

THE IMPACT ON CLIMATE AND ENVIRONMENT CHANGE – RENEWABLE ENERGY SECTOR

Elena GURGU, Lecturer Ph.D.
Faculty of Marketing and International Affaires
Spiru Haret University

Abstract

Most of the people have an idea of what renewable energy sources are and what they can offer us. The majority of people are also very aware of the impact that non-renewable energy is having on the environment. The adage reduce, reuse, recycle is commonly recited today by adults and children alike. We have started to see an increase in the reduction of waste and consumption of energy and the recycling and reuse of products we use. It is time to see an increase, however, in the use of renewable energy.

Key-words: *environment, climate change, renewable energy, non-renewable energy, recycling, alternative energy sources*

JEL Classification: Q28, Q30, Q42, Q54

Introduction

This article is about to put the accent on solving one of the biggest problems of the mankind – the climate and environment change.

Human beings require energy – and lots of it – to run our planet. Every since the industrial revolution, we have required more and more energy each year to keep our factories, automobiles, air conditioning units, and domestic appliances running. As large nations like China continue to ramp up industrial production at record rates, the global demand for energy has never been greater. Traditionally, industrial nations have relied upon fossil fuels like oil, coal and natural gas to power their economies. Fossil fuels are an example of this type of energy resources. But the *disadvantages* of using this type of energy are multiple:

- a) contributes to the warming of the planet, or global warming;
- b) causes pollution such as acid rain, which hurts animals and plants around the world;
- c) potential source of global political unrest, given that many nations are reliant upon other nations for these non-renewable energy resources.

The governments are aware of the non-renewable energy problems we are facing. Research is being done on how to best use the Earth's energy resources while keeping it cost effective. Of course, when the non-renewable energy sources are depleted we will have no choice but to find an alternate energy solution.

Solving the climate and environment change must be the action of governments in implementing strategies of growing the investments in renewable energy sector. Also, this have to be one of the biggest problems of the people, because they must be awared of the near future climate disaster. So, they have to change their actual way of living by consuming only green energy for their needs.

The literature in green energy that I studied is about to make people and governments understand the importance of using only renewable energy alternatives in order to satisfy their needs. An important step was made by the governments of the industrialized countries who were making big improvements in investing in the green sector. This fact is proved by the following reports made by the most important authorities regarding green energy sector, such as: *Clean Energy Trends 2010*, issued by The Clean Tech Market Authority in US, *Global Trends in Sustainability Performance Management*, issued by The Economist Intelligence Unit in US, *Renewable Energy Future for the Developing World*, issued by ISSES – International Solar System Society in US.

Revised literature in the field

There are a lot of people in important key jobs regarding green energy sector and also scientists who believe that only a big investment in renewable energy is the way to solve the climate and environment change.

Bruce Piasecki, the president of the *AHC Group* (a management consulting firm since 1981), defines new directions in capitalism and reshape the purposes of corporate environmental and energy strategy in his books.

Jeremy Rifkin, the founder and president of the *Foundation on Economic Trends* and the author of seventeen bestselling books on the impact of scientific and technological changes on the economy, the workforce, society, and the environment, has been one of the most important advisors to the European Union for the past decade, on issues related to climate change and energy security.

The name of *Rajendra K. Pachauri*, Director General of *TERI* and Chairman of the *IPCC*, has become synonymous with climate change and the environment, receiving the 2007 Nobel Peace Prize on behalf of the IPCC. Internationally recognized as a leading global thinker and leader of research, Rajendra's passion lies in disseminating greater knowledge about man-made climate change and helping lay the foundations for the measures that are needed to counter such change.

The Need to Find Alternative Energy Sources as Soon as Possible

As of December 2009, 439 nuclear reactors exist in the world. The United States produces the most nuclear power, providing 19% of the total electricity it consumes. As of 2006, France produces 80% of its electrical power from nuclear reactors, which is the highest percentage in the world. This form of energy is risky to produce and many people worry about the long term effects.

