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TENDER HEART HIGH SCHOOL, SEC-33B, CHD.

Class-X

Mineral and Energy Resources-II

Subject: Geography
Chapter: 9

Date: 5.8.24
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Dear Students,
This lesson is part of Chapter-8: Mineral and Energy Resources-I. It is Chapter-9 of your textbook. In this chapter, we are going to learn about conventional energy sources (Coal, Petroleum, Natural Gas) and non conventional energy sources (Solar, wind, biogas and nuclear energy).

Introduction:
Energy is an important element in every domain of life. It is an essential input for industrial and economic development and for improving the standard of living. This energy can be obtained from either conventional or non-conventional sources of energy.

Conventional Sources of Energy:
The sources which can not be created and compensated once they are used are called conventional energy sources. These sources are exhaustible, cause pollution and are expensive.
e.g. Coal, petroleum, natural gas.

Non-Conventional Sources of Energy:
The sources which are abundantly found in nature, are renewable and cheaper or cost effective are known as non conventional sources of energy.
e.g. Solar energy, tidal energy, nuclear energy etc.

Coal:

Coal is the most important energy mineral of India and our country is one of the largest producer and consumer of coal. It is termed as mother of industries in India. It became the primary source of energy for household and industries since ancient times.

Types of Coal:

Anthracite - Contains more than 80% carbon
Bituminous - Contains about 60-80% carbon
Lignite - Contains about 50-60% carbon
Peat - contains about 50% carbon

Uses:

- It is used for generation of thermal power
- It is used in mineral based industry like iron and steel, cement industry etc.
- Inferior varieties of coal are also used for household purposes (cooking, boiling of water etc.)

Distribution:

Gondwana Coalfields:
Jharkhand - Jharia, Bokaro, Giridih and Karanpura
Chhattisgarh - Korba, Tatapani
Odisha - Talcher, Sambalpur
Madhya Pradesh - Singrauli, Sholapur
Maharashtra - Wardha Valley

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Tertiary Coalfields:

Kashmir	- Riasi
Assam	- Lakhimpur
Arunachal Pradesh	- Namchik
Nagaland	- Borjan
Meghalaya	- Balphak, Darrangiri
Rajasthan	- Pallu

Petroleum:

The word 'Petroleum' has been derived from two Latin words 'Petro' means rock and 'Oleum' means oil. It is obtained from sedimentary rocks. Therefore, it is also called mineral oil. It is composed of hydrocarbons.

Uses:

- Petroleum and petroleum products are mainly used as locomotive power
- It provides the most important lubricating agents and is used as an important raw material for petrochemical products
- It is used for making paints, medicines, plastic and fertilisers
- It is used in chemical industry

Distribution:

Maharashtra - Mumbai High (offshore oilfield)

Assam - Digboi, Naharkatiya, Moran, Sibsagar

Gujarat - Ankleshwar, Kalol, Mehsana
Andhra Pradesh - Krishna, Godavari basin, Vishakhapatnam
Uttar Pradesh - Mathura
Bihar - Barauni

Advantages:

- It can be extracted easily
- Small amount of petroleum generate a substantial amount of energy
- Petroleum products are useful in many ways

Disadvantages:

- It is an exhaustible and non renewable resource
- Extracting and burning oil generates greenhouse gases
- Once burnt to generate electricity, it can not be replaced

Natural Gas:

It consists primarily of methane. It is created in two ways- Biogenic mechanism and thermogenic gas. It is an important source of energy.

Distribution:
Mumbai High
Assam
Tamil Nadu
Tripura

Advantages:

- It is a renewable resource
- It can be created in the landfills
- It can be efficiently and safely stored
- It can be considered environment friendly as compared to some other sources of energy

Disadvantages:

- It causes greenhouse emissions
- It can not be used at large scale
- It is dangerous if handled carelessly
- Detection of leakage is difficult

Non Conventional Sources of Energy

Hydroelectricity:

It is renewable, cheap, clean and environmentally benign source of energy. Rivers and waterfalls are natural sites for generation of hydroelectricity.

India being rich in water resources is capable of generating tremendous amount of electricity using this resource since:

- It is endowed with rich perennial rivers
- Permanent supply of water can be ensured
- There are many swift flowing rivers with natural waterfalls which help in power generation

Advantages:
- It is exhaustible and renewable source of power
- It is cheaper
- Power projects do not cause pollution
- Easy to transport

Disadvantages:
- Suitable terrain and location is necessary
- Supply of water should be continuous
- Problem of silting occurs often

Multipurpose Project:
A multipurpose project is a large scale hydro project often including dams for water retention, canals for irrigation, water processing and pipelines to supply water to cities.

Bhakra Nangal Project:

Bhakra Nangal Project is a joint venture of Punjab, Haryana and Rajasthan Governments. It was commissioned in 1963 and is the largest multipurpose project of India.
- It is constructed across river Sutlej at the Bhakra gorge in Shiwaliks
- It consists of 2 dams - Bhakra and Nangal on Sutlej
  Pong dam on river Beas
- It serves as a balance reservoir for the Bhakra dam, diverting water into Nangal Hydel channel
- Power Houses - 4 Power Houses under this project are - Bhakra, Ganguwal, Nangal and Kotla

Benefits :-

- Generation of hydroelectric power for industrial, agricultural and domestic use
- Controls floods
- Conserves soil by avoiding floods
- States benefited - Punjab, Haryana and Rajasthan

Hirakund Project :-

- It was built in 1953 and was inaugurated in 1957.
- It is constructed on river Mahanadi, about 15 km away from Sambalpur in state of Odisha
- The main purpose of this project was to control floods
- There are two power houses:
  Hirakund Power House and Chiplima Power House.
- The electric power generated from this project is supplied to Hirakund, Rourkela, Rajgangpur, Baragarh etc.

Benefits :-

- It makes valuable contribution to industrial development in Odisha
- Areas benefited - Puri, Sundargarh, Cuttack, Sambalpur, Rourkela, Vishakhapatnam

Nuclear Power :-

- Nuclear energy is generated from the energy released by nuclear fission or fusion processes.
- The main raw materials used for generation of atomic energy is Uranium, Plutonium, Beryllium and Thorium

- India has vast deposits of Thorium amounting to about 50% of the world's total.
- India is one of the six countries viz USA, Russia, UK, France, Canada which have acquired the capability of developing nuclear power stations independently

Distributions:

- The first nuclear power station was developed in Tarapur in 1969
- Other stations are located in Kalpakkam (Tamil Nadu), Rana Pratap Sagar (Kota), Narora (Uttar Pradesh) and Kakrapara (Surat, Gujarat), Kundankulam (Tamil Nadu)

Advantage:

- Less fuel is required as small amount of fuel generates large amount of energy
- It is non-polluting (if handled carefully)
- It reduces our dependence on fossil fuels
- It is renewable source of energy

Disadvantages:

- Mishandling of nuclear fuel or waste may cause harm to environment and living beings
- The waste needs to be disposed off at a safe place.
- Disposal of waste is costly
- Uranium is finite

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Solar Energy :

- It is a non-polluting, renewable source of energy.
- It is generated by using sunlight which is abundantly present in our country
- It is going to become the future source of energy
- Solar photovoltaic systems, solar thermal systems and solar energy centres are some of the means of generating solar energy

Distributions:

Gandhinagar Solar Plant
Azure Power – Gujarat
Tata Solar Plant – Maharashtra, Tamil Nadu
REHPL – Bolangir (Odisha)

Advantages :

- It is sustainable, indefinitely renewable source
- It is non polluting
- It requires little maintenance

Disadvantages :

- It can not be generated during night
- The amount of energy produced is affected by season and cloudiness
- Even the most efficient solar cells convert only 20% of the Sun rays to electricity
- Installing solar panels is expensive

Wind Energy :

- The Kinetic energy contained in wind can be harnessed by employing Wind Mills or Wind Turbines for various applications. The electricity generated through this is free and non polluting
- It is generally installed in open areas where there is no obstruction in flow of wind such as coastal areas, desert etc.

Advantages :

- It is a clean source of energy
- It is renewable and free of cost since no fuel is required
- Remote areas can get electricity through this source

Disadvantages :

- It is dependent on local wind pattern and speed
- It can not be used on larger scale power generation

Biogas Energy :

Biogas (Or Gobar Gas) is based on the use of dung to produce gas which is used as domestic fuel and lighting streets at homes, especially in rural areas. This technique is based on decomposition of organic matter in the absence of air to yield gas consisting of Methane (55%) and Carbon Dioxide (45%)

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Advantages:
- It is a sustainable source of energy
- It reduces pollution & also reduces amount of waste
- It is cost effective
- It reduces our dependence on fossil fuels upto some extent

Disadvantages:
- High cost of production of gas
- Biogas plant requires a large area for installation