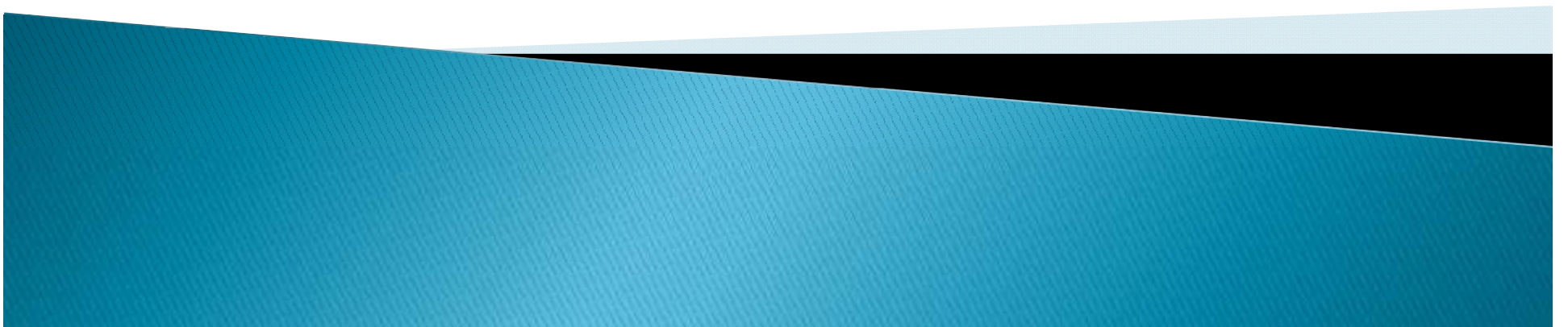


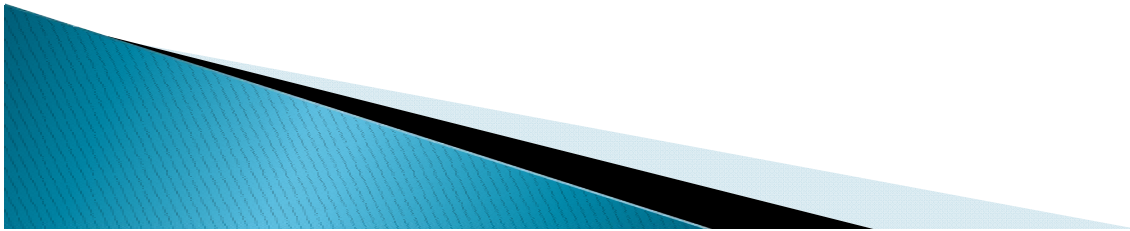
Power Systems Analysis

ET-321



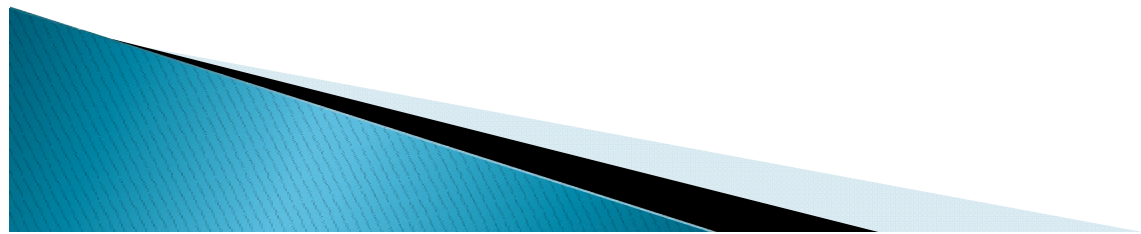