The 1986 Chernobyl Disaster is probably the most famous nuclear power disaster in history. Obviously, people do not want something like that to ever happen again. Barring any other awful nuclear reaction accident, radioactive waste

is still produced by this energy source. This remains in the environment for thousands of years. People are very worried about the effects of radiation on the body. Once the uranium is depleted, nuclear energy is lost to us forever, and we find ourselves even deeper in the energy crisis than we were before.

Besides the depletion of the non-renewable energy sources, they add to the energy crisis due to their impacts on the environment even just to harvest them. Oil fields are becoming scarcer and mining is becoming a profession of the past. The harvesting of these resources damages the Earth and permanently depletes some of the natural resources it has to offer us. We must solve this energy crisis while it is still just a crisis and not a full blown disaster.

Climate Change – One of Top Three Concerns Globally

Climate change is one of the top three concerns globally, on par with economic stability and terrorism, according to HSBC’s fourth Climate Confidence Monitor. The online survey Lightspeed Research was conducted of 15,000 consumers in fifteen countries between August 25 and September 2010.

On average 38 percent of survey respondents strongly agree that climate change is among their biggest concerns. This ranges from 57 percent in China to 16 percent in the UK. Eighteen percent of U.S. respondents say climate change is one of their biggest issues.

The survey *Climate Confidence Monitor* finds that 64 percent of respondents in China claim to be making a significant effort to help reduce climate change, compared to 23 percent in the UK, 20 percent in the U.S. and 11 percent in Japan. The report also reveals that one in three people in Vietnam, India and China believe climate change can be halted, compared to just one in twenty in France and the UK. Survey respondents in Hong Kong and Vietnam also rank climate change as their number one concern.

In terms of creating jobs, more than half of respondents in Brazil, India and Malaysia strongly agreed their country would prosper and create new jobs by responding to climate change. In comparison, one-third of respondents in the UK and the U.S. think economic opportunities and new jobs can be created.

The survey also indicates that businesses need to address climate change. Nearly 75 percent of respondents in France and 67 percent in Germany agreed that greater business investment is needed. NGOs and individuals were seen as central to the effort, backed up by effective government intervention such as carbon taxes and emissions trading schemes, say researchers.

Another HSBC report indicates that annual capital investment in the green economy would grow from an annualized \$460 billion in 2010 to \$1.5 trillion in 2020.

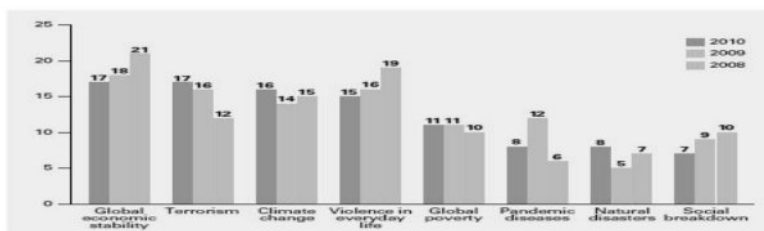
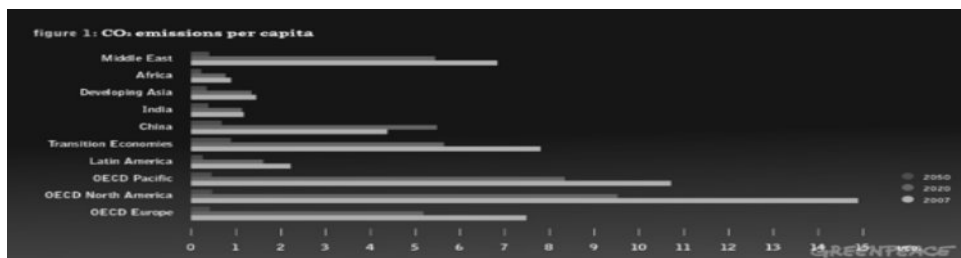


Figure 1. Climate change as a top concern 2008-2010. Global percentage ranking each issue as their top concern.

