

**Forum:** Environment Commission

**Issue:** Promoting Urgent Measures to Promote Green Energy

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## Introduction

In recent years, with climate change having disastrous effects on our planet, the need for green energy has risen. Climate changes as a result of high levels of carbon emissions has led to water shortage and pollution problems, a shortage in food supply, habitat destruction, and is said to be a major contributing factor to recent natural disaster such as Hurricane Harvey and Irma. Though irreversible damage, that has put us on a path to guaranteed consequences, has already been done, if action is not taken our future and the future of our planet will be decidedly worse. Sea levels are predicted to rise 1-4 feet by 2100, which could put some cities under water. Already, many island people are fighting for their lives as they watch their islands slowly go under. The arctic is expected to become essentially ice free during summers before the middle of our current century due to global warming. Additionally, many industries will be threatened including agriculture, fishery, and forestry. The threat to agriculture lies in global warming and decreased precipitation affecting crop growth, fisheries are at risk due to ocean acidification caused by a rise in global temperature, and forestry is at risk because increased wildfires, insect outbreaks, and tree disease are causing trees to die-off.

Not only are energy sources like coal and oil bad for our planet, they are also finite meaning they will run out and we will need to find alternative energy sources eventually. Green energy is both renewable and clean which is exactly what is needed at this time. In addition, green energy tends to be cheaper in the long run highly efficient. Green energy comes in many different forms including solar energy, wind energy, energy harnessed from the rain, tidal energy, plant and algae energy, and geothermal heat energy. Different communities can use the type of energy most appropriate for them and the methods and technologies that work best in their environment in order to harness these energy sources.

## Definition of Key Terms

### Green Energy

Green energy is energy that comes from natural sources such as the sun, wind, rain, waves, plants, algae, and geothermal heat.

### Renewable Energy

Renewable energy is energy collected from renewable sources, meaning the source of the energy won't run out. Sources of green energy are renewable like solar energy, wind energy, rain energy, and wind energy.

### Photovoltaic Cells (PV Cells)

Photovoltaic cells convert the light energy directly into electrical energy using the photovoltaic effect. The photovoltaic effect creates voltage upon exposure to light, this voltage is electricity that can be harnessed. These are the cells used in systems of solar panels.

### Wind Turbines

Wind turbines have blades that act like aircraft propeller blades and turn when wind is present. When they turn they power an electrical generator that supplies an electrical current that can be harnessed and used for various purposes.

### Energy Efficiency

The aim of using the least amount of energy needed to power products and services. For example, building insulation is a technique used to be more energy efficient. Insulation allows buildings to use less heating and cooling energy to achieve comfortable temperatures.

## Background Information

### Consequences of carbon emissions

Since the beginning of the industrial revolution, humans have emitted 375 billion tons of carbon into the atmosphere as carbon dioxide (CO<sub>2</sub>). This has had and is continuing to have disastrous effects on our planet, including diminishing our clean water supply, rising sea levels, increasing incidences and severity of natural disasters, and changes in food supply as a result of climate change.

### *Water supply*

Global warming and a change in climate patterns has had and will continue to have numerous negative effects on our planet. Rising sea levels as a result of melting ice caps will cause saltwater to infiltrate freshwater systems increasing the need for water treatment. In many areas, a decrease in rainfall has led to drought while in others an increase in rainfall has meant more sediments and pollutants entering water supplies. An overall decrease in water supply will have consequences not only for human health, but also for the manufacturing and processing of food.

### *Severe weather*

Climate change as a result of our carbon emissions has led to many severe weather patterns. Global warming could affect storm formation by decreasing the temperature difference between the poles and the equator. Rising temperatures also lead to higher levels of water vapor entering the atmosphere, resulting in hotter, more arid climates. Predictions by many credible organizations in the field, such as NASA, state that storms like hurricanes will increase in intensity as a result of climate change.

### *Changes in food supply*

Carbon emissions contribute to rising temperatures and decreased levels of precipitation changing the conditions many crops grow in. All over the world, crop yields are decreasing and with a decrease in supply prices are rising. Climate change as a result of carbon emissions is also causing animals to migrate. Many animals are fleeing towards the poles in search for more moderate climates meaning a decrease in availability of animals that are hunted for food. This not only affects land animals though because a rise in ocean acidification is killing off large amounts of marine animals consumed as seafood.

### *Different types of green energy*

Numerous types of green energy have been developed and best green energy system to develop is dependent upon the climate and environment where it will be utilized.

#### *Solar Energy*

As the popularity of solar panels increases, their price decreases, allowing solar energy to create the record for the cheapest electricity source. Businesses and industries use solar energy in order to diversify their energy sources, be more energy efficient, and save money.

