



GREEN ENERGY FOR A SUSTAINABLE FUTURE

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Abstract

The primary goal of developing green sources of energy is to generate power while minimizing both waste and pollution, to thereby reduce the impact of energy production on the environment. Thus green energy is an energy that is collected from resources which are naturally replenished such as sunlight, wind, rain, tides, waves, and heat. Energy can be produced from these resources without having a detrimental impact on the environment. Green energy resources exist over wide geographical areas, in contrast to other energy sources, which are concentrated in a limited number of countries. Green energy can be particularly suitable for developing countries. In rural and remote areas, transmission and distribution of energy generated from fossil fuels can be difficult and expensive. Producing green energy locally can offer a viable alternative.

Key Words: *Renewable Energy, Fossil Fuels, Sustainable Energy.*

1. INTRODUCTION

Green energy comes from natural sources such as sunlight, wind, rain, tides...etc. These energy resources are renewable, meaning they're naturally restored. In contrast to this fossil fuels take millions of years to develop and will continue to diminish over time. Green energy sources have a smaller impact on the environment than non renewable ones, which produce pollutants such as greenhouse gases as a by-product, and leads to climate change. Production of fossil fuels typically requires either mining or drilling deep into the earth in ecologically sensitive areas. Green energy, utilizes energy sources that are available all over the world. Advances in renewable energy technologies have lowered the cost of solar panels, placing the ability to produce electricity by the common man rather than those big corporate companies. Green energy can replace fossil fuels in all major areas of use such as electricity, water and space heating and fuel for motor vehicles.

2. IMPORTANCE OF GREEN ENERGY

The industrial revolution that began in the second half of the 18th century changed the world, with new methods of machine-based manufacturing leading to a profound increase in economic growth, population growth, and quality of life. At the time, the long-term consequences could not even be conceived of, much less felt; however, the burning of vast quantities of fossil fuels, such as coal and oil, has caused a great deal of harm to the environment. Most climatologists agree that the use of fossil fuels has contributed significantly to global warming. This term refers to the measured increase in the Earth's surface temperature since the late 19th century and the environmental effects of this change.

The primary goal of developing green sources of energy is to generate power while minimizing both waste and pollution, to thereby reduce the impact of energy production on the environment. Scientists who advocate the use of green energy say that using such sources will reduce the rate at which climate change occurs, although it cannot stop or reverse the temperature increase. Another important objective is creating energy sources that are renewable. This is in contrast to fossil fuel sources, which are finite and estimated to be depleted before the end of the 22nd century

3. TYPES OF GREEN ENERGY

Development of renewable and non-polluting energy sources are advancing in a fast pace, it's difficult to keep track of all types of green energy that are in development. Here presents the most common types of green energy sources.

3.1 Solar Power : Solar power is the conversion of sunlight into electricity, either directly using photovoltaic (PV), or indirectly using concentrated solar power (CSP). Concentrated solar power systems use lenses or mirrors and tracking systems to focus a large area of sunlight into a small beam. Solar energy is also used to heat buildings and water, provide natural lighting and cook food. Solar technologies have become inexpensive enough to power everything from small hand-held gadgets to entire neighbourhoods. Solar power doesn't produce any emissions and is renewable in nature. Hence it is an important source of green energy. Solar power is suitable for powering portable devices as well as homes. Many new homes take solar energy generation as part of its design concept. Popularly known as green homes. The use of solar energy in transportation is in a nascent stage. When it comes to large-scale energy production, the main disadvantage of solar technology is that solar panels and energy storage devices use a significant amount of land. This can be avoided somewhat by building on land that is not suitable for other uses.



India and France together launched an international solar alliance in Paris during the UN climate change conference in Paris on 30 November 2015 by Indian Prime Minister Narendra Modi and French President Francois Hollande. The alliance seeks to bring together 121 tropical countries in a global effort to use solar energy and move away from fossil fuels. The headquarters of the International Solar Alliance will come up on a 5-acre plot on the National Institute of Solar Energy campus in Gurgaon. India has promised Rs 175 crore for constructing the building, other infrastructure and meeting the recurring expenditure for five years.

In India the south eastern railway will use solar energy systems in selected railway stations, hospitals, office establishments and guest houses. They have been utilised for lighting, heating water, illuminating gardens. Etc. this is a great leap forward in green energy utilisation. Another example is as part of its 'solar mission' Delhi Metro Rail Corporation has installed several solar power plants in stations and depots across its vast network that generates around 2794 kilowatts currently. The powers generated by these plants are used for DMRC's operational requirements, which include station lighting and other loads.

3.2 Wind Power: The terms "wind energy" or "wind power" describe the process by which the wind is used to generate mechanical power or electricity. Wind turbines convert the kinetic energy in the wind into mechanical power.

Wind is used to generate energy with large turbines connected to a power collection, storage, and distribution system. This type of energy generation is a highly effective method of providing electricity to small, isolated communities. They are often preferred over solar-powered methods in agricultural areas, because land which contains wind turbines is more easily able to be used for other purposes. Off-shore wind farms have much higher building and maintenance costs, but they are able to harness stronger, more consistent winds.

Because the turbines are large, some people complain that they are eyesores that distract from the beauty of the environment. There is also some concern that they could harm local bird and bat populations.

