

The Need For Renewable Energy Sources

Umair Shahzad

¹Department of Electrical Engineering, Riphah International University, Faisalabad, Pakistan

Email: ¹ umairshahzada@hotmail.com

ABSTRACT

An ever growing population means an ever growing requirement for energy. Nowadays, enormity of energy cannot be denied. It is essential in every walk of life. Energy sources can be broadly classified as renewable and non renewable. Knowing the dreadful fact that nonrenewable sources will eventually deplete, the importance of renewable sources cannot be underestimated. The most important aspect while utilizing them is their impact on the environment. This paper briefly presents the importance of renewable sources of energy owing to the backdrop of fossil fuel dilemma. Major emphasis is placed on the use of alternative energy technologies. Some applications of renewable sources and future of energy is also discussed.

Keywords: Energy, renewable, non renewable, alternative energy technology, fossil fuel

1. INTRODUCTION

Renewable energy is the energy which is derived from a limitless source. Proper utilization of energy resources is a hot debate going these days. It is very essential to choose which source of energy must be used and why. Majority of factors such as cleanliness, cost, stability, efficiency and environmental effects must be taken into account. It is a bitter fact that many industries around the world are still dependent on fossil fuels for electricity generation. No doubt, these fuels are very effective as far as power production quality is concerned, but in the long run they are not advantageous. Fossil fuels will deplete one day and the industries must turn to renewable sources as soon as possible. Moreover, these fossil fuels pose a huge threat to environmental balance and are a cause of many ecological hazards.

2. FOSSIL FUEL DILEMMA

Fossil fuels are basically compounds of hydrocarbons comprising of coal, natural gas and oil. The main dilemma of fossil fuels is not the use of them but the ill side effects their usage creates. Fossil fuels are not sustainable. It means they will eventually deplete. When they are burnt, they produce large amounts of harmful gases, the most noteworthy being carbon dioxide gas. This gas is the greatest culprit in producing global warming. This global warming is continuously playing its negative part in increasing the temperature of the planet and endangering the lives of species on it. Moreover, due to these high temperatures, ice has been constantly melting at Arctic and Antarctica which is making the sea levels higher than normal. This can lead to floods and can severely affect agricultural and fishing activities.

Middle East countries have huge reserves of coal, oil and natural gas and many other countries are dependent on them for invariable supply of these fuels. Organization of the Petroleum Exporting Countries (OPEC) is a group of 12 countries which include Algeria, Angola, Ecuador, Libya, Nigeria, Venezuela and Middle East countries like Iran, Iraq, Kuwait, Qatar, Saudi Arabia and UAE. According to the Energy Information Administration (EIA), these are responsible for about 40 percent of the world's total oil production and hold the majority of the world's oil reserves.

This monopoly results in drastic worldwide price fluctuations in fossil fuels [1].

Burning of fossil fuels produce nitrogen monoxide, nitrogen dioxide, sulphur dioxide and carbon monoxide gases. These deleterious gases directly give birth to air pollution which causes smog and dilapidation of human health and plant growth. Acidic rain, majorly caused by sulphur dioxide, leads particularly to the destruction of marble monuments and crops. Coal mining has deprived land of its liveliness and has made it barren. There are various portions of land where crop cannot be grown due to this harmful side effect. Coal mining has caused many unfortunate deaths in the past. For instance, in 1942, an explosion at the Benxihu Colliery, in China, killed 1549 miners in a single day. Oil spilling has totally destroyed ecosystems. Leakage of fossil fuel often takes place, mainly when it is being transported by water. When the ship that carries these fuels sinks, the fuel will merge with the sea water that kills sea creatures. Such incidents have happened in the past. The largest oil spill to date is the Ixtoc I in Mexico. During this accident, half a million ton of crude oil dumped into the Gulf of Mexico which polluted 162 miles of U.S. beaches. In Jaipur, India, 5 people died and over 200 were injured when a fire broke out at an oil depot few years back. Similarly, natural gas causes unpleasant odors and is known to cause transportation problems. In 2013, Sinopec pipeline exploded in Shandong Province in China, taking away precious lives of 55 people. The companies of coal, oil and natural gas very well know about these serious coercions but they are constrained. They cannot do anything until renewable energy sources become more feasible as major providers of energy [2], [3].

