

Renewable energy sources – Natural resource management

¹P. Raghava Rao, ²N. Narasimha Rao, ³B. J.R.S.N. Swamy, ⁴A. Chitti Babu & ⁵Kumara Raja Kandula

^{1,2,3}Department of Physics, Krishna University Dr. MRAR PG Centre, Nuzvid - 521201 (India)

^{4,5}St.Martins Engineering College, Dhulapally, Secunderabad-500100 (India)

1. Introduction

The renewable energy supply is continuously increasing. A large amount of investment has been made during recent years and the advancement of technology has enabled countries to produce renewable energy more cost effectively. It is forecasted that the number of countries producing above 100 megawatts (MW) of renewable energy. Due to some negative and irreversible externalities coming with conventional energy production, it is necessary to promote and develop renewable energy supply technologies. These technologies may not be comparable with conventional fuels in terms of production cost, but they could be comparable if we consider their associated externalities, such as their environmental and social effects. Also, it should be noted that economies of scale could play a key role in reducing the unit production cost. Transmission and distribution costs, as well as technologies, do not differ much among the conventional and renewable energies. Below we present facts about the development of the main renewable energy supply technologies.

2. Different Types of Energy

(A) Solar Energy

Every day, the sun radiates (sends out) an enormous amount of energy called solar energy. It radiates more energy in one day than the world uses in one year. This energy comes from within the sun itself. Like most stars, the sun is a big gas ball made up mostly of hydrogen and helium gas. The sun makes energy in its inner core in a process called nuclear fusion. Only a small part of the visible radiant energy (light) that the sun emits into space ever reaches the Earth, but that is more than enough to supply all our energy needs. Every hour enough solar energy reaches the Earth to supply our nation's energy needs for a year! Solar energy is considered a renewable energy source due to this fact. The amount of solar energy an area receives depends on the time of day, the season of the year, the cloudiness of the sky, and how close you are to the Earth's Equator. A solar collector is one way to capture sunlight and change it into usable heat energy. A closed car on a sunny day is like a solar collector. As sunlight passes through the car's windows, it is absorbed by the seat covers, walls, and floor of the car. The absorbed light changes into heat. The car's windows let light in, but they don't let all the heat out. A closed car can get very hot! Space heating means heating the space inside a building. Today, many homes use solar energy for space heating. A passive solar home is designed to let in as much sunlight as possible. It is like a big solar collector. Solar energy can be used to heat water. Heating water for bathing, dishwashing, and clothes washing is the second largest home energy cost. Installing a solar water heater can reduce your water heating bill by as much as 50

percent. Solar cells are made up of silicon, the same substance that makes up stands. Silicon is the second most common substance on Earth. Solar cells can supply energy to anything that is powered by batteries or electric power. Solar energy has great potential for the future. Solar energy is free, and its supplies are unlimited. It does not pollute or otherwise damage the environment. It cannot be controlled by any one nation or industry. If we can improve the technology to harness the sun's enormous power, we may never face energy shortages again.

(B) Wind Energy

Wind is simple air in motion. It is caused by the uneven heating of the earth's surface by the sun. Since the earth's surface is made of very different types of land and water, it absorbs the sun's heat at different rates. During the day, the air above the land heats up more quickly than the air over water. The warm air over the land expands and rises, and the heavier, cooler air rushes in to take its place, creating winds. At night, the winds are reversed because the air cools more rapidly over land than over water. In the same way, the large atmospheric winds that circle the earth are created because the land near the earth's equator is heated more by the sun than the land near the North and South Poles. Today, wind energy is mainly used to generate electricity. Wind is called a renewable energy source because the wind will blow as long as the sun shines.

Fundamental equation of wind power
Wind power depends up on Amount of air (volume), speed of air (velocity), mass of air (density)

$$\text{Kinetic energy (KE)} = \frac{1}{2} m v^2$$

$$\text{Power is KE per unit (P)} = \frac{1}{2} m v^2$$

$$\text{Mass flow rate (dm/dt)} = \rho A V$$

$$\text{Therefore } P = \frac{1}{2} \rho A V^3$$

(C) Bio Mass Energy

Biomass is any organic matter—wood, crops, seaweed, animal wastes—that can be used as an energy source. Biomass is probably our oldest source of energy after the sun. For thousands of years, people have burned wood to heat their homes and cook their food. Biomass gets its energy from the sun. All organic matter contains stored energy from the sun. During a process called photosynthesis, sunlight gives plants the energy they need to convert water and carbon dioxide into oxygen and sugars. These sugars, called carbohydrates, supply plants and the animals that eat plants with energy. Foods rich in carbohydrates are a good source of energy for the human body.

