OULU UNIVERSITY OF APPLIED SCIENCES

Sunil Karki

Emerging markets and business potential for cleantech solutions in Nepal – A virtual guide for Finnish companies

Emerging markets and business potential for cleantech solutions in Nepal – A virtual guide for Finnish companies

Sunil Karki
Thesis
Autumn 2016
Business and Information Technology
Oulu University of Applied Sciences

ABSTRACT

Oulu University of Applied Sciences
Business and Information Technology

Author(s): Sunil Karki
Title of Bachelor´s thesis: Emerging markets and business potential for cleantech solutions in Nepal - A virtual guide for Finnish companies
Supervisor(s): Minna Kamula
Term and year of completion: Autumn 2016 Number of pages: 37+2

This study has been done for Centre for Environment and Energy (CEE). The aim of this research is to highlight emerging cleantech markets in Nepal for Finnish SMEs. The findings of this research will also be in Centre for Environment and Energy (CEE) webpage.

The objective of the research is to give an overview to Finnish SMEs about Nepal's cleantech market and highlight business potential and need. This research also provides general information on starting up business in Nepal.

The method used in this thesis is qualitative research, which includes desktop study. The information collected was mainly from government websites, research articles, and newspaper articles.

The results of this thesis highlight on Nepal's emerging potential energy sector and urban development planning particularly in waste management and water management. Nepal's has adopted most liberal foreign investment to attract foreign direct investment and government of Nepal is giving tax exemption for investors investing particularly in energy sector. There are other potential cleantech sectors in Nepal, which has been overshadowed by current energy crisis. Further studies can be on Nepal's agriculture and its modernization.

Keywords:

Cleantech, cleantech market, renewable energy, sustainable development

CONTENTS

1 INTRODUCTION

This study was conducted for Centre for Environment and Energy (CEE), which is an innovation hub organized under the University of Oulu and a partner in the Oulu Innovation Alliance (OIA). CEE brings business enterprise, top research, Research Development and Innovation projects into knowledge hub to find out whether an eco-innovation will turn into a project or not. CEE's mission branding Oulu with eco-innovation and green economy (Centre for Environment and Energy, cited 30.9.2016). The initial idea for this study came from CEE's Pekka Tervonen and Janne Antila. Their plan is to make a portal guidebook for Finnish SMEs operating in cleantech sector. The portal guidebook will feature different developing or underdeveloped countries with cleantech potential, while Nepal was selected as first case study. Their vision is to include many different countries in the portal. The portal basically will feature basic information about the country, emerging cleantech sectors, business setup, financial supports and security and important web links. Figure 1 shows screenshot of portal being on CEE's website. The URL for the portal is, http://www.cee.fi/en/cleantech-nepal/ (Centre for Environment and Energy, cited 21.11.2016).

FIGURE 1. Screenshot of portal (Centre for Environment and Energy, cited 21.11.2016)

1.1 Objective of the thesis

The main objective of this thesis work is to identify potential cleantech sectors in Nepal, to provide general information about setting up a business in Nepal and possible financial support and security. The second objective is integrating the acquired information on CEE's website.

In the end of this research following questions will be answered. What are the emerging cleantech sectors in Nepal and opportunities with it? How to establish business in Nepal and possible financial support?

1.2 Methodology

Qualitative research method was selected due to the nature of the thesis. Desk research method was used for data collection which is basically acquiring information while sitting at a desk (Management Study Guide, Cited 30.09.2016), which consists of government websites, newspaper articles, reports, and fact book. Author's own expertise as a native habitant has also been used while sorting out the information.

2 CLEANTECH IN NEPAL

2.1 CLEANTECH

It has been clear that burning fossil fuel and emitting greenhouse gases at an exponentially rate, the earth's climate is changing. The predicated effects of temperature rise above 2°C include extreme weather events, sea level rises, precipitation changes, disappearing coral reefs, and ocean acidification. World population is increasing at an alarming rate and by 2040 the projected population of the world will be over nine billion. With the increase in number of population, natural resources have also been exploited than ever before. This has also huge effect on human health for instance, it is estimated that over 1.3 billion people die every year due to urban outdoor pollution originated from air pollutants such as So2, NOx, heavy metal, or black carbon. This shows that to preserve resources and sustain life in future, a multi-dimensional innovative solution is needed. According to WWF's Energy Report, all of the world's energy could be provided cleanly and renewably by the year 2050 (WWF & Cleantech Group 2014a, cited 30.09.2016.)

"*Cleantech, also referred to as clean technology, and often used interchangeably with the term greentech, has emerged as an umbrella term encompassing the investment asset class, technology, and business sectors which include clean energy, environmental, and sustainable or green, products and services."* (Dikeman 2008, cited 05.09.2016).

When cleantech was started, it was thought as small part of investment, now growing so fast and impacting all industries as diverse as ICT, Healthcare, Food, Electronics, Chemicals and Retail. Cleantech term has been used interchangeably with "resource innovation", "industrial efficiency", "sustainable technology", but all of them have same meaning, doing more with less (e.g. fewer materials, less energy expenditure, reduced water availability) while making money doing so. At first cleantech was only associated with Energy realm (renewable energy, energy efficiency), but its true and wider meaning is now proliferating, solving the prominent world challenges, such reducing carbon footprints, sustainable food sourcing, land and air pollution, clean water availability (WWF & Cleantech Group 2014b, cited 30.09.2016.)

2.2 Nepal

Nepal, now officially the Federal Democratic Republic of Nepal, located in south Asia bordering India from East, South, West and China from North with high Himalayas. Nepal is a landlocked country with an area of 147,181 square kilometers, ranking as world's 93rd largest country by area. Nepali is the official language and is spoken throughout nation (Wikipedia 2016, cited 15.09.2016.) Nepal is multiethnic, multilingual, multi-religious with a population 26,4 million (31 M 2016 est.). Kathmandu is country's capital and largest city (Nationonline, cited 15.09.2016).

Nepal can be divided into three ecological zones as Himalayas (highland), Hills (midland) and Terai (lowland). Himalayas ranges between 4877 m – 8848 m, it includes 8 of the highest 14 summits in the world, which exceed altitude of 8000 meters including mount Everest. The mountain region covers 64 percent of total land area while the lowland Terai occupies about 17 percent of the total land area of the country (Nationonline, cited 15.09.2016.) The following figure 2 of Nepal shows the different cities, airports, ecological division and neighboring countries. (Roughguides, cited 15.09.2016)

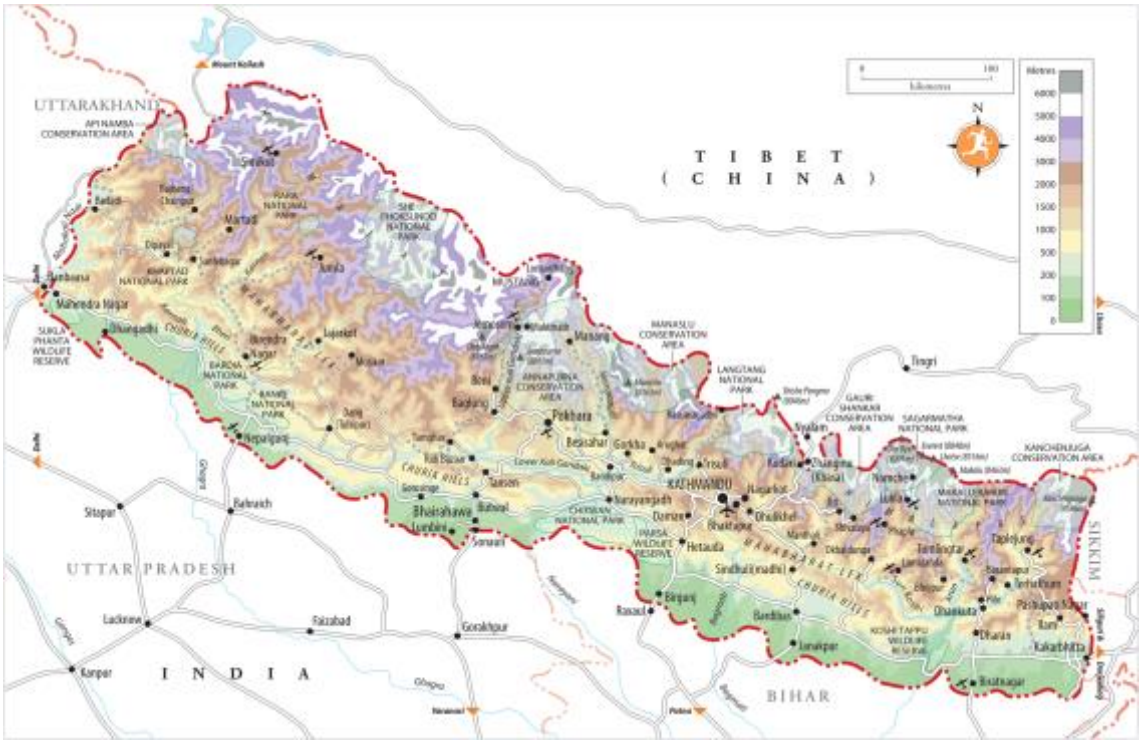

FIGURE 2. Political Map of Nepal (Roughguides, cited 15.09.2016)

King Prithvi Narayan Shah envisioned the modern Kingdom of Nepal back in the 18th century. From 1951 to 1960 Nepal saw multiparty democracy but soon King Mahendra took all powers and introduced panchayat system. In 1990 King Birendra restored parliamentary government, but country faced a decade long Communist Maoist insurgency, and in 2008 monarchy system was abolished by mass protest. Now country has a new constitution (2015) formed by 2nd constituent assembly. (Wikipedia 2016, cited 15.09.2016)

Nepal is ranked as one of the least developed nation, ranking 145th on the Human Development Index (HDI) in 2014 (UNDP 2014, cited 15.09.2016). Despite of many challenges, Nepal is making steady progress and has potential to do more. In past few years, remittance inflow in the country has increased and shares some portion of the country's economy (CIA 2015, cited 15.09.2016). The past decade progress of Nepal in different factors has shown a steady progress than other least developed nation, however 2015 earthquake has shaken country's economy and impacted in its steady progress. Nepal's vast natural resources possess a lot of potential for the country's economic development if properly utilized. Cleantech solutions are best way for Nepal to utilize its resources and be a model for other countries.

