Conventional Sources of Energy

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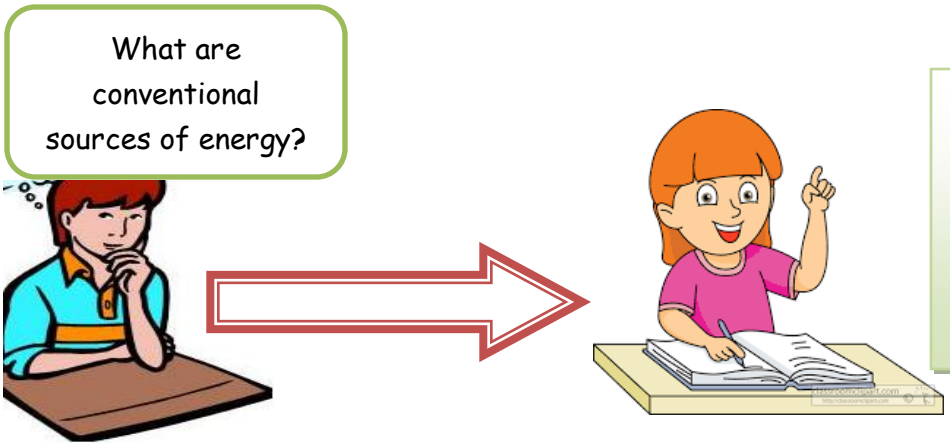


Conventional sources of energy are those which have been in use since a long time and are still being used on a large scale. Examples-coal and petroleum

Coal

Coal is an important mineral in India. It occurs as a sedimentary rock in association with carbonaceous shale, sandstone and fine clay. Coal was formed by the decomposition of large land plants and trees buried under the Earth about 300 million years ago. Sediments began to get deposited over the pile of trees and plants. The resultant heat and pressure resulted in physical and chemical change leading to the formation of coal.

Depending upon the amount of carbon and moisture content coal can be divided into four main types. These are:

Types of Coal

- **Anthracite**
  - Highest and hardest quality coal.
  - Burn slowly without smoke
  - High heating value and leaves very little smoke
- **Bituminous**
  - Highest and hardest quality coal.
  - Burn slowly without smoke
  - High heating value and leaves very little smoke
- **Lignite**
  - Known as Brown coal. It is a lower grade coal.
  - It has about 40% of carbon and has less combustible matter.
- **Peat**
  - First stage of transformation of wood into coal.
  - It is inferior to other three varieties of coal.

Distribution and Uses of Varieties of Coal in India

Variety of Coal	Distribution	Uses
Anthracite	Jammu and Kashmir	Ideal for domestic use as it is a smokeless fuel. It is used for metallurgical processes and in iron and steel industry.
Bituminous	Gondwana coal fields	Known as cooking coal as it is used to produce coke, coal gas and steam coal. High grade bituminous coal is also used for domestic purposes.
Lignite	Tami Nadu, Rajasthan, West Bengal and Puducherry	Used for the generation of electricity
Peat	Nilgiri mountains, Kashmir valley and swampy areas of coastal plains	-

Advantages of using Coal

- It is an important source of power for running machines, trains, ships and dynamos.
- Coal is used in the manufacturing iron and steel.
- It is a source of direct heat for domestic purposes, burning of bricks, tiles and in iron and brass factories.
- When coal is burnt in a closed chamber, a variety of chemicals such as ammonia and benzol are obtained as by-products.

Disadvantages

- The calorific value of coal found in India is low.
- Coal reserves in India are scattered and limited.
- Cost of production and transportation of coal is very high.
- Burning of coal results in large scale pollution.

There are two main coalfields in India. Gondwana coalfields and tertiary coalfields. **Gondwana coalfields** accounts for 98% of the total reserves of coal in India. The coalfield is largely confined to the river valleys like Damodar, Mahanadi and Godavari. The Gondwana coalfields are found in the states of West Bengal, Jharkhand, Odisha, Chattisgarh, Madhya Pradesh, Maharashtra, Uttar Pradesh, Andhra Pradesh and Telangana.

Coal found in the **tertiary coal field** has high moisture content. They are found in Assam, Arunanchal Pradesh, Meghalaya and Nagaland. The Neyveli lignite field in Tamil Nadu is the largest lignite deposit in South India.