3. IMPORTANCE OF RENEWABLE ENERGY

The most significant feature of renewable energy is its plentiful supply. It is infinite. Renewable energy sources are hygienic sources of energy that have a much lesser negative environmental impact than conventional fossil energy technologies. Most renewable energy investments are spent on materials and personnel to build and maintain the facilities, rather than on costly energy imports.

With technological advancements in mass communication, people have now become aware of the demerits of burning

fossil fuels. Renewable energy is the need of the hour. Its clean and sustainable nature has compelled the human beings to think seriously about it. Scientists and Engineers, around the world, are continuously working and researching in this domain. They are finding new ways to use these sources of energy effectively. Global warming is a huge hazard which is being caused by burning of coal, oil and natural gas. It is very harmful for the planet and the living beings on it. Moreover, fossil fuels are a cause of many unfortunate mishaps in the past as described before. To put an end to this apocalypse; we must resort to renewable sources. This is because they are cleaner and do not produce poisonous harmful gases. Moreover, fossil fuels are finite. They will certainly end one day. Therefore, before the crucial stage comes up, experts of energy sectors must maintain a positive attitude in this regard and should try their level best to replace fossils fuels with renewable energy sources as the main sources of generating electricity.

Renewable energy is dependable and copious and will potentially be very cheap, once this technology and its present infrastructure are enhanced. The major sources of renewable energy include solar, wind, biomass, geothermal, hydropower and tidal energy. Non renewable energy, such as coal, natural gas and oil, require costly explorations and potentially dangerous mining and drilling, and they will become more expensive as supplies diminish and energy demand increases. Renewable energy produces only small levels of carbon emissions and therefore, helps battle climate change caused by fossil fuel burning.

Renewable energy sector is comparatively new in most countries and this sector can attract a lot of companies to invest in it. This can create a pool of new jobs for the unemployed. Therefore, renewable energy can play a very significant role in bringing the unemployment scale down in many countries, especially the developing ones. This, in turn, will make a substantial difference to their economies. Renewable energy can make the electricity prices stable. It is because their cost is dependent only on the initial invested capital and is free of the fluctuating costs of coal, oil and natural gas.

The daily price of oil depends on various factors which also includes political stability in various regions of the globe. In the past, political discords have caused severe energy crises. Renewable energy can be locally produced and therefore, it is not vulnerable to distant political disturbances. Many of the safety concerns engulfing fossil fuels, such as explosions on oil platforms and collapsing coal mines do not exist with renewable energy. Coal, natural gas and oil reserves are restricted and veiled. An unknown and inadequate amount of each resource is buried deep underground or under the ocean. As more of these reserves are harvested, finding new sources shall become more complicated and more expensive, and utilizing them becomes tougher and sometimes risky as well. Trivial reserves, such as oil sands, require the burning of huge amounts of natural gas to process them into exploitable oil. Drilling under the ocean floor can lead to calamitous accidents, such as the famous British Petroleum Oil Spill in 2010. On the contrary, renewable energy is as effortless to find as wind or sunlight. Renewable energy is far cleaner than fossil fuels. Coal mining and petroleum exploration produce solid toxic wastes, such as mercury, lead and other heavy metals. The burning of coal to generate electricity uses large quantities of water which often discharges arsenic and lead compounds into surface waters and releases carbon dioxide, sulphur dioxide, nitrogen oxides and mercury into the air.

Gasoline and other products of petroleum cause similar pollution. These pollutants cause respiratory illnesses and death in humans, produce acid rain that devastates buildings and destroys fragile ecosystems, and deplete the ozone layer through global warming [4].