3 CLEANTECH MARKETS IN NEPAL

Energy situation

Nepal's economic and social development is hampered due to inadequate power supply, despite its huge amount of water recourses and possibility for electricity production. Nepal's highlands and numerous rivers holds potential for 83,000 MW electricity of which 42,000 MW is economically feasible, but only 1 percent have been harnessed until now (Reegle 2012, cited 20.09.2016.) In recent years, rapid urbanization has caused sharp growth in the demand of electricity and to equalize the demand nation suffers power cutoff up to 16 hours a day during driest month of January, February, March and April. Nepal does not have any fossil fuel reserve of its own and every year country spends huge amount of its foreign exchange reserves for the importation of fossil fuel. The geographical structure makes the transportation harder and expensive in the highlands, resulting excessive use of firewood, threatening country's forest and at the same time causing indoor air pollution and health hazards.

Electricity is generally available in urban areas and Nepal Electric Authority (NEA) is the sole electricity producer and supplier owned by state. Only 15 percent of total population has access to electricity and 90 percent of that population lives in urban areas (Reegle 2012, cited 20.09.2016.) In rural Nepal biomass is major source of energy. Biomass fuel consists of both woody and non-woody biomass. The former come from trees and shrubs, and latter from crop residue and other vegetation. Recently done air quality survey by Yale University puts Nepal in vulnerable condition, threatening to cause hazardous health harms such as lung cancer and other respiratory disease (Yale University 2016, cited 20.09.2016.)

In December 2008, government of Nepal declared "national energy crisis". Nepal ranks among the lowest in the world in terms of net electricity generated per capita and energy intensity. World bank argued the Nepal's energy crisis caused by years of under-investment and sharp growth in electricity demand (Reegle 2012, cited 20.09.2016.) Beneath this energy crisis there is a huge opportunity, to explore on other alternative resources. This is also an opportunity for Nepal to meet the energy demands in cleaner way.

3.1 Renewable Energy

3.1.1 Hydro Energy

Nepal's possess tremendous amount of water resource with potential of producing 83,000 MW of electricity, of which 42,000 MW is economically feasible. Nepal has more than 6000 rivers covering approximately 4,500 KM in total length. The geographical structure of the country with high hills makes possible for many large and small hydropower developments (Reegle 2012, cited 13.10.2016.) The first hydroelectric plant development goes back to 1911 (with a capacity of 500 KW) (KAFLE 2007, cited 13.10.2016). Nepal Electricity Authority (NEA), state owned electric supplier, responsible for generating, transmitting and distributing electricity throughout the country. In the fiscal year 2014/15, total installed capacity into Integrated Nepal Power Supply (INPS) remained at 765 MW (SAARI, cited 17.10.2016). Figure 3 shows that NEA's own generation was 42.52%, while IPPs remained at 23% and purchase from India increased to 34.48%. (NEA 2015, Cited 18.10.2016)

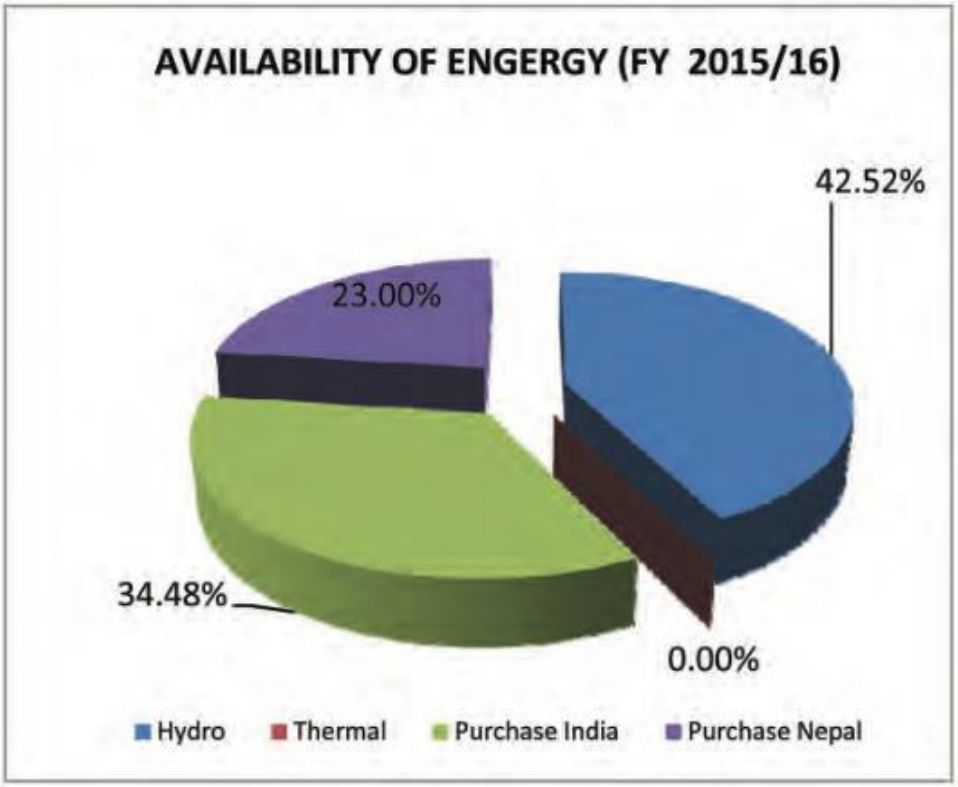

FIGURE 3. Availability of Energy, (NEA 2015, Cited 18.10.2016)

Expansion of the grid is slow because of the geographical difficulties and NEA serves only 56% of the population (including on-grid and off-grid) (Reegle 2012, cited 18.10.2016). NEA operates with energy deficits every year, and is struggling to meet the sharp growing energy demand. NEA has no other choice than to impose power cutoff to make a balance with unmet power demand. The current energy crisis has helped to priorities to invest in clean energy. Government of Nepal introduced a 38-point Electricity Crisis Resolution Action Plan in 2009 (Reegle 2012, cited 18.10.2016). Government of Nepal is supporting small hydropower projects via independent power producer by providing different subsidy scheme. Large hydro projects needs huge amount of funds, for that government of Nepal is trying to attract foreign direct investment but instability in political situation has hindered in process of those large projects to get started.

Small Hydro Power

Government of Nepal set a roadmap plan for the development of SHP in the year 2011. The main objective is to utilize country's water resources to meet domestic electricity demand export surplus power to neighboring countries. The plan is set for long-term, up to 2027, by which it plans to generate 4,000 MW of power for domestic needs, expand the electricity services through national grid to cover 75% of the population (Government of Nepal 2011, cited 19.10.2016). Government of is giving tax exemption of 100% for the first 10 year for investment made in hydro sector.

3.1.2 Solar Energy

Nepal does not have its own fossil fuel reserves and every year a huge amount of foreign exchange reserve is spent for importation of fossil fuel. Imported fossil fuels are mostly distributed in urban areas, as transportation of the fossil fuel to rural areas is harder because of the geographical structure. NEA's national grid expansion is also slow and hasn't been able to connect rural areas of the country. The most predominant source of energy in rural areas is fuel wood form forest and tree resources; affecting human health and environment. In such scenario solar energy would be the most efficient and cost effective source of energy.

APEC in coordination with UNEP/GEF conducted solar and wind energy resource assessment research (SWERA) in 2008, which indicates that Nepal has potential for commercial development of solar energy. A total of 2,100 MW could be generated from grid connected PV and

commercially used. The average sunshine hour is 6.8/day nationwide, with 300 days of sunshine approximately. Solar Water Heater (SWH), Solar Dryer (SD) and Solar Cookers (SC) are some other solar possibility considered in Nepal. SWH has already been fully commercialized while SD and SC are still in infancy phase (APEC 2008, cited 20.10.2016.)

In January 2016 AEPC started replacing Kathmandu valley's street lamps powered by NEA power grid with solar ones. The total number of NEA's powered street lamps alone in Kathmandu valley is 18,000 and replacing them with solar powered would save up to 6 megawatt of electricity (Ekantipur 24.12.2015, cited 20.10.2016.) Solar powered street lamps and traffic lights are not new technology in Nepal, in past similar initiatives have been done but later due to regular maintenance most of them are out of order. Lack of technical human resource, absence of communities' involvement is main reason behind the failure of such projects.

There is still a lot to explore and identify the hidden opportunities of solar energy in Nepal. Commercialization of solar energy hasn't been successful though government of Nepal plans to increase the access of alternative energy sources from 10% to 30% within the next 20 years (Government of Nepal 2011, cited 20.10.2016).

3.1.3 Wind Energy

Nepal is a landlocked country and the nearest sea access is 644 KM yet there is considerable wind enough for generating wind energy. Nepal began to collect data on wind from 1967 and now there are 40 wind measurement stations installed all over the country that runs under the department of Hydrology and Meteorology though only 29 stations are functioning properly. The recorded extreme wind speed was 46.76 m/s and the annual average energy potential is about 3.387MWh/m2 (Upreti & Shakya 2009, cited 21.10.2016). The feasibility study done on potential wind energy by AEPC estimates generation of 3,000 MW of electricity considering installed capacity of 5 MW per square KM (APEC 2008, cited 20.10.2016). Figure 4 shows the area covered for study of potential wind power in Nepal conducted by AEPC which also indicates that most of the higher altitude parts of Nepal hasn't been explored (APEC 2008, cited 20.10.2016).

