. These are the knowledge, skills and attributes that are on demand at present and will be on demand in the future in Vanuatu.

Pic 4: Group activity

Type of Skills	Description	
	Sustainable Energy	Climate Change Adaptation

Knowledge-based
Knowledge of specific subjects, procedures, and information necessary to perform particular tasks Such knowledge-based skills are acquired through education, training, and on-the-job experience
	• Power Conversion
	• Electrical Distribution
	• Electrical Appliances O&M skills
	• Energy Efficient building designing and construction skills
	• Air conditioning and Refrigeration maintenance skills
	• Solar PV system sizing skills
	• Solar PV systems O&M skills
	• Small scale hydropower O&M
	• Energy Auditing skills
	• knowledge of different types of renewable energy Resources
	• Operation and & Maintenance Skills of electrical appliances
	• Building Construction Design Skills
	• Electrical wiring
		• CC Adaptation & DR Assessment skills.
		• Food security (Agriculture & Fisheries)
		• Aquaculture design and management knowledge skills.
		• Water security
		• Weather Patterns & Climate Variability
		• Crop Resilience
		• Fish Spies & Breeding Cycle
		• Marine Conservation
		• Fish Aggregating Device
		• Soil and Nutrition Analysis
		• Local Dairy Production
		• Use of Appropriate Technology
		• Food Handling, Sea-food processing and preservation & Hygiene skills
		• Traditional Knowledge
		  • Knowledge-based skills on fish species and breeding cycles.
		  • Knowledge-based skills on sustainable fishing methods Food Preservation

Transferable/Functional Skills *These are actions taken to perform a task, transferable to different work functions and industries and the skills are based on ability and aptitude*	• Communication Skills • Analyzing skills • Public Speaking skills • Organizing skills • Planning Skills • Report Writing Skills • Research Skills	• Creative and Innovative skills • Administrative skills • Coaching & Mentoring skills • Project Management • Listening skill
Personal Traits/Attitude *Traits or personality characteristics that contribute to performing work. Such skills are developed in childhood and through life experience*	• Hard worker • Interpersonal skills • Dependable • Positive • Self-motivated • Leadership skills	• Patience Skill • Diplomatic Skills • Result-oriented skills • Independence skills • Flexible • Confident

Table 1: Skills identified to be on demand

7. Consultation Recommendation

The findings of this Vanuatu consultation are presented in the section 6. Both climate change/disaster risk and sustainable energy issues were found. From these issues, they stakeholders recommended the following strategies:

i. PacTEVT to take on-board the SPC/GIZ/ CCCPIR CCDRR Course already developed. Dr. Christopher Bartlet was the one who really welcomed this idea
ii. There was also a need for renewable energy and energy efficiency or energy conservation to be developed and rolled as CCDRR. The aim is to develop a new course on Renewable Energy (RE) and Energy Efficiency (EE) targeting RTCs and other TVETs in Vanuatu (VITE, Nursing College, Police School others), to be rolled out at Vanuatu Institute of Technology (VIT) at level 2/3
iii. From the resources available SPC/GIZ/CCCPIR CCDRR Course that was already developed by Charles Pierce will be progress forward to be rolled out. The RE and EE course can be developed at a later stage when resources are available, and at Vanuatu's call.

7.1. Recommended Action to be supported by EU-PacTVET

The support to roll out the CCDRR Course was the priority at this stage for Vanuatu. The following are the required activities that need to be supported by EU-PacTVET:

i. Launching of CCDRR Training materials (Learner Guide, Learner Workbook & Facilitator Guide)
ii. Printing of CCDRR Training Materials in colour and Dispatching to RTC's
iii. RTC Trainers Consultancy to Trial the Course
iv. Intention To Accredited Application for CCDRR with VQA
v. Accreditation application fee for CCDRR with VQA
vi. Implement Quality Management System at RTC to address CCDRR to ensure CCDRR meet VQA requirement
vii. VRDTCA Board and RTC Board meeting to review the progress of implementing CCDRR
viii. TOT for VIT to conduct for RTC Trainers in CCDRR @ VIT
ix. Tools and Equipment to deliver CCDRR courses at RTC's

8. General Outlook of TVET in the Vanuatu

The Vanuatu Energy Road Map (VERM), the National Climate Changes Adaptation Strategy (NCCAS) and the Vanuatu Education Sector Strategy (VESS) in parallel with the Priorities Action Agenda (PAA), in collaboration with the regional frameworks can, if commitments at the national level, pave way forward to a vibrant technical, vocational education and training programme (TVET), that will address the requirements of the industries in Vanuatu.

