Conventional Sources of Energy

Conventional sources of energy have been used for a long time and continue to play a major role in energy production. These include **coal, petroleum, natural gas, and hydropower**.

Coal

Coal is a **sedimentary rock** formed by the decomposition of plants buried under the Earth millions of years ago. It is classified into four types based on **carbon and moisture content**:

Type	Characteristics	Uses & Distribution
Anthracite	High carbon content, burns without smoke.	Found in **Jammu & Kashmir**; used in iron & steel industries.
Bituminous	Known as "coking coal"; high heating value.	Found in **Gondwana coalfields**; used for making coke & steam coal.
Lignite	Low-grade coal, high moisture content.	Found in **Tamil Nadu, Rajasthan, West Bengal, Puducherry**; used for electricity generation.
Peat	First stage of coal formation, lowest energy content.	Found in **Nilgiri mountains, Kashmir valley, and swampy coastal plains**.

Advantages of Coal

- Used in **power generation, iron & steel production, and domestic heating**.
- By-products like **ammonia and benzol** are obtained.

Disadvantages of Coal

- **Low calorific value** in India.
- **Expensive to mine and transport**.
- **Pollutes the environment** when burned.

Major Coalfields in India

- **Gondwana coalfields (98% of India's reserves)** – Found in **Jharkhand, West Bengal, Odisha, Chhattisgarh, Madhya Pradesh, Maharashtra, UP, Andhra Pradesh, and Telangana**.
- **Tertiary coalfields** – Found in **Assam, Arunachal Pradesh, Meghalaya, Nagaland**.
- **Neyveli (Tamil Nadu)** – Largest **lignite** deposit in South India.

Petroleum

Known as **"liquid gold"**, petroleum is found in **sedimentary rocks** and refined to produce **fuel, lubricants, and chemicals**.

Advantages of Petroleum

- High **energy density** (1 kg generates 10,000 kcal).
- Easily **transported via pipelines**.
- Used in **transport, power generation, and petrochemical industries**.

Disadvantages of Petroleum

- **Non-renewable** and depleting rapidly.
- **Contributes to pollution and global warming**.
- **Highly flammable** and dangerous.

Major Oil Fields in India

- **Mumbai High** (the largest offshore oil field).
- **Digboi (Assam)** – India's oldest oilfield.
- **Cambay Basin (Gujarat)** – Other fields include **Ankleshwar, Kalol, and Kosamba**.

Oil Refineries

- Crude oil is refined into **LPG, gasoline, diesel, and lubricants**.
- **Reliance Petroleum (Jamnagar, Gujarat)** – First private refinery.

Natural Gas

Natural gas is a **fossil fuel** found along with petroleum and is used as **CNG and LPG**.

Distribution

- **Mumbai High** produces **75%** of India's natural gas.
- Also found in **Assam, Rajasthan, Tamil Nadu, and Tripura**.

Advantages of Natural Gas

- **Eco-friendly** – Low carbon emissions.
- **Cheaper than petrol/diesel**.
- Used in **fertilizers, plastics, and paints**.

Disadvantages of Natural Gas

- **Highly flammable** – Risk of explosion.
- **Non-renewable** – Will eventually deplete.

- **Expensive infrastructure** for storage and distribution.

Hydropower

Electricity generated from **water** stored in dams and released onto turbines.

Advantages

- **Clean and renewable** – No toxic emissions.
- **Cost-effective** – Cheaper than fossil fuel-based power.
- **Multipurpose benefits** – Used for **irrigation, drinking water, and flood control**.

Disadvantages

- **High initial costs** for dam construction.
- **Deforestation and the displacement** of local populations.
- It can **trigger earthquakes** in some areas.

Major Hydropower Projects in India

Bhakra Nangal Dam (Punjab-Haryana-Rajasthan)

- **Second highest dam in India**.
- **Gobind Sagar Reservoir** (3rd largest in India).
- **Functions**: Irrigation, hydroelectricity, flood control.

Hirakud Dam (Odisha)

- **Longest earthen dam in Asia**.
- Provides **irrigation and flood control** for Mahanadi delta.
- Generates **307.5 MW of electricity**.