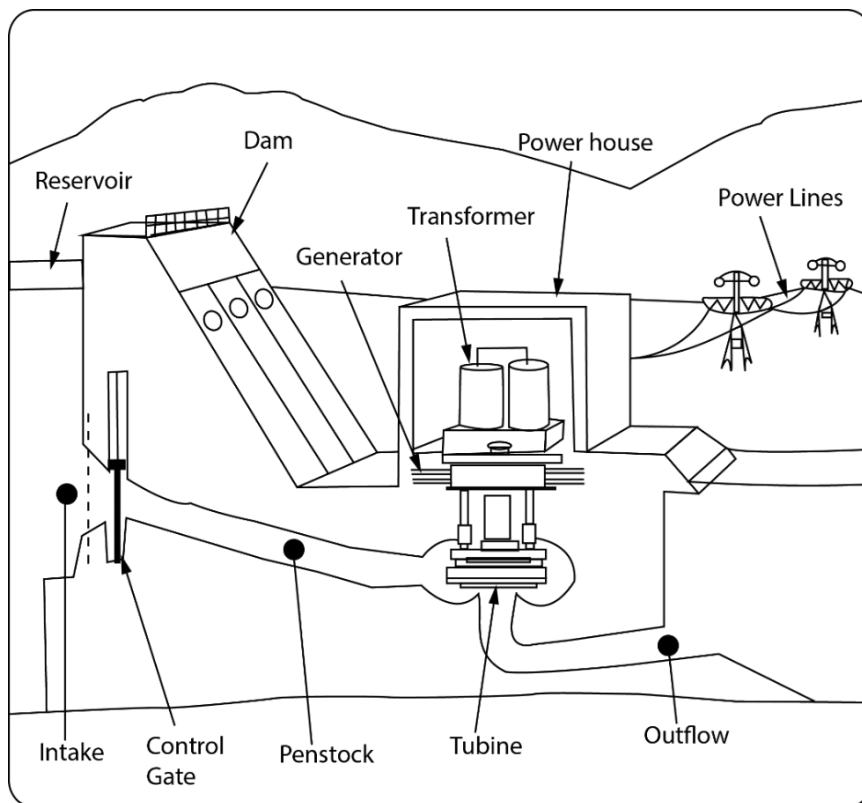


## NCERT Class 10<sup>th</sup> Science Notes

### Chapter 14 - Sources of Energy

- **Characteristics of a good fuel:**
  1. High calorific value
  2. Less smoke
  3. Less residue after burning
  4. Easy availability
  5. Inexpensive
  6. Easy to store and transport
  
- **Fossil fuels:**
  - Plant and animal remains were buried under the earth and subjected to high temperature and pressure conditions millions of years ago, resulting in the formation of lava flows.
  - For example, **coal, petroleum**, and so forth.
  - These **fossil fuels** are **non-renewable energy sources** that contribute to pollution in the environment.
  
- **Thermal power plants:**
  1. **Thermal electricity** is generated from **coal, petroleum, and natural gas**.
  2. The **transmission of electricity** is very efficient.
  3. The **steam** generated by the combustion of fossil fuels powers the **turbine**, which **generates electricity**.

- **Hydro power plant:**



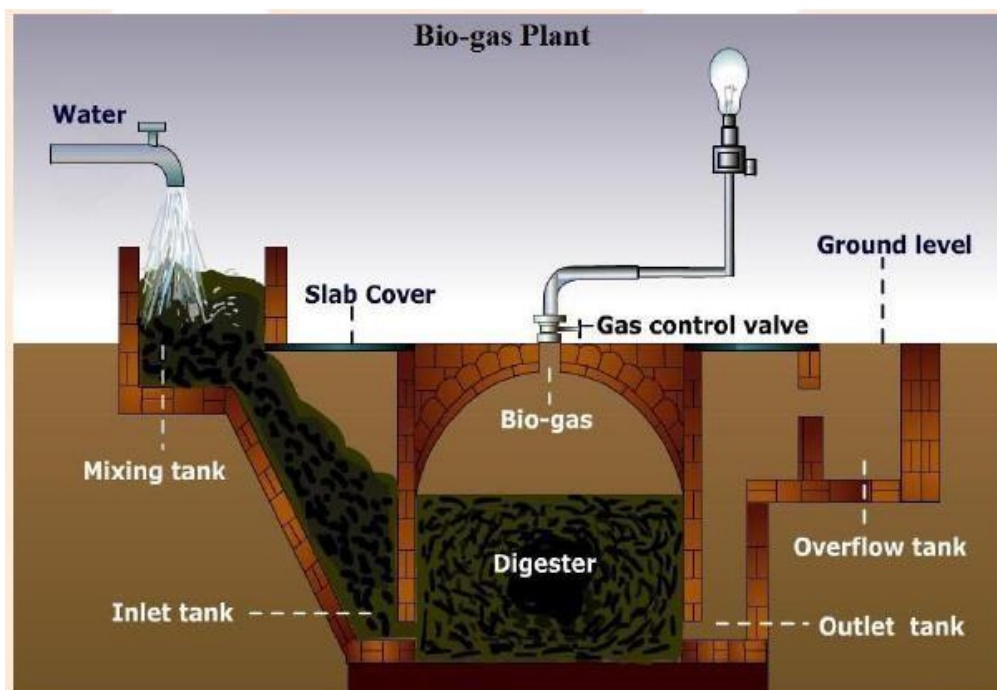
1. It is the most common form of **renewable energy**, derived from **water falling from vast heights**.
2. It is a **non-polluting** and **clean source** of energy.
3. **Dams** are built to catch water flowing via high-altitude Rivers. There is a lot of potential energy in the stored water.
4. When water falls from a height, **potential energy is converted to kinetic energy**, which **rotates the turbines to produce electricity**.