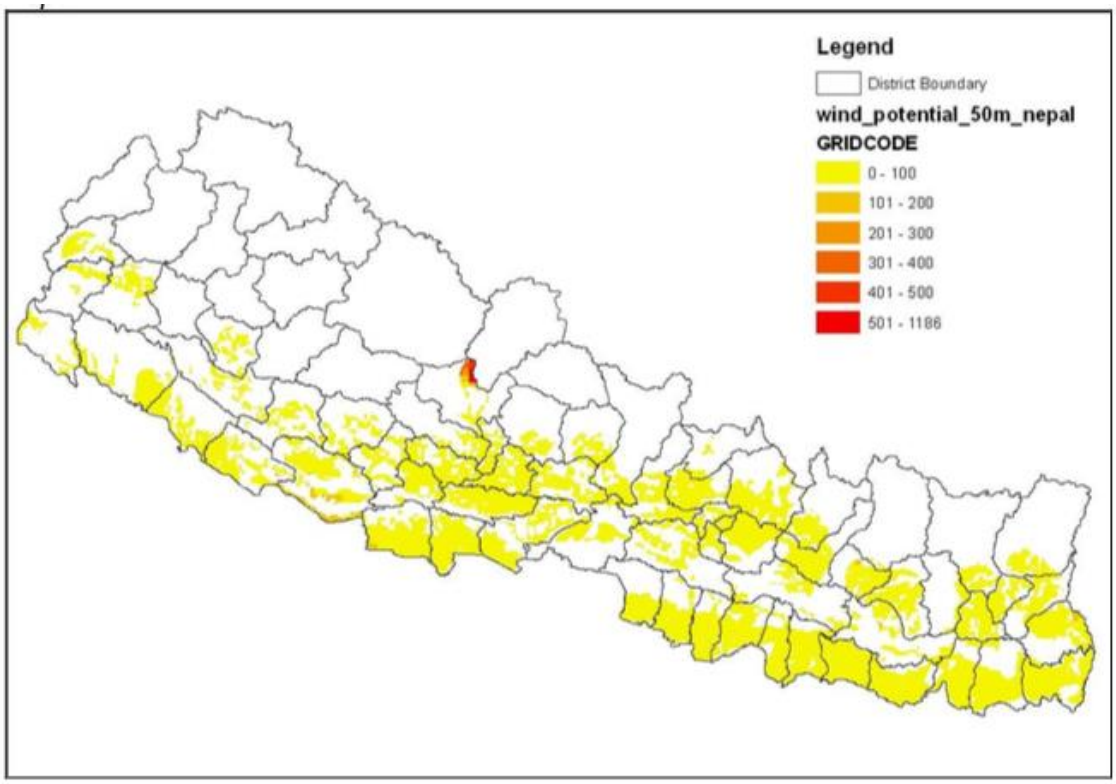

FIGURE 4. Wind power potential of Nepal (APEC 2008, cited 20.10.2016)

Wind energy has been considered as another good source of alternative energy in Nepal, particularly in rural areas where national grid is way far to reach in those places anytime soon. Recent activity shows that Nepal government is planning to generate 20 MW wind energy form Kathmandu Valley and surrounding hills. International companies like Suzlon Energy Limited (India) and AGA Middle East Pvt. Ltd Singapore/Hong Kong have submitted proposals in the production of 200 MW wind energy (Upreti & Shakya 2009, cited 21.10.2016.) APEC with support from Asian Development Bank (ADB) has installed wind – solar hybrid system of 400 watt with 150 watt solar power projects in six sites. (AEPC, cited 21.10.2016)

In order to harness wind energy, concerted efforts to survey is needed. Nepal's topographic condition demands large number of wind stations distributed according to the altitude and locations (Upreti & Shakya 2009, cited 21.10.2016).

3.1.4 Bioenergy

Bioenergy is renewable source of energy made available for materials derived from biological sources. Humans have been using bioenergy from the ancient times, mainly for cooking and keeping warmth. In the context of Nepal, traditional sources of energy such as firewood, agricultural residue and animal dung hold majority when it comes to necessity and supply of energy. However, inefficient use of firewood has threatened country's forest and to health of individuals from indoor pollution. Figure 5 shows firewood as dominant source of energy covering 50% with dependency on petroleum products being second largest source of energy (Government of Nepal 2016, cited 21.10.2016).

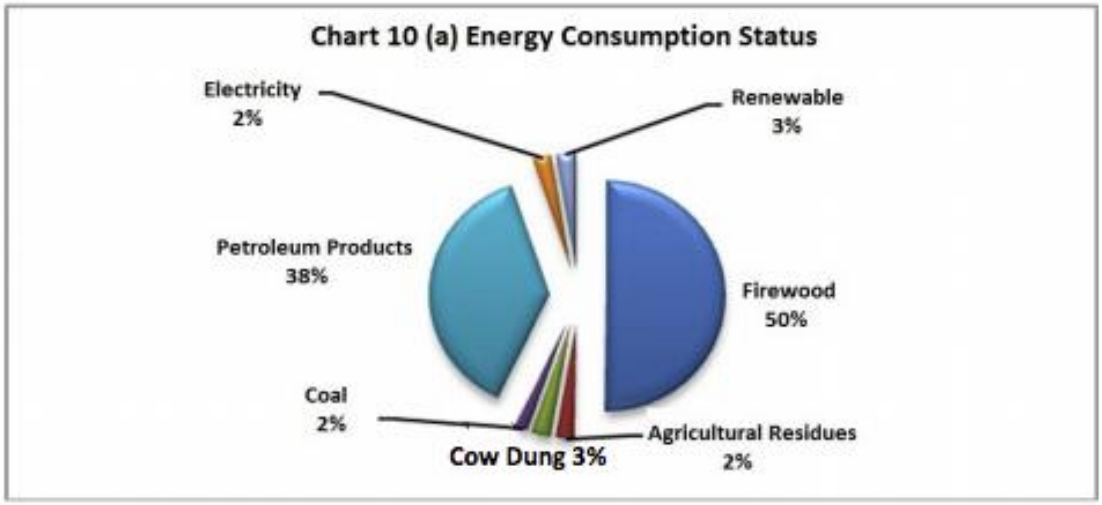

FIGURE 5. Energy Consumption Status (Government of Nepal 2016, cited 21.10.2016)

Nepal needs technologies for efficient use biomass, it is important for country's development and improvement of people's living conditions. Improved cooking stoves (ICS) and biogas are the most successful bioenergy technologies in use in Nepal.

Biomass

Improved cooking stoves (ICS) biomass densification and biomass gasification are emerging biomass technologies in Nepal. ICS are energy efficient and easy to build. AEPC has been promoting ICS program throughout the country. ICS are getting more popular as it consumes only the half fuel wood than traditional ones. The indoor pollution has also been reduced by 30-90 percent and greenhouse gas emission reduced by about 2.5 ton CO2 per year. The respiratory

problem caused by the traditional stoves has been reduced with the use of ICS. ICS has certainly changed the lives of people in some part of the country but majority of the people still use traditional way of cooking, which is inefficient, hazardous to health and to environment. Figure 6 is an illustration of ICS, which is easy and cheap to build (Dixit 2013, cited 21.11.2013).

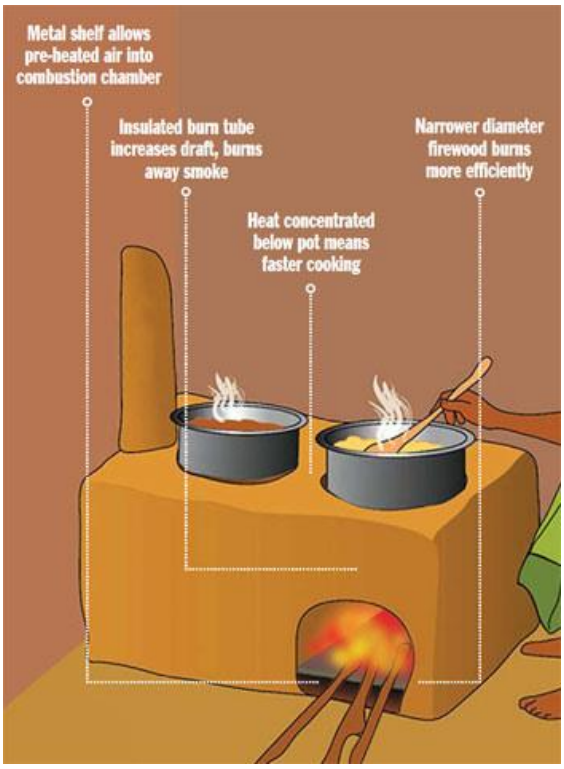

FIGURE 6. Illustration of improved cooking stove (Dixit 2013, cited 21.11.2013)

FCG Finnish Consulting Group Ltd supported a project funded by Nordic Development Funded. The project installed ICS in daily use in 6073 households. Center for Rural Technology, Nepal was the local partner of the project (NDF 2012, cited 21.10.2016.)

Biogas

Introduction of biogas technology in Nepal was in 1955 though it took 25 years for government to officially start biogas program. In 1992 biogas support program was established, making biogas more popular in rural areas. The installation of biogas in Nepal has rapidly increased with the involvement of private companies as major actors in this sector (AEPC, cited 21.10.2016.) Biogas mainly serves two purposes, one for cooking (80%) and other for electrification (20%).

Private companies have been playing vital role in the development of biogas by carrying construction/promotional activities with the Pre-Qualification (PQ) identity. Estimated number of biogas companies in Nepal is around 100 (AEPC, cited 21.10.2016.) Biogas technology has helped many households in rural Nepal, especially women who spend much of their time in kitchen. Nepal is conducting experimental projects for urban domestic biogas plant as well. Government of Nepal first introduced it in the fiscal year 2012/13 with a subsidy for piloting in Kathmandu Valley. The basic concept of this technology is producing bio energy form organic waste coming out of kitchen. This concept is now expanding in other cities of Nepal as well.