Biomass is a renewable energy source because its supplies are not limited. We can always grow trees and crops, and waste will always exist.

Types of Biomass

We use several types of biomass today, including wood, agricultural products, solid waste, landfill gas and biogas, and biofuels. The uses for alcohol fuels, like ethanol.

i. Wood

Most biomass used today is home grown energy. Wood—logs, chips, bark, and sawdust—accounts for about 42 percent of biomass energy. But any organic matter can produce biomass energy. Other biomass sources can include agricultural waste products like fruit pits and corncobs.

ii. Solid Waste

Burning trash turns waste into a usable form of energy. One ton (2,000 pounds) of garbage contains about as much heat energy as 500 pounds of coal. Garbage is not all biomass; perhaps half of its energy content comes from plastics, which are made from petroleum and natural gas.

iii. Landfill Gas and Biogas

Bacteria and fungi are not picky eaters. They eat dead plants and animals, causing them to rot or decay. A fungus on a rotting log is converting cellulose to sugars to feed itself. Although this process is slowed in a landfill, a substance called methane gas is still produced as the waste decays.

Use of Biomass

A little less than 42 percent of the biomass used today comes from burning wood and wood scraps such as saw dust. About 48 percent is from biofuels, principally ethanol, that are used as a gasoline additive. The rest comes from crops, garbage, and landfill gas. Industry is the biggest user of biomass. Over 48 percent of biomass is used by industry. Electric utilities use almost 11 percent of biomass for power generation. In turn, biomass produces 1.55 percent of the electricity we use.

Biomass and the Environment

Environmentally, biomass has some advantages over fossil fuels such as coal and petroleum. Biomass contains little sulfur and nitrogen, so it does not produce the pollutants that can cause acid rain. Burning biomass releases carbon dioxide, but growing plants for use as biomass fuels may also help keep carbon dioxide levels balanced. Plants remove carbon dioxide—a greenhouse gas—from the atmosphere when they grow.

References

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3. Discussions

In this paper discussion with simple way to explain different types of energies and also uses in the society, to effect the nature. The number of ways possible The solar collector is the heart of a SWH, and its performance is strongly affected by variation of its constructional and operating parameters. Among various types of solar collectors, flat-plate type is the world's most widely used collector because of simpler technology, lower price and easier maintenance. An optimization of the flat-plate collector will have influence on improving the performance of the SWH [1].Badescu [2] presented optimal operation strategies for energy gain maximization in open loop thermal solar energy collection systems. They used the water mass flow rate in the collectors as the control parameter, and found that the optimum mass flow rate increases near sunrise and sunset and by increasing the fluid inlet temperature. The results also show that during warm season, the optimum mass flow rate is well correlated with the global solar radiation. The power produced by wind turbine depends on number of factors such as wind speed, height of the wind turbine, air density, geographical location of the wind turbine, texture of the land over which wind turbine is installed, and number of other factors [3]. Ocean energy comes from a number of sources. In addition to tidal energy, there's the energy of the ocean's waves, which are driven by both the tides and the winds. The sun also warms the surface of the ocean more than the ocean depths, creating a temperature difference that can be used as an energy source. All these forms of ocean energy can be used to produce electricity [4].The another advantage using renewable resources is that they are distributed over a wide geographical area, ensuring that developing regions have access to electricity generation at a stable cost for the long-term future. The sun's heat also drives the winds, whose energy, is captured with wind turbines. Then, the winds and the sun's heat cause water to evaporate. When this water vapor turns into rain or snow and flows downhill into rivers or streams, its energy can be captured using hydroelectric power. The concept of energy can also be used to combine and compare all flows of energy according to their quantity and quality. Unlike energy, energy is always destroyed during conversions because of the irreversible nature of energy conversion process [5].

4. Conclusion

The renewable sources are cost effective, user-friendly, so that they can easily beat the fossil fuels. By promoting renewable energy sources we can avoid, Air pollution, soil pollution and water pollution. Country's Economy will increase. Throughout the year these sources are available without affecting the Environment.

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