Petroleum

Petroleum is an important mineral resource. It is known as 'liquid gold' because not even a tiniest part of crude petroleum goes waste or remains unused. Petroleum is found in underground reservoirs in sedimentary rock formations like sandstone, shale and limestone.

Petrol, diesel. Kerosene, tar, Liquefied Petroleum Gas, lubricants and paraffin wax are some products which are obtained during the refining process.

Advantages

- It has a high density. One kg of oil can generate 10,000 kcal of energy.
- Petroleum is liquid in form and can be transported through pipes or vehicles.
- It is used as a fuel. Its by-products that are used a fuel include diesel, gasoline, jet fuel, kerosene and LPG.
- Petroleum after refining is used for the production of various petrochemical products such as synthetic rubber, synthetic fiber, PVC phenol, gasoline, varnishes, lubricating oil and paraffin wax.
- Petroleum is also used for power generation.

Disadvantages

- Petroleum is a non-renewable source of energy. Hence, its availability is limited. Because of ever increasing demands, petroleum resources are fast depleting.
- Extracting and burning of petroleum generates greenhouse gases that contribute to environment pollution and global warming.
- Because of petroleum's limited supply and high demand, the cost is high.
- It is highly inflammable and can cause fire.
- Spilling of oil in water not only pollute the oceans but also leads to the death of number of marine animals.

Oil Refineries

Crude oil is refined and processed in refineries to produce light distilleries like gasoline, LPG and naphtha; middle distilleries like diesel and kerosene and heavy products such as bitumen, petroleum and coke.

The Reliance Petroleum Limited at Jamnagar in Gujarat was the first refinery in the private sector.

Most of the refineries are located near the oilfield or near the coast to minimise the cost of transport.

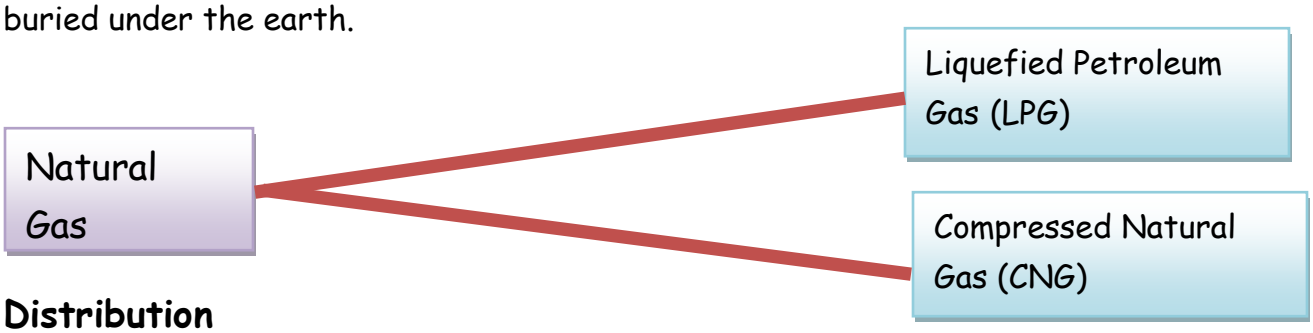
ONGC platform at Mumbai High

Distribution

- Mumbai High is an offshore oil field located 176 km off Mumbai shore in the Arabian Sea. Mumbai High is called so because of the height of the syncline of the rock structure in which the oil has been struck.
- It is the most productive oil field and has a reserve of 5 crore tonnes of oil.
- Digboi oil field in upper Assam is the biggest oilfield in India.
- In Gujarat, Cambay Basin is an important oil bearing site. The other important oil bearing sites in the state are Kalol, Koyali, Kosamba, Sanand, Anklaeshwar and Navgaon.

Natural Gas

Natural gas occurs in association with mineral oil. It is a fossil fuel. It is found along with the deposits of oil because it has been formed by decomposing remains of dead animals and plants buried under the earth.



Distribution

More than three-fourths of India's natural gas comes from Mumbai High, the rest is produced in Assam, Tamil Nadu, Rajasthan and Tripura.

Advantages

- It is an environment friendly fuel as it is made up of methane which results in less carbon emission.
- It is easier to preserve the fuel as it can be stored and transported through pipelines, cylinders or in tankers on land and sea.
- It is cheaper fuel than diesel or gasoline.
- It is used for producing hydrogen, ammonia for fertilisers, paints and plastics.