The Alternative Energy Promotion Centre (AEPC) is working to build large-scale biogas plants for managing municipal solid waste. The required technology and expertise needed for this project to start are challenging factor. Alternative Energy Promotion Centre (AEPC) has opened invitation for interested private and public sector organizations to place bid.

Biofuel

The possibility of biofuel has been ongoing in Nepal for a while now. Recently government of Nepal has formed a team for the study of possibility of making biodiesel form jatropha seeds. Alternative energy Promotion Centre (APEC) is supporting 11 organizations to establish 10 modern nurseries for growing jatropha. According to the study done by Alternative energy Promotion Centre (AEPC), there is a high potential for commercial farming of the plant in different part of country (kathmandupost 11.06.2016, cited 21.10.2016). Alternative energy Promotion Centre (AEPC) is planning to support two private organizations to setup biofuel-processing plants.

3.1.5 Geothermal Energy

Nepal is way behind in realizing and utilizing the proper use of geothermal energy. Geothermal energy has been used from ancient times for space heating and bathing, but now electricity production is possible. Study and research in this particular sector is almost none in Nepal, although there have been some efforts in identifying the sites. There are 28 localities recorded with geothermal activities in Nepal (AEPC, cited 21.10.2016). The use of geothermal energy in Nepal has been mainly for bathing purpose. Local entrepreneurs have grasped this as opportunities into business as tourist (internal and external) are attracted to such place.

Geothermal energy remains out of focus in Nepal because there is no trained manpower; energy officials have lack of knowledge about the direct use of it and government's lack of interest in the development of it. In figure 7 we can see different geothermal springs identified in Nepal till date (Ranjit 2015, cited 21.10.2016.)

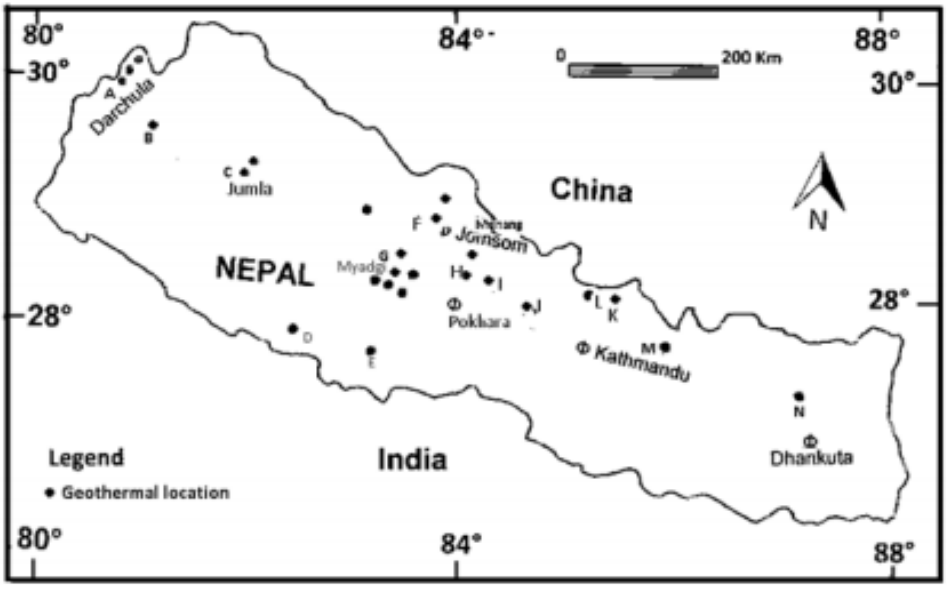

FIGURE 7. Location of geothermal springs in Nepal (Ranjit 2015, cited 21.10.2016)

3.2 Waste Management

Kathmandu valley is in the phase of rapid urbanization, with population of 2.5 million people it is growing at 4% every year and is also one of the fastest growing metropolitan city in South Asia (The World Bank 2013, cited 21.10.2016). Kathmandu valley is gateway to Nepal. Nepal is often ranked as one of the top tourist destination in world by different sites, and only Kathmandu valley embraces seven world heritage sites. There are lots of opportunities and problems brought by urbanization and one of them is disposal of solid waste. Kathmandu valley is the highest producer of unsorted waste material. Kathmandu metropolitan city is responsible for collecting and transporting waste from valley to landfill sites and for doing so it utilizes huge amount of budget every year, for instance in the fiscal year 2012 Rs.443 million was utilized for Kathmandu metropolitan city for the purpose of collecting and transporting waste to landfill sites (Khatiwada 2014, cited 21.10.2016.) There are frequent disturbances in collection of waste material, resulting increase in the pile of organic residues and making city more malodorous than ever. Sisdole is

the present landfill site, which is nearly filled up with waste and environmentalists have warned of contamination of the ground water, which can affect the locals living in those areas.

In figure 8, the unsorted solid waste from valley mostly consists of organic (63.22%) and for the inorganic waste such as plastic, paper, glass, textile, rubber and metals can be reused (Urban Development Ministry 2015, cited 22.10.2016). If households could segregate their solid waste by themselves, it would be easy for municipal to manage it. In general, Nepalese people do not have idea about recycle and reuse. People are either ignorant, lazy or they do not have enough time for doing this. In such case government of Nepal need to organize campaigns for mass awareness about the segregation of solid waste, recycle and reuse.

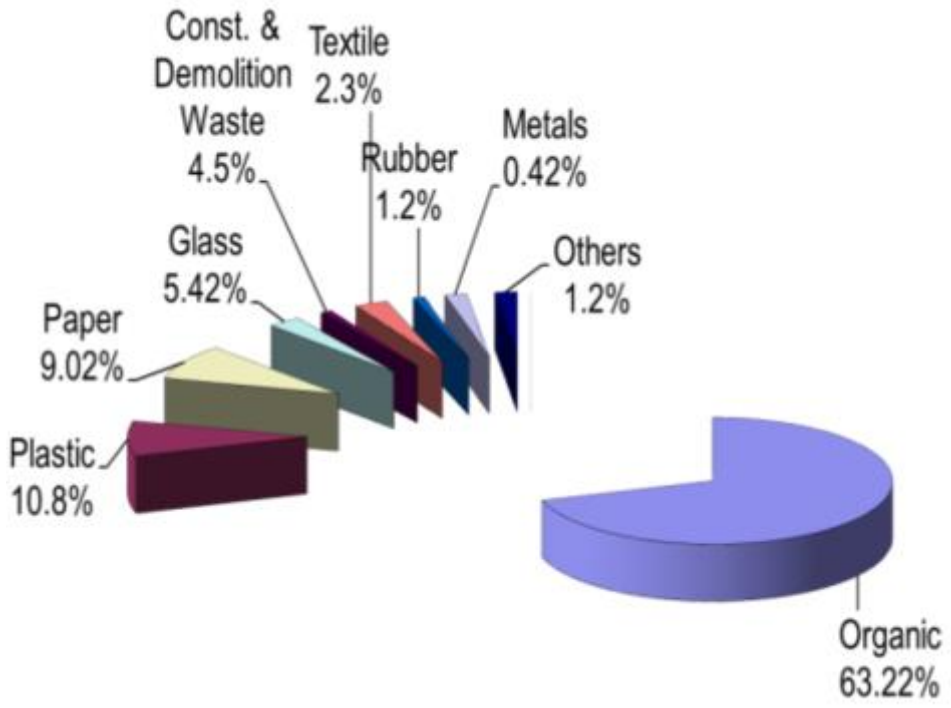

FIGURE 8. Composition of Solid Waste in the KMC (Urban Development Ministry 2015, cited 22.10.2016).

Investment Board Nepal is preparing to sign a project development agreement (PDA) with two Nepali companies (Nepwaste and Clean Valley) to manage the Kathmandu Valley's garbage. This would be the first time a private company-managing valley's waste (Ekantipur 21.09.2016, cited 21.10.2016). Nepwaste is a joint venture of Finland-based Compunication, Poyry, Bioste and the Dutch-Nepali enterprise the organic Village while Clean Valley is Nepali-Indian joint venture company (Nepali Times 2015, cited 21.10.2016).

Waste to energy

Kathmandu valley consumes significant amount of energy, 30% of electricity, 50% of petrol, 60% of LPG. Nepal dependency in fossil fuel is increasing every year as the energy on demand keeps increasing constantly. The Waste-to-Biogas (WtB) system is the most prominent solution for managing municipal waste and earning revenue from the sales of biogas/bio-electricity and bio-fertilizer. The WtB concept or technology has been implemented by many countries and also in the phase of commercialization in developed countries. Nepal needs clear policies, legislative framework, intuitional arrangements and financing mechanism in order to implement WtB (Khatiwada 2014, cited 21.10.2016.)

Kathmandu metropolitan city has successfully generated power from the waste for the first time after years of continuous efforts. The waste-to-energy project is likely to facilitate waste management in the Kathmandu Valley. This project not only generates electricity but also plans to produce 96 kg gas, 300 kg bio-organic fertilizer and 13,500 liters of purified water daily from the waste collected (The Himalayan Times 26.10.2016, cited 29.10.2016.) AEPC with support from World Bank under Scaling up Renewable Energy Program (SREP) is working to build a market for large Commercial and Municipal Solid Waste biogas. APEC is attempting to develop market with the participation of private sector and public organizations and calling applications for new innovative technologies that would create new opportunity in the renewable energy sector of Nepal (AEPC, 21.10.2016).

