



Perspective

Renewable Options for Power Generation

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Introduction

A renewable energy source is defined as a substance from which energy released is sustainable, that is, something which is exhaustible, or is endless. 'Alternative energy' is another term used in this context. It implies sources of energy which act as an alternative to the most commonly used non-sustainable sources-like coal and petroleum. Fossil fuels are not a renewable source of energy because they are not infinite and are exhaustible. Moreover, they release various greenhouse gases such as carbon dioxide other emissions into earth's atmosphere which contributes to climate change and global warming. Climate change leads to natural disasters such as drought, crop failure, famine, earthquakes, floods, etc., and rising health risks in children and adults due to air pollution and water contamination. Currently, a large proportion of the world's population relies on fossil fuels. The fossil fuel industry is not only the leading contributor to climate change, but also it is a finite source that will be depleted.

Renewable Energy Sources

The most popular renewable energy sources currently are: Solar energy, Wind energy, Hydro energy, Tidal energy, Geothermal energy and Biomass energy

1. **Solar energy:** Sun is the source of all energy. The sun has been radiating an enormous amount of energy at the present rate for nearly 5 billion years (5×10^9 years) and will continue radiating energy at that rate for years to come. The amount of solar energy that reaches the earth's surface in one hour is more than the planet's total energy requirements for a whole year. However, the amount of solar energy that can be used varies according to the time of day and the season of the year as well as geographical location. Solar Cells or Photovoltaic cells are used for utilization of solar energy as an energy source. They are used to convert sunlight into usable energy for different sources. The benefit of using solar is the ability to install panels on roof and turn your home into clean energy source and thereby minimizing the electricity bills, adding equity to home and thus helping in reducing expenses
2. **Wind energy:** Wind is a rich source of clean energy. Wind possesses kinetic energy which can be used to generate electricity. And for this purpose, turbines are used which drive generators that produce electricity. When the fast moving wind strikes the blades of wind turbine, it starts rotating continuously. And this rotation converts kinetic energy of wind into mechanical energy, leading to production of electricity by generator. Wind turbines are very tall and

needs a lot of open space to generate electricity. Although domestic or 'off-grid' generation systems are available, not every property is suitable for a domestic wind turbine as the speed of wind is very essential in rotation of the windmills, which must be about 36-54 kmph

3. **Hydro energy:** It is one of the most commercially developed renewable energy source. A large reservoir can be used by building a dam or barrier which creates a controlled flow of water that rotates the turbine, generating electricity. Hydroelectric power implies using the energy from flowing water to generate electricity. Generally water is trapped into a reservoir which when released, rotates the turbine with its flow and powers a generator to create electricity
4. **Tidal energy:** This is another kind of energy that uses water as a source to generate electricity. In this, tidal currents are used to drive turbine generators. It converts the energy obtained from tides into useful forms of power generation. Although it is not widely used, yet it has the potential for future electricity generation as tides are more predictable than sunlight and the speed of wind
5. **Geothermal energy:** It is the heat energy from rocks that are embedded inside the earth. It can be used as a heating source in homes directly or can be used indirectly to generate electricity. Although it harnesses a great power, yet geothermal energy is of negligible importance in the many countries as compared to countries such as Iceland, as geothermal heat is much more freely available there
6. **Biomass energy:** In this type, dead remains of plants and waste products of animals are treated as a fuel to generate electricity. Biomass is defined as burning organic materials instead of wood to produce electricity, and nowadays this is a much cleaner, more energy-efficient process. Biomass generates power which is more economical and environmental friendly than other sources

The Future of Renewable Energy

Replacing fossil fuels with clean energy sources is vital for sustainable development. It is expected that the usage of renewable energy sources will increase as demand for power increases. To maintain a sustainable level of energy and for protection of our planet from climate change and global warming, expansion and innovation of renewable sources is essential. Renewable energy sources are clean and bring us cleaner, healthier water and fresh air. In comparison to fossil fuels, renewable energy sources can be harnessed sustainably over the long-term, and thus stabilizes our energy costs. These sources also help humans to become more energy independent, improves air quality, and also advances economy by creating new clean energy jobs and also reduces the amount of money sent out of country for fossil fuels. Generating electricity from clean renewable sources increases our opportunities to displace costly polluting oil and gasoline. Moreover, fossil fuels are a finite source which will be exhausted in the years to come and can have disastrous effect, clean energy has an infinite supply of power, with no dangerous emissions resulting from its use.

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