

UNIT-IV  
GEOHERMAL ENERGY AND TIDAL ENERGY

# Introduction

## Renewable Energy Sources

- Renewable energy comes from naturally replenishing resources.
- Geothermal and tidal energy are sustainable energy sources.
- They help reduce dependence on fossil fuels.
- Environmentally friendly and reliable.

# Geothermal Energy – Definition

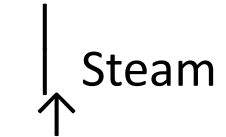
- **What is Geothermal Energy?**
- Geothermal energy is heat energy obtained from the Earth's interior.
- The Earth's core continuously produces heat.
- This heat can be used for electricity generation and heating purposes.

# Sources of Geothermal Energy

- **Sources**
- Magma beneath the Earth's crust
- Hot rocks
- Hot water reservoirs
- Steam reservoirs

- **Diagram**

- Surface



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Hot Water

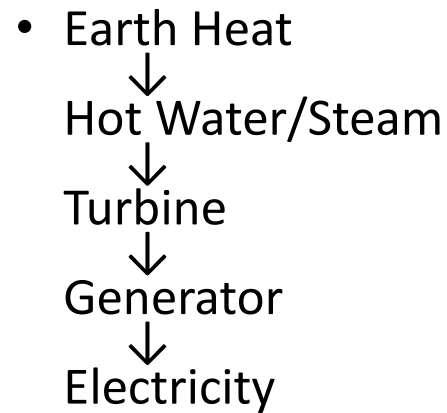
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Hot Rocks

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Magma

# Principle of Geothermal Energy

- **Working Principle**
- Heat from the Earth heats underground water.
- Steam is produced.
- Steam rotates a turbine.
- The turbine drives a generator to produce electricity.

- **Flow Diagram**



# Types of Geothermal Power Plants

- **Types**
- **Dry Steam Plant**
  - Uses natural steam directly.
- **Flash Steam Plant**
  - Uses high-pressure hot water.
- **Binary Cycle Plant**
  - Uses secondary fluid with low boiling point.

# Advantages of Geothermal Energy

- **Benefits**

- Renewable source
- Reliable power generation
- Low greenhouse gas emissions
- Small land requirement
- Available throughout the year
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## **Disadvantages of Geothermal Energy**

- **Limitations**

- High installation cost
- Limited suitable locations
- Risk of land subsidence
- Corrosion and scaling problems

# Applications of Geothermal Energy

- **Applications**
- Electricity generation
- Space heating
- Greenhouses
- Industrial processes
- Hot water supply
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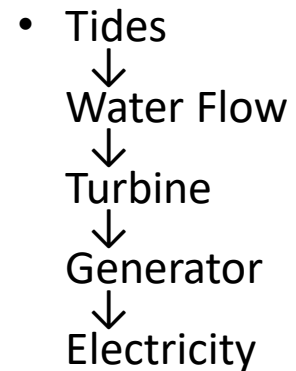
## **Introduction to Tidal Energy**

- **What is Tidal Energy?**
- Tidal energy is energy obtained from ocean tides.
- Caused by the gravitational attraction of the Moon and the Sun.
- Predictable and renewable energy source.

# Principle of Tidal Energy

- **Working Principle**
- Rising and falling tides move water.
- Water flow rotates turbines.
- Turbines drive generators.
- Electricity is produced.

- **Flow Diagram**



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