

# Importance of Renewable Energy

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**Abstract** – For its energy needs, a major portion of the world relies heavily on oil, gaseous gasoline, and coal. These abilities draw on a large number of assets that will eventually deplete, making them either prohibitively expensive or environmentally harmful to recover. This article discusses the points of attraction and drawbacks of renewable energy sources, as a result, based on the advantages of various energy assets, such as the use of renewable energy sources rather than fossil fuels. Renewable energy can provide two-thirds of world energy demand while also contributing to the reduction of greenhouse gas emissions.

**Key Words:** Sustainable Energy, Biomass, Solar Energy

## 1. INTRODUCTION

As the price of fossil fuels fluctuates, renewable energy is fast gaining relevance as a source of energy. It is consequently vital for engineering and technology students to grasp and appreciate the technologies related to renewable energy at the educational level. The proper utilization of energy assets is currently a major topic of debate. It is critical to decide which source of energy should be used and why. A wide range of factors, such as tidiness, cost, solidity, effectiveness, and environmental implications, should be examined. Many businesses all around the world are still using petroleum derivatives for electricity generation. These powers are most likely effective when all factors are considered, but they are not advantageous in the long run. Petroleum derivatives will run out one day, and enterprises should switch to inexhaustible sources as soon as possible. Furthermore, these petroleum derivatives pose a significant threat to natural equilibrium and are the source of some biological hazards. The use of renewable energy is increased by 3% in 2020 as demand for other fuels declines. Solar energy is one of the most widely used renewable energy sources.

In the year 2021, four main climate change indicators, greenhouse gas concentrations, sea-level rise, ocean heat, and ocean acidification, all set new highs. This is another indication that human activities are generating global-scale changes on land, in the ocean, and in the atmosphere, with far-reaching and long-term consequences. The key to

resolving this catastrophe is to reduce our reliance on fossil-fuel-based energy, which is the primary cause of climate change."The good news is that the lifeline is right in front of us," UN Secretary-General Antonio Guterres says, pointing out that renewable energy sources such as wind and solar are currently available and, in most cases, cheaper than coal and other fossil fuels.

World interest in energy is projected to beyond twofold by 2050 and to dramatically multiply by the century's end. Steady upgrades in existing energy organizations won't be sufficient to supply this interest in a manageable manner. Tracking down adequate supplies of clean energy for what's in store is quite possibly society's most overwhelming test.

## 2. History

Energy is the most basic and universal unit of measurement for all types of human and natural work. It is, first and foremost, a gift from nature to humans in diverse ways. The amount of energy consumed is directly proportional to the amount of energy produced. There is mankind's advancement as the world's population continues to expand, advancement in humanity's level of existence, The globalization of developing nations' industrialization very day, the demand for energy grows. The most important fossil fuel is a source of energy, but it is limited .large-scale environmental issues and fossil fuel resources deterioration brought on by their extensive usage, in particular, strongly influenced by global warming, urban air pollution, and acid rain argues that non-conventional, renewal and innovation can be harnessed.

The process of generating electric energy from other types of energy is known as electricity generation. During the 1820 and early 1830s, the basic concepts of electricity generation were found by the British scientist Michael Faraday. His fundamental method is still in use today. Electricity is a source of energy produced by the movement of a wire loop or a disc of metal copper sandwiched between the magnet's poles. Generation of electricity is mostly done at the power stations by electrochemical generators, which are primarily powered by heat engines powered by chemical combustion or nuclear fission.

### 3. Impact of Conventional Energy

The environmental impact of burning fossil fuels has been profound and nothing short of disastrous, meriting its own report. However, at this point, a brief examination of the subject is required. Conventional fuels, such as coal and, to a lesser extent, oil, are largely to blame for the deterioration of the Earth's protective envelope-the atmosphere. We are now paying the price for the previous century's uncontrolled industrialization and material progress. The term "global warming" has come to mean the degradation of the Earth's environment. Because of the 'greenhouse effect,' global temperatures have risen significantly. Pollutants released into the atmosphere by vehicle emissions, industrial wastes, and other sources, which become concentrated in the upper atmosphere, trap heat within the envelope, causing temperatures to rise with potentially disastrous consequences. The population's health has also suffered as a result of the degradation of the living environment. Hydroelectric power is the only convenient source of renewable and environmentally friendly energy. However, large river valley projects are encountering difficulties due to the vast tracts of land required for these projects and the imbalance they create in the region's ecology. Furthermore, the question of resettling the displaced population is never satisfactorily addressed to the satisfaction of all parties involved. The time has come to consider renewable and environmentally friendly alternatives to existing power sources, which will lead us to a secure and self-sufficient future. Buildings have been responsible for a significant portion of environmental degradation, contributing significantly to effects such as ozone depletion, global warming, and acid rain. Understanding how buildings affect the environment is critical in order to create designs that are more environmentally friendly while also looking for energy-efficient solutions.

