

COMPARATIVE STUDY ON EFFECTIVE USE OF DIFFERENT TYPES OF ENERGY RESOURCES AND THEIR ROLE IN A REVIEW REPORT

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ABSTRACT

Energy is integrated into every aspect of human activity. In fact, the energy sector has played a vital role in the industrial and economic development. In growing industrialization have come major improvements in the standards of living. There were 0.6 billion people in 1700, double this number by 1850 and double again by 1950. World population today (2004) exceeds 6 billion and is still increasing by about 80 million per year. Today concerns about impacts extend to global ecosystem. The major global concerns related to poverty and human health, societal disturbances driven by economic collapses or major inequities, availability of water of acceptable quality. The present concerns about global climate change are most closely linked to the energy sector because of our increasing demand for energy and for energy – intensive goods services. This paper provides different types of energy resources and their role in details. Energy sources, in general include fossil fuel, Nuclear power, Bio – mass energy, thermal energy, Hydropower, Solar energy, Wave and wind energy. All these sources are available for generating energy but each one has its own limitations. Not all of them are available all through the year. There are problems that are perennial. These various energy sources are not competitive with each other but are complementary to each other.

KEYWORDS: Fossil Fuel, Nuclear Power, Bio – Mass, Thermal Energy, Hydropower, Solar Energy, Wind and Wave Energy.

FOSSIL FUEL

Fossil Fuel is a fuel (such as coal, oil, or natural gas) that is formed in the earth from dead plants or animals. In India coal resources known as fossil fuels are not going to last long. Even in Arabian Countries, fossil – fuel is fastly depleting. India cannot indefinitely import petrol and gas from Gulf countries. Hence it has become imperative that India should exploit renewable energy like solar, wind and nuclear fission and fusion.

In the World of Electricity Generation

Coal contributes to	39%
Oil Energy	10%
Gas Energy	15%
Nuclear Energy	16%
Hydel Energy	20%

NUCLEAR POWER

A form of energy produced by an atomic reaction, capable of producing an alternativesource of electrical power to those that are supplied by coal, gas, or oil. Nuclear power is stated to be comparatively cheaper than all other sources of energy. Nuclear fission was discovered in 1939. During the Second World War (1939 – 45) it was used by the USA for weapon production. In 1944, Homi Bhaba returned from the United Kingdom

and envisaged for nuclear energy programme for India. The plan of the Government of India is to generate 20,000 Megawatt of nuclear power by the year 2020, which means 6 to 7% of the total power generation in the country. But at present what India generates is 4000 to 4600 MW of nuclear power. This amounts to 2 to 3% of the total power generation.

What stands in the way of the expansion of nuclear power generation is its proneness to explosion. In such an eventuality, radiological contamination will be rampant. Hence there is nervousness about the safety of nuclear installation that remains. But there is no doubt about the attractiveness and convenience of nuclear technology when used with ease and safety. Some countries have valued it for cost – effective energy supply and for reducing imports of other fuels. Hence a problem – free operational record for the existing power plants is essential to gain a wider social acceptance.

Even though nuclear powers are shortly opposed in India, European countries such as Germany and France continue to generate electricity through the nuclear plants. France is one of the World’s leading exporters of nuclear technology. It has got fifty eight reactors.

The future use of nuclear weapons poses another important problem. In case of future global wars, the nuclear holocaust will be tremendously incalculable and

highly dangerous. We must hope that mankind will be sufficiently sensible to avoid such wars and to limit the number of states having nuclear military capabilities.

BIO MASS

Biomass is a renewable energy source from living or recently living plant and animal materials which can be used as fuel. Sources of energy are few and far between in bio-mass. It is defined as all living plant matter as well as organic wastes derived from plants, humans, marine life and animals. Trees, grasses, animal dung, as well as sewage, garbage, wood construction residues and other components of municipal solid waste are all examples of bio – mass. Long back, in the world all over the use of bio – mass was outpaced by that of coal and also by oil and gas. But still, even in developing countries, biomass remains an important energy source for heating and cooking especially in indoor spaces.

In some countries biomass accounts for a higher percentage of the total energy consumption. Its benefits include an opportunity for management of municipal, individual and agricultural waste. But however, a setback and challenge for increasing the energy from bio – mass is the economic disadvantage of bio-mass compared to nuclear and fossil sources.