Though there is more sunlight available on the equator than on the poles, solar energy can be used at every latitude. Nonetheless, there are some difficulties in placing solar panels in some areas. In desert environments, there have been difficulties using solar energy because the panels don't do well under intense heat. Another problem desert environments face with solar panels is

the amount of dust. The combination of intense heat and dust make most solar panels lose about 75% of their efficiency. There is still a need for the development of solar panels that will be productive in desert environments.

Leading in the use of solar energy is Germany, which has almost twice as many units installed than the second place country, Italy. Even though they hold first place in solar photovoltaic power, solar energy still only accounts for 3% of the country's total electricity consumption, though market analysis indicates this number will reach 25% before 2050. Germany has been able to achieve what they have in terms of solar energy use because they have an excellent subsidizing framework, which allows solar energy to compete on the market.

### *Wind Energy*

Wind turbines convert the kinetic energy present in the wind to mechanical power. The mechanical power can be used for specific tasks such as grinding grain or pumping energy. The other way mechanical power can be used is by converting it into electrical energy which can then be used to power homes as well as large facilities such as businesses and schools.

China is currently the leader in wind energy use with its wind sector accounting for 31% of the global total. China has seen such success with wind energy because its large coastline and land mass give it excellent potential for harnessing wind power. Additionally, Chinese technology has developed a magnetic levitation model of a wind turbine which can harness wind power even at low wind speeds.

### *Wave Energy*

Wave energy captures the kinetic energy of waves in order to do useful work. Wave power devices utilize energy on from waves on the ocean surface. The energy from the waves can be used for things including electricity generation, water desalination, and the pumping of water into reservoirs.

Australia has taken advantage of its vast coastline to harness its marine energy potential. Currently, hydroelectricity accounts for 6.5-7% of electricity generation in Australia. Another country making significant progress with wave energy is the United States. Last year alone, 15 grants were given to developed wave energy programs and it is predicted that waterpower could provide 15% of the country's energy by 2030.

## Major Countries and Organizations Involved

### Denmark

Denmark is a nation that has embraced and effectively implemented green energy, having produced 57.4% of its net electricity generation in 2014 from renewable resources. It is a leading country in wind energy production and in 2015, it produced 42% of its electricity from wind turbines, the highest figure recorded worldwide.

In the past, Denmark was dependent on imported oil to run its economy. However, after it was severely impacted by the oil crises of the 1970s, the government decided to look to other sources to meet its growing energy needs. At the same time, it also wished to address environmental concerns. The nation plans to have its entire energy sector comprised of renewable energy by 2050, and it plans to meet half of that target by 2030. The long-term goal of the plan is to implement an energy and transport network that relies solely on renewable energy, with the main ones being wind and biomass. It plans to achieve this by increasing energy efficiency and optimising the use of available resources. Denmark plans to develop an intelligent energy system that is capable of managing the fluctuations of renewable energy. This is mainly due to the fact that no single renewable energy resource can power an economy alone and therefore, relying on multiple renewable resources is the most viable strategy. By 2020, Denmark plans on launching initiatives to reduce energy consumptions, allowing the country's total electricity consumptions to be covered by wind power and by 2030; there are plans to completely eliminate coal from power plants. Recently, the government of Denmark removed subsidies on the green energy industry, as there was confidence that it could survive on its own. Denmark's Minister for Climate, Energy and Building stated that creating green economic growth would secure Denmark's future, and that if Danish companies take advantage of eco-friendly technology, the nation would benefit in the long run.

### United States of America (USA)

USA has also integrated renewable energy into its economy. While its energy production primarily consists of fossil fuels, the use of solar and wind power are predicted to grow. In March, for the first time in US history, wind and solar made up 10% of total electricity generation. As these resources are becoming more competitive, the private sector is pushing to implement renewable energy. Hydropower is currently the largest source of energy in USA, accounting for 25% of renewable consumption, while geothermal power is the smallest.