### 4. Objective

This paper examines the benefits and drawbacks of a few common sustainable power sources: hydropower, solar power, wind power, geothermal force, and biomass. Ideally, after reading this survey article, people will have a better understanding of sustainable energy sources.

### 5. Types of Renewable Energy

- Solar Energy
- Wind Energy
- Hydro Energy
- Tidal Energy
- Biomass Energy
- Geothermal Energy

### 5.1 Solar Energy

Daylight gives by a long shot the biggest of all carbon-unbiased energy sources. More energy from daylight strikes the Earth in 60 minutes ( $4.3 \times 10^{20}$  J) than all the energy consumed in the world in a year ( $4.1 \times 10^{20}$  J). We presently exploit this sunlight-based asset through sun-oriented power a\$7.5 billion industry developing at a pace of 35-40% per annum and sun-powered got fuel from biomass, which gives the essential energy source to north of a billion group.

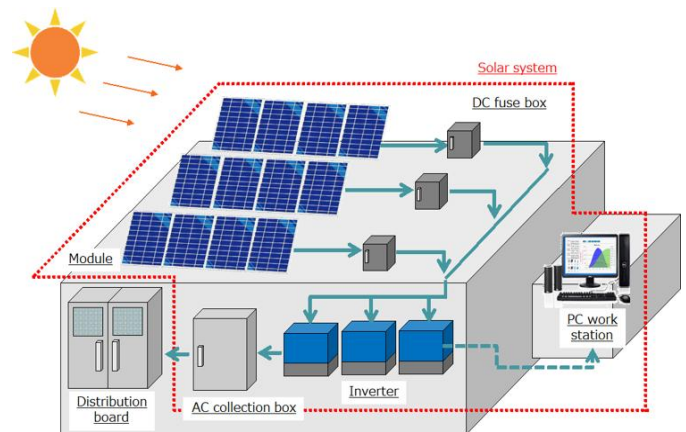


Fig-1: Solar Energy System

On our globe, sun-oriented force is the most abundant and unbounded resource. Despite this abundance, just 0.04 percent of the basic energy needed by people is generated directly by solar energy because installing a photovoltaic (PV) panel is more expensive than using petroleum derivatives. In order to manage a generator that generates electricity, concentrating sun-oriented force uses the heat from the sun to supply steam. Additionally having low operating costs and excellent efficiency, this can produce a significant amount of energy by utilizing heated capacity. Solar energy does not pollute the environment, does not produce ozone-depleting compounds like oil-based energy does, and does not produce waste that needs to be disposed of, as thermal energy does. It is also calmer to construct and tackle, which significantly reduces the turmoil pollution needed to convert energy into a useful structure. It is also calmer to construct and tackle, which significantly reduces the turmoil pollution needed to convert energy to a useful structure.

### 5.2 Hydro Power

The hydroelectric energy source is an ideal and environmentally friendly energy source. Given the financial, specialized, and environmental benefits of hydropower, most nations advocate for its implementation. China, for example, has the most extravagant hydro assets on the planet, with a total hypothetical hydropower capability of 694GW. Developing hydropower is critical to alleviating the energy crisis and natural pollution caused by China's and

other countries' rapid economic development in the twenty-first century.