Vanuatu aims at creating more opportunities for young people to be trained to acquire employable skills related to the field of sustainable energy and climate change and disaster risk management. This is evident in the partnership and collaboration between GIZ CCCPIR in developing a Climate Change and Disaster Risk management competency based material to be delivered in the RTCs. There are seven Unit or modules on CCDRR being produced and trialled out at the Fisher Young RTC and would be delivered to the RTC trainers in Santo in September 2015.

The PacTVET would take up the CCDRR and “sprinkle” a spice of energy conservation and basic of renewable energy resources in the tone of environmental science rather than from the engineering perspective. That would be an “additional” module to make the CCDRR course up to 8 modules at Certificate 1 level.

With the recommended Renewable Energy and Energy Efficiency Course to be developed to supplement the CCDRR, the TVET in Vanuatu should have a complete set of course that set in mode the much talked about climate changes, disaster risk managements and means to mitigate greenhouse gases.

With all the knowledge based skills, the functional skills and those skills acquired through individual experiences, TVET in Vanuatu might be looking good in producing graduates that are work-ready and that such employable mass of TVET graduates will contribute in shaping the job market in the country by inducing the businesses and industries in creating new jobs, in a hope to increase productivity, hence increase economic activities that is translated down to the rural and remote communities.

Annex 1. Vanuatu Training Needs Assessment Workshop

Date	Scheduled activities	Facilitator
Thu 25th June 2015	**DAY 1: Workshop Starts**	
Time	Activities	Facilitator
08:30hrs	Registration	William Bani
09:00hrs	Workshop Opening	Director of Energy
09:15hrs	Welcome and Introduction to Workshop ❖ Outline EU-PACTVET Project ➢ Outline Rationale ➢ Objectives/Purpose ➢ Country Expectation	Nixon Kua
10:30hrs	**Morning Tea Break**	
	Gauging stakeholders Linkages to SE and CCA	
10:45hrs 11:40 hrs	Stakeholders Presentations (5 minutes minimum– 7 minutes maximum) **Education Sector** i. Ministry of Education (TVET) ii. Vanuatu Agriculture College iii. Curriculum Development Unit iv. Vanuatu Institute of Technology v. Vanuatu Maritime College vi. Vanuatu Institute of Teacher's Education vii. Vanuatu Qualification Authority viii. Vanuatu Rural Development Training Centres Association ix. AusTVET	William Bani
11:40 12:00	Discussion Topic: "Do you see yourselves as providing the needs of the Workplace and the communities in Vanuatu"	Nixon/ William Bani
12:05hrs	**Lunch Break**	
1:00 pm 1:40 pm	Continue Stakeholders Presentation **Energy Sector** i. Energy Department ii. Cofely iii. Takara geo-thermal project iv. Utilities Regulatory Authority	William Bani
1:40 pm-2:00 pm	Discussion Topic: "Are the TVET providers meeting the requirements of the Industries?"	Nixon/ William Bani
2:00 pm 2:50 pm	**Climate Change Sector** i. Fisheries Department ii. Department of Forests iii. Department of Local Authority iv. Vanuatu Meteorology & Geo-hazards Department v. SPC/GIZ Climate Change Vanuatu vi. National Advisory Board on Climate Change vii. Department of Local Authority viii. Shefa Provincial Gov. Council	William Bani