Disadvantages

- Leaks in natural gas are extremely dangerous. Such leaks may result in explosion and fire. Leakage of natural gas can have serious consequences as methane is more dangerous than carbon dioxide.
- The natural gas is s fossil fuel and hence is a non-renewable source of energy.
- The infrastructure requiring the setting up the production process and distribution of gas is very expensive.
- Natural gas when used as a fuel in vehicles provide less mileage than gasoline.

Hydel Power

Electricity that is generated from water is known as hydel power or hydroelectricity. It is generated when water stored in a dam falls from a great height on a turbine whose blades then move with a great force. This in turn rotates the generator and produce electricity. The hydro power projects are multipurpose projects because they are used for irrigation, water supply for domestic and industrial consumption and to control floods.

Advantages

- It is a clean, non-polluting source of energy. It does not release any toxic gases.

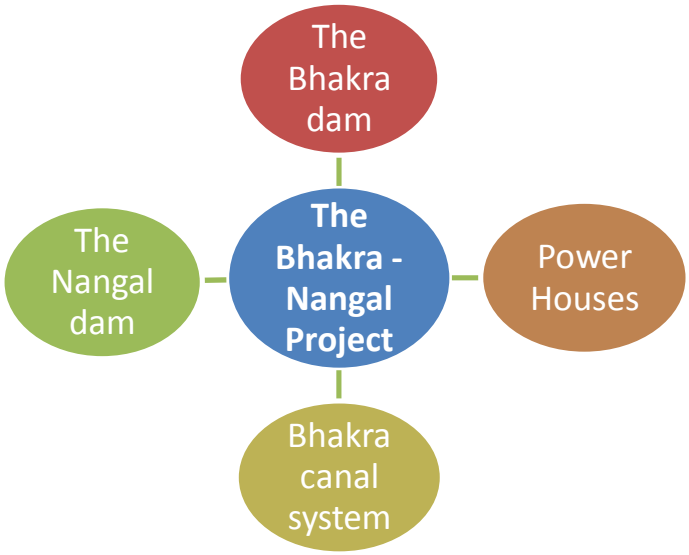
- It is a renewable source of energy which can be repeatedly used.
- The dams built to produce hydroelectricity help in saving and restoring water.
- It is economic and sustainable. The cost of electricity generation is cheaper than the electricity produced from fossil fuels and nuclear power.

Disadvantages

- The initial cost for building dams for generating hydroelectricity is extremely high.
- Building a large dam results in destruction and submergence of forests on a large scale.
- Building of huge dams may trigger earthquake in an area.
- Dam building may displace people from their villages. They may also lose their source of livelihood.

Bhakra Nangal Dam

This project is a joint venture of Punjab, Haryana and Rajasthan governments.
The Bhakra dam is the second highest dam in India. **Gobind Sagar** is the name of the reservoir of the Bhakra dam. With a storage capacity of 9.3 billion cubic meters, it is the third largest water reservoir in India.
The Bhakra- Nangal project comprises of the following:
The Bhakra Dam: It is the second highest and the third largest water reservoir in India.
The Nangal Dam: It is constructed at Nangal at river Satluj in Punjab. It supplies water to Bhakra irrigation canal.
Power Houses: There are four power houses.
Bhakra Canal System: It irrigates the lands of Punjab, Haryana and Rajasthan.
The aim of the project Bhakra Nangal project are:



- Provides water for irrigation
- Generate hydro-electricity
- Prevent flooding from Sutlej-Beas rivers

Hirakud Dam

This dam is built across the river Mahanadi. It was one of the earliest multipurpose river project that started after independence. Its construction was completed in 1953. It is the longest major earthen dam in Asia. The dam also forms the biggest artificial lake in Asia. There are two observational towers on the dam at each side. One is Gandhi Minar and the other is Nehru Minar.

Benefits of the Hirakud Dam

- The dam helps control floods in the Mahanadi delta ad irrigates 75,000 sq. km of land.

- The project provides irrigation to the 'kharif' and 'rabi' crops in districts of Sambalpur, Bargarh, Bolangir and Subarnpur.
- The dam can generate upto 307.5 MW of electrical power through its two power plants at Burla and Chiplima.
- Moreover, the project provides flood protection to 9, 5000 km^2 of delta area in districts of Cuttack and Puri.

The Hirakud dam helps in controlling floods in the Mahanadi delta and irrigates 75,000sq km of land.