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A Study on Non-Conventional Energy Resource in India

Velanganni.R
Assistant Professor of Management Studies
Bharath Institute of Science and Technology,
Selaiyur, Chennai, Tamil Nadu 600 073

ABSTRACT

The sources of energy which are exhaustible and being produced continuously in nature are called non-conventional energy or renewable sources of energy. The consumption of energy is proportional to the progress of the mankind. Till date primary source of energy is fossil fuel reserve and large scale environmental degradation caused by their widespread use, air pollution, acid rain, global warming also there is a fear that they will get exhausted eventually from the earth. The development and progress of mankind are closely related to energy sources, many countries throughout the world have engaged themselves in searching and developing non-conventional energy sources that would be very essential to sustain the life cycle of human being. This paper will try to explore about that to examine the non-conventional energy or renewable energy in India and to analysis the non-conventional/renewable energy systems provision for new residential, commercial and industrial buildings.

1. INTRODUCTION

Energy is the major input to drive the life cycle and improve it. Energy consumption is closely related to the progress of the mankind. In future, improvement in the living standard of the mankind, industrialization of the developing countries and the global demand for energy will increase with the every growing population. The development of infrastructure plays a significant role to sustain economic growth. The power sector is one of the major significant constituents of infrastructure. Despite fossil fuels are the primary source of energy, its finiteness of reserves and large scale environmental degradation resulted from their widespread use, specifically global warming, urban air pollution and acid rain. Capacity of body to do work is known as Energy, there are two forms of Energy they are

- Conventional source of energy.
- Non-conventional source of energy

2. OBJECTIVES

- To examines the non-conventional energy or renewable Source of energy in India.
- To explore the non-conventional/renewable energy systems provision for new residential, commercial and industrial buildings.

CONVENTIONAL AND NON-CONVENTIONAL SOURCE OF ENERGY

The conventional sources of energy are generally non-renewable sources of energy, which are being used since a long time. These sources of energy are being used extensively in such a way that their known reserves have been depleted to a great extent. Conventional energy sources include fossil fuel energy (coal, petroleum, natural gas), nuclear energy etc. Since, the main focus of this

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paper deals with non-conventional energy sources, are that kind of energy sources which are essentially infinite. Examples of Non-Conventional include wind power, solar power, biomass energy, geothermal energy, tidal power and hydroelectric power. The non- conventional sources are available free of cost and are pollution-free.

TYPES AND STATUS OF NON-CONVENTIONAL SOURCE OF ENERGY

SOLAR ENERGY

Solar energy has the greatest potential of all the sources of non-conventional energy. This energy keeps the temperature of the earth above than in colder space, causes current in the atmosphere and in ocean, causes the water cycle and generate photosynthesis in plants. Electricity can be produced from the solar energy by photovoltaic solar cells, which convert the solar energy directly to electricity. The most significant applications of photovoltaic cell in India are the energization of pump sets for irrigation, drinking water supply and rural electrification. In July 2009, India unveiled a $19 billion plan to produce 20 GW of solar power by 2020.

WIND ENERGY

Wind energy is an indirect source of solar energy conversion which can be utilized to run windmill, turn drives a generator to produce electricity. Wind can also be used to provide mechanical power such as for water pumping. The wind power program is the fastest growing Non-Conventional energy program [in India] and is almost entirely coming through private sector investments. In India high wind speeds are obtainable in coastal areas of Tamil Nadu, Saurashtra, western Rajasthan and some parts of central India. Energy of wind can be economically used for the generation of electrical energy. The estimate of total wind –generated capacity in India to be at least 20000 MW, reportedly, a total capacity of 17353 MW wind power has been established up to March 2012.

BIOMASS ENERGY

Bio-energy, in the form of biogas, which is derived from biomass, is expected to become one of the key energy resources for global sustainable development. Biomass is a renewable energy resource derived from the carbonaceous waste of various human and natural activities. Biomass is produced in nature through photosynthesis achieved by solar energy conversion. The technologies being promoted include combustion, gasification and cogeneration, either for power in captive or grid connected modes, or for heat applications. In India is very rich in biomass and has a potential of 16881MW in agro-residues, 5000MW in bagasse cogeneration and 2700MW energy recovery from waste.

GEOTHERMAL ENERGY

This is the energy, which lies embedded within the molten core of earth. The steam and the hot water come naturally to the surface of the earth in some locations of the earth. It is a common knowledge that the earth‟s interior is made of a hot fluid called „magma‟. The two ways of electric power production from geothermal energy has been suggested. In one of this, heat energy is transferred to a working fluid which operates the power cycle. In the other, the hot geothermal water and or steam is used to operate the turbines directly. In India identified about 340 geothermal

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hot springs, the rough estimate on GSI Studies indicates that energy generation potential is 10000MW. These springs are perennial and their surface temperatures range from 37C – 90C which is suitable for direct heat application and reservoir temperature 102C-260C.

HYDRO ENERGY

Hydropower is considered to be a renewable energy source because it uses the continuous flow of water without using up the water resource. The potential energy of falling water, captured and converted to mechanical energy by waterwheels, powered the start of the industrial revolution. Hydropower from many kinds of watermills has been used as a renewable energy source for irrigation and the operation of various mechanical devices. The report estimated that power generation in the country from small and hydel is about 15000MW fron 5718MW. So far 837 small hydropower projects aggregating to 3163MW in January 2013 and 3000MW in 13th plan period.

TIDAL ENERGY

Tidal energy is a renewable energy source. Among sources of renewable energy, tidal power has traditional. There are currently three different ways to get tidal energy: tidal streams, barrages, and tidal lagoons. Tidal energy generators, turbines are placed in tidal streams. A tidal stream is a fast-flowing body of water created by tides. A turbine is a machine that takes energy from a flow of fluid. That fluid can be air (wind) or liquid (water). Because water is much denser than air, tidal energy is more powerful than wind energy. India has a long coast line of about 7500 km. the maximum tidal range of 11m and 8m with average tidal range of 6.77m and 5.23m respectively. The identified estimated potential is of the order of 8200 MW with about 7000 MW in the Gulf of Cambay, about 1200 MW in the Gulf of Kuchchh in the State of Gujarat and about 100 MW in the Gangetic Delta in the Sunderbans region in the State of West Bengal.

NON-CONVENTIONAL ENERGY/ RENEWABLE ENERGY

To overcome the deficit of energy from the non-conventional energy resources. Non-conventional energy (especially solar and wind) could enhance India's energy security and represent a bright spot in its economic and environmental future. Supplying almost 100 per cent of Indi's energy demand through the use of clean renewable energy from solar, wind, hydro and biogas, etc. by 2050 is technically and economically feasible. But, a number of political barriers must be overcome.

3. CONCLUSION

India is the only country that has an exclusive Ministry for New and Non-Conventional Energy Sources. India possesses the largest decentralised solar energy programme, the second largest biogas and improved stove programmes, and the fifth largest wind power programme in the world. The uses of non- conventional/ renewable energy could help to conserve foreign exchange and generate local employment. The renewable energy has low energy density and more or less there is no pollution or ecological balance problem. It is compulsory to install solar water heating systems for all urban residential, commercial and industrial buildings for better and efficient use in India and other developing countries. Restricting the uses of large battery energy storage systems and promoting use of bio fuels in vehicles in India and other developing countries.

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