Renewable Energy without Slow Growth – An Overview

Greenpeace outlined a scenario in which 95 percent of energy generation comes from renewable sources by 2050 while creating 12 million jobs, for a price tag of around \$18 trillion in global investment, resulting in an 80 percent decrease in CO₂ emissions.

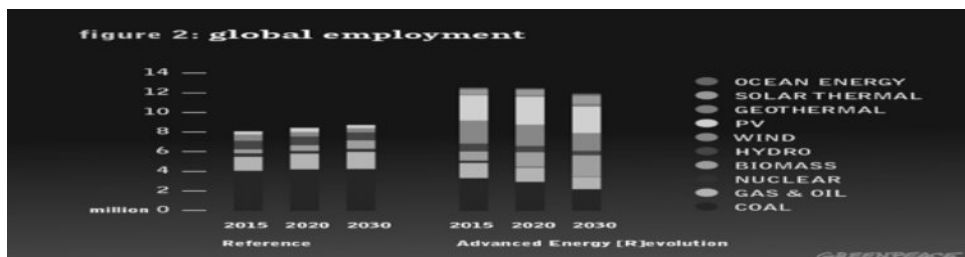
According to the Greenpeace report, *Energy [R]evolution: A Sustainable World Energy Outlook*, such a drastic revolution in energy production is necessary, since even a 50 percent decrease in CO₂ emissions by 2050 might not be enough to prevent runaway climate change scenarios. Under the Greenpeace scenario, CO₂ emissions will peak in 2015 before dropping by more than 80 percent by 2050.



In its first edition of the *Energy [R]evolution Report* in 2007, Greenpeace had predicted that 156 GW of renewable energy would be produced in 2010. As of the end of 2009, 158 GW were being produced.

The report makes several policy recommendations, such as phasing out all subsidies for fossil and nuclear fuel businesses, establishing legally binding targets for renewable energy, and strict efficiency standards. According to the report, conventional fuel sources receives an estimated \$250-300 billion in worldwide subsidies, with coal alone receiving \$63 billion.

The *Energy [R]evolution* scenario outlines a scenario which creates about 12 million jobs, with 8.5 million in the renewable sector alone, by 2030. Without adopting the policy recommendations of the report, however, only 2.4 million renewable jobs will be created. The renewable energy sector already employees two million people worldwide. The policy recommendations also state that the market for renewable technology will increase from \$100 billion today to more than \$600 billion by 2030.



Actual energy consumption is expected to increase up to 60 percent by 2050, according to the report. Implementing the policy recommendations in the report, including improved insulation and design for buildings, implementing efficiency standards and replacing heating systems with renewable technology, would decrease energy consumption by 20 percent.

Greenpeace also reported that renewable energy resources alone have the potential to generate up to 32 times current global power demands. The report estimates potential savings in fuel costs of switching to renewable systems at \$282 billion per year.

However, the annual investment necessary between now and 2030 is estimated to be \$782 billion, though without further investment costs beyond that time horizon. Under current policies, Greenpeace estimates global energy investment of \$11.2 trillion dollars from now until 2030, while under the *Energy [R]evolution Scenario*, global investment reaches \$17.9 trillion.

Renewable Energy Sector Grows Despite Recession

The recent economic slowdown appears to not have impacted the renewable energy sector as many had feared. Renewable energy has actually been exhibiting strength in recent years according to a new study. The Renewable Energy Policy Network for the 21st Century recently released their study, which was requested by the United Nations.

The study found that renewable energy installations outpaced fossil fuel installations in 2009 in Europe and the United States. According to the study, 60 percent of new energy installations in Europe were in the form of renewable energy. In the United States, just over 50 percent of new energy installations were from the renewable energy sector.

Overall, the study concluded that renewable energy instalments should account for a larger percentage of installations than fossil fuels across the world and not just in Europe and the United States in 2010. This is in large part due to China's renewable energy sector growth. In 2009, China installed 37 gigawatts of renewable energy across the country. China also increased their status as a world leader in building renewable energy equipment, such as their 40 percent hold in *solar* panels and 30 percent hold in *wind* turbine manufacturing.

