

ENERGY RESOURCES IN INDIA

Energy Resources

We need energy in different forms for all our daily activities. The conventional sources of energy include firewood, cattle dung cakes, minerals like coal, petroleum and natural gas, and electricity generated by flowing water or burning fuel.

The non-conventional sources of energy include solar energy, wind energy, tidal energy, geothermal energy, atomic energy and biogas. Firewood and cattle dung cakes are the primary sources of energy, meeting around 70% of the total energy requirement in our villages.

The intense heat and pressure over millions of years has turned prehistoric plant material buried under the earth into coal. The variety of coal depends on how long the plant material has been buried, at what depth and under how much pressure. Peat is a low carbon variety that has high moisture and provides low heat output. Lignite is a soft, low-grade variety of coal that has high moisture content and appears brownish in colour.

Bituminous coal is formed from plant material buried deep in the earth and subjected to very high temperature. Bituminous coal is the most important commercial variety of coal used in metallurgical applications like smelting of iron. The best and the most expensive variety of coal is called anthracite.

In India, coal is found as Gondwana deposits that are over 200 million years old, and tertiary deposits that are just about 55 million years old. The Gondwana deposits in India are found in the Damodar valley in West Bengal and Jharkhand and the Mahanadi, Godavari, Son and Wardha valleys. Tertiary deposits of coal are found in the north-eastern states of Assam, Meghalaya, Arunachal Pradesh and Nagaland.

Coal is bulky and expensive to transport in large quantities so, most power plants and heavy industries relying on coal are located near coal fields. Petroleum provides fuels like petrol and diesel, industrial lubricants and raw material for a number of industries including textiles, fertilisers and cosmetics.

Petroleum deposits are found in anticlines and fault traps in rock formations. Off-shore oil fields in Mumbai High account for 63% of the total petroleum production in India. This is followed by 18% of the production coming from Gujarat and 16% from Assam. Ankaleshwar in Gujarat, and Digboi, Naharkatiya and Moran-Hugrijan in Assam are other major oil fields in India. Assam is the oldest oil-producing state in India.

Natural gas is a mixture of gases, primarily methane, which is found trapped in rocks. Natural gas is used as auto fuel (CNG), to generate electricity and in the fertiliser industry. Large deposits of natural gas have been found in the Krishna-Godavari basin, Mumbai High, the Gulf of Cambay and the Andaman and Nicobar Islands.

The natural gas fields in Mumbai High and Bassein are linked to the power and fertiliser plants in western and northern India by the 1700-kilometre long Hazira-Vijaipur-Jagdishpur or HVJ Natural Gas Pipeline.

Electricity and Non-Conventional Sources of Energy

The electricity generated by the energy of flowing water is called hydroelectricity which is a renewable resource of energy. Large hydropower plants like Bhakra Nangal, Damodar Valley Corporation and Kopili are called multi-purpose river projects.

Electricity generated from the heat of burning fuel minerals like coal, petroleum and natural gas is called thermal electricity and hence is produced using non-renewable fossil fuels. India has over 310 thermal power plants. Nuclear or atomic energy is also used to generate electricity.

India currently has 6 operational nuclear power plants in Uttar Pradesh, Maharashtra, Karnataka, Rajasthan, Tamil Nadu and Gujarat. The increasing prices, shortage in supply and environmental concerns against using fossil fuels can severely affect our energy security.

The answer to the problem of energy security lies in using non-conventional sources of energy like solar energy, wind energy, biogas, tidal energy and geothermal energy. The secret of using

solar power lies in photovoltaic technology. This technology uses panels made of photovoltaic cells that trap solar energy and convert it into electricity.

The use of solar energy in rural India can reduce dependence on firewood and cattle dung cakes. Wind turbines convert the energy of the blowing wind into electricity. The largest wind farm in India is in Tamil Nadu, spread from Nagercoil to Madurai. Animal, human and farm waste produce biogas on decomposition, which is a better fuel than kerosene, cattle dung cakes, firewood and coal. Biogas plants that operate on animal waste are called gobar gas plants in India.

Oceanic tides are used to generate electricity called tidal energy. The National Hydropower Corporation has set

up a 900 megawatt tidal energy plant in the Gulf of Kutch that provides excellent conditions for harnessing tidal energy. The heat trapped in the depths of the earth is called geothermal energy. Experimental projects to utilise geothermal energy have been set up at the Parvati Valley near Manikaran in Himachal Pradesh, and the Puga Valley in Ladakh.