THERMAL ENERGY

Thermal energy is the energy that is generated and measured by heat. Thermal means rotating or caused by heat on by changes of temperature. Thermal power is generated by heating water with the help of coal or lignite which are otherwise known as fossil – fuel. It is a substance that releases energy by a chemical reaction. The storage and burning of fossil – fuels pose considerable safety and environmental risks. Ten thousand tons of coal or lignite is necessary to generate thousand megawatt of thermal power. Such a heavy burning of coal pollutes the atmosphere with carbon dioxide. Notwithstanding its eco – unfriendliness, fossil fuels are needed to sustain economic progress now and for the foreseeable future. Hence they will continue to play a significant and dominant role in the supply of energy.

HYDRO POWER

Hydroelectricity is the term referring to electricity generated by hydropower; the production of electrical power through the use of the gravitational

force of falling or flowing water. Hydro power is a renewable energy resource exploited from the stored energy in water that falls from a higher to a lower elevation because of the gravitational force of the earth. This hydro energy is converted into electricity by flowing water through turbines to provide rotating shaft work which turns an electric generator.

One estimate is that Hydro power is about 25% of the total electricity produced in India. This hydropower is not only renewable but also emission – free resource. It reduces our dependence on depletable fossil fuels and mitigates the emission of green house gasses. The major setback to the source of hydro power is scanty rainfall and poor flow of work in rivers.

SOLAR ENERGY

“Solar power is the conversion of energy from sunlight into electricity, either directly using photovoltaic (PV), or indirectly using concentrated solar power.” Solar energy has been utilized for domestic use in heating and cooking in ancient days. Technologies for solar energy capture have been actively pursued for over a century with adequate engineering know – how and analysis developed during the last fifty years. The Government of India envisages 20,000MW of solar power by 2022. To reach this target, solar energy installations have to go up. But the capital costs of solar energy systems are high relative to fossil fuels. But efforts are being made to lower manufacturing costs. Research and Development support for solar power is likely to bring down the cost and it is meant to serve the energy needs of the Country in a better ways.

WIND ENERGY

“Wind power is the use of air flow through wind turbines to mechanical power generators for electric power.” Exploiting energy from the wind dates back to the pre – Christian era. Until the 19th Century, wind mills were functioning in the rural parts of Europe. The wind – driven Buddhist prayer – wheels were in function even in the 4th century B.C. The entry of steam power in the late 18th century and gasoline and electric motors in the late 19th century ended the early wind power era.

When demand for energy is growing, the Wind Sector is felt essential in India. Until the year 2012, there were wind energy installations that produced a total of 16,084 MW of electricity. According to a press note of

the Indian Wind Power Association, of the 47 million units of energy consumed in Tamil Nadu in 2011, 8744 million units were from wind. One drawback in exploiting wind energy is that the quality and velocity of the wind is neither consistent nor exactly predictable. Selected locations alone have winds that are sufficiently strong and steady to be amenable for exploitation.

WAVE POWER

“Power obtained by harnessing the energy produced by waves at sea”. Wave power is still in experimental stage. Wave power has great potential as a power source. The transport of energy by wind waves and the capture of energy is meant to do useful work. A single unit is in function in the coastal area of Vizhingam, the fishing harbor in Kerala State. Wave power is yet to be made use of.

DEFINITIONS IN GENERAL

Sustainable development means the ability of humanity to ensure that it meets the needs of the present age without compromising the ability of future generations to meet their own needs. (Brundtland, 1987). Biophysical sustainability means maintaining or improving the integrity of the life-support system of earth (Fuwa, 1995).

Sustainability means preservation of productive capacity for the foreseeable future. (Solow, 1992). Sustainability includes a participatory process that creates and pursues a vision of community that makes prudent use all its resources – natural, human, human – created, social, cultural, scientific, etc. (Viedeman, 1997).

Daly (1990) has proposed three operational principles of sustainable development, as follows. For a renewable resource: the sustainable rate of use can be no greater than the rate of generation.

For a nonrenewable resource: the sustainable rate of use can be no greater than the rate at which a renewable resource, used sustainably, can be substituted for it. For a pollutant: the sustainable rate of emission can be no greater than the rate at which the pollutant can be recycled, absorbed, or rendered harmless by the environment.

When we focus on the world from the perspective of energy supply and use, we need to keep all these issues in mind. Some will be more applicable in certain circumstances than others. However, in many

countries, the concern about future energy use that receives most attention from politicians and the media is the potential of present and future fissile fuel utilization to cause changes in global climate that could, in turn, give rise to adverse regional impacts including sea level rise, shifts in rainfall patterns, modification of agricultural and natural crops and species, and change in ocean circulation.

Informative comparisons of different forms of energy are more challenging than converting energy units. From a sustainability perspective, the quality of various types of energy is determined by scientific, technological, economic and environmental factors as well as inputs such as user preferences and behavior.

CONCLUSION

When all that is said and done the most essential thing is awareness among the public that they must conserve energy and use it only to meet essential needs.

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