In 2009, the study found that 25 percent of energy capacity across the globe was in the form of renewable energy. However, only 18 percent of electricity needs were met through renewable energy in 2009. Those behind the study believe that 2010 will be a major year for the renewable energy sector and will set a precedence for years to come.

Across the globe, renewable energy policies and investments appeared to also be of importance in 2009. 100 countries now have renewable energy policies compared to only 55 in 2005. Also, investment into the United Nations' Environment Program was \$162 billion despite the economic recession. However, this was a slight decrease from the \$173 billion invested in 2008.

However, some involved still express concern regarding the state of renewable energy across the globe, especially in terms of the impact on climate change. United Nations' Environment Program executive director Achim Steiner stated: "There still remains, however, a serious gap between the ambition and the science in terms of where the world needs to be in 2020 to avoid dangerous climate change."

EU Nations Confident on Renewable Energy Goals

Most EU member states are confident that they will be able to ramp up the production of renewable energies to meet their 2020 production targets, according to national forecast documents submitted to the European Commission.

The EU's renewable energy directive set national targets for renewables in order to reach a 20% share in the EU's overall energy mix by 2020.

To ensure that the goals are reached, the directive set "indicative trajectories" – intermediate targets – for each member state. Countries were obliged to draw up national renewable energy action plans by the end of June 2010, setting out measures on how they intend to keep up with their trajectories.

The directive also offers member states the option to use "statistical transfers" to sell excess renewable credits to another country to contribute towards their targets. But they can only do this if they meet their own intermediate targets.

Six months before handing in their national action plans, member states are due to submit to the European Commission forecast reports, estimating their potential excess production or demand for renewable sources in addition to domestic sources.

So far, twenty countries have submitted production forecasts on delivering the EU's objective of sourcing 20% of its energy from renewable sources by 2020.

In the country reports, member states estimate whether they expect production to exceed their interim domestic targets or whether they will need help from others to meet them.

Many member states, including France and the Czech Republic, said they expect to follow indicative trajectories that set midterm goals up to 2020. This means that they do not expect to need help to meet their own targets, nor to contribute towards others' goals.

A few member states announced that they expect to exceed their goals. These countries expressed an interest in transferring the volumes that exceed their indicative trajectories to other countries to help them achieve their goals. These include Sweden and Denmark, where renewables penetration is already above average. Germany and Spain also fall into that category.

Only a few nations expressed doubt as to whether they would reach their domestic production goals. Belgium said it "does not exclude the possibility of using the cooperation mechanisms" to meet its objective, while the Netherlands pledged to make "temporary efforts" to step up its energy policy "in the unlikely event" that it does not manage to keep up with its indicative trajectory.

Potential cooperation projects include a pan-Mediterranean Solar Plan, an idea raised by France and Spain, and offshore wind parks in Germany.

Moreover, several other countries stressed the need for further development of interconnections. Ireland called for the development of offshore grids to harness wind power, while Spain and Portugal expressed concern about the lack of electricity links between the Iberian Peninsula and the rest of Europe.

One of the most optimistic countries was Spain, which estimated that it would cover 22.7% of its energy consumption from renewable sources by 2020, overshooting its 20% target. Moreover, Madrid would exceed its 40% target for renewables in electrical power generation by 2.3%.

To accomplish this feat, Spain would need to more than double its share of renewables in its energy mix – which currently stands at 10.5% – in the next decade. Moreover, Spain has a poor track-record in complying with EU renewables legislation. It came second only to Italy regarding the number of infringement procedures started against member states by the European Commission under the 2001 Renewable Electricity Directive. However, the Spanish government said achieving the target will be possible with greater energy savings.

Renewable Energy Investments in 2010

Renewable energy investment may rise by 23 percent in 2010 as government stimulus funds mainly in the U.S. and Europe are spent wind turbines and solar panels.

”Spending may rise to between \$175 billion and \$200 billion in 2010 from \$162 billion in 2009”, said Bloomberg New Energy Finance Chief Executive Officer Michael Liebreich at the beginning of 2010.