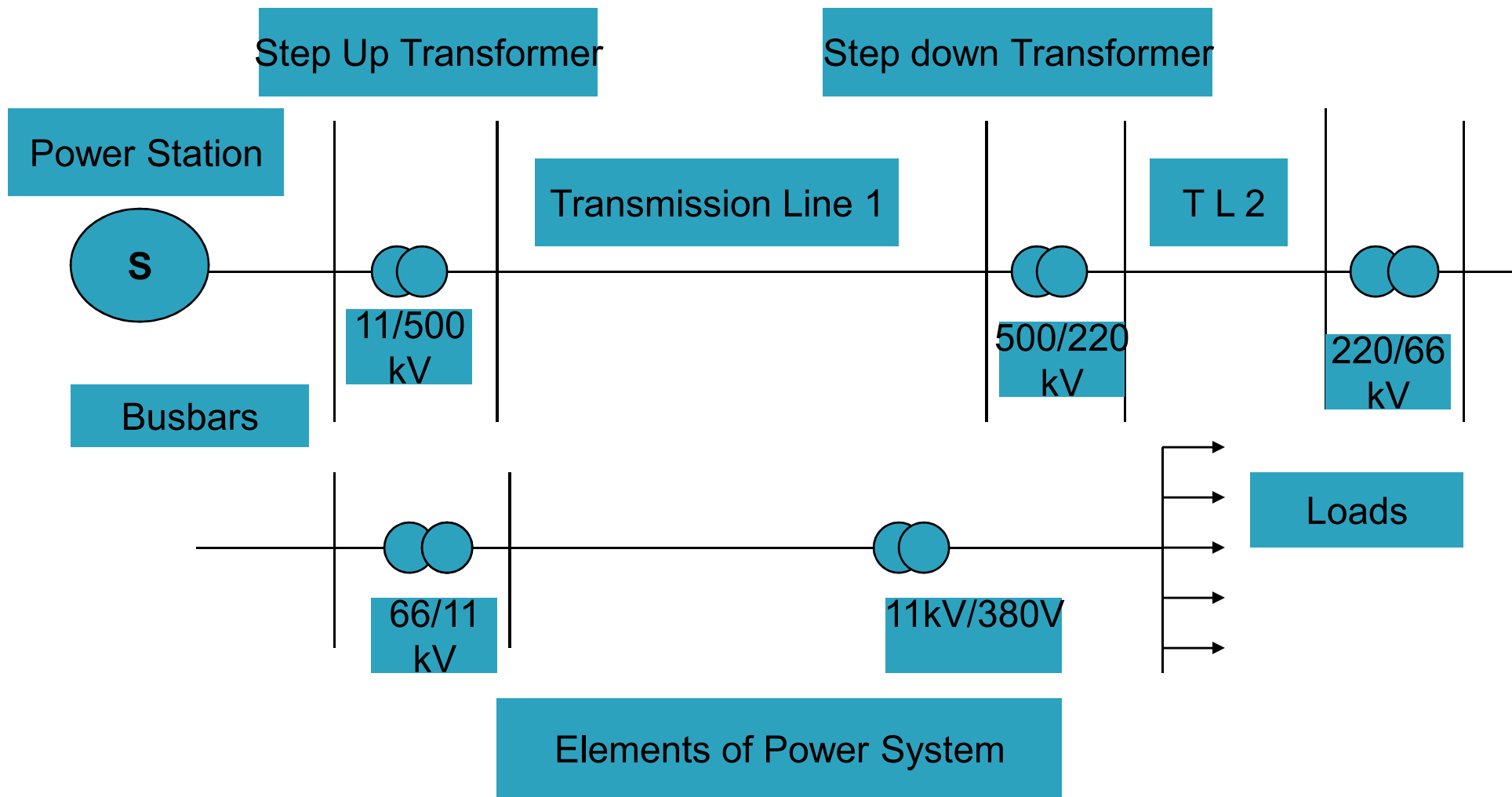
References

- **Elements of power system analysis**
(**William Stevenson**)
- **Power system analysis**
(**Hadi Sadaat**)



