CHAPTER I

INTRODUCTION

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Today, energy is the primary input for almost all economic activities and has become vital for improvement in the quality of life. Infact, the whole infrastructure rests upon energy. There is a wide disparity in energy consumption in developed and industrialized countries and developing countries. About 2 billion people, one third of global population living in developing countries, lack access to adequate energy supplies. On the other hand, industrialized nations, with only 25 percent of global population, account for 70 percent of the commercial energy consumption. India, with 16 percent of world's population, accounts for just 3 percent of the total energy consumption. Economic growth, increasing prosperity and urbanization, rise in per capita consumption, and spread of energy access are the key factors that would be responsible for substantially increasing the total demand for electricity. Thus there is an emerging energy supply-demand imbalance. To cope with this increasing demand, efforts are being made to develop new approaches in conventional and non-conventional energy sources and new measures of energy conservation. In this paper attempt has been made to assess the Indian scenario of energy resources.

Energy can be defined in a number of ways. In the broad sense, energy means the capacity of something – a person, an animal, or a physical system (machine) – to do work and produce change. It can be used to describe someone doing energetic things such as running, talking, and acting in a lively and vigorous way. It is used in science to do describe the part of the market where energy itself is harnessed and sold to consumers. Today, energy is the primary input for almost all economic activities and has become vital for improvement in the quality of life. Infact, the whole infrastructure rests upon energy. The energy consumption of a nation now-a-days is usually considered as an index of its development. About 24 percent of energy consumed globally, is used for transportation, 40percent for industries, 30 percent for domestic and commercial purposes and the rest 6 percent for other uses including agriculture. There is a wide disparity in energy consumption in developed and industrialized countries and developing countries. About 2 billion people, one third of global population living in developing countries, lack access to adequate energy supplies. Three billion people depend upon fuel wood, coal, charcoal, dung and kerosene etc. for cooking and heating. On the other hand, industrialized nations, with only 25 percent of global population, account for 70 percent of the commercial energy consumption. India, with 16 percent of world's population, accounts for just3 percent of

the total energy consumption. For a 100 units consumed by an American citizen for transportation, a Japanese consumes 30 units and an Indian consumes only 2 units. The case is more or less similar with other developmental activities. India is an agriculture country. Majority of its population lives in village and uses wood, agricultural wastes, livestock dung etc. as energy source. In urban areas, in industries, transportation, telecommunication, domestic establishment etc., the energy consumed is derived from oil, coal, natural gas, hydroelectricity or nuclear power. The industries claim a large share (about 38.5 percent) of the total energy followed by transportation (about 31.2 percent), domestic establishment (about 13.7 percent) and the rest in agriculture. Share of various energy sources in the commercial consumption of energy in India mostly comes from the coal (about 56 percent) and petroleum (about 32 percent). The other sources are hydroelectric, nuclear power, natural gas etc. Economic growth, increasing prosperity and urbanization, rise in per capita consumption, and spread of energy access are the key factors that would be responsible for substantially increasing the total demand for electricity. Thus there is an emerging energy supply-demand imbalance. According to Central Electricity Authority (CEA) report, the anticipated energy and peaking shortage in the country was estimated to be 10.3 percent and 12.9 percent, respectively, in 2011 and 2012

The modern civilization is much dependent on energy availability but the energy resources, mainly oil, coal, natural gas and hydroelectric power are becoming scarce and costlier.The prices of oil, the most common source of energy, are going very high. To cope with everincreasing demand, efforts are being made to develop new approaches in conventional and non-conventional energy sources and new measures of energy conservation

2. Energy Resources

Like other natural resources, energy resources are also renewable as well as non-renewable.

A) Renewable Energy Resources:

Renewable energy resources are mostly biomass-based and are available in unlimited amount in nature since these can be renewed (i.e. regenerated in natural process) over relatively short period of time. Renewable energy sources are inexhaustible, i.e. they can be replaced after we use them and can produce energy again and again. These include, firewood (or fuel

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wood)obtained from forest, petro plants, plant biomass (as agricultural wastes like biogases), animal dung, solar energy, wind energy, water energy (hydro-electrical, ocean wave and tidal energy),and geothermal energy etc. These can reproduce themselves in nature and can be harvested continuously through a sustained proper planning and management.

- The resources which are yet in the process of development over the past few years. It includes solar, wind, tidal, biogas, and biomass, geothermal.
- They are inexhaustible.
- They are generally pollution free.
- Less expensive due to local use and easy to maintain

B) Non-renewable (Exhaustible)

Energy Resources:

Non-renewable energy resources are available in limited amount and develop over a longer period of time. As a result of unlimited use, they are likely to be exhausted one day. These include various fossil fuels including petroleum products, coal and natural gas and nuclear energy. Nuclear energy is mainly obtained from the nuclear fission of the uranium and thorium. The global resources of fossil fuel and uranium and thorium are limited and will be eventually be depleted. Moreover, use of fossil fuels for energy has negative environmental consequences, such as air pollution, global warming, acid rains and oil spills. Thus, it has been become essential to minimize the use of fossil fuels and to replace them with renewable resources. Energy sources are also classified as Conventional and Non-conventional sources.

- The sources of energy which have been in use for a long time, e.g., coal, petroleum, natural gas and water power.
- They are exhaust able except water.
- They cause pollution when used, as they emit smoke and ash.

- They are very expensive to be maintained, stored and transmitted as they are carried over long distance through transmission grid and lines.

Energy Sources

Conventional Sources	Non-Conventional Sources
Coal	Solar energy
Oil and Natural Gas	Wind energy
Thermal power	Ocean (Tidal) energy (Water)
Firewood (Fuelwood)	Wave energy (Water)
Hydropower	Geothermal energy
Nuclear (Nuke) energy	Bioenergy (Biomass)

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. At the same time it is becoming increasingly difficult to discover and exploit their new deposits. It is envisaged at known deposits of petroleum in our country will get exhausted by the few decades and coal reserves are expected to last for another hundred years. Along with the coal, petroleum and natural gas, electricity is conventional source of energy, which is playing a barometer of a nation's economic well-being. Availability of abundant electricity means unrestricted growth of industries, transport and agriculture. Depending upon raw material used, various types of electricity are hydroelectricity, thermal electricity (steam, gas, oil) and nuclear electricity

Keeping in view, the growing energy needs, use of non-conventional energy sources,

over conventional should be promoted. A brief account of the various conventional and non-conventional sources of energy with special reference to Indian scenario is presented as follow.