

ADVANTAGES OF RENEWABLE ENERGY: A STUDY

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ABSTRACT

The demand for energy to power our homes, businesses, and communities grows along with the global population. Maintaining a sustainable energy level and preventing climate change need innovation and expansion of renewable energy sources. The International Energy Agency (IEA) predicts that by 2024, 30 percent of the world's electricity would come from renewable sources, up from the current 26 percent share. The IEA's executive director, Fatih Birol, stated that "renewable energy is at a critical juncture right now."

KEYWORDS: Energy, Fossils, Fuel, Renewable, Sources

MADLAUDA PANIPAT

1. INTRODUCTION

Energy that is sustainable is defined as something that never runs out or is limitless, like the sun. Renewable energy sources are frequently included when the term "alternative energy" is used. It refers to energy sources that are an alternative to the most popular non-sustainable sources, such as coal.

2. SOURCES OF RENEWABLE ENERGY

Solar energy Wind energy Hydro energy Tidal energy Biomass energy

SOLAR ENERGY

One of the most plentiful and readily available energy sources on our planet is sunlight.

The quantity of solar energy that reaches the surface of the globe in a single hour exceeds the planet's whole annual energy needs. The quantity of solar energy we can utilise varies depending on the time of day, the season of the year, as well as our geographic location, despite the fact that it may seem like the ideal renewable energy source. Solar energy is becoming a more and more common alternative to complement your energy needs. Solar energy is the radiant heat and light

from the Sun that is captured by a variety of technologies, including solar architecture, solar thermal energy (including solar water heating), and solar power to produce electricity.

It is a crucial source of renewable energy, and depending on how solar energy is captured, distributed, or transformed into solar power, its technologies are often classified as passive solar or active solar. Utilizing photovoltaic systems, concentrated solar electricity, and solar water heating are examples of active solar approaches. A building's orientation toward the Sun, the use of materials with favourable thermal mass or light-dispersing qualities, and the creation of naturally ventilated rooms are all examples of passive solar approaches.

Because of how much solar energy is available, it is a very alluring source of electricity. Since 2021, solar energy has been less expensive than fossil fuels.

The International Energy Agency stated that the creation of accessible, limitless, and clean solar energy technology would have enormous long-term advantages in 2011.

WIND ENERGY

Utilizing the kinetic energy provided by moving air, wind energy is used to generate electricity. Using wind turbines or other wind energy conversion technologies, this is converted into electrical energy. Wind strikes a turbine's blades first, turning them and the turbine attached to them. By rotating a shaft that is attached to a generator, this converts kinetic energy into rotational energy, providing electrical energy via electromagnetism.

The size of the turbine and the length of its blades determine how much electricity can be generated by the wind. The output is inversely related to the rotor's size and to the square of the wind speed. Theoretically, the potential for wind power grows by a factor of eight when wind speed doubles.

The capacity of wind turbines has grown over time. In 1985, average turbines had rotor diameters of 15 metres and rated capacities of 0.05 megawatts (MW). Turbine capacities for new wind energy projects nowadays range from 2 MW onshore to 3 MW offshore.

Wind turbines that are now for sale have rotor diameters up to 164 metres and an 8 MW capacity. In 2014, the average wind turbine had a 2 MW capacity, up from 1.6 MW in 2009.

HYDRO ENERGY

Hydro power is one of the most economically established sources of renewable energy. One of the earliest and most significant types of renewable energy, hydropower or hydroelectric power harnesses the naturally occurring flow of moving water to produce electricity. Currently, 31.5 percent of all renewable electricity produced in the US and around 6.3 percent of all electricity produced in the country comes from hydropower.

A big reservoir can be utilised to create a regulated flow of water that will drive a turbine, producing power, by erecting a dam or barrier. The ability to store electricity for use during times of peak demand makes this energy source often more reliable than solar or wind power (especially if it's tidal rather than river-based). Similar to wind energy, hydro can occasionally be more cost-effective as a commercial energy source (depending on the type and compared to other sources of energy), but it can also be utilised for domestic, "off-grid," generating.

TIDAL ENERGY

This is an additional hydro energy source that powers turbine generators with twice-daily tidal currents. The rush of ocean waters that occurs during tidal rise and fall is known as tidal energy.

Even though tidal flow isn't constant, unlike some other hydro energy sources, it is very predictable and may therefore make up for times when the tide current is weak.

Compared to the wind and the sun, tides are easier to anticipate. Tidal energy is one of the renewable energy sources that has historically been limited in availability due to its relatively high cost and lack of places with high enough tidal ranges or flow velocities.

However, there have been a lot of recent technological advancements, both in terms of design (such as dynamic tidal power and tidal lagoons) and turbine technology

GEOHERMAL ENERGY

Heat from the earth is known as geothermal energy. The Greek words *geo* (earth) and *therme* are the source of the word geothermal (heat). Due to the ongoing production of heat deep inside the ground, geothermal energy is a renewable energy source. Geothermal energy is used to produce electricity, heat buildings, and provide hot water to people. Geothermal energy can be utilised to directly heat homes or to generate power by utilising the natural heat that exists beneath the earth's surface. Geothermal energy is of minor importance in the UK compared to nations like Iceland, where geothermal heat is considerably more freely available, despite the fact that it harnesses a power that is just beneath our feet.

BIOMASS ENERGY

In this process, solid fuel created from plant resources is transformed into electricity. Although the core of biomass is the burning of organic materials to create electricity, this process is now more cleaner and more energy-efficient. Biomass creates power at a significantly lower financial and environmental cost by turning home, industrial, and agricultural waste into solid, liquid, and gas fuel.

3. NON RENEWABLE ENERGY SOURCES

Due to their finite supply, fossil fuels are not a renewable source of energy. They also contribute to climate change and global warming by releasing carbon dioxide into the atmosphere. Although using wood instead of coal is a little better, it is complicated. On the one hand, wood is a renewable resource if it originates from forests that are sustainably managed. Making wood pellets and compressed briquettes out of waste from the wood processing sector could be considered waste recycling. More energy is produced by compressed biomass fuels than by burning logs. On the other hand, burning wood (whether it be unprocessed wood or garbage) causes particles to be released into the atmosphere.

4. ADVANTAGES OF RENEWABLE ENERGY SOURCE

The benefits of utilising renewable energy in a residential environment are compelling. Producing energy from fossil fuels with no greenhouse gas emissions while lowering some forms of air pollution.

Increasing energy supply diversity and decreasing reliance on imported fuels. fostering economic growth and employment in manufacturing, installation, and other fields.

Clean, secure, and effective.

There are numerous ways to produce renewable energy that provides your nation with energy independence creates jobs for your neighbourhood. not dependent on the main power grid. stable prices. can enjoy both the summer and the winter inside. Money is made via saving.

minimising carbon footprint: Carbon dioxide and other dangerous pollutants are not released into the atmosphere while using green, renewable energy sources. Around 1.5 to 2 tonnes of carbon dioxide could be saved annually by a conventional solar PV installation.

5. CONCLUSION

By 2020, solar PV could supply up to 5% of the world's energy needs, and by 2030, that percentage could reach 9%. 95 percent of the energy we require can be obtained from renewable sources by 2050. By 2050, according to Waterhouse Cooper, Africa might be entirely powered by renewable energy.

The cost of solar PV panels has decreased by 99% during the past 40 years. According to a US research, renewable energy generates three times as many jobs as fossil fuels.

Investment in renewable energy now exceeds that in fossil fuels. The market for renewable energy in the world is now worth more than \$250 billion.

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