The development of wind power in India began in the 1986 with first wind farms being set up in coastal areas of Maharashtra (Ratnagiri), Gujarat (Okha) and Tamil Nadu (Tuticorin) with 55 kW Vestas wind turbines. As of 31 Dec 2015 the installed capacity of wind power in India was 25,088 MW, mainly spread across South, West and North regions., the MNRE (Ministry of New and Renewable Energy) set the target for Wind Power generation capacity by the year 2022 at 60,000 MW

3.3 Hydro Energy: This technology uses the movement of water to power turbines attached to generators, and in many countries, it provides a larger proportion of energy than any other green resource. Hydropower does not produce a significant amount of waste and provides a unique environmental advantage. Many of the largest hydroelectric dams make use of a reservoir, which can serve as a location for recreational activities. The presence of a large water supply can also provide valuable support for agricultural regions. In some cases, however, damming a river and creating an artificial lake can cause damage to the environment.

India was the 6th largest producer of hydroelectric power after Norway. It produced 114 TWh and 3.5% the world total in 2008.^[1] The potential for hydroelectric power in India is one of the greatest in the world. The first hydro-electric power station in India was established in Karnataka at "shivana samudra". The present installed capacity as on July 31, 2015 is 41,997.42 MW which is 15.22% of total electricity generation in India.

3.4 Tidal Power: Tidal power, also called tidal energy, is a form of hydropower that converts the energy obtained from tides into useful forms of power, mainly electricity. Although not yet widely used, tidal power has potential for future electricity generation. Tides are more predictable than wind energy and solar power.

Tidal energy is produced through the use of tidal energy generators. These large underwater turbines are placed in areas with high tidal movements, and are designed to capture the kinetic motion of the ebbing and surging of ocean tides in order to produce electricity. Tidal power has great potential for future power and electricity generation because of the massive size of the oceans. These articles explore the potential energy of tidal power technologies.

India has a long coastline with the estuaries and gulfs where tides are strong enough to move turbines for electrical power generation. A variety of different technologies are currently under development throughout the world to harness this energy in all its forms including waves (40,000 MW), tides (9000 MW) and thermal gradients (180,000 MW). Deployment is currently limited but the sector has the potential to grow, fuelling economic growth, reduction of carbon footprint and creating jobs not only along the coasts but also inland along its supply chains.



3.5. Geothermal Energy: Geothermal energy is generated by the earth underneath its surface in the form of heat. While it is not technically a renewable source, it is sustainable more or less indefinitely, and produces only a small amount of waste in comparison to fossil fuels. Many countries use this type of energy for a portion of their requirements, but most thermal energy plants are located near tectonic plate boundaries, where the energy can be extracted more easily. The potential of geothermal energy to supply a significant portion of the world is limited by the expense of the technology it requires. Geothermal Energy is generated due to the natural decay of radioactive elements inside the earth. A temperature gradient is thus formed which results in energy release. Hot bath systems are not uncommon and have been prevalent since ancient times but such geothermal energy sources can be put to many other uses.

There is always some emissions associated with geothermal energy but they are low when compared to fossil fuels and it is thus a better option for a country like India looking to cut down its total emissions.

3.6 Nuclear Energy: Some types of nuclear energy are categorized as green because they produce very small amounts of waste. A green nuclear reactor can burn its own nuclear waste to produce energy, relying on a process called nuclear transmutation. In this process, the waste is converted into progressively lower-energy forms via further similar reactions. This means that almost all of the available energy can be extracted from thorium or uranium, the fuel sources most often used in nuclear energy plants. Scientists believe that this form of energy production is so efficient, it could provide for 100% of the earth's needs for up to five billion years.

The Government of India intends to draw twenty-five per cent of its energy from nuclear power by 2050. This plan includes 20,000 MW of installed capacity from nuclear energy by 2020, and 63,000 MW by 2032.

3.7 Biomass: It is an organic matter derived from living, or recently living organisms. Biomass can be used as a source of energy and it most often refers to plants or plant-based materials which are not used for food or feed, and are specifically called lignocellulosic biomass.

Biomass has always been an important energy source for the country considering the benefits and promises it offers. It is a carbon neutral fuel source for the generation of electricity; and apart from providing the much needed relief from power shortages; biomass power projects could generate employment in rural areas. About 32% of the total primary energy use in the country is derived from biomass and more than 70% of the country's population depends upon it for their energy needs. The Ministry of New and Renewable Energy (MNRE), Government of India has realized the potential and role of biomass energy in the Indian context and has initiated a number of programmes for the promotion of efficient biomass conversion technologies to be used in various sectors of the economy.

4. CONCLUSION

Thus green energy is an energy that is collected from resources which are naturally replenished such as sunlight, wind, rain, tides, waves, and heat. Energy can be produced from these resources without having a detrimental impact on the environment. Green energy resources exist over wide geographical areas, in contrast to other energy sources, which are concentrated in a limited number of countries. Green energy can be particularly suitable for developing countries. In rural and remote areas, transmission and distribution of energy generated from fossil fuels can be difficult and expensive. Producing green energy locally can offer a viable alternative. Green energy projects in many developing countries have demonstrated that it can directly contribute to poverty reduction by providing the energy needed for creating businesses and employment without having any adverse impact on the environment.

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