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RENEWABLE SOURCES OF ENERGY: MERITS AND DEMERITS

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ABSTRACT

Energy demand is continuously increasing. Energy is one of the importantneeds of society. Natural energy resources are materials or things that people use from the earth. Theseenergy sources are divided in renewableand nonrenewableenergy sources. Renewable sources are free and abundant in nature on the other hand nonrenewable sources are limited and also to sustain life on earth. Nonrenewable sources causes pollution and hence degrade the environment.As the nonrenewable sources are limited on the earth the utilization of renewable energy sources has become inevitable. Renewable energy is derived from natural process that can be replenished. Depending on the sources of energy renewable energy sources are derived in various types. This paper deals with the Merits and Demeritsof renewable and nonrenewable energy sources.

Keywords: Natural energy resources, Renewable, Non-renewable,Meritsand Demerits Comparative study.

INTRODUCTION

Energy is an essential part of our life. It improves the socioeconomic standard of society. Humans are using different types of energy and energy resources since from the stone and cave edge. [1]. A survey states that India is a significant consumer of energy resources. India's demand of energy is continuously increasing[2]. Electrical power and heat generation is the major contributor of CO_2 of atmosphere [3]. Therefore it becomes essential to switch the energy resource. Energy resources are of two types, renewable i.e. non-conventional and non-renewable i.e. conventional energy sources. Nonrenewable resources are physically or economically finite and this implies special concern about their consumption and recycling. whereas renewable resources are abundant in nature and free of cost. In a seminal paper, Nordhaus, W. estimates that available nonrenewable resource is sufficient to continue consumption for hundreds of thousands of years. Researcher also states that prohibitively high extraction costs make a very large share of mineral deposits not recoverable. Yet no any systematic treatment is available [4]. Thus the gap between supply and energy is continuously increasing. Now daysfor bridging this gap nonconventional energy sourceare

Solar energy
Wind energy
Tidal energy

Solar energy: Solar Energy is the most readily available source of energy. The sun radiates energy uniformly in all directions in the form of electromagnetic waves. It is clean, inexhaustible, abundant and universally available source of renewable energy. World Energy Assessment found that the annual potential of solar energy was 1,575–49,837 exajoules(EJ). This is several times larger than the total world energy consumption, which was 559.8 EJ in 2012. Most solar installations would be in China and India. In 2017, solar power provided 1.7% of total worldwide electricity production, growing at 35% per annum.The Earth receives 174 petawatts (PW) of incoming solar radiation (insolation) at the upper atmosphere. Approximately 30% is reflected back to used. Nonconventional energy is a clean source of energy. Optimal use of these resources minimize environmental imbalance as well as produce low secondary products [5]. To increase the use of nonconventional energy sources it is essential to boost the efforts for development and promotion of renewable energy sources [6].Most of the researcher shows the calculation of demand of energy, supply of energy, conservation of energy, comparative study of energy sources [7, 8, 9]. A study shows that the use of renewable sources affect the environment. It also disturbs the wild life [10]. Here is a survey of renewable and nonrenewable sources of energy.

Renewable sources are the best option for the energy consumption.These sources are clean source of energy and reduce the greenhouse emission. It alsoreduces impacts of environmental and human health. Many schemes are promoted for the use of renewable sources. .

Renewable sources of energy: Renewable i.e. non-conventional sources of energy are those sources which produced continuously in nature and will never be exhausted. These sources are free and easy to access.

Types

Geothermal energy
Biomass energy
Nuclear energy

space while the rest is absorbed by clouds, oceans and land masses. Solar energy is used by various natural effects and appears in nature in some other forms of energy.

Wind energy:Wind energy systems convert kinetic energy to more useful forms of power. A windmill is a structure that converts wind power into rotational energy by means of blades. Wind energy systems for irrigation and milling have been in use since ancient times and since the beginning of the 20th century it is being used to generate electric power. Windmills for water pumping have been installed in many countries particularly in the rural areas. It has been used for hundreds of years for sailing, grinding grain, and for irrigation.

