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Effects of Renewable Energy Resources on the Environment

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Abstract:

The resources for the production of electricity are very important as they provide electricity in homes, building, school and industries. This electricity is also used in the every field such as agriculture, in factories and so on. In previous years, conventional methods i.e., fossil fuel and natural gases are used as the energy production. But these resources are limited now due to the continuous use of these can make the earth fuel less and these resources pollute the environment by the emission of greenhouse gases. The alternative of these conventional resource, renewable resources such as wind energy, hydropower energy, solar energy and biogas energy are used which are clean energy because they reduce the greenhouse gases effect and develop the sustainability. In spite of these advantages, these renewable energy resources have some effects on the environment. This review paper discuss about these renewable energy resources and the advantages. It also discuss about their impacts on the environment.

Keywords: *Resources, Greenhouse Gases, Sustainability*

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Introduction

In the world, various countries are rich with the energy resources. These energy resources can be present in different ways. Due to the availability of energy resources, the nation has a good wealth status. According to the energy resources, the living standards are vary from country to country. There are some countries which are rich in energy resources such as Norway has high social development with high Human Development Index (HDI) due to presence of large amount of oil. In the same way United State of America (USA) and Nigeria are also rich in oil (Didenko and Skripnuk, 2014).

In the recent time, most of the energy generation is done by the non-renewable sources that may be vanished at any time. So, there is a need to develop an alternative resources to avoid power disaster before facing critical situation. Renewable source is also called alternative energy source. It is the best solution for removing the power crises problem. Renewable energy sources contribute only 15% out the total energy generation at present in the world. Renewable resources are those sources that are able to produce energy again and again. These renewable resources include solar, wind geothermal, hydropower, biomass and marine energy. These resources are clean and exhaust able energy resources (Shahabuddin *et al.*, 2016)

1. Solar Thermal energy

It is the most abundant energy that is available in both forms: direct and indirect. The generation of this energy is by the sun that emit energy at a rate of 3.8×10^{23} kW. From this, 1.8×10^{14} kW energy is captured by the earth. This solar energy on earth utilized as thermal applications such as cooking, water heating, crop drying etc. Several types of solar cooker are available in which box type solar cooker is used worldwide (Panwar, Kaushik and Kothari, 2011).

Environmental Impact of Solar Thermal Energy

One of Solar thermal energy example is photovoltaic technique that is safe compared to some dangerous electricity generating technologies. This photovoltaic technique is noise free as well as pollution free. This device is made by the variety of chemicals and materials. According to the types of cell, amount and types of chemicals are used. Photovoltaic cell's chemicals could be released into air, surface water, and groundwater. According to U.S. EPA's toxics Release Inventory System (TRIS) most of the chemicals are not released in reportable quantity from the photovoltaic cells. But some chemicals such as 1, 1, 1-trichloroethane, acetone, ammonia, isopropyl alcohol, and methanol released in large quantity in air stack emissions. The large use of solar cell facilities depends upon the location raise the concern for land degradation and loss of habitat. Using lower quality locations such as abandoned mining land, or existing transportation and transmission corridors, the effect of solar system can be minimized (Radziemska, 2014).

2. Wind Energy

This type of energy source technology is mature, competitive and pollution free that is used in many areas of world. In the world, India is one of the most promising country for the development of wind power energy. The wind energy expansion and its installed capacity is as controlled as it play a significant role in the climate change mitigation. That's why, global climate is changed by the wind energy. These changes may occur with the climate evolution as well as negative impact such as gains and losses. The produced wind energy is converted into electricity and mechanical power by the use of wind turbines. The work of wind turbine is to convert the wind into rotational energy that is used to move a generator. Airfoil is used by the turbine blade to develop the mechanical power (Panwar, Kaushik and Kothari, 2011).

Environmental Impact of Wind Power

Modern wind turbine is made that have reduced the noise that reflects the lost energy. Infrasound and low frequency sound are present universally which are emitted from natural sources (wind and river) and artificial sources (traffic and air conditioning). Modern turbine is designed to reduce the level of infrasound and have no health risk. The risk with the wind turbine, the birds strikes with the blade of turbines and harmed (Radziemska, 2014).

3. Biomass

In renewable resources, Biomass energy is the most complex form that use a wide raw material base. The production and usage of the biomass energy location are separated. There are three different ways in which biomass energy can be exploited

- Biomass power plants
- Biogas power plants
- Biofuel (Biodiesel and bioethanol)

Environmental Impact of Biomass Energy

The principle of biomass power plant is similar to the conventional power plants. Forestry, agriculture and livestock remains are used in biomass power plant

which are burned or gasified directly. These power plant directly emit the greenhouse gases and particulate matters. Produced carbon dioxide is used for the photosynthesis reaction. The concentration of biofuels in classic fuels can reduce the emission of greenhouse gases (Vezmar *et al.*, 2014).

4. Hydropower

For the generation of electricity, the kinetic and potential energy of water is represented as hydropower. All wave energy, river flow, and tidal energy come under the hydropower. In the competition with fossil fuels, the hydropower is only renewable energy source to generate the power. The hydropower plant is used to convert the water' kinetic power into electricity (Vezmar *et al.*, 2014).

Effect of Hydroelectric Power Plants on Environment

Different types of effect are due to the hydropower plant such as climatic, hydroelectric, ecological, socio-economic and cultural effects. During the operation, water collecting part of hydroelectric power plant induced environmental effects. The vaporization of water is increased due to the large surface area of reservoir compare to the river result in the effects on climate. The rate of humidity in air is increased, change in the air movement and temperature with the change in wind and rain events (Bozkurt, 2010)

5. Geothermal Energy

The arising of hot water, vapor and gases from the depth of earth crust that have the high temperature compare to atmosphere. This energy is beneficial in the term of economics. The reinjection of waste fluid to underground due to the negative environmental effects. Geothermal power plants are the clean energy resources because of the risk free as they do not effect on ozone layer and health.

Impact of Geothermal energy on environment

The development of Geothermal energy also has the negative impacts because of the large scale constriction and drilling operation give the visual impact on the landscape in the form of noise and waste. It also affect the local economies. The issues such as air quality, water quality, waste disposal, geologic hazards, noise, biological resources and land use are created during the development of geothermal fields **(Radziemska, 2014)**.

The geothermal power plant use the fluid from the earth crust and evolve greenhouse gases such as carbon dioxide, hydrogen sulfide, methane and ammonia. These greenhouse gases produce pollution and contribute in the global warming, acidic rain and noxious smells.

Advantages of Renewable Resources

- Pollution free environment
- Eliminate greenhouse gases effect.
- Give clear energy
- Reduce the dependency on fossil fuel

Review of Literature

Bozkurt (2010) proposed that the renewable in the replacement of fossil fuel and natural gases is the best option. By the use of renewable energy resources, the dependency on foreign for the fossil fuel will be decrease. They solve the problem of pollution generated by the use of fossil fuel. According to them, these renewable resources such as wind energy, solar energy and hydroelectric energy do not have negative impact.

Shipkovs *et al.* (2011) stated that the effective use of renewable resources bring changes in the climate. These renewable energy resources help to develop the sustainability, conserving environmental quality and reduce the greenhouse gas emissions.

Panwar, Kaushik and Kothari (2011) concluded that for the industry and domestic application, major renewable resources work as gadgets. These renewable resources are solar water heaters, solar cookers, dryers, wind energy, biogas technology, biomass gasifiers, improved cookstoves and biodiesel. They studied the development and scope of the mitigation of carbon dioxide for the clean and sustainable development. Biodiesel, a renewable sources that improve the combustion and reduce the emission of hydrocarbon, carbon monoxide and particulates.

Radziemska (2014) discussed about the fossil fuel and natural gases that harms the environment, human health, wildlife, global warming and habitat loss. He also discussed about the renewable resources that are the alternative resources for the production of power with the less harm of environment.

Radosavljevic *et al.* (2014) proposed the problems of conventional resources as the high cost and continuous increasing of the carbon dioxide is reducing the reliability on non-renewable sources. In this case, the use of renewable energy resources are more effective. They reduce the consumption of fossil fuel and inhibit the production of greenhouse gases.

Vezmar *et al.* (2014) stated that the renewable energy resources are more powerful for the generation of electricity. In nest few years, these energy sources become the primary sources of energy because of the regional development and ecological dominance. They also discussed about the Croatia area in which renewable resources such as solar power, wind power, hydropower and biomass have good potential. But there are some area where these resource are out of reach. Now, ministry of economy is working to bring the geothermal energy sources in that areas.

Shahabuddin *et al.* (2016) studied on the renewable resources and concluded that they are the useful sources for the removal of effects of global warming and greenhouse gases. They discussed about the advantages of renewable sources over the conventional sources such as fossil fuel.

According to Owusu and Sarkodie (2016), the interrelation between sustainable development and renewable energy is still limited. There is no net emission of complete lifecycle of renewable energy that can help in future for the removal of global greenhouse gases. For supporting the least developed and developing countries, global opportunities should be given for the access of renewable energy, energy efficiency, and clean energy technology and research and energy infrastructure investment by the international cooperation that will reduce cost of renewable energy, eliminate barriers to energy efficiency (high discount rate) and promote new potentials towards climate change mitigation.

Conclusion

Renewable energy resources are the clean energy that are used to produce the electricity. This energy can be generated again and again by the use of this resources. These resources replace the conventional resource because of the reduction of pollution and help to maintain the sustainability development. This review paper concluded on the basis of the review of other researcher that in spite of the advantages of the renewable energy resources, they impact on the environment in negative way. So, there is a need to study the positive and negative impact of any resource before applying in the area by which the impact on environment due to these resources can be controlled.

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