3.3 Water Management

Numerous fresh water rivers, lakes make Nepal rich in water recourses and yet experiences clean drinking water crisis. The Department of Water Supply and Sewerage in Nepal claim that though around 80% of the population has access to drinking water, and it is not safe. Every year Nepal faces high number of water borne disease such diarrhea, dysentery, typhoid, gastroenteritis and cholera, mostly affecting children of age under five with an estimated 44,000 children dying every year (Suwal, cited 22.10.2016.) Untreated sewage from industry and domestic waste are main cause for polluting surface water and are mostly seen in urban areas. Lack of public awareness and education on proper sanitation is also one of the concerns.

Government of Nepal considers providing safe drinking water and sanitations services as fundamental human needs and a basic human right-for all of its citizens. However, the rapid increase in population has increased the water demand and placed a strain on the existing urban water supply and sanitation services. There are only five major wastewater treatment plants (WWTP) in Kathmandu Valley. In table 1 we can see that most of the WWTPs are out of order or not fully functioning and in most of the case, the main reason behind the failure are technical difficulty, funding and lack of skilled human resource (Kathmandu Upatyaka Khanepani Limited 2013, cited 22.10.2016.)

TABLE 1: Existing Centralized WWTPs (Kathmandu Upatyaka Khanepani Limited 2013, cited 22.10.2016)

Parameter	**WWTP**				
	Hanumanghat	**Sallaghari**	**Kodku**	**Dhobighat**	**Guheshwori**
Year established	1975	1983	1982	1982	2002
Reported nominal capacity (MLD)	0.5	2	1.1	15.4	16.4
Original supporting agency	GTZ/ Germany	GTZ/ Germany	IDA, Engineering Science/ USA	IDA, Engineering Science/ USA	Government of Nepal
Operator	KUKL	KUKL	KUKL	KUKL	HPCIDBC
Type of plant originally installed	Aerated lagoon	Aerated lagoon	Waste stabilization pond	Waste stabilization pond	Oxidation ditch
Catchment served	North-east Bhaktapur	North & south Bhaktapur	East Lalitpur	Kathmandu and Lalitpur	Gokana & Chabahil
Existing operation status	treatment significantly below design intentions	treatment significantly below design intentions	treatment significantly below design intentions	Not operational since 1982	treatment below design intentions

Rain Water Harvesting (RWH)

Kathmandu Upatyaka Khanepani Limited is public company responsible for the operation and management of water and wastewater services in the Valley (KUKL, cited 22.10.2016). Nepal holds 2.7% of the world's total fresh water available but ironically water crisis has deepened in the capital in recent years. One of the government over politicized project Melamchi water project designed in 1988 to bring 170m liters of drinking water per day to Kathmandu valley hasn't been yet finished (Bhushal 09.04.2015, cited 22.10.2016.) Residents of Kathmandu valley are facing

great hardship for the access of clean water and this will worsen in future due to climate change and population increase.

Rainwater harvesting (RWH) has can be sustainable solution to this problem. RWH is not a new concept or technology, and Nepal receives an average annual rainfall between 1500mm to 3000mm. Rainwater harvesting is included in the National Water Plan though government of Nepal's central planning, policymaking, implementation and monitoring is insufficient (Rainfoundation, Cited 22.10.2016.) Several pilot projects on rainwater harvesting have already done in different parts of the country. FINNIDA (the Finnish Development Agency) has been supporting rainwater-harvesting projects in Nepal. There are many success stories of rainwater harvesting from different parts of the world and how miracles have happened (Thanju & Shrestha 2007, cited 22.10.2016.) Government of Nepal should organize awareness campaign on rainwater harvesting and plan building large and small-scale rainwater harvesting projects all over the country in near future. There would be plenty of opportunity for the involvement of private and public sector if government of Nepal understands and plans for the development of rainwater harvesting technology.

In Nepal, there are few private companies who provide service of installing this technology. The business hasn't soared yet as there is little knowledge about this technology to people. Figure 9 explains the technology of rainwater harvesting used in Nepal for household purpose (FAO 2011, 27.10.2016).

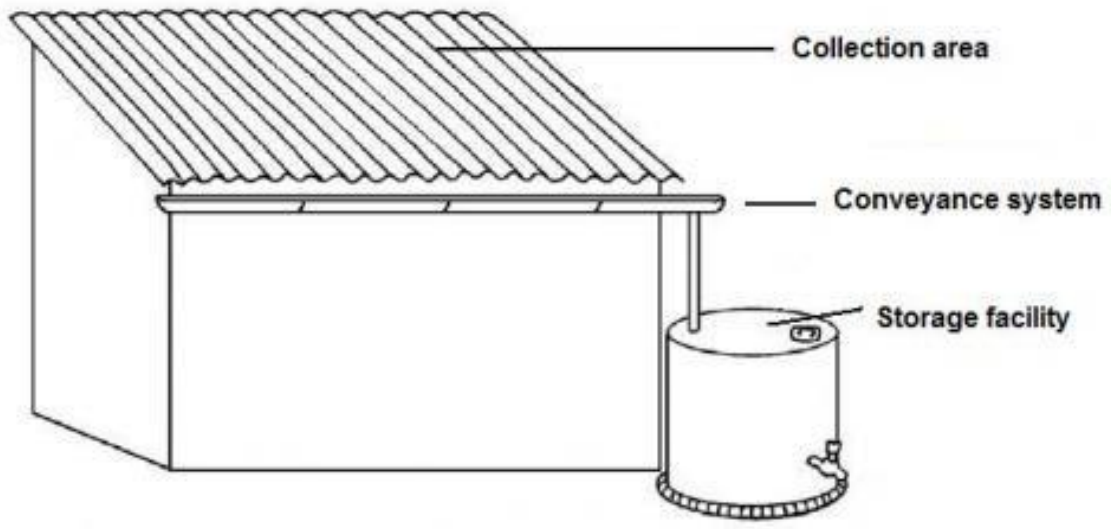

FIGURE 9. Rainwater harvesting technology used in Nepal (FAO 2011, 27.10.2016)

4 OPERATING BUSINESS IN NEPAL

4.1 Legal

Starting business in Nepal is an easy process, and there is no any provision restricting for foreign investors to invest in Nepal except for areas of negative list. Foreign Investment in Nepal are regulated and administered by Foreign Investment and Technology Act (FITTA), 1992 and Industrial Enterprise Act (IEA) 1992. According to FITTA 1992, "Foreign investor" means any foreign individual, firm, company or corporate body involved in foreign investment or technologies transfer, including foreign governments or international agencies. The Department of Industries (DOI) is the only agency for administration and implementation of Foreign Investment and Technology Transfer Act in Nepal (Corporate Catalyst Nepal 2014, cited 23.10.2016.)

Nepal's foreign investment act allows 100% foreign investment except in few sensitive sectors. Decision for foreign investment will be made within 30 days (appendix 1) form the date of application. Visa arrangements are simple for foreign investors, for e.g., foreign investors and his/her authorized representative and their dependents will be granted a business visa for five years and if the investment is equivalent or more than US $ one hundred thousands at one time, residential visa will be granted. For expatriate personnel working in the industries, a non-tourist visa will be granted for a duration period of one year (Department of Industry, cited 23.10.2016.)

Government of Nepal and Government of the Republic of Finland signed an agreement on the promotion and protection of the investment on 3rd of February 2009. The agreement helps promote investment in both of the countries, maintaining a business environment and ensuring safety of investment made by the investors of both parties agreed (WIPO 2009, cited 23.10.2016.)

Dispute settlement, if arise between investors and contracting parties should be amicably settled and if not settled within the 3 months form on which it was raised in writing, investor can choose the way for settling the dispute as follows;

(a) The competent courts or arbitral or administrative bodies of the Contracting Party in whose territory the investment is made; or

(b) Arbitration by the International Centre for Settlement of Investment Disputes (ICSID); or
(c) Arbitration by the Additional Facility of the Centre, if the Centre is not available; or
(d) An ad hoe arbitration tribunal to be established under the Arbitration Rules of the United Nations Commission on International Trade Law (UNCITRAL)

(WIPO 2009, cited 23.10.2016.)

Taxation policy

Income tax on dividends earned out of investment in any industry is at 5% and export earnings are taxed at 40% of the income tax imposed on other industries. However, the tax amount shall not exceed 0.5% of the total export amount (Department of Industry 2012, cited 23.10.2016.) Government of Nepal has also declared to give full tax exemption of income tax for first ten years and 50% exemption in income tax for next five years to the licensed person or entity commencing commercial production, transmission or distribution of hydroelectricity within March 2024. The exemption is also provided to electricity production through solar, wind or bio fuel energy (Crowe Horwath 2015, cited 23.10.2016.)

4.2 Cultural

Culture illustrates norms and values and traditional behavior accepted by a group and each country has its own beliefs, values and activities (Passport to trade, cited 23.10.2016). Doing business might sound easy; but it can be different than said from cultural perspective. Culture is always evolving and moving forward with time. Prejudice can sometime mislead, its better to have an open mind and follow what others do.

Culture in general

Nepal is not big in terms of it geographical size; however, in terms of culture, Nepal is multi-diverse. Per the National census 2011, 123 different languages are spoken in Nepal as a mother tongue (Wikipedia 2016, cited 23.10.2016). Nepali language is widely spoken and also considered as official language, though Nepal's constitution accepts all language as official language. English language is spoken widely in urban areas and also considered as official language.

“Namaste” (/ nɑːməsteɪ /, nah-məs-tay) (press one’s palm together in front of the chest and say) is general way of saying “hello!” in Nepal, however men in urban areas have adopted the custom of shaking hand. Physical contact between the sexes in public places is considered inappropriate, though men may be openly affectionate with men and women with women as it is a sign of a good friendship (Advameg, cited 23.10.2016.) Kissing, hugging in public places are not acceptable for Nepalese people.