Renewable energy was expected to surpass coal in energy production by 2040 under the Clean Power Plan of the Obama administration. However, as these regulations are no longer in place, the US Energy Information Administration (EIA) estimated that the scenario seems very unlikely. In fact, there was a lot of uncertainty regarding the environmental actions taken by the government after the US pulled out of the Paris Climate Agreement earlier this year. One of the biggest impacts of this decision is that it

will become more difficult for the rest of the world to reach the goal of the agreement, which is to limit global average temperatures to no more than 2 degrees Celsius above the levels from the years 1850 to 1900, since the USA is an important source of finance and technology for many developing countries in their efforts to limit rising temperatures. The USA however, will still pursue efforts to address climate change; states such as California and New York will continue with their own programs to reduce emissions from power plants and vehicles. Moreover, the private sector will still shift towards cleaner energy as the utilization of natural gas and renewables will yield more long-term benefits as opposed to coal. However, the nation will be taking less action overall with regards to global warming; a recent analysis by the Rhodium Group showed that the nation's emissions will now likely fall just 15% to 19% below 2005 levels by 2025 (in 2015, the Obama administration vowed to cut emissions by 26% to 28% below 2005 levels by 2025 and so in comparison, the current projections are a significantly lower amount).

The nation is putting out plans for green energy implementation in the coming years. The Energy Department have launched an initiative under the name of SunShot in 2011, whose goal is to reduce the levelised cost of electricity generated by solar power by 50% between 2020 and 2030. The initiative supports efforts by private companies, state and local governments, and national laboratories and so far, it has been successful in multiple areas; at the end of the first quarter of 2016, there were an estimated 29.3 gigawatts of solar power installed within the nation, an amount which could power around 5.7 million average American homes. Since 2010, the average cost of solar PV panels decreased by more than 60% and in addition to that, by 2016, there were around 209,000 people employed by the solar industry.

### **United Arab Emirates (UAE)**

Being one of the world's top oil exporters, the energy sector in the UAE is solely composed of oil and natural gas. At present, the nation does not utilize any renewable energy resources and since there are large oil and gas reserves within its territory, there has been no incentive to implement them. However, rapid industrialization, growing population and increasing water desalination have increased energy consumption, and because current fossil fuel reserves will be unable to satisfy future energy demands, there has been an urgent need to utilize new sources of energy.

The UAE's commitment to the global carbon agenda has also been another reason why the development of renewable technology has become necessary. The government has set a target to reduce carbon dioxide emissions by 30% by 2030 and have 44% of its energy mix in the form of renewable energy. In June 2017, Dubai announced plans to build a 1000 megawatt solar power plant by 2030. Moreover, UAE has also announced plans to invest US \$163 billion in projects to reduce the country's dependency on fossil fuels and increase the country's share of renewables.

## Nicaragua

The Republic of Nicaragua contains fierce winds, a tropical sun and volcanoes, which makes it the perfect location for the development of green energy. In 2012, the government had invested the fifth highest percentage worldwide GDP in developing these renewable resources, according to the Renewables 2014 Global Status Report. The International Renewable Energy Agency's 2015 report stated that, from 2006 to 2012, 15% of Nicaragua's electricity came from wind, 16% from geothermal, 12% from hydropower and 7% from biomass.

Following the blackouts and electricity rationing the nation faced in 2005 due to high oil prices and dependence on imports from Venezuela, Nicaragua realised that developing green energy was of utmost importance and so it set to work doing so. The government has set a non-binding target of having 90% of its electricity generation coming from renewable resources by 2027. Developers of renewable energy within the nation get to benefit from tax breaks, including import duty, VAT and income tax exemption. This incentivizes the utilization of green energy, bringing Nicaragua closer to its target. In 2010, the government announced its plans to build the Tumarín Dam, whose completion is scheduled for 2019. The construction of the dam would increase hydroelectric power in Nicaragua and could quite possibly provide around 50% of the country's electricity. As for Nicaragua's geothermal energy industry, because investors are hesitant to invest in early stage geothermal developments (unless the government participates in explorations, for which funds are required), the Scaling Up Renewable Energy in Low Income Countries Program (SREP) is providing support to increase the confidence of investors. An increase in investments would mean that the government would be able to further develop its geothermal energy and these efforts would altogether reduce Nicaragua's dependence on fossil fuels and pave the way for a greener nation.

## International Energy Agency (IEA)

The International Energy Agency (IEA) is an intergovernmental organization based in Paris. It was founded in 1974 and initially had the objective to help countries co-ordinate a collective response to major disruptions in the supply of oil; a notable example of this was the oil crisis in 1973. Since then, the areas that the IEA work in have expanded and now it works on a variety of issues such as fossil fuel supply and demand, renewable energy technologies, electricity markets and energy efficiency. The IEA has four main areas of focus, which include: energy security (promoting the diversity, efficiency, flexibility and reliability for all fuels and energy sources); economic growth (supporting markets to boost economic growth and alleviate energy poverty); environmental awareness; and worldwide engagement (working with partner countries to find solutions to energy and environmental concerns).