4. APPLICATIONS OF RENEWABLE ENERGY

Applications of renewable energy are broadly classified as “on-grid” and “off-grid”. A grid is basically an integration of generation, transmission and distribution system which supplies energy to several consumers. On-grid and off-grid are the terms which describe the way electricity is delivered. On-grid deals with power stations which are directly connected to grids such as wind farm and solar panels. Off-grid applications, in general, serve only one load, such as a small home or a village house. Off-grid applications can take many forms, from photovoltaic (PV) modules for an individual village home to centralized windmills to power a village water pump or a commercial battery charging facility. These off-grid applications are most generally used in remote or rural settings. A major on-grid application is to generate electricity in mass amounts [5].

The most important application of wind energy is the wind turbine. The wind turbine can convert the energy in the wind to mechanical power which, in turn, can be fed into a generator to generate large amounts of electricity. This electricity may be used to charge batteries or pump water. Wind energy can also be used in wind-powered vehicles. This can save a lot of fuel and can provide increased performance and efficiency. Similarly, solar energy can be used to power photovoltaic panels which are an excellent way of producing electricity at small scales, especially for rural and remote areas, where transmission lines cannot reach. Due to their little maintenance and high reliability, they are ideal to use in isolated and far-flung places. Offices can employ glass PV modules for reliable supply of electricity. Solar energy is also widely utilized in solar water heaters, solar calculators and solar lights. They work on the principle of storing energy from the sun during the day and utilizing it at night time. Geothermal energy is most common amongst farmers. They use this energy to heat their greenhouses which enable them to grow various fruits and vegetables all around the year. In some countries, the heat produced from this energy is also utilized to heat pedestrian walkways and bicycle lanes in order to prevent them from freezing in extreme winters. Solid biomass can be burnt in incinerators to produce heat that can be used to produce steam for electricity generation. Biomass can also be converted to biofuels like ethanol for transportation needs. A widely used application of hydropower is in a compressor. Specially designed compressors can be used for adjusting turbine blades and governor valves. They can also be used to blow out the water to eliminate the load during starting [6], [7].

5. THE FUTURE OF ENERGY

Proper use of energy is very vital in catering the need for energy demand. Experts all over the world are of the opinion to utilize renewable energy sources for power generation. Gone are the days when fuel prices were low and power companies resorted to fossil fuels for meeting energy demand. The sustainable nature of wind, hydropower, geothermal, solar and biomass highly encourage the energy supply companies to utilize them. Moreover, people can setup small solar panels over their homes to tackle their own load demands. These

sources of energy are not hazardous to the environment since they do not require any sort of mining and drilling and produce nearly no pollution. Most importantly, they are much more economical than fossil fuels and do not cause adverse mishaps.

Conservation of energy and utilizing renewable sources is the ultimate destination of energy. Many vehicles run on gasoline (which is a fossil fuel). Gasoline will deplete one day and vehicle industry must resort to some new sort of energy such as hybrid systems to continue its business. Energy can be conserved in many ways. Many a times, we take for granted the lights being switched on. When not in the room, the lights do not need to be switched on. This practice will certainly save lots of cash on electricity bill. Incandescent lamps can be replaced with Compact Fluorescent Lamps (CFLs). They consume very less power and give much more light using the same amount of current. This not only saves money, but it also conserves an energy source for others. Air conditioning and heating are responsible for a large percentage of electricity bills in various countries. Consider adjusting the thermostat of air conditioner and heater by a few degrees, but while still maintaining soothe. For example, if the heater is typically set to 71 degree Fahrenheit in the peak winter, set it to, for instance, 69 and if the air conditioner is at 73 in the peak summer, set it to, for instance, 75. Just a couple of degrees can make a considerable indentation in the amount of energy consumed while this also reduces the electricity bill.