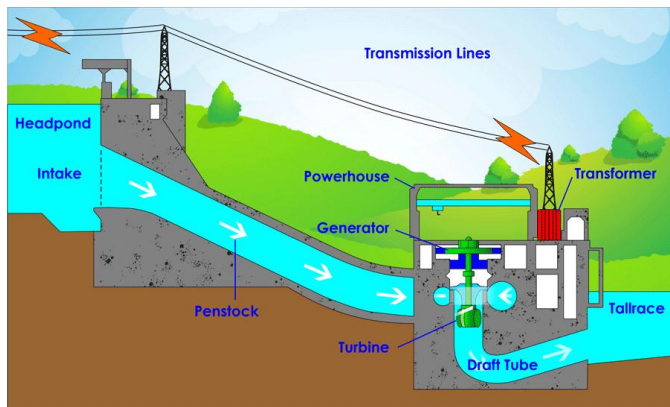


Fig -2: Hydro Power Plant

Hydropower is produced by channeling the mechanical energy of flowing water through a funnel called a penstock, which then turns into a generator to produce power. Furthermore, hydropower has no negative side effects such as corrosive rain and ozone-depleting substances. Hydropower has several drawbacks, including high startup costs for businesses, reliance on precipitation (no control over the amount of water available), adjustments to stream patterns (which can affect fish, plants, and natural life by changing stream levels, stream examples, and temperature), the entanglement of land and untamed life environment (formation of the repository), and relocating residents of the supply region.

### 5.3 Wind Energy

The cycle of the wind energy source is really simple. The active energy (movement) of the wind is converted into mechanical energy by a breeze turbine and used to generate electricity. The energy is handled by a generator, transformed into electrical energy, and then handled into a lattice to be transmitted to a force station. Wind energy has many places of focus, just like other renewable energy sources. By using turbines, which produce energy and power when propelled by the breeze and can lower power prices, it reduces ozone-harming material emissions. The only thing the turbines require to function is wind, which is just air moving normally, and the air is everywhere. Wind energy connotes a cost-free, easily accessible source of energy that won't degrade even if we use it. We are recommended to use this asset's benefits because they will only help to improve and clean up our reality. It will also promote domestic development for various reasons. The construction of the turbines with local resources benefits the local economy first.

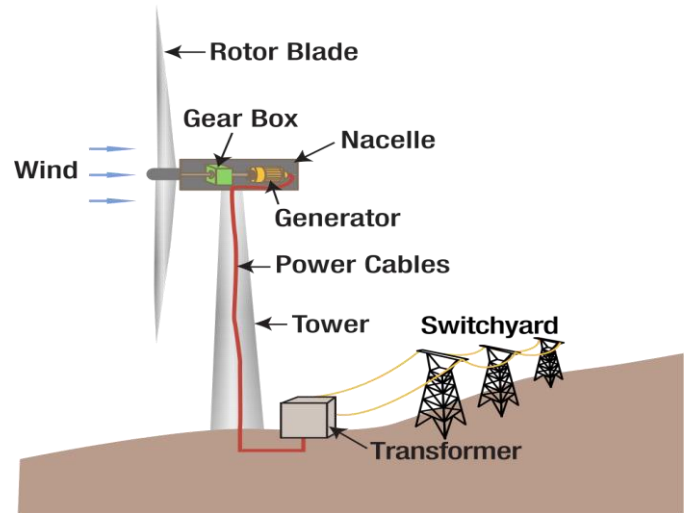


Fig-3 : Wind Energy System

Second, the development and improvement of the innovation predict a high expected return, and expansions in speculative activity increase the nation's GDP.

### 5.4 Biomass Energy

People have used biomass energy, or bio-energy, to the fullest extent possible! Although other sources of biomass can also be used, wood is still the largest biomass energy resource available today. Food crops, lush, woody plants, buildups from farming or ranger work, oil-rich green growth, and the natural byproduct of civil and modern wastes are all included in this. In fact, even landfill methane seepage can be used as a source of biomass fuel. The use of biomass energy might potentially greatly reduce ozone-damaging substance outflows, dependence on foreign oil, and landfills, and lastly supports local farming and backcountry product enterprises. The three main biomass feedstocks for energy are city waste, paper plant waste, and ambulatory plant trash. The most popular feedstocks used in biomass power plants nowadays are soybean oil and maize grain (for ethanol and biodiesel, respectively). Long-term plans include cultivating and using dedicated energy crops, such as swiftly growing trees, grasses, and green vegetation. If one chooses not to select biomass for the production of biomass energy from the following list, even with all of its benefits, biomass could harm the climate:

1. Energy plants that don't compete with food plants for land.
2. Remains of the crop, such as maize stover or wheat straw.
3. Reasonably harvested timber and forest deposits.