There are 29 countries that are presently members of the IEA, a few of which include Denmark, Australia, Italy, Canada and USA. With regards to renewable energy, the organization provides in-depth market analysis, policy advice and technology insights to assist with the large-scale implementation of renewable energy across the electricity, heat and transport sector within countries. The IEA is also

involved with the research and analysis of clean energy technologies and looks at ways to boost demand and deployment to increase the world's share of renewable energy.

## Timeline of Events

Date	Description of event
1850s	The windmill becomes a popular water-pumping tool of western homesteaders and railroad builders.
1860	The first solar power system is developed in France to produce steam to drive machinery.
1882	The first commercial scale hydroelectric plant goes into operation in Wisconsin, USA.
1927	The first commercial wind turbines are sold to generate electricity on remote farms.
1953	The first silicon solar cell is developed at Bell Laboratories.
1970	The Geothermal Steam Act is passed by the US government to allow the leasing of federal land for geothermal energy development.
1977	The Solar Energy Research Institute is formed.
2009	The first framework for wind energy development on the US Outer Continental Shelf is announced.

## Relevant UN Treaties and Events

- Promotion of new and renewable sources of energy A/66/100
- Resolution adopted by the General Assembly on 19 December 2014 A/RES/69/225
- Resolution adopted by the General Assembly A/RES/67/215
- Sustainable development: implementation of Agenda 21, the Programme for the Further Implementation of Agenda 21 and the outcomes of the World Summit on Sustainable Development and of the United Nations Conference on Sustainable Development Promotion of new and renewable sources of energy A/69/395

- DECLARATION OF PANAMA: ENERGY FOR SUSTAINABLE DEVELOPMENT AG/DEC. 52 (XXXVII O/07)
- DECLARATION COORDINATION OF VOLUNTEERS IN THE HEMISPHERE IN RESPONSE TO NATURAL DISASTERS AND THE FIGHT AGAINST HUNGER AND POVERTY – WHITE HELMETS INITIATIVE AG/DEC. 55 (XXXVII O/07)
- NATURAL DISASTER REDUCTION, RISK MANAGEMENT, AND ASSISTANCE IN NATURAL AND OTHER DISASTER SITUATIONS AG/RES. 2314 (XXXVII O/07)
- INTER-AMERICAN MEETING ON ECONOMIC, SOCIAL, AND ENVIRONMENTAL ASPECTS RELATED TO THE AVAILABILITY OF AND ACCESS TO DRINKING WATER AG/RES. 2347 (XXXVII O/07)
- WATER, HEALTH, AND HUMAN RIGHTS AG/RES. 2349 (XXXVII O/07)
- Implementation of Agenda 21, the Programme for the Further Implementation of Agenda 21 and the outcomes of the World Summit on Sustainable Development and of the United Nations Conference on Sustainable Development A/70/472/Add.1

## Previous Attempts to solve the Issue

A recent solution dates back to *A Global Green New Deal for Climate, Energy, and Development* by the United Nations Department of Economic and Social Affairs in 2009. This solution is known as *the Global Green New Deal*. Key messages of the document includes the importance of energy in economic development and specifically renewable energy is a key element to the future without the dangers of climate change. The document recognizes renewable energy as a high price in modern economy especially in comparison to less economically developed countries. Though the price is declining, it is not in the rate that will solve the issue of climate change and thus it recognizes that public policies will catalyze the decline. The document supports the notion of triggering public and private investments to scale up renewable energy that hopes to reduce cost, improvement of technology, and knowledge in doing so. Furthermore, a cycle emission reductions, additional investment, international cooperation, economic growth, geopolitical stability, employment generation, and energy security will created in the investment and cost reduction of green energy. A global cooperation is imperative in this solution and will require global cooperation and collaboration of funded guarantees. The hope of this solution is to turn renewable energy as the default option of energy globally.

## Possible Solutions

The shift to green energy is an expensive transition as non-renewable energy supports most of the modern economy. Promoting and encouraging nations is step in reminding the world to start and preparation for the change, however, to execute the shift, the economy must be taken into consideration.

As different countries around the world have developed their economy of the years, the source of energy globally is a pressing concern as it involves all the nations. Thus, all nations must come a term or agreement in which focus in cooperation and collaboration in funding and promoting green energy. In promoting urgent measure to promote green energy, nations can focus on research in how the price of green energy can decline and potentially making its methodology possible for mass production.

Research is a key element; also, to slowly shift the entire world into green energy, a slow approach is necessary. If developed nations have the resources and the economy to fully transition, this step should be considered, as the number of nations fully dependent on green energy is directly proportional to the number of nations who have the capability to help less economically developed countries.

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