2:50pm 3:10 pm	Discussion Topic: *"Knowledge-based skills and Transferable/Functional skills on CC that the Public, including rural and remote communities in Vanuatu should have so that they can be able to be innovative and can take measure to adapt to CC and mitigate adverse effects of CC"*	Nixon
3:10 pm	Break	
3:25 pm	Presentation: (Training/Technical) Needs and Gaps Analysis – Basic Outline	William Bani
3:35 pm	Plenary Session: *Creating National and Regional capacity and technical expertise to respond to CCA and SE challenges - What Approaches* Panellist: 1. Jerrol Arnambart (VRDTCA (Jerrol) 2. Willie Ben (Manager RTC) 3. Kilmar (Manager RTC)	Moderator: Joe Timothy (VAC) Rapporteurs – Nixon, William Bani
5:00 pm	End of Day 1	
Fri 26th June 2015	DAY 2	
Time	Activities	
	Training Needs and Gap Analysis	
8:15 am	Group Work: National Training Needs Assessment in SE and CCA. Groups: Participants are divided into 3 Groups: 1. Group 1: Sustainable Energy: Energy Department; Vanuatu Maritime College; VQA; 2. Group 2: Climate Change Adaptation: Fisheries Department;; Department of Geology, Mines, &; Department of Forests; Department of Local Authority; Vanuatu Agriculture College; National Advisory Board on Climate Change; Department of Local Authority Shefa Provincial Gov't; Ministry of Education (TVET) 3. Group 3: Education:; Vanuatu Agriculture College; Curriculum Development Unit; Vanuatu Institute of Technology; Vanuatu Institute of Teacher's Education; VQA; Vanuatu Rural Development Training Centres Association and AusTVET. **Group Tasks**: Group 1 Task: "Gauge the KNOWLEDGE-BASED SKILLs; TRANSFERABLE SKILL and TRAIT SKILLS required/demanded by the industries in the Vanuatu, present and future. Rank them in order, from HIGH DEMAND to LOW DEMAND. Group 2: Task: "Gauge the KNOWLEDGE-BASED SKILLS; TRANSFERABLE SKILLS and TRAIT SKILLS (relating to CC) that are required/needed for communities (both rural/ remote and urban) to be better equipped to adapt to the adverse effects of Climate Change" Group 3: Task: "Identify technical Institutions in the country (formal and non-formal) that provide formal and informal technical skills in SE and CCA. List down the following: 1. Institutions; 2. Course; 3. Duration; 4. Award; 5. Accrediting Agency; 6. Etc….	**William Bani and Nixon** **Use Butcher Paper/ markers** **Use Butcher Paper/ markers** **Use Butcher Paper/ markers**
9:30 – 10:15 am	Merge into two Groups. Education Group (Group 3) to divide into two and join the Energy (Group 1) and CC groups (Group 2) Work in 2 groups. Group 1: - Develop a Supply and Demand Matrix or Course Providers and KSA Matrix for SE Group 2: - Develop a Supply and Demand Matrix or Course Providers and KSA Matrix for CCA Deduce the trend to identified the most needed or required skills in SE and CC	**Use Butcher Paper/ markers**
10:15 am	Morning Tea Break	
10:30 am	Resume Group Work	**William Bani and Nixon**
11:00 am	Group Presentation of TNA	**William Bani**
11:40 am	Discussion of the Findings	**Nixon/ William Bani**
12:40 pm	Lunch. End of Workshop	

Annex 2: Training Needs and Gap Assessment - Matrix

Annex 2a: TNGA Matrix - CCDRR

Knowledge-based Skills	VIT				VAC						RTC					VITE						VMC			TOTAL TALLY	
	Building Construct	Tourism	Business	Tally	Horticulture	Livestock	Forestry	Aqua Culture	Business	Tally	Building Construct	Livelihood Skills	Community Education	Business	Tally	Science	Social Science	Biology	Teaching Method	Physics	Tally	Rural Fishing	Small Vessel	Tally		%
Weather Patterns	X	X	X	3				X	X	2	X	X	X	X	4										9	47%
Climate Variability	X	X	X	3	X	X	X	X	X	5	X	X	X	X	4	X		X	X	X	4	X		1	17	89%
Crop Resilience	N/A	N/A	N/A		X	X	N/A	X	N/A	3	N/A	X	X	X	3	X	X	X	X	N/A	4	X	X	2	12	100%
Fish Spies & Breeding Cycle	N/A	N/A	X	1	N/A	N/A	N/A	X	N/A	1	N/A	N/A	X	X	2	X	X	X	X	N/A	4	N/A	N/A		8	100%
Aqua Culture Design & Management	X	X	X	3	X	N/A	N/A	N/A	X	2	X	X	X	X	4	N/A	N/A	X	N/A	N/A	1	X	N/A	1	11	100%
Marine Conservation	N/A	X	X	2	X	N/A	N/A	N/A	N/A	1	N/A	X	X	X	3	N/A				N/A		X	N/A	1	7	70%
Fish Aggregating Device	N/A	X	X	2	X	N/A	N/A	N/A	N/A	1	N/A	X	X	X	3	N/A	X		X	N/A	2		N/A		8	80%
Soil Analysis	N/A	N/A	X	1	X	X	X	N/A	X	4	N/A	X	X	X	3			X		N/A	1		N/A		9	69%
Nutrition Analysis	N/A	X	N/A	1	X	X	X	X	X	5	N/A	X	X	X	3				X	N/A	1		N/A		10	71%
Local Dairy Production	N/A	N/A	X	1	N/A	X	NA	X	X	3	X	X	X	X	4	X	N/A		X	N/A	2	X	N/A	1	11	58%
Use of Appropriate Technology		N/A	N/A		X	X	X	N/A	X	4	N/A	X	X	X	3		X		X	N/A	2	N/A	X	1	10	77%
Food Handling & Hygiene	N/A	X	X	2	N/A	N/A	N/A	X	X	2	N/A	X	X	X	3		X			N/A	1		X	1	9	69%
Food Preservation	N/A	X	X	2	X	X	X	X	X	5	N/A	X	X	X	3					N/A			X	1	11	79%
Traditional Knowledge	X	X	X	3	X	X	X	X	X	5	X	X	X	X	4	X	X	X	X	X	5	X	X	2	19	100%