**Disadvantages of Hydro power plant:**

1. Construction is extremely **costly**.
2. **Dams** are **not feasible** on all riverbeds.
3. Submergence of large areas of human settlement and agricultural lands.
4. People are confronted with social and environmental issues.

- **Non-conventional sources:**

- 1) **Bio Mass:**



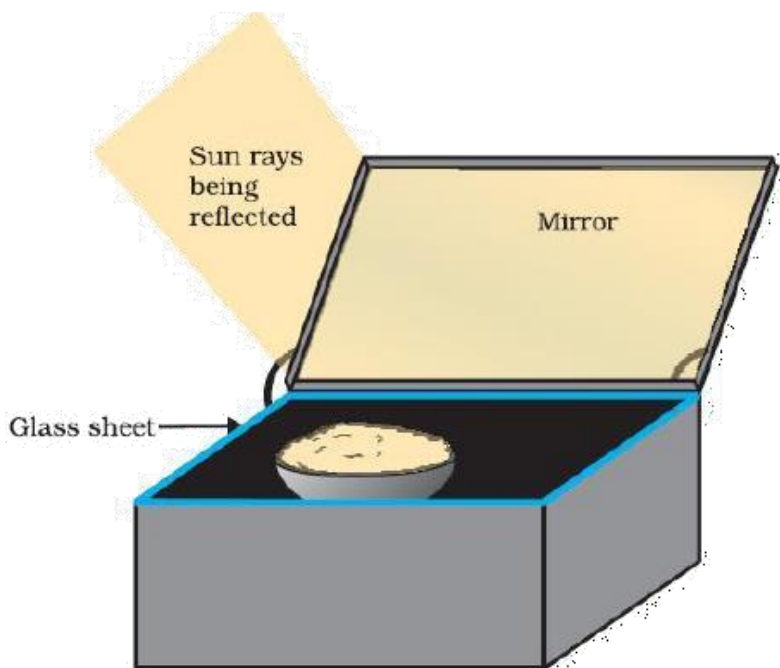
- It is the source of our country's routinely used fuels.
- **Cow dung cakes, firewood, coal, and charcoal**, for example.
- **Bio gas** is a combination of gases created when **biomass** decomposes in the **absence of oxygen** (Anaerobic Respiration).
- Biogas is primarily composed of **methane**.
- Animal dung, sewage, agricultural leftovers, vegetable wastes, chicken droppings, and other wastes are utilised in Bio gas plants to make **Bio gas**.

## 2) Wind Energy:



- **Mechanical and electrical energy** can be converted from it.
- Wind turbines, which are used to lift water, use **kinetic energy** from the wind.
- **Benefits:**
  1. Environment friendly
  2. Renewable
- **Disadvantages:**
  1. Wind speed is not always consistent.
  2. Requires a big space to construct a series of wind turbines.
  3. A significant quantity of capital is required.
  4. The output is lower than the investment.

### 3) Solar Energy:



- **Solar cells** can convert **solar energy into electricity** (photovoltaic cells).
- **Photovoltaic cells** use silicon solar cells to convert solar radiation into electricity.
- A solar panel is made up of **solar cells** arranged on big flat sheets.
- **Solar cookers** have a big glass plate and are painted **black** on the outside to capture solar energy through the **greenhouse effect**.
- **Advantage of Solar cookers:**
  1. Eco friendly
  2. Renewable
  3. Used in rural areas.
  4. Retains all the nutrients in food due to slow cooking.
- **Disadvantages of solar cooker:**
  1. Silicon cells are not cheap.
  2. Solar radiation is not uniformly distributed across the Earth's surface.
  3. Not suitable for usage at night or on foggy days.
  4. Cannot be used to make fried chapattis because they require a temperature of at least 140°C. (Only a solar cooker can reach a maximum temperature of 100°C.)
- **Solar water heater, Solar furnace**, etc. are the other solar devices.

#### 4) Geo Thermal Energy:

- **Geo thermal energy** is a type of energy that is derived from the **sun's heat**.
- When this heat melts the rocks, magma is created.
- **Magma** is the term for molten rocks and hot gases.
- Magma collects at various depths under the earth's surface. These are known as "**Hot Spots**" because when underground water comes into touch with them, it turns into **steam**, which may be used to **generate power**.
- **Advantages of Geo thermal energy:**
  1. Renewable
  2. Inexpensive
- **Disadvantages of Geo thermal energy:**
  1. Very few sites available for harnessing energy.
  2. Expensive

#### 5) Nuclear Energy:

- **Nuclear energy** is the energy released when the nucleus of an atom of a substance undergoes changes.
- It is utilized as a source of heat and as a fuel for **marine boats**.
- **Advantages or Nuclear Energy:**
  1. Alternative source of energy due to depletion of fossil fuels.
  2. A significant amount of energy is released from a small amount of fuel.
- **Disadvantages of Nuclear Energy:**
  1. Risk of nuclear waste leakage
  2. Expensive nuclear plant construction
  3. Pollution of the environment

#### 6) Energy from the sea:

- **Tidal Energy in India: Gulf of Kutch, Gujarat, and West Bengal –**
  - Relies on **tidal action** to control the rise and fall of sea level.
  - **Dams** are built across a **narrow stretch of sea**, and a turbine converts **tidal energy to electricity**.
  - The **main disadvantage** for using this is that, there is **no consistent tidal action**.
- **Wave Energy:**
  - Turbines are rotated by the **kinetic energy of sea waves**.
  - These turbines produce electricity.