Tidal energy: Tidal power or tidal energy is the form of hydropower that converts the energy obtained from tides into useful forms of power, mainly electricity i.e. the energy in the flowing water can be used to produce electricity. Tidal power is taken from the Earth's oceanic tides. Tidal forces are periodic variations in gravitational attraction exerted by celestial bodies. This power is the only technology that draws on energy inherent in the orbital characteristics of the Earth–Moon system. Because the Earth's tides are ultimately due to gravitational interaction with the Moon and Sun and the Earth's rotation.

Geothermal energy: Geothermal energy is thermal energy generated and stored in the Earth. The geothermal energy of the

Earth's crust originates from the original formation of the planet and from radioactive decay of materials and continual heat loss from Earth's formation [11]. This energy originates from the earth's interior in the form of heat. Volcanoes, geysers, hot springs and boiling mud pots are visible evidences of the great reservoirs of heat that lie in the earth.

Biomass energy: Biomass is general term for living material like plants, animals, fungi, algae, bacteria. Earths biomass represents an enormous store of energy. Biomass is a renewable energy resource derived from the carbonaceous waste of various human and natural activities. It is derived from numerous sources, including the by-product from the timber industry, agricultural crops, raw material from the forest, major parts of household waste and wood. Technically, it was discovered back in our cave-dwellings dayswhen we realized that wood could burn.

Nuclear energy:Nuclear energyreleases through nuclear reactions.Thisis most frequently used in steam turbines to produce electricity in a nuclear power plant. Nuclear power can be obtained from nuclear fission, nuclear decay and nuclear fusion reactions. Presently, the vast majority of electricity from nuclear power is produced by nuclear fission of uranium and plutonium. Civilian nuclear power supplied 2,563 terawatt hours (TWh) of electricity in 2018, equivalent to about 10% of global electricity generation.

Merits and demerits of renewable sources of energy

Merits

- These are renewable energy sources.
- It is environment friendly energy and doesn't produce greenhouse gases.
- Renewable energy technologies require less overall maintenance than generators that use traditional fuel sources.
- Reduced dependence on foreign oil and fossil fuels.
- Energy doesn't require any kind of fuel to run.
- Federal grants, tax incentives, and rebate programs are available to help with initial costs.

Demerits

Energy consumption in India

- High initial costs for material and installation.
- Needs lots of space as efficiency is not 100% yet.
- Can't work in all locations.
- Many of these resources aren't available 24/7, year-round.
- There's a high need for energy storage and it is expensive.
- In some cases transmission of energy is expensive.
- Wind mill or tidal energy plant may disrupt the wild or aquatic life.

Comparison between Renewableand Non-renewable Resources

Renewable Resources	Non-renewable Resources
Inexhaustible sources of energy.	Limited sources of energy
It is free of cost.	This is not free of cost.
Eco-friendly i.e. carbon emission is low.	Non eco- Friendly i.e. carbon emission is high.
It can be used again and again throughout its life.	These sources are limited so cannot be used again and again
Requires large land area for the installation of the power plant.	Requires less land area for the installation of the power plant.
The maintenance cost is very high.	The maintenance cost is low.
Heat energy produced is less.	Heat energy produced is high.
Transmission cost is high.	Transmission cost is comparatively very less.

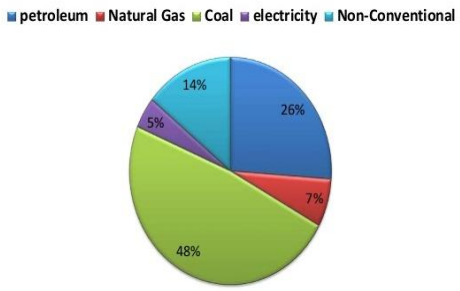

Fig. 1 Consumption of energy in India

The survey shows that coal is most commonly used energy source in India. Only 14% renewable sources are used in India.

CONCLUSION

The renewable sources are abundant in nature. Many schemes arepromoted by government to increase the use of renewable sources. This will help to sustain the energy resource and save environment.

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