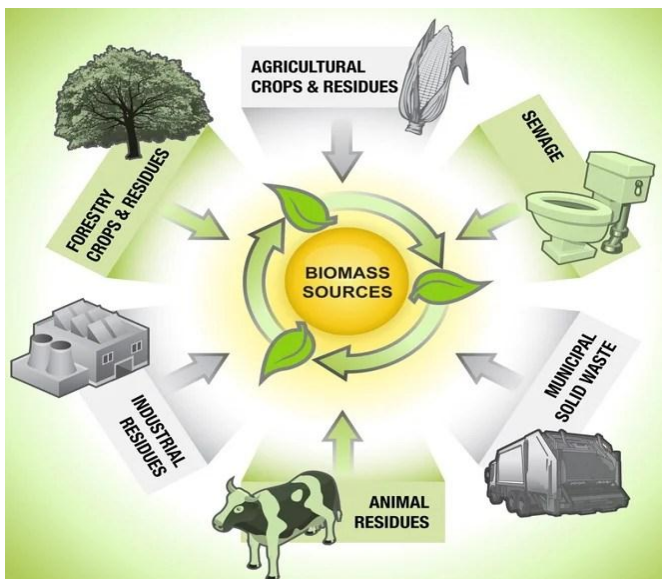


Fig-4 : Biomass Energy Sources

The beneficial utilization of biomass can also be seen as a part of the earth's carbon cycle, which is the continuous cycling of carbon from the atmosphere into plants and then into soils and the atmosphere through plant rot. There are a few drawbacks to biomass energy in addition to all of its positives. For instance, compared to petroleum derivatives, biomass energy is a poor source of energy (ethanol versus fuel).

## 6. Effects Of Renewable Energies

It is evident that scientists face a challenging problem in trying to convince the public to refocus their attention on sustainable energies and overlook the convenience of working with and controlling non-renewable energy sources continuously. Having said that, I can say with absolute certainty that all that is required to awaken people to the problems associated with non-renewable energy sources is to provide them with some factual information about health issues as well as an ecological catastrophe from some of the major large urban communities all over the world! In order to encourage people to use sustainable energy sources, we also need to create an environment where doing so is rewarding (charge incentive). The price of oil fluctuates daily based on a variety of factors that also take into account political stability in various parts of the world. Political divisions have in the past led to severe energy catastrophes. Green power can be generated privately, and as a result, it is not defenceless against axing political irritants. Environmentally friendly power eliminates a large portion of the security issues that plague petroleum goods, such as explosions on oil platforms and collapsing coal mine shafts. Holds for coal, gaseous gasoline, and oil are restricted and concealed. Oil sands are a minor store that needs to be converted into usable oil by using enormous amounts of petroleum gas. Exploring the ocean's depths can result in

catastrophic accidents, such as the well-known British Petroleum Oil Spill in 2010.

## 7. Future Of Sustainable Power

When cooking, efficient energy use is essential to meet the need for energy. Experts from all across the world believe that using sustainable power hotspots will usher in a new era of energy. The time when gasoline was inexpensive and military organizations relied on petroleum derivatives to meet their energy needs is long gone. The energy supply companies are especially inspired to employ wind, hydropower, geothermal, solar, and biomass since they make sense. Additionally, anyone can set up little solar-powered boards above their homes to handle their own stack requests. A clear goal of energy is the preservation of energy and the use of sustainable sources. Many vehicles are fuel-powered (which is a petroleum product). Gas will eventually run out. Additionally, the car industry should rely on a novel source of energy, such as hybrid frameworks, to continue operating. There are several ways to conserve energy. We frequently misjudge how much light is being switched on. The lights shouldn't be on when no one is present in the room. This training will undoubtedly save you a tonne of money on utility costs. Compact fluorescent lamps can replace brilliant lighting (CFLs). In several countries, cooling and heating account for a significant portion of electricity bills.

## 8. Conclusion

It is crucial that we minimize risk while distributing and depleting the world's resources. The current mismanagement and depletion of the world's resources is due to the use of petroleum gas and nonrenewable energy sources combined with an increasing global population.

The effects on the climate are crippling and endanger the ability of the earth to be managed. It is concerning how we have been consuming petroleum derivatives, but what is even more concerning is how non-renewable energy sources have been used more frequently during the past few years.

The amount of oil being saved globally is decreasing, and the current over-reliance on oil and fossil fuels for energy production contributes to the release of pollutants that destroy the ozone layer. Due to the dire consequences of poisons entering the environment, including a rise in global temperatures, it is crucial that we use non-depletable, eco-friendly fuel sources in our daily lives in order to protect the world.

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