

UNIT 4

ENERGY PRODUCTION

1. FORMS AND USES OF ENERGY
2. CONVENTIONAL THERMAL POWER

1. FORMS AND USES OF ENERGY

All of activities we do daily, require the use of energy. In the past we could only use to physical exertion. In the last two centuries, however, the major sources of energy come from fossil fuels or various sources of energy transformed into electricity.



◆ Fuels

They play a direct role in activities such as cooking food, heating and transport.



◆ Electric energy

Most of the machines we use, use this type of energy and transform it producing different types of effects such as heat or light.



1.2. CLASSIFICATION OF ENERGY SYSTEMS

Energy demand has increased dramatically in recent times. This has led research and development of new energy production systems that are known as **alternative energy** (wind , solar, new fuels, geothermal..etc),



compared to more **conventional** sources (hydro, fossil fuels, nuclear, etc. ..). At the same time, it seeks new energy systems that are **renewable** and cleaner, and won't exhaust the resources of the planet

➤ **Alternative energies** are those which have been proposed as alternatives to **conventional** ones. In a broader sense, we could consider alternative energies those that do not involve the burning of fossil fuels.

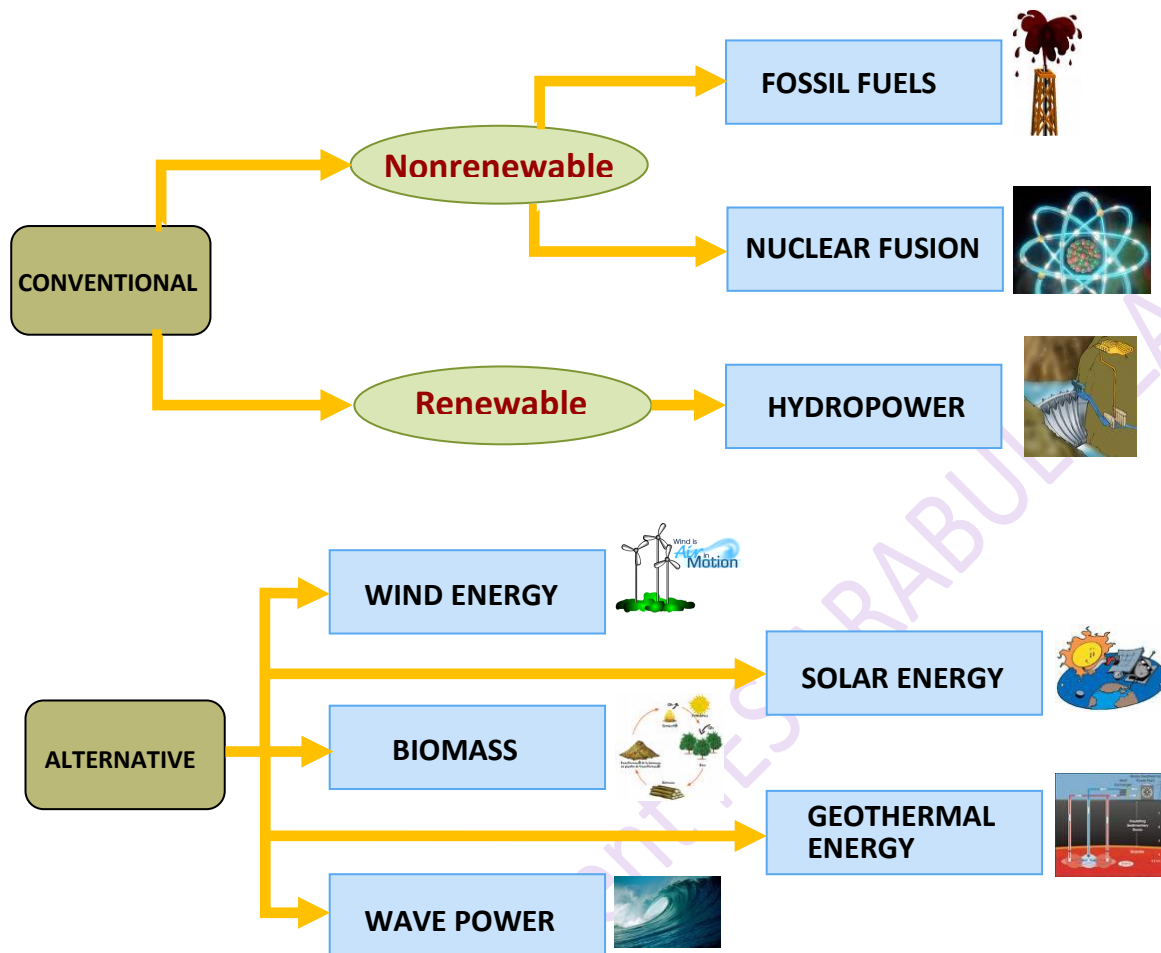


➤ **Renewable** Renewables are those that occur continuously and are inexhaustible on a human scale.

➤ **Nonrenewable** They are non-renewable energy sources, those found in a limited way on our planet and depleted as they consumed.