6. THE SOLUTION

There is no hesitation in saying that people are becoming increasingly conscious of the importance of using renewable sources of energy but still a lot of work needs to be done in this domain. For instance, awareness programs must be started in various regions by local Engineers and Scientists to make people responsive of the importance of alternative energy technologies. They must also discourage them to use fossil fuels due to their evident demerits to the environment and living beings. Courses on renewable sources must be made compulsory to students at school, college and university levels in order to make them realize their significance and to increase their knowledge in this sphere. The governments should revise the power policies to cope with the energy crisis and to make full use of renewable energy sources. Innovative solutions must be brought by experts in the field to solve the energy catastrophe. Technology exchange programs must be initiated by developed countries in order to help the developing countries to establish, build and reinforce the renewable energy sector.

7. CONCLUSION

Alternative energy sources are here to stay. They have become an integral part of the energy portfolio. The objective in using renewable energy sources is to reduce the pessimistic environmental effects associated with non renewable energy sources such as coal, oil and natural gas. Choosing to use a renewable energy source will not only translate into cost savings over the long-term, but will also help protect the environment from the risks of fossil fuel emissions. Energy conservation awareness campaigns must be initiated at government level to make people aware of the importance of conserving energy. Moreover, power companies should gradually resort to the use of renewable resources as they are profuse and will never deplete. Social media can play a key role in this by educating people about energy sources and their utilization. Colleges and universities should teach a compulsory subject on energy conservation and utilization.

Given that these steps are followed accurately, the time is not far when the entire world will be reliant on renewable sources for power production because this is the definitive future of energy.

REFERENCES

- [1] "Fossil Fuels" [Online], Available at http://www.conserve-energy-future.com/disadvantages_fossilfuels.php, [Accessed 16th April 2015].
- [2] McLamb E., "Fossil fuels vs. renewable energy resources", 6th September 2011 [Online], Available at <http://www.ecology.com/2011/09/06/fossil-fuels-renewable-energy-resources/>, [Accessed 20th April 2015].
- [3] Anders CJ., "Greatest fossil fuels disasters in human history", 2010 [Online], Available at <http://io9.com/5526826/greatest-fossil-fuel-disasters-in-human-history>, [Accessed 20th April 2015].
- [4] Moll E., "Importance of renewable sources of energy" [Online], Available at <http://homeguides.sfgate.com/importance-renewable-resources-energy-79690.html>, [Accessed 17th April 2015].
- [5] "Renewable energy overview" [Online], Available at <http://www.oas.org/dsd/publications/unit/oea79e/ch05.htm>, [Accessed 17th April 2015].
- [6] "Applications for solar energy" [Online], Available at <http://www.solarpowernotes.com/solar-energy-applications.html#.VTTaAyGqqko>, [Accessed 20th April 2015].
- [7] "Sauer Compressors-hydroelectric power plant applications", 3rd April 2012 [Online], Available at <http://news.thomasnet.com/companystory/sauer-compressors-hydroelectric-power-plant-applications-613186>, [Accessed 20th April 2015].

AUTHOR'S PROFILE

Mr. Umair Shahzad was born in Faisalabad, Pakistan on 28th September, 1987. He has completed his M.Sc. Electrical Engineering Degree, with Distinction, from The University of Nottingham (U.K.) in 2012. Prior to that, he received his B.Sc. Electrical Engineering Degree from University of Engineering & Technology, Lahore (Pakistan) in 2010.

He has worked at The University of Faisalabad, Faisalabad (Pakistan) as a LECTURER for two years. During this tenure, he has taught various subjects on Control and Power Engineering to B.Sc. Electrical Engineering students. On his outstanding teaching abilities, he was presented the Best Teacher Award in 2014. His research interests mainly consist of power systems, load flow studies, renewable energy and smart grids. Presently, he is performing his duties as a LECTURER at Electrical Engineering Department, Riphah International University, Faisalabad.

Mr. Shahzad is currently a member of Pakistan Engineering Council (PEC).