“Atithi Devo Bhava” which means “The Guest is Equivalent to God” therefore hospitality is essential. Guests are always offered food and are not permitted to help with food preparation. Using your right hand for eating is considered more polite and do not share food from same plate because if lips touches the food vessels or water vessels it is called “Jutho” meaning polluted for others.

Hindu temples and Buddhist stupa are common sites in Nepal. In some Hindu temples, foreigners are not allowed to enter. It is advisable to ask before taking pictures of temple or of any heritage sites. Shoes are not allowed inside a typical Nepalese home.

In Nepalese culture, value of time is not so important. Being late in any occasions is a common thing, in other words time moves slowly in Nepalese culture. “Nepali time” is an idiom usually referred to being late. In such cases showing anger will only increase delay.

According to figure 10 Nepal is compared with Finland based on Greet Hofstede dimensions of culture. The differences between two cultures can be seen clearly in all the measures. There is a huge gap in power distance and individualism as most of the Nepalese still live in joint family where head of the family takes control and makes decision. Nepalese live in a close circle, where society plays important role in individual’s life. Male domination over the society is huge and women role is basically starts and ends inside the kitchen (Itim international, cited 23.10.2016.)

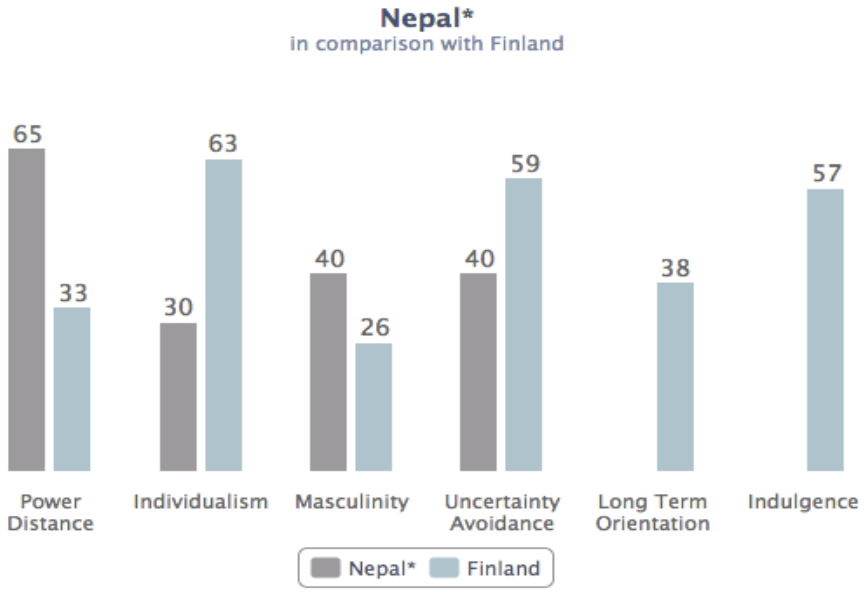

FIGURE 10. Nepal in comparison with Finland; Geert Hofstede dimensions (Itim international. cited 23.10.2016)

Business culture

Formal business attire for men are business suit and tie or the Nepali dress code "Kurta Surwal" with Nepali hat and for ladies either business suit or saree. Meetings usually start late, even the formal ones. Everyone greets each other by saying "namaste" when they meet. A cup of tea is served before the meeting begins and it is absolutely normal people talking about personal relationship in that time. Nepalese management follows top down approach in decision-making process (AlloExpat, cited 23.10.2016).

Nepal is a male dominant society and being head of the family decision are taken by male. Women by birth do not exercise equality in freedom as men do, though situation can be different form rural to urban areas. Participation of women in rural areas is very few while in urban areas; women are equally active as men.

4.3 Political

History of Nepal begins with the unification of the scattered small kingdom by one determined king from Shan dynasty in 1768. Earlier many kings had tried to accomplish this task of unification but were not as successful as king Prithivi Narayan Shah. Nepal was never colonized even

though East India Company attempted once in 1814, Nepal maintained a defensive position. The first election was held in 1959 with the promulgation of new constitution, but in 1962, King Mahendra suspended parliament and took all power in his hand. In 1990 King Birendra restored parliament, but in 1996 Maoists formed rebellious armed group to overthrow the monarchy. Civil war was fought almost a decade taking 12,000 people's life and displacing 100,000 people according to UN report. Peace deal was done between government of Nepal and Maoists in November 2006, and after the constitutional assembly's election Maoists emerged as biggest parties in the parliament. Monarchy system was abolished and Nepal became republic in May 2008. Nepal got its new constitution in 2015 (Wikipedia. cited 23.10.2016.)

Politics has influenced every sector in Nepal, especially in education sector the influence of politics has hampered the whole education system. Even bureaucracy suffers from the direct influence of political involvement. Nepal enjoys multi party coalition government and there has always been lack of political stability, which is, realized as one major hindrance in the country's development. The new constitution has been viewed with high hope among the public for bringing stability in the government and prospering forward.

Internationally, Nepal maintains peaceful and harmonious relationship with other countries. Finland and Nepal has long and good relationship. Nepal represented in Finland through its embassy in Copenhagen, Denmark while Finland has embassy in Kathmandu. Finland development cooperation with Nepal focuses mainly on three sectors, forestry, education and water, besides theses main sectors Finland promotes crosscutting themes such as good governance and human rights, gender equality and mitigation of climate change (Embassy of Finland, cited 23.10.2016.)

Nepal's improvement in corruption level has been worse every year. Nepal was placed 130th among 167 countries per the annual survey released by Transparency International in the year 2015 (Ekantipur 27.01.2016, cited 23.10.2016.)

4.4 Economic

Nepal is among the poorest and most remote countries in the world. Agriculture is the mainstay of the economy and industrial activity mainly involves in the processing of agricultural products, including pulses, jute, sugarcane, tobacco and grain (CIA, cited 15.09.2016). Nepal has

embarked on several reforms and investment after the end of decade long civil conflict in 2006. In the last decade, poverty rate in Nepal decreased from 80% to 57% which is remarkable achievement in Nepalese economy (Battista 16.10.2015, cited 24.10.2016.) In April 2015, major earthquake hit Nepal, killing nearly 9,000 people and causing massive damage. The overall damage was estimated to be $10 billion almost half of its gross domestic product (GDP) (Karnik 22.05.2015, cited 24.10.2016). This has slowed down the economic progress, as GDP growth in FY2016 was only 0.8%. According to Asian Development Bank (ADB) report, Nepal's economy is expected to recover and grow by 4.8% in FY2017 (ADB, cited 24.10.2016). In the figure 11 the GDP growth of Nepal in 2014 was 5.7% which plunged down to 2.3% 2015. One of the main reasons for decline was earthquake while another reason was unrest in the Terai region bordering India that seriously disrupted trade and supply (ADB, cited 24.10.2016).

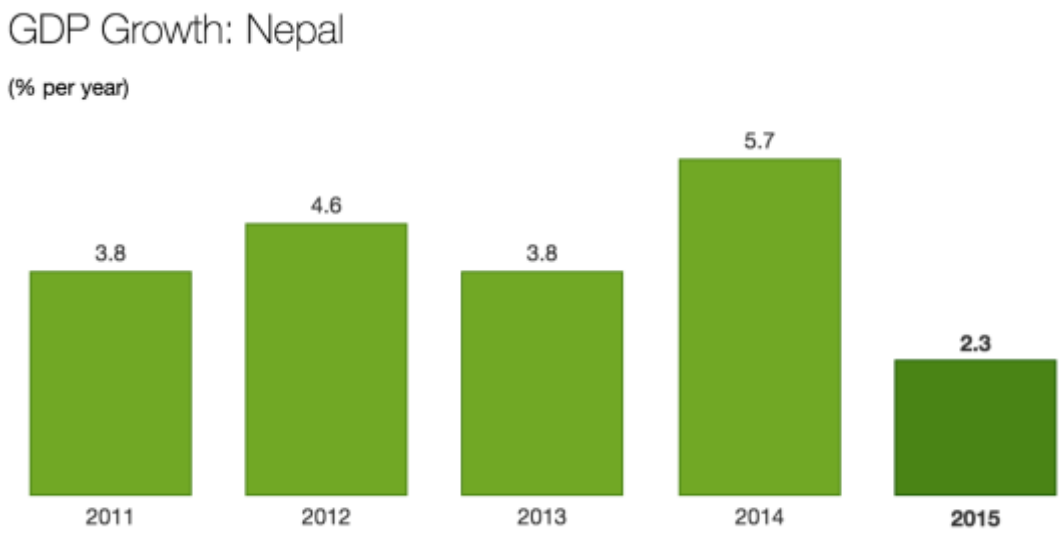

FIGURE 11. GDP Growth: Nepal (ADB, cited 24.10.2016)

The inflation rate in Nepal also climbed up due to 2015 earthquake, although ADB projects it to climb down from 9.9% in 2016 to 8.5% in 2017 (ADB, cited 24.10.2016). Nepal's economy is closely tied with its neighbor India which alone holds 67.1% of Nepalese import and 64.8% of export. (Nepalembassydanmark, cited 24.102016) Nepal's trade with another neighboring country China is minimal due to gigantic Himalayas in the north.

Agriculture stays as the principal economic activity sharing 35.10% of the total GDP in 2013 while industry and service sector shared 15.71% and 49.19% respectively. Remittance inflows in past

few years have covered a major part of GDP. Nepal was third largest recipient of remittances in 2014, which amounted 29.2% of the GDP, and after the earthquake remittance inflows soared and had been one the important source of income for earthquake-affected households (Republica 17.04.2016, cited 24.10.2016).

The economic progress of Nepal depends upon how much it can attract foreign investments and make suitable environments for doing business in Nepal, while it also need to compete in the world, looking for new markets and new opportunities. Government of Nepal also should make policies to utilize the remittance inflow. The stability of in political side is also important factor for economic development.

