

AN ALTERNATIVES OF ENERGY SOURCES : A REVIEW

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ABSTRACT

This paper presents a review of the green technologies and processes for the development of renewable energy resources. Renewable energy options show a lot of potential for fulfilling the world's energy and development demands. This promise is especially compelling in emerging nations, where many areas have yet to commit to fossil fuel supremacy. Solar photovoltaic and solar thermal technologies are especially helpful for supplying the two billion people living in rural regions with no access to grid power. Biomass energy is appealing because it makes use of locally accessible agricultural waste. Small hydroelectric resources and wind energy are also developed technologies well suited to developing countries. Renewable energy sources are significantly more cost-effective than traditional energy sources, particularly when the expenses of acquiring, maintaining, and running centralized power plants and pollution remediation costs are avoided. However, a slew of economic, societal, and legal roadblocks stand in the way of these renewable resources attaining their full potential.

Keywords: Renewable Energy Resources, Green House Effect, Solar Energy, Generations of Technologies.

I. INTRODUCTION

Alternative energy (sometimes known as renewable energy) refers to a wide range of power generation options. Electricity obtained from renewable resources such as solar or wind energy, as opposed to single-use resources such as coal or uranium, is referred to as renewable energy. Solar power, wind power, and hydropower are the most prevalent kinds of alternative energy available to homeowners today. Nonrenewable energy sources were the primary energy sources in the twentieth century. These include fossil fuels, Coal, Oil, Natural gas, Nuclear energy.

Nonrenewable energy sources have two major drawbacks: limited supply and pollution. The combustion of fossil fuels produces a large amount of carbon dioxide (CO₂), a greenhouse gas [1][2]. This is most likely the primary cause of the recent rise in global temperatures. Nuclear power facilities, on the other hand, are not harmful to the environment, but the compounds formed as a result of nuclear reactions are radioactive for years and must be stored in specific chambers. Renewable energy sources, on the other hand, are unaffected by any of these issues. The following are the most important renewable energy sources: [3][4].

Wind energy, solar energy, Bioenergy, Hydroenergy

Renewable energy sources do not pollute the environment to the same extent that non-renewable do, but they are also not fully clean. This primarily affects biomass energy, which has the same effect as fossil fuels in terms of CO₂ emissions when burned, but the carbon circle is at least closed in that case [5][6]. The expense and small volume of renewable

energy sources (water energy excluded) are the two biggest issues, of newly acquired energy. Renewable energy sources have enormous promise, but our current technological advancement prevents us from solely relying on them. The "Greenhouse Effect" is seen in this image [7][8]. The earth reflects some of the sun's reflected radiation as greenhouse gases (CO₂, N₂O, CH₄, HFC, PFC, and SF₆), and this effect is responsible for Earth's temperatures. Due to the increasing concentration of CO₂ during the last century, greenhouse effects have been strengthening over the period. As a result, the average temperature of the Earth rises globally. Ice melting, rising sea levels, agriculture impacts, and so on are all consequences of global warming [9][10]. If the greenhouse effect did not exist, the earth's temperature would be approximately 30°C lower than it is now. Wood and biomass burning, deforestation, and fossil fuel combustion are all major producers of CO₂ [11][12].

II. FORMS OF ENERGY

Energy is sometimes stored to retain power for future use and the forms of energy are non-renewable or they are not put in to use again, although energy is neither created nor destroyed or turned (Chris & Hua, 2013), rather its forms are changed. Some of the forms of energy are:

- Gravitational energy
- Kinetic energy
- Potential energy
- Nuclear energy
- Heat energy
- Electrical energy
- Chemical energy

- Electromagnetic energy
- Solar energy
- Sound energy.

Humans use different form of energy for different purposes; however, each form of energy has its own applications.

III. ALTERNATIVE SOURCES OF ENERGY

In this modern and mechanized world, there are different sources of energy, which make the humans to work in daily life. (Chris & Hua, 2013) Those sources generate different power, and force to perform different task at various activities and at different period. Those sources of energy do not always provide the type of energy humans need. Humans convert the source of energy to get the best use, and convert the energy sources to get better results. Whatever any source of energy harvests, (Daniels P. L., 2005) it results in the conversion of the source in the prescribed manner of energy required by human beings.

A. ALTERNATIVE SOURCES OF ENERGY FOR DIFFERENT ACTIVITIES

There are Alternative Sources of energy for different activities, every individual needs different type of energy to perform a task. (Chris & Hua, 2013) For example, the omnivores get energy from consumption of herbs and meat (all type); the herbivores get energy from the herbs, shrubs, plants and the trees on the other hand the carnivores get energy from the meat they consume. (David & Htwe, 2010) A car needs kinetic energy to start and run on the road. This is the combination of fuel and energy release carbon dioxide in the air, which is ultimately a chemical energy source. The reaction of uranium through the effect of radioactive rays results in nuclear energy and presents lots of nuclear energy in the air. This nuclear energy is absorbed by the turbine and ultimately results in electric energy sources. Therefore, energy changes its forms and is used by the human beings. (Bracho, 2000) An apple has potential energy to fall down on the ground and the earth processes the gravitational energy to keep people walking and talking on it.