Annex 2b: TNGA Matrix – Sustainable Energy

Knowledge-based Skills	Vanuatu Insstitute of Teechnology (VIT)				Rural Training Centres (RTCs)				
	Electrical	Solar Energy & Maintenance	Automotive	Tally	Electrical	Autimotive	Building Construction	Tally	%
Operation and maintenance of electrical appliances		x	x	2	x	x	x	3	83%
Building Construction Design Skills	x	x	x	3	x	x		2	83%
Water puumping and purification skills	x	x	x	3	x	x	x	3	100%
Electrical wiring Skills			x	1		x	x	3	67%
RAC maintenance		x	x	2	x	x	x	3	83%
Motor re-wiring	x	x	x	3	x	x	x	3	100%
Solar PV System sizing skill		x	x	2	x	x	x	3	83%
SolarPV system O&M skills	x	x	x	3	x	x	x	3	100%
Energy Auditing skill	x	x	x	3	x	x	x	3	100%
Diesel mechanics	x	x		2	x		x	2	67%
Electrical Power generation				0			x	1	17%
Wind Turbine	x	x	x	3	x	x	x	3	100%
Power Conversion	x	x	x	3	x	x	x	3	100%
Steam generation	x	x	x	3	x	x	x	3	100%
Electrical distribution	x	x	x	3	x	x	x	3	100%
Energy Efficiency			x	1				0	17%
Wave Energy	x	x	x	3	x	x	x	3	100%
Bio-gas	x	x	x	3	x	x	x	3	100%
Hydropower	x	x	x	3	x	x	x	3	100%

Annex 3: Training providers in Vanuatu

Course Provider	Courses	Duration	Award	Level	Accrediting Agency
Technical Institutions					
Vanuatu Institute of Technology (VIT)	Building Construction	2 years	Certificate IV	Level IV	VQA
	Electrical Wiring	2 years	Certificate IV	Level IV	VQA
	Solar Energy and Maintenance	2 years	Certificate I	Level I	VQA
	Automotive	2 years	Certificate I	Level I	VQA
Vanuatu Institute for Teacher Education (VITE)	Diploma in Primary Teaching	2 years	Certificate	Level 3	VQA
	Diploma in Secondary Teaching (Science)	3 years	Diploma	Level 5	VQA
	Diploma in Secondary Teaching (Social Science)	3 years	Diploma	Level 5	VQA
Vanuatu Nursing College	Certificate in Nursing	2 years	Certificate	Level4	VQA
Vanuatu Agriculture College	Horticulture	2 years	Certificate	Level 3	VQA
	Forestry	2 years	Certificate	Level 3	VQA
	Livestock	2 years	Certificate	Level 3	VQA
	Aqua Culture	2 years	Certificate	Level 3	VQA
	Agri-Business	2 years	Certificate	Level 3	VQA
Vanuatu Policy Academy	Certificate in Policing	1-2 years	Certificate	Level 2	Self/VQA

Vanuatu Maritime College	Various Maritime qualifications in Cadet and Engineering up to Class IV. Sandwiched	Varies	Professional Certs	Level 4	WMO
Rural Training Centres Fisher Young; Vietimboso; Narea; Pelsa; Torgil; Emmanuel; Londuna; Vatuara; Timotake; Agape; Vaiduhu; Matahi; Lorulvilko; Lonnoc; Uluveu; Morobian; Marven; Pekel; Horhor; Lalindar; Nakiliaena; Epule; Suran; TOD; Vetumit; Port Narvin; Lorakau; Lume; Napil; Green Hill	Automotive	1 year	Certificate	Level 1	VQA
	Electrical	1 year	Certificate	Level 1	VQA
	Building Constructions	1 year	Certificate	Level 1	VQA
	Business	1 year	Certificate	Level 1	VQA
	Community Education	1 year	Certificate	Level 1	VQA
	Livelihood Skills	1 year	Certificate	Level 1	VQA

Training Providers

Table TP1 provides information on the two training institutes identified in the desktop study. Based on his experience with the VOCTEC project, GSES project team member Mr Gavin Pereira completed the survey form on behalf of the Vanuatu Institute of Technology (VIT)). This was sent to them for confirmation, but they did not respond. The VIT capabilities as estimated by Mr Pereira shown in Table TP2.

Table TP1: Training Institutes Identified in Vanuatu

Institute	Contact	Position	E-mail	Phone
Vanuatu Institute of Technology	Mr. Kalbeo Kalpat	Principal	intvdir@vanuatu.com.vu	(678)22294
APTC Vanuatu Campus			enquiries.vanuatu@aptc.edu.au	+678 24023 / 25584 Fax +678 23985

Table TP2: TIST Capabilities estimated by Gavin Pereira

Does your TVET have any department that could conduct any of the following types of courses	Yes or No?	If Yes, please state which department	Contact Person	Contact E-mail
Renewable Energy Technologies?	Yes	School of Electro-technology	Christina and Reece	School of Electro-technology
Grid Connect PV Systems?	Yes	School of Electro-technology	Christina and Reece	School of Electro-technology
Off Grid PV Systems?	Yes	School of Electro-technology	Christina and Reece	School of Electro-technology
Solar Hot water?	Yes	School of Electro-technology	Christina and Reece	School of Electro-technology
Wind Power Systems?	Yes	School of Electro-technology	Christina and Reece	School of Electro-technology
Hydropower?	Yes	School of Electro-technology	Christina and Reece	School of Electro-technology
Micro-Hydro Power?	Yes	School of Electro-technology	Christina and Reece	School of Electro-technology
Biomass?	Yes	School of Electro-technology	Christina and Reece	School of Electro-technology
Biogas?	Yes	School of Electro-	Christina and Reece	School of Electro-technology

		technology		
Geothermal	Yes	School of Electro-technology	Christina and Reece	School of Electro-technology
Others technologies?	Yes	School of Electro-technology	Christina and Reece	School of Electro-technology
Energy Efficiency?	Yes	School of Electro-technology	Christina and Reece	School of Electro-technology
Refrigeration?	Yes	School of Mechanical Engineering	Christina and Reece	School of Mechanical Engineering
Air-conditioning?	Yes	School of Mechanical Engineering	Christina and Reece	School of Mechanical Engineering
Electrical wiring?	Yes	School of Electro-technology	Christina and Reece	School of Electro-technology
Efficient land and water transport systems?	No			
Energy sector planning and management?	No			

During the VOCTEC project, two trainers from TIST were trained to conduct off-grid solar training courses and they have since conducted the VOCTEC course. Details are provided in Table TP3.

Table TP3: Trainers trained Under VOCTEC project

Institution	Name of Trainer	Contact Number	Email	Course Type	Date Trained	Trainings Delivered
Vanuatu Institute of Technology	Reece Kalsakau	+ 678 5932327	rkalsakau@vit.edu.vu	Small Off Grid PV systems	Jan-13	1
Vanuatu Institute of Technology	Cristina Atingting	(678) 5656955	chrisa-1980@hotmail.com	Small Off Grid PV systems	Jan-13	1

From the experience of the project team and from survey responses, 5 courses were identified as having been conducted in Vanuatu in the last 5 years. Information on these courses is contained in Appendix 16.

In summary, these included;

- VOCTEC Technician Course 1
- VOCTEC Technician Course 1
- Household energy survey training for surveyors and power utility staff-

- Training of government officials from various departments in the Energy Costing Tool for use in costing MDG-based Energy Needs
- ADB/GEF/Australia Promoting Energy Efficiency in the Pacific

GSES is aware that VIT has conducted training courses on solar in the past and was shown in a curriculum in 2010. However updated information was not able to be obtained during this study.

The VOCTEC course had the intention of capacity building.