ENERGY SYSTEMS



1. CONVENTIONAL THERMAL POWER

A **thermal power station** is a power plant in which the first step is to produce steam. Water is heated, turns into steam and spins a steam turbine which either drives an electrical generator or does some other work, like ship propulsion. After it passes through the turbine, the steam is condensed in a condenser and recycled to where it was heated.

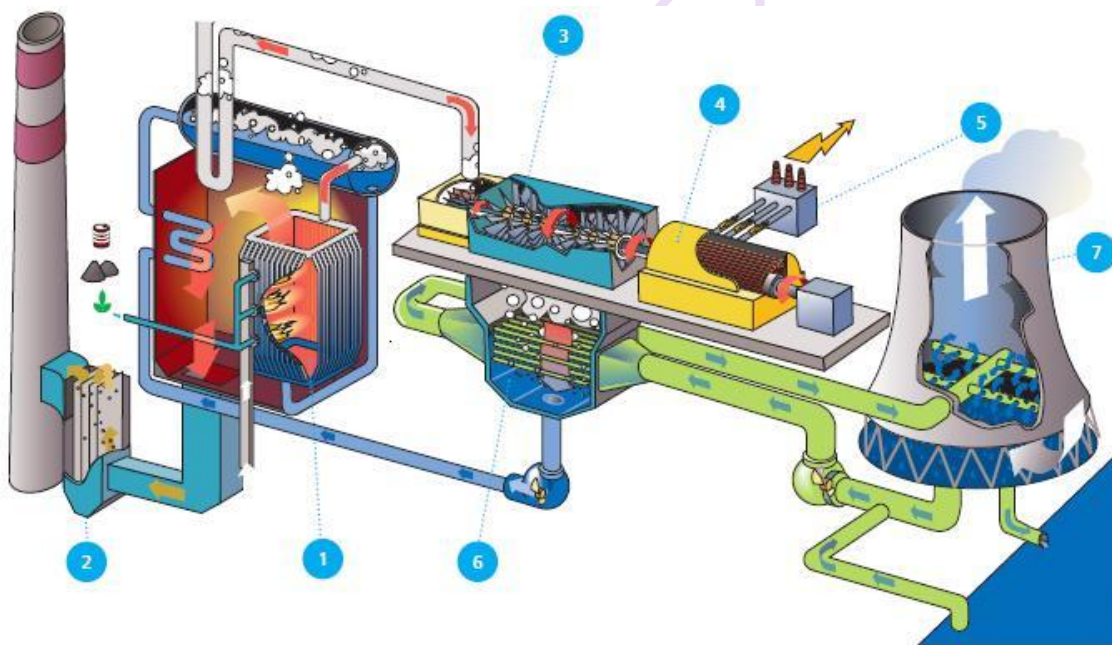
Thermal power stations can vary in design according to the fuel sources they use.

- ➔ **Combustion power plant.** In fossil-fueled power plants, steam is generated by a furnace that burns the fossil fuel to boil water to generate steam.

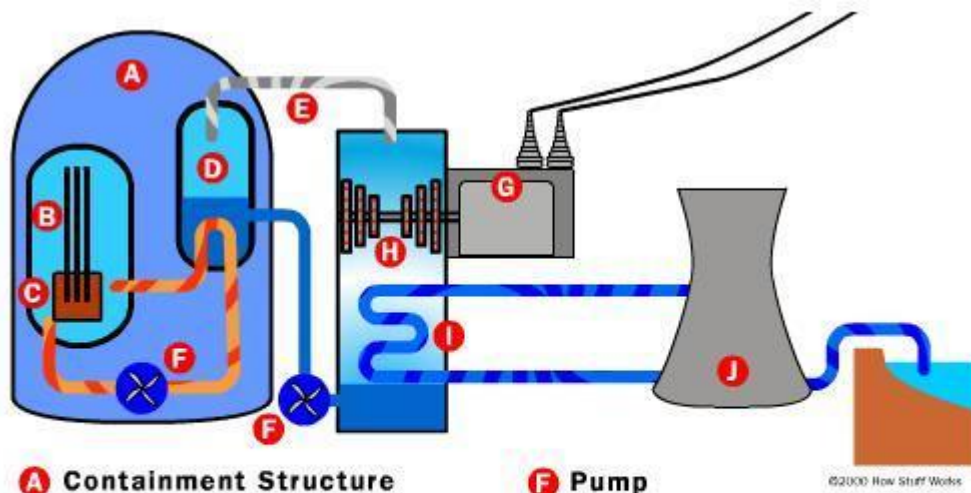
- ➔ **Nuclear plant.** In a nuclear plant, the steam generator is a specific type of large heat exchanger used in a pressurized water reactor (PWR), which of course is used to generate steam.

Main elements in a power plant

1. Steam boiler.
2. Electrostatic precipitator.
3. Steam turbine.
4. Generator (AC generator).
5. Transformer.
6. Condenser.
7. Cooling tower.



Nuclear plant



- A** Containment Structure
- B** Control Rods
- C** Reactor
- D** Steam Generator
- E** Steam Line

- F** Pump
- G** Generator
- H** Turbine
- I** Cooling Water Condensor
- J** Cooling Tower

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