Government of Nepal gets fund for different projects, besides there are few financial institute supporting renewable energy programs. World development bank and Asian development bank are actively working in Nepal and are also investing in cleantech sector. Nepalese financial institution is not strong enough to invest on large projects such as large-scale hydro projects though they are active in small projects. Team Finland is promoting Finland and Finnish companies in Nepal. It helps Finnish companies for internationalization and succeed in global market. Team Finland has good network of different organization such as ministries, Finpro, Tekes, Finnvera, Finnfund just to name some. Team Finland can be a great help in terms of opening business, funding, and other help needed for opening business in Nepal (Embassy of Finland, cited 23.10.2016.)

Market size

Nepal's market size compared with its neighboring countries like India, china and Bangladesh is relatively small, it still provides market for 28.11million people with a growing middle class population. A survey conducted by Asian Development bank in 2004-2010 shows that Nepal had middle class and higher-class population of 23.36 % with the capacity of combined yearly expenditure USD 10.72 billion in purchase power parity terms (Hasan & Kim 2014, cited 24.10.2016.)

5 CONCLUSION

Nepal is going through huge energy crisis and country needs a long-term sustainable solutions. The energy crisis has resulted in increased use of fossil fuel mostly in urban areas. The rural part of the country largely depends upon firewood as major source of energy, threatening country's forest. Access of electricity is mostly limited to urban areas and expansion of national gird is slow due to geographical hardship.

Nepal's holds huge potential in hydroelectric generation; it can not only fulfill domestic needs but also earn revenue from selling surplus electricity to its neighboring countries. The assessment done on the solar and wind energy potential also indicates possibilities for commercial electricity generation. Solar energy and wind energy are especially suitable for rural and scattered areas where national gird won't reach in near future. In rural Nepal where biomass is major source of energy, energy efficient cooking stove and biogas has been sustainable solutions.

Nepal's cities are in the phase of rapid urbanization and there are number of issues brought by this situation such as increased demand in electricity, waste management, water management, increase in use of fossil fuels. Government of Nepal has realized this issue and is taking steps to solve it in sustainable way by collaborating with private and public sector. Government of Nepal has also decided to build large-scale biogas plants in urban areas to reduce dependency in fossil fuels. There is also demand for wastewater treatment facility and skilled human resource to maintain it. Majority of the country's population is still deprived of safe and clean drinking water. Rainwater harvesting technology is in its initial phase of commercialization, and government is also promoting this technology.

Nepal was affected by major earthquake in 2015 and country is undergoing in reconstruction phase. There are indirect opportunities created from this such as installing rooftop solar panels, installing biogas plants, installing rainwater-harvesting technology, but initial decision should come from the owner of house. Government of Nepal is attracting foreign direct investment in Nepal through its liberal foreign investment policy. Government of Nepal is also giving tax exemption for investors in sectors like hydro, waste to energy, solar energy and wind energy. The environment for opening new business in Nepal is suitable now though the future depends upon the Nepal's government decision and policymaking process.

6 DISCUSSION

Cleantech is an emerging concept in the world but yet many of us don't have clear idea about it. I had very few knowledge about cleantech before I started my thesis work. During the process of this research work, I certainly have learned idea of cleantech and its importance in today's world. Cleantech is proliferating rapidly and making impact on all sectors. Finland produces skilled manpower and innovative solutions in the sector of cleantech. In 2014 Finland was ranked in second position after Israel in terms of cleantech innovation. Finland has potential to make cleantech as major industry and bring revenue from it.

Nepal, on other hand holds lot of potential in energy sector. Nepal's energy crisis is hindering in its development process. Nepal's true potential has yet to be discovered, as it is clear that very little research work has been conducted. More research work is needed to identify true potential of country's alternative source of energy. Most of the rural part on Nepal is out of reach; it is not feasible to take modern technologies in those parts. Innovative and cheap solutions are sought in those parts. Political instability is also one of the major barriers for its socio-economic development. Nepal needs to overcome this issue in coming future. Energy crisis in Nepal has overshadowed other opportunities.

The cooperation of CEE for this research has been great value to me. I had good experience working with them and learnt many things, which will help me in my professional skill development.

There is plenty of room for the future research in this topic. Nepal is an agricultural country and majority of the population depends upon agriculture. Possibility of modern agriculture in Nepal can future research topic.

REFERENCES

Advameg, Inc. Nepal. Cited 23.10.2016, http://www.everyculture.com/Ma-Ni/Nepal.html

AlloExpat. Business Etiquettes in Nepal. Cited 23.10.2016, http://www.nepal.alloexpat.com/nepal_information/business_etiquettes_nepal.php

Alternative Energy Promotion Center. Geothermal Energy. Cited 21.10.2016, http://www.aepc.gov.np/old/index.php?option=com_content&view=category&id=70&layout=blog&Itemid=97

Alternative Energy Promotion Center. Nepal: Applications of renewable energy technologies. Cited 21.10.2016, http://en.openei.org/datasets/dataset/896bfa8f-3671-4c01-9684-6ba5a805d16a/resource/7e30fb04-344e-47d7-8a3a-fc5d129d6b69/download/nepalret200341.pdf

Alternative Energy Promotion Center. 2008. Solar and Wind Energy Resource Assessment in Nepal (SWERA). Cited 20.10.2016, http://www.aepc.gov.np/docs/resource/subreport/20130818124528_Solar%20and%20Wind%20Energy%20Resource-Assessment%20in%20Nepal.pdf

Alternative Energy Promotion Center. What is Extended Biogas Programme? Cited 21.10.2016, http://w2ebazaar.org.np/about/what-is-the-extended-biogas-programme

Alternative Energy Promotion Center. Wind Energy Technology-Achievement. Cited 21.10.2016, http://www.aepc.gov.np/index.php?option=renewable&page=subsubrenewable&mid=2&sub_id=13&ssid=3&cat=Achievement

Asian Development Bank. Nepal:Economy. Cited 24.10.2016, https://www.adb.org/countries/nepal/economy

Battista, A.D. 16.10.2016. World Economic Forum. What's next for Nepal's economy?. Cited 24.10.2016, https://www.weforum.org/agenda/2015/10/whats-next-for-nepals-economy/

Bhushal, R. 09.04.2015. Kathmandu: a city within sight of glaciers struggles with water crisis. Cited 22.10.2016, https://www.theguardian.com/sustainable-business/2015/apr/09/kathmandu-nepal-city-glaciers-water-crisis

Central Intelligence Agency. The World Factbook-Nepal. Cited 15.09.2016, https://www.cia.gov/library/publications/the-world-factbook/geos/np.html

Center for Energy and Environment. About CEE. Cited 30.09.2016, http://www.cee.fi/en/cee-en/

Corporate Catalyst Nepal. 2014. Doing Business in Nepal. Cited 23.10.2016, http://ccnepal.com.np/downloads/ccnepal1.pdf

Crowe Horwath. 2015. Overview of the Financial Budget of Nepal For The Fiscal Year (2015-16). Cited 23.10.2016, https://www.crowehorwath.net/uploadedfiles/np/news/nepal%20budget%202015-16.pdf

Department of Industry. Investment Climate in Nepal. Cited 23.10.2016, http://www.doind.gov.np/images/publications/mannual/investment-climate-in-nepal.pdf

Department of Industry. 2012. PROCEDURAL MANUAL FOR FOREIGN INVESTMENT IN NEPAL. Cited 23.10.2016, http://www.doind.gov.np/images/publications/mannual/procedural_manual_2012.pdf

Dikeman, N. 2008. What is clean tech?. Cited 05.09.2016, https://www.cnet.com/news/what-is-clean-tech/

Dixit, k. 2013. It is Rocket science. cited 21.11.2013, http://nepalitimes.com/article/nation/It%20-s-Rocket,295

Ekantipur. 24.12.2015. Govt planning to install sloar-run street lamps. Cited 20.10.2016, http://kathmandupost.ekantipur.com/news/2015-12-24/govt-planning-to-install-solar-run-street-lamps.html

Ekantipur. 11.06.2016. Govt moves to revive plan to make biodiesel. Cited 21.10.2016, http://kathmandupost.ekantipur.com/news/2016-06-11/govt-moves-to-revive-plan-to-make-biodiesel.html

Ekantipur. 21.09.2016. IBN to sign Rs8b waste management contract. Cited 21.10.2016, http://kathmandupost.ekantipur.com/news/2016-09-21/ibn-to-sign-rs8b-waste-management-contract.html

Embassy of Finland. Development Cooperation between Finland and Nepal. Cited23.10.2016, http://www.finland.org.np/public/default.aspx?nodeid=35080&contentlan=2&culture=en-US

Embassy of Nepal Copenhagen, Denmark. ECONOMY. Cited 24.102016, http://nepalembassydanmark.com/about-nepal/economy/

FAO. 2011. Rooftop rainwater harvesting in Nepal. Cited 27.10.2016, http://teca.fao.org/technology/rooftop-rainwater-harvesting-nepal

Government of Nepal. 2011. SCALING-UP RENEWABLE ENERGY PROGRAM INVESTMENT PLAN FOR NEPAL. Cited 19.10.2016, http://moste.gov.np/documents/scaling-up_renewable_energy_program,_investment_plan_for_nepal

Hasan, R & Kim, K. 2014. REVISITING FOREIGN DIRECT INVESTMENT IN NEPAL: PROBLEMS AND PROSPECTS. Cited 24.10.2016, http://www.journalijdr.com/sites/default/files/2268.pdf

Itim international. 2016. GREET HOFSTEDE. Cited 23.10.2016, https://geert-hofstede.com/nepal.html

Kafle, M. 2007. Electric Power in Nepal: History, Experiences & Possibilities. Cited 13.10.2016, http://ieeexplore.ieee.org/stamp/stamp.jsp?arnumber=4510261

