# **Energy Resources: Renewable and Non-Renewable**

#### Introduction

Energy resources are the natural sources from which we obtain energy to do work or run machines, vehicles, and devices. These sources can be grouped into two main categories:

- i. Non-renewable energy resources
- ii. Renewable energy resources

#### **Non-Renewable Energy Resources**

Non-renewable energy resources are those natural resources that exist in limited quantity on Earth and cannot be replenished quickly. They take millions of years to form and once exhausted, cannot be regenerated within a human lifespan.

#### **Examples:**

- Coal
- Petroleum (Crude Oil)
- Natural Gas
- Nuclear Energy (Uranium)

# **Details of Non-Renewable Resources:**

- i. Coal
  - Formed from dead trees and plants buried deep under Earth millions of years ago.
  - It is a fossil fuel and is burned to produce heat and electricity.
  - Found in coal mines.

#### ii. Petroleum (Crude Oil)

- Formed from the remains of ancient marine organisms.
- Used to produce petrol, diesel, kerosene, LPG, and other fuels.
- Extracted from oil wells under the sea and land.

#### iii. Natural Gas

- Formed along with petroleum from marine animal remains.
- Used for cooking, heating, and in industries as CNG (Compressed Natural Gas).

### iv. Nuclear Power

- Produced from uranium, a heavy metal found in rocks.
- Releases huge amounts of energy through nuclear reactions.
- Used in nuclear power plants.

# **Disadvantages of Non-Renewable Resources:**

- Limited supply cannot be replaced once exhausted.
- Pollution burning fossil fuels leads to air pollution and global warming.
- Risk of oil spills and nuclear disasters.
- Harmful for the environment and health.

# **Renewable Energy Resources**

Renewable energy resources are those that are naturally replenished over a short period of time. They are environment-friendly and can be used again and again.

### **Examples:**

- Solar Energy
- Wind Energy
- Hydropower (Water)
- Biomass Energy
- Geothermal Energy

# **Details of Renewable Resources:**

# i. Solar Energy

- Comes from the Sun.
- Captured using solar panels and solar cells.
- Used for lighting, heating water, and running appliances.

# ii. Wind Energy

- Generated by moving air (wind).
- Wind turns the blades of windmills or turbines to generate electricity.
- Common in open, windy areas.

# iii. Hydropower (Water Energy)

- Produced from flowing or falling water.
- Dams are built to store and control water.
- Water flow turns turbines to produce electricity.

## iv. Biomass Energy

- Comes from organic matter such as wood, crop waste, animal dung.
- Burned or converted to gas to produce heat or electricity.

# v. Geothermal Energy

- Comes from heat inside the Earth.
- Hot rocks or water beneath the Earth's surface provide energy.
- Used for heating homes and electricity generation.

# Advantages of Renewable Resources:

- Unlimited and naturally replenished
- Non-polluting and safe for the environment
- Help in reducing carbon emissions
- Can be used sustainably over generations

# **Comparison Table: Renewable vs Non-Renewable Energy**

Aspect	Renewable Resources	Non-Renewable Resources
Availability	Naturally replenished	Limited in supply
Time to regenerate	Short period	Millions of years
Environmental impact	Environment-friendly	Causes pollution and global warming
Examples	Solar, Wind, Water, Biomass, Geothermal	Coal, Petroleum, Natural Gas, Nuclear
Sustainability	Sustainable for long-term use	Unsustainable after depletion