Thermal power plant

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What is the thermal power plant?

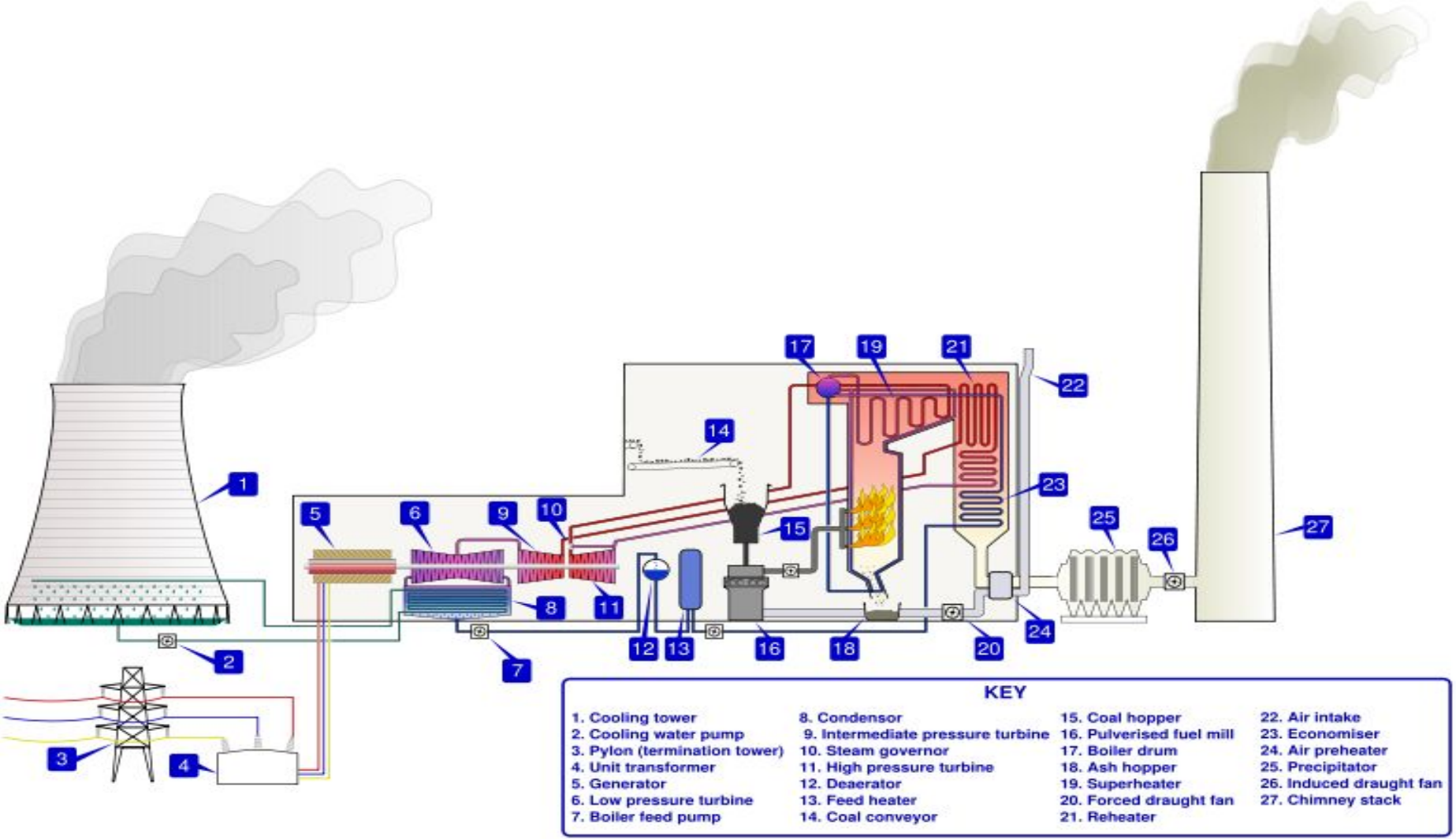
Thermal power generating uses steam generated by the combustion of oil, liquid natural gas (LNG), coal, and other materials to turn generators and generate electricity.

It spins at either 3,000 or 3,600 rpm, synchronized to the power grid, and generates up to 21,000 amperes at 24,000 volts AC (504 MWe).

The real thermal efficiency of modern thermal power plants typically ranges from 35 to 49 percent.

How it works?

- First, water is poured into the boiler for boiling. The water is taken from the condenser or from another water source. The boiler is heated with the assistance of coal.
- Then the water turned into hot steam is transferred to the steam turbines. Due to the high pressure and the high temperature, the steam turbine starts to rotate, thereby generating energy.
- The generator is connected to the steam turbine. Electricity produces when the turbine rotate. Then the electricity that produced by generator is transferred to the consumers by high-voltage power lines.


KEY
1. Cooling tower
2. Cooling water pump
3. Pylon (termination tower)
4. Unit transformer
5. Generator
6. Low pressure turbine
7. Boiler feed pump
8. Condensor
9. Intermediate pressure turbine
10. Steam governor
11. High pressure turbine
12. Deaerator
13. Feed heater
14. Coal conveyor
15. Coal hopper
16. Pulverised fuel mill
17. Boiler drum
18. Ash hopper
19. Superheater
20. Forced draught fan
21. Reheater
22. Air intake
23. Economiser
24. Air preheater
25. Precipitator
26. Induced draught fan
27. Chimney stack

Main parts	Heat Recovery parts
Furnace/ Boiler	Economizer
Generator	Air heaters
Condenser & cooling tower	Deaerator
Chimney	
Turbine	

Boiler- the function of boiler is to generate steam by burning the coal.
Generator- used to generate electricity from rotation of turbine.
Condenser- make a liquid (water) from steam.
Cooling tower- main purpose is to cool the water that will used to condensate the steam.
Chimney- minimise pollutants to specified standards. Chimneys for power plants dissipate harmful substances contained in emissions into higher layers of the atmosphere. The specific concentration of harmful substances in power plant emissions is reduced.
Turbine- is rotating by steam. 3 types: high pressure turbine: low pressure turbine: intermediate pressure turbine.
Economizer- extracts a part of the heat from flue gases and uses it for heating feed water.
Air heater- preheating the air before entering to the furnace by utilizing some of the energy left in the flue gases before exhausting them to atmosphere
Deaerator- purification of unwanted dissolved gas impurities present in the water. In many power stations and boiler plants it also serves as a feedwater storage tank for steam boilers or as a make-up for the heating system.

Advantages:
Initial cost is less than other generating stations
Small area
High output power
Low fuel cost

Disadvantages:
Pollution of the atmosphere
Low efficiency
Huge amount of water is required

Thank you!