Governments in the U.S., China, Europe and other regions have earmarked \$184 billion for clean energy projects, with two-thirds of that money expected to be spent through 2011, New Energy Finance estimates. Construction of windmills, solar power and biomass plants will continue even after United Nations negotiators failed to reach a binding treaty to limit carbon dioxide emissions from fossil fuel plants. ”We’re going to be negotiating on the climate for the next 50 years”, Liebreich said.

In 2009, China replaced the U.S. as the biggest investor in renewable energy for the first time in at least five years as the Asian nation raced to meet rising demand for power and reduce carbon emissions.

China vs USA in Renewable Energy Investments

China invested \$34.5 billion in wind turbines, solar panels and other low-carbon energy technologies in 2009, said Bloomberg New Energy Finance from London. The U.S. spent about half as much last year, or \$18.6 billion, slipping to second.

Demand for electricity, fuels and heating has soared in China as millions of farm workers moved to the cities, found jobs and bought appliances. Economic growth averaging 10 percent a year the past three decades made the country of 1.3 billion people the largest polluter, forcing the government to implement tougher emissions rules and set clean-energy targets.

“The rise of China as an investor in clean energy is a striking development that reflects in part Beijing’s determination to be at the forefront of manufacturing key technologies such as wind turbines and solar PV modules,” said Liebreich. “Investment in the U.S. was held back last year by a shortage of long-term private sector finance for projects.”

China has pledged to reduce its carbon-dioxide output per unit of gross domestic product by 40 percent to 45 percent of 2005 levels by 2020. Premier Wen Jiabao in January 2010 called pollution in his nation “grim” and said the government will curb emissions from power plants, cement and steel producers.

U.S. investments in clean energy fell 42 percent from a year earlier (2009), reflecting tighter credit conditions amid the worst recession since World War II and the lack of a federal plan encouraging renewable power.

Worldwide, only 9 percent of the \$182 billion of global economic stimulus packages earmarked for clean energy had been spent by the end of 2009, New Energy Finance estimates. Two-thirds of the spending is scheduled for 2010 and 2011, which follows 2009’s \$162 billion.

China, the world’s third-largest economy, boosted the installed capacity of renewable energy projects to 52.5 gigawatts, mainly in the form of wind turbines and biomass plants. That’s the equivalent of 52 medium-sized coal plants. Low-carbon energy now accounts for 4 percent of the total.

The U.S. still leads the world in installed renewable capacity at 53.4 gigawatts, or 4 percent of the total. Spending in 2010 is poised to climb, reversing 2009’s 40 percent decline, with much of the \$66 billion of the clean-energy stimulus money being spent, New Energy Finance said.

Venture capital spending was the highest in the U.S., accounting for 60 percent of the world total, New Energy Finance said in a fact book distributed at its annual conference in London this year.

The U.K. was the third-largest renewable investor in 2009, accounting for 10 percent of the G-20 total, followed by Spain, Brazil, Germany and Canada.

Conclusion

Because non-renewable energy is energy that could become depleted, people have to be thrifty with it. If the nations persist with their present behaviour, oil will be depleted within 32 years, gas will be depleted in 72 years and we will have coal till the year 2259.

Another minus of non-renewable energy is that it is more pollutant than renewable energy. Polar ice is melting, ocean and seawater levels are rising, and air pollution is every day’s reality. Because of these facts we are developing techniques to mass-produce renewable energy.

No doubt our planet is full of energy resources but it is our duty to exploit only those reserves that cannot cause harm to the environment. The constant consumption of fossil fuels has evolved threats of fuel extinction but we are provided with many alternates.

Need of the hour is to invent not only cost effective but also environment friendly methods (to limit the hazardous residues) to fulfil the increasing demand of power.

I wrote this article to aware the people about the near climate and environment change and make them understand that only an action of big proportion (governments and people) will make a green Earth again. I believe that the actions already taken by the important industrialized countries in the sector of

renewable energy investments is only a small part of the future ones. We all have to work together for our goal: a better and a safest way of living is good for everyone. We have to learn how to live in a healthier way again.

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