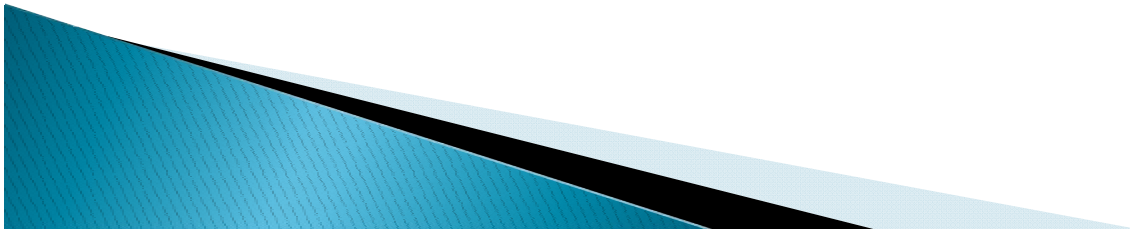
Elements of power system

1. Power stations .
2. Substations .
3. Busbars .
4. Primary T.L and secondary T.L



Standard voltages

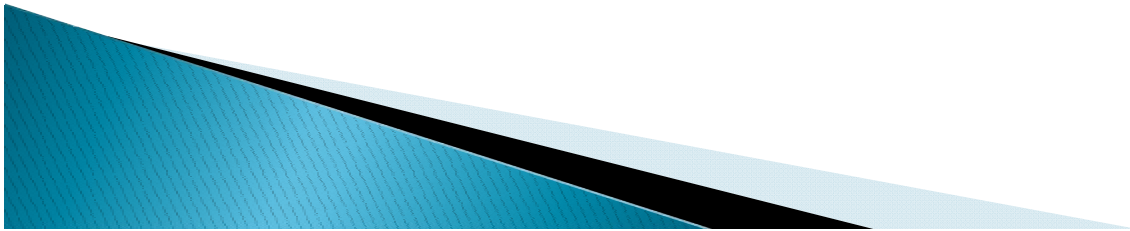
1. **Generation voltages .**
3.3 , 6.6 , 11 , 33 KV
2. **Transmission line voltage .**
11 , 33 , 66 , 110 , 132 , 165 , 220 ,
380 , 400 , 500 , 750 KV
3. **Distribution high voltages .**
11 , 6.6 KV
4. **Distribution low voltages .**
380 , 220 V



Power stations

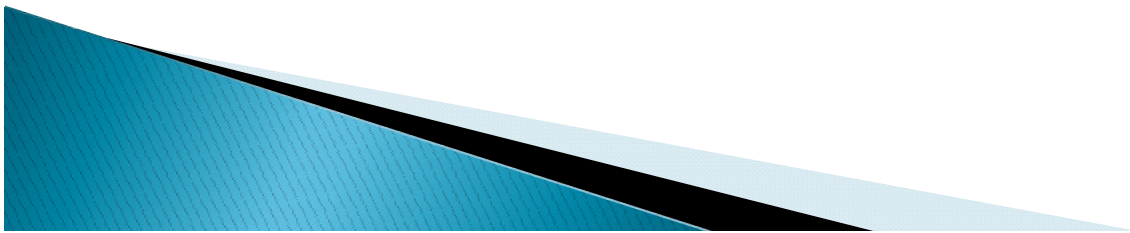
Types of power stations :

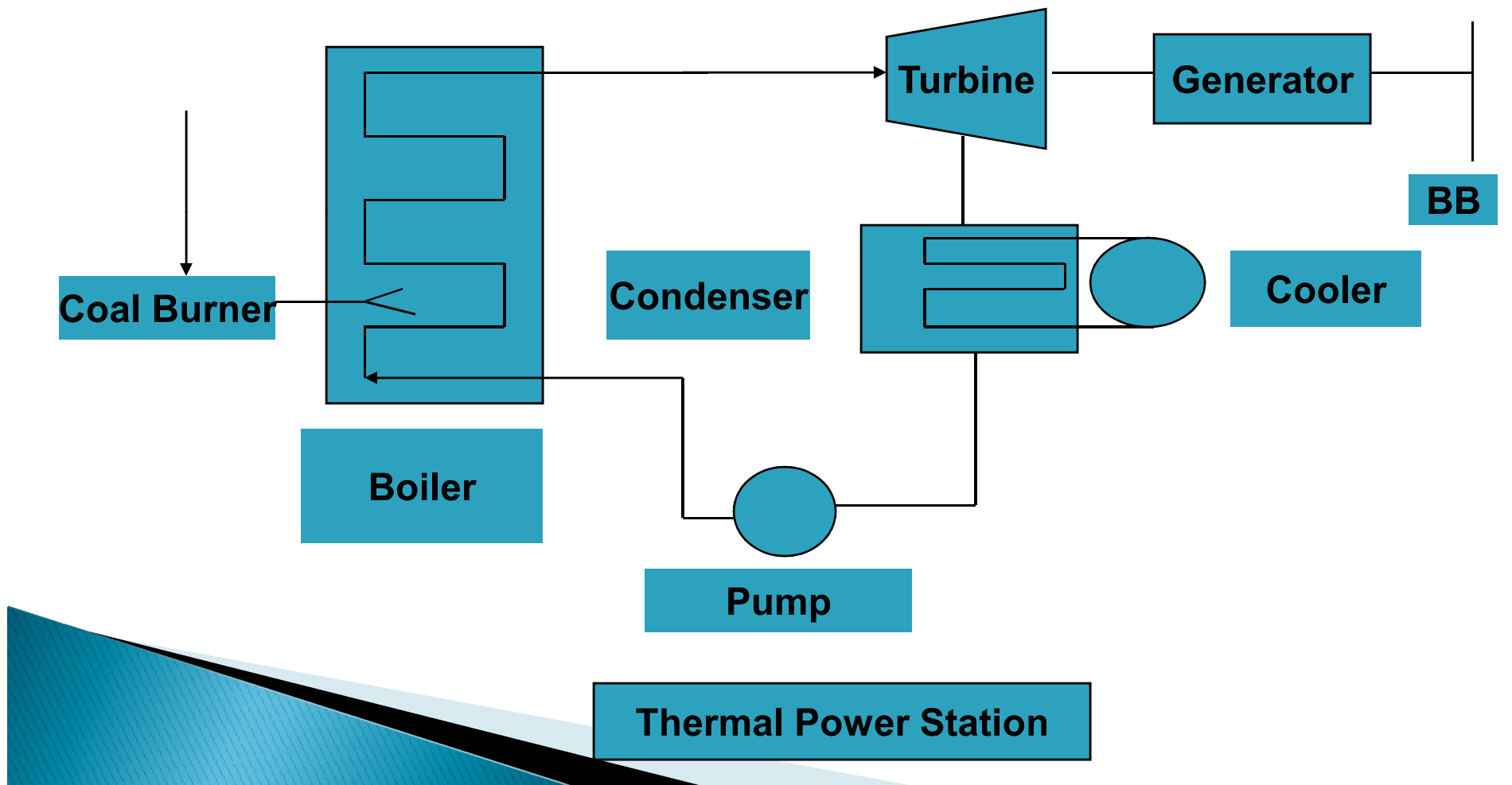
1. Thermal power stations .
2. Hydro power stations .
3. Nuclear power stations .
4. Gas power stations .

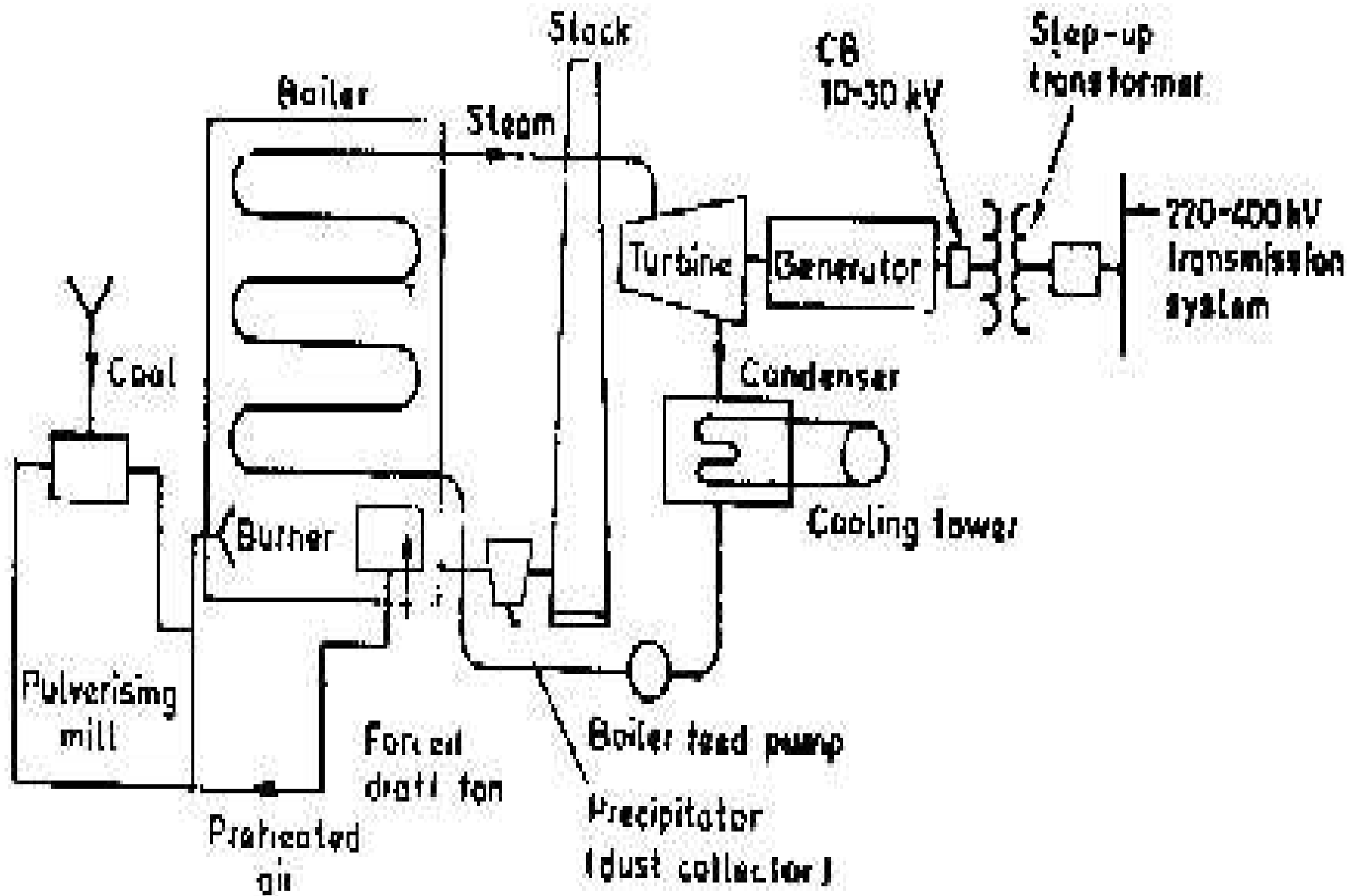


Thermal power stations

It depends on coal and petrol to heat the water in big boilers under high pressure to transfer the water to steam.

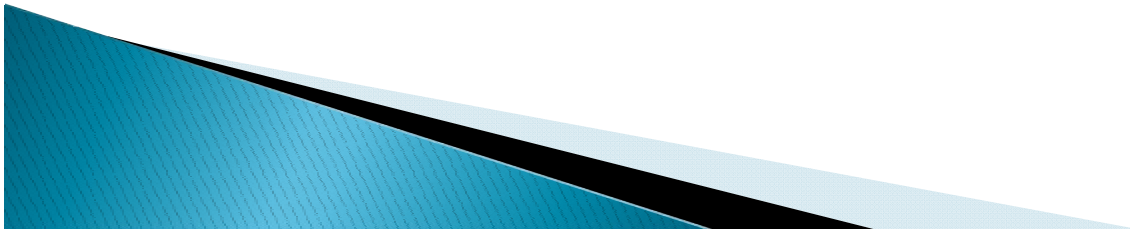






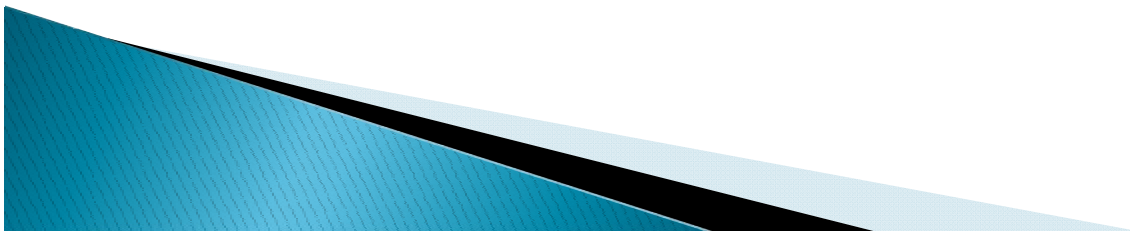
Advantages of this stations .

1. It has low construction (primary) cost .
2. It uses small area to construct .
3. No trembles (vibrations) .
4. It can be constructed in minimum time compared to Hydro and Nuclear power stations .
5. It can be constructed near to the load .



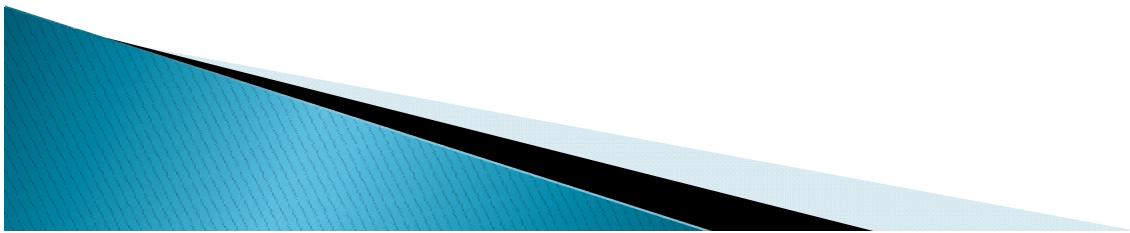
Disadvantages

1. Running costs are high because it uses coal and solar .
2. The response is very low to supply the increasing in load .
3. It is not clean and causes more pollution .
4. It has low efficiency (25 : 40 %) .



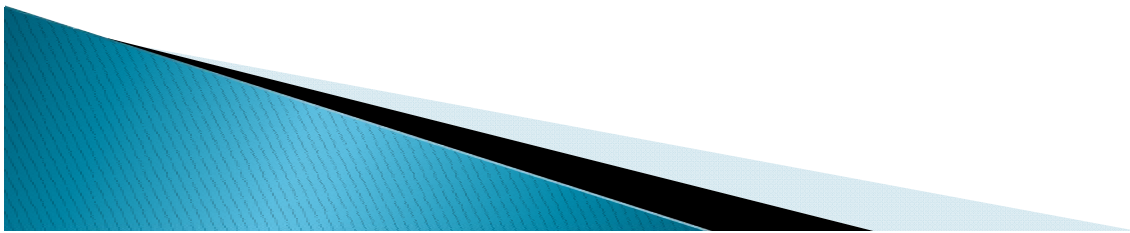
Some of consideration must be taken

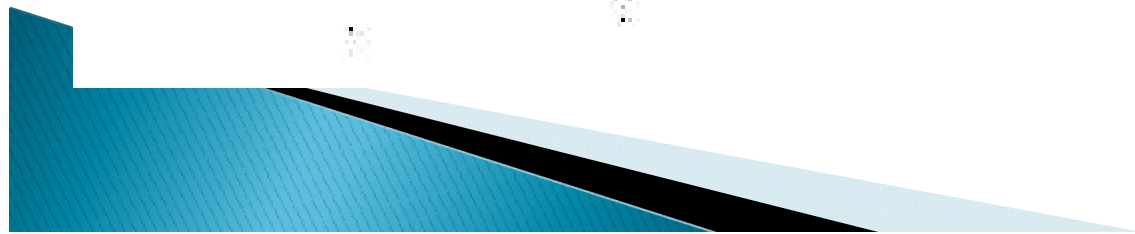