Kathmandu Upatyaka Khanepani Limited. Home. Cited 22.10.2016, http://www.kathmanduwater.org/home/index.php

Kathmandu Upatyaka Khanepani Limited. 2013. NEP: Kathmandu Valley Wastewater Management. Cited 22.10.2016, https://www.adb.org/sites/default/files/linked-documents/43524-014-nep-ieeab.pdf

Karnik, M. 2015. The economic damage from the Nepal earthquake is almost half of the country's GDP. Cited 24.10.2016, http://qz.com/409484/the-economic-damage-from-the-nepal-earthquake-is-almost-half-of-the-countrys-gdp/

Khatiwada, D. 2014. Garbage to gas. Cited 21.10.2016, http://www.diva-portal.se/smash/get/diva2:750023/FULLTEXT01.pdf

Management Study Guide. Desk Research – Methodology and Techniques. Cited 30.09.2016, http://www.managementstudyguide.com/desk-research.htm

Ministry of Finance. 2015. Economic Survey. Cited 23.10.2016, http://mof.gov.np/uploads/document/file/Economic%20Survey%202015-16%20-%20English_20160812062624.pdf

Nationonline. Nepal. Cited 15.09.2016, http://www.nationsonline.org/oneworld/nepal.htm

Nepal Electricity Authority. 2015. NEPAL ELECTRICITY AUTHORITY REVIEW FISCAL YEAR 2015/2016. Cited 18.10.2016, http://www.nea.org.np/images/supportive_docs/NEA%20design.pdf

Nordic Development Fund. 2012. NCF: Promoting Renewable Energy Technologies for Enhanced Rural Livelihoods. Cited 21.10.2016, http://www.ndf.fi/project/ncf-promoting-renewable-energy-technologies-enhanced-rural-livelihoods-ndf-c3-c6

Passport to Trade. Business Culture. Cited 23.10.2016, http://businessculture.org/business-culture/

RAIN. Nepal. Cited 22.10.2016, http://www.rainfoundation.org/country/np/

Ranjit, M. 2015. Geothermal Energy Update of Nepal. Cited 21.10.2016, https://pangea.stanford.edu/ERE/db/WGC/papers/WGC/2015/01010.pdf

Reegle. 2012. Nepal. Cited 13.10.2016, http://www.reegle.info/policy-and-regulatory-overviews/NP

Republica. 17.04.2016. Infographics: Remittance flows in Nepal. Cited 24.10.2016, http://admin.myrepublica.com/opinion/story/40659/infographics-remittance-flows-in-nepal.html

Roughguides. Cited 15.9.2016, https://www.roughguides.com/tasters/9780241238103_EPUB/images/rg_nepalintnep_003.gif

SAARI. 2016. SARI/EI Participation in “NEPAL POWER INVESTMENT SUMMIT”. Cited 17.10.2016, http://sari-energy.org/wp-content/uploads/2016/05/Brief-Report-on-SARI-EI-Participation-in-Nepal-Power-Investment-Summit-2016-the-future-battery-of-South-Asia-31st-May-3rd-June2016-1-.pdf

Shrestha, S. 2015. Rupees from rubbish. Cited 21.10.2016, http://nepalitimes.com/article/nation/making-money-from-garbage-in-kathmandu,2055

Suwal, S. WATER IN CRISIS - NEPAL. Cited 22.10.2016, https://thewaterproject.org/water-crisis/water-in-crisis-nepal

Thanju,J & Shrestha, B. Rain Water Harvesting in Kathmandu. Cited 22.10.2016, http://www.nepjol.info/index.php/HN/article/download/4230/3591

The Himalayan Times. 26.10.2015. Power generated form the waste for the first time. Cited 29.10.2016, https://thehimalayantimes.com/kathmandu/power-generated-waste-first-time/

The World Bank. Doing Business. Cited 23.10.2016, http://www.doingbusiness.org/data/exploreeconomies/nepal/

The World Bank. 2013. Managing Nepal’s Urban Transition. Cited 21.10.2016, http://www.worldbank.org/en/news/feature/2013/04/01/managing-nepals-urban-transition

United Nations Development Programme. Table 1: Human Development Index and its components. Cited 15.09.2016, http://hdr.undp.org/en/composite/HDI

Upreti, B.N. & Shakya, A. 2009. WIND ENERGY POTENTIAL ASSESSMENT IN NEPAL. Cited 21.10.2016, http://www.wind.arch.t-kougei.ac.jp/APECWW/Report/2009/NEPAL.pdf

Urban Development Ministry. 2015. Solid Waste Management of Kathmandu Metropolitan City. Cited 22.10.2016, http://www.environmental-auditing.org/Portals/0/AuditFiles/Solid%20Waste%20Management%20of%20KMC_2015_Nepal.pdf

Wikipedia. 2016. Nepal. Cited 15.09.2016, https://en.wikipedia.org/wiki/Nepal/

Wikipedia. 2016. Languages of Nepal. Cited 23.10.2016, https://en.wikipedia.org/wiki/Languages_of_Nepal

WIPO. 2009. Agreement between the Government of the Republic of Finland and the Government of Nepal on the promotion and Protection of Investments. Cited 23.10.2016 http://www.wipo.int/wipolex/en/other_treaties/text.jsp?file_id=310717

WWF & Cleantech Group. 2014. The Global Cleantech Index 2014, Cited 30.09.2016, https://wwf.fi/mediabank/6751.pdf

Yale University. 2016. GLOBAL METRICS FOR THE ENVIRONMENT. Cited 20.09.2016, http://epi.yale.edu/sites/default/files/2016EPI_Full_Report_opt.pdf

PROCEDURE FOR STARTING BUSINESS IN NEPAL

ANNEX 1

No.	Procedure	Time to Complete	Associated Costs
1	**Verify the uniqueness of the proposed company name** *Agency: Office of the Company Registrar* Verification of the uniqueness of a company name can now be done online. To reserve the available company name, the company must submit an application to the Office of the Company Registrar. The company name reservation can also be completed online for no charge.	1 day	no charge
2	**A professional verifies and certifies the memorandum and articles of association** *Agency: Professional Agency* Although professional verification or certification prior to submission to the official agency is no longer required, entrepreneurs continue to use the services of professionals in practice for verifying and drafting the memorandum and articles of association. This is mainly done to avoid mistakes since there are no standard memorandum and articles of association forms that entrepreneurs can use.	5 days	NPR 10,000 depending on the professional's charges
3	Buy a stamp to be attached to registration form Agency: Post Office Company founders can buy a stamp to be attached to the registration form for NPR 5 at the Post Office.	1 day	NPR 5
4	**Register at the Office of the Company Registrar, Department of Industry** *Agency: Office of the Company Registrar* To register a company, the promoter must submit an application as prescribed by the Ministry of Industry, Commerce, and Supplies. Online filing of the required documents has been introduced and made mandatory. After the online filing, entrepreneurs are required to visit the Office of Company Registrar and submit all the original documents for further verification. The registration fee is based on the company's authorized capital: - Up to NPR 100,000 (authorized capital): NPR 1,000. - NPR 100,001 to NPR 500,000: NPR 4,500. - NPR 500,001 to NPR 2,500,000: NPR 9,500. - NPR 2,500,001 to NPR 10,000,000: NPR 16,000. - NPR 10,000,001 to NPR 20,000,000: NPR 19,000. - NPR 20,000,001 to NPR 30,000,000: NPR 22,000. - NPR 30,000,001 to NPR 40,000,000: NPR 25,000. - NPR 40,000,001 to NPR 50,000,000: NPR 28,000. - NPR 50,000,001 to NPR 60,000,000: NPR 31,000. - NPR 60,000,001 to NPR 70,000,000: NPR 34,000. - NPR 70,000,001 to NPR 80,000,000: NPR 37,000. - NPR 80,000,001 to NPR 90,000,000: NPR 40,000. - NPR 90,000,001 to NPR 100,000,000: NPR 43,000. - More than NPR 100,000,000: NPR 43,000 plus NPR 30 for each additional NPR 100,000.	7 days	NPR 9,500
5	**Make a company rubber stamp** *Agency: Sealmaker* Company founders can make a company rubber stamp at the Seal maker for NPR 275.	1 day	NPR 275
6	**Register for VAT and income Tax at the Inland Revenue Office, Ministry of Finance** *Agency: Inland Revenue Office* According to the Value Added Tax Act 2052, of 1996, the company must disclose the office address and withhold 10% tax of the rent for at least 3 months and deposit it to the tax office. If the company's objectives include goods or services subject to VAT, both registrations (VAT and income tax) should be obtained simultaneously.	1 day	no charge
7	**Enroll the employees in the Provident Fund** *Agency: Provident Fund* Every month, 10% is deducted from the basic salary of each employee, matched by a contribution from the employer. The contribution is made to the provident fund and released upon employee retirement. The employer further needs to pay gratuity at the rate prescribed by the labor regulations upon the employee's retirement. These rules are only applicable if the company appoints 10 or more employees.	1 day	no charge

(The World Bank 2016, cited 23.10.2016)

IMPORTANT LINKS ANNEX 2

S.N	Name of the Institutions	Web address
1	Alternative Energy Promotion Centre	http://www.aepc.gov.np/index.php
2	Centre for Rural Technology, Nepal (CRT/N)	http://www.crtnepal.org/
3	Clean Energy Nepal (CEN)	http://www.cen.org.np
4	Department of Energy Development (DoED)	http://www.doed.gov.np/
6	Independent Power Producers' Association, Nepal	http://www.ippan.org.np/
7	Ministry of Energy (MoEn)	http://www.moen.gov.np/
8	Ministry of Environment (MoEnv)	http://moste.gov.np/
9	National Development Council	www.npc.gov.np/en/ndc/
10	National Planning Commission	www.npc.gov.np
11	Water and Energy Commission	www.wec.gov.np