B. TYPES OF ENERGY SOURCE

There are various types of energy source; broadly, they are classified as the renewable and the non-renewable sources of energy (Daniel, Lacouture, & Roper, 2008). For finest supply it

is mandatory to utilize energy generated from renewable sources and monitor it. [18]

The environment friendly sources of energy are those, which are offering the environment many advantages. (Graham, Roger, Benedict, & Peter, 2001) Those sources are the providing the environment the best outcome. (Chris & Hua, 2013) Humans are keen to make further innovation in the non-conventional sources of energy.

a. Air (Wind Energy)

Winds energy is a greatest source of energy. It is obtained through the turbines and the windmills; it is converted into electric energy and mechanical energy. (David & Htwe, 2010) This is a cheapest source of energy, in which huge farms are erected with the wind mills and those mills produce the wind energy through the revolving of fan in the windmills. (Makame, 2007) The energy obtained from a windmill is quite efficient it can even light one small house. There side areas are often lighted with the help of windmills farms far away from the resident (David & Htwe, 2010).

The oldest farms of windmills are in Denmark, and then up established the windmills in 2007. (David & Htwe, 2010) However, USA and China are focusing to gain the energy sources from windmills through the largest land-wind farms. They are constructing the land wind farms in the off-line sea coastlines.

b. Hydrogen Inner Earth Layers (Geothermal Energy)

(Daniel, Lacouture, & Roper, 2008) The earth is harvest with millions of natural resources by the nature. The movement of water in stream, the rivers, seas, and oceans are greatest source of energy. The surface of earth is filled almost 70 percent with water. (Moshirian, 1998) The floating and buoyancy on the land and surface of earth generates huge sources of energy. This is the source available in the ecosystem, through the Hydrogen Inner Earth Layers. (Graham, Roger, Benedict, & Peter, 2001) The layers inside the earth cooled over time, and the temperature dropped, and it became a task to sort out the mineral resources from the core of the earth. The density of the solids was more precious than the liquids. Thus, human being found the natural sources of energy in land (Moshirian, 1998).

c. Geothermal energy power plant

This type of energy is used to extract raw material from the earth. (Moshirian, 1998) The initial investment cost of this

plant is high, and the operational cost is 50 percent of the initial investment, whereas the supply of hot water is the core requirement, which gets hot itself in the plant. (Makame, 2007) The plant is effectively used in the construction projects, renovation of buildings situated on higher lands, and in replacing an old plant. The geothermal plants are frequently used for the extraction of oil, water, and mineral resources from the earth.

d. Sun (Solar Energy)

Sun is the source of energy, which is effective enough to produce large quantity of electricity. It is estimated, that one solar plant stores almost 5220 megawatts of energy, which can supply electricity to a small house for 2 days. (Makame, 2007) Photovoltaic (PV) is the power released by the sun, to produce energy. Sun is considered the greatest source of energy these days. It is the quickest source and provides high amount of energy.

e. Photovoltaic Cells

Those are the cells, which absorb the energy released by sun rays, and use the energy source for producing electricity. (Makame, 2007) They are made up of semi-conductor material and produce energy in different sources and arrays. The Photovoltaic Cells module may vary in size, and the power outcome of the cell may vary according to the requirement (Makame, 2007).

(Baizhan, Meng, & Keith, 2006) The first solar cell was made by team of professors at Oxford, which absorbed the heat energy and later on the energy from the sun and converted the energy into a useable source. Today, the use of solar cells is common to obtain energy and produce electricity.

f. World production of Solar Energy

The production of electricity through the solar cells was 47 over the entire world in 2011. The percentage has risen in total to 55 percent by March 2013. The survey made by the society of solar energy control showed that this percentage shall rise to double almost by the end of 2014. (Moshirian, 1998) Since solar energy is the cheapest source of energy.

- 63% of global solar cell production occurred in China in 2012 (Graham, Roger, Benedict, & Peter, 2001)
- 64% of global solar module production occurred in China in 2012 (Daniel, Lacouture, & Roper, 2008)
- 95% of global solar cell production occurred in Asia in 2012 (Moshirian, 1998)

- 86% of global solar module production occurred in Asia in 2012 (Makame, 2007)

g. Solar energy sources in the South Asian Countries

The South Asian countries are lacking in production of full electricity voltages in their countries to meet the requirement of their country. Countries like Pakistan and India are shortage of electric sources and they have huge load shedding each day, which results in lower productivity of the industry and the textiles. (Makame, 2007) The energy absorbed by the land through sun is 14 percent in this way a solar cell is estimated to store 3,000 EJ of energy in one year. (Mohanty, 2011) The world is moving towards the modern source of energy available to humans and making it less costly so that more and more humans can take advantage of it.

h. Cost of solar energy sources

"It costs approximately 500 USD to supply electricity to a medium village with solar lanterns, however the electricity supply to the villages costs approximately 1000 USD, (Mohanty, 2011) thus, the trend is being promoted to use solar lanterns or solar cells to provide light to the villages. In country like Pakistan, more than 25,000 people in more than 72 villages are taking the advantage of those projects (Makame, 2007).

The cost of a solar cell is estimated to be 0.04 USD per day and the estimated life span is 10 years approximately. (Daniels P. L., 2005) All a solar cell needs is the sun light to work effectively; it stores the energy, which is used later on. It has been estimated by an analysis published by Deutsche Bank that the electricity production by the solar cells shall increase to 16 GWs by 2016.

i. Biomass (Alternative fuels)

Biomass is a collective term used for the biological wastes in the earth. The garbage, dead bodies, industrial wastes, the human waste are the fertilizers, later on they are valuable form of energy. (Mohanty, 2011) This energy source is not limited by the climate or any other condition. This type of energy is stored by power engines and the generators.

❖ Biomass is growing source of energy

This dead biological material is used as fuel or as an industrial produce, this is used to burn and generate fuel, it is used in producing fibers, heat, and chemicals. (Mohanty, 2011) The biomass released by the industries contain a variety of material as well as many other species, like hemp, corn,

poplar, miscanthus, switch grass, sugarcane, willow, sorghum, as well as a variety of tree species, ranging from eucalyptus to oil palm (palm oil) (Makame, 2007). The use of biomass industry is increasing day by day as the outcome is sources of energy as well as many other products in the industry.

IV. DISADVANTAGES OF ALTERNATIVE ENERGY

Alternate energy sources have the following disadvantages:

No Constant Supply. The energy supply is dependent on nature and, thus, is not constant, e.g., solar energy. The same may be said about wind energy. Wind farms can only generate power in the countryside or other such regions where turbines can receive wind without being obstructed. The situation is better with hydroelectricity (or water energy) because once power is created at the dams, it can be extracted through wires and sent across long distances [13].

Implementation Problems This is one of the main reasons why alternative energy isn't popular. Alternative energy sources have been used by many industries. They, on the other hand, withdraw as soon as they realize it would be too expensive [14].

It is costly to use. In terms of cost, fossil fuels are less expensive to utilize than alternative energy. Fossil fuels are easily available, maybe stored anywhere, and can be transferred using standard transportation methods. Solar electricity is expensive to utilize in everyday life. The cost per KWH might range from 20 to 25 cents. **Dependant on Seasons.** Biomass is generally produced from corn, wheat, barley, and similar crops all of which are seasonal. Thus biomass can only be produced only in certain seasons. **Energy/ Hydropower:** Hydropower (water energy) often damages the surrounding environment. It has a well-known effect on fish. Many people consider hydropower plants to be an ecological blight. Damming also reduces the amount of oxygen dissolved in the water. It would be erroneous to assert that alternative energy has no drawbacks [15].

V. NON-TECHNICAL BARRIERS TO ACCEPTANCE

The main impediments to the broad commercialization of renewable energy technology are political rather than technical, and several studies have found a variety of non-technical hurdles to renewable energy use. The following are some of the most significant obstacles: Lack of government

policy support, which includes the absence of policies and regulations that assist the deployment of renewable energy technology as well as the presence of rules and regulations that both impede and encourage renewable energy development. Subsidies for fossil fuels, a lack of consumer-based renewable energy incentives, government insurance for nuclear plant accidents, and complicated renewable energy zoning and approval processes are just a few examples. Consumer awareness and information transmission are lacking. Renewable energy technologies have a greater capital cost than traditional energy systems. Inadequate funding alternatives for renewable energy projects, including project developers, entrepreneurs, and consumers having insufficient access to reasonable finance. Failing to absorb all costs of conventional energy (e.g., consequences of air pollution, the danger of supply interruption) and failure to internalize all benefits of renewable energy are examples of imperfect capital markets (e.g., cleaner air, energy security). Lack of necessary scientific, technical, and manufacturing skills required for renewable energy generation; lack of dependable installation, maintenance, and inspection services; and the inability of the educational system to give adequate training in new technologies. Codes, standards, utility connections, and net-metering rules are all lacking. Poor public perception of renewable energy system aesthetics. Lack of stakeholder/community participation and co-operation in energy choices and renewable energy projects [16] [17].

VI. CONCLUSION

As the alternative energy industry grows and refines the available technology, the cost of renewable energy will decrease, and alternative power generators will become capable of supplying more power from less wind or sun, making them more reliable as a year-round power source. Over time, as fossil fuel resources become scarcer and environmental regulations become stricter, the cost of utility-supplied electricity and fuel oil will increase. It's only a matter of time before alternative power sources present themselves as the only sensible. However, implying that fossil fuels are superior to alternative energy is incorrect. Alternative energy is becoming increasingly popular as people become more concerned about the environment. The downsides of alternative energy will gradually fade away as we adopt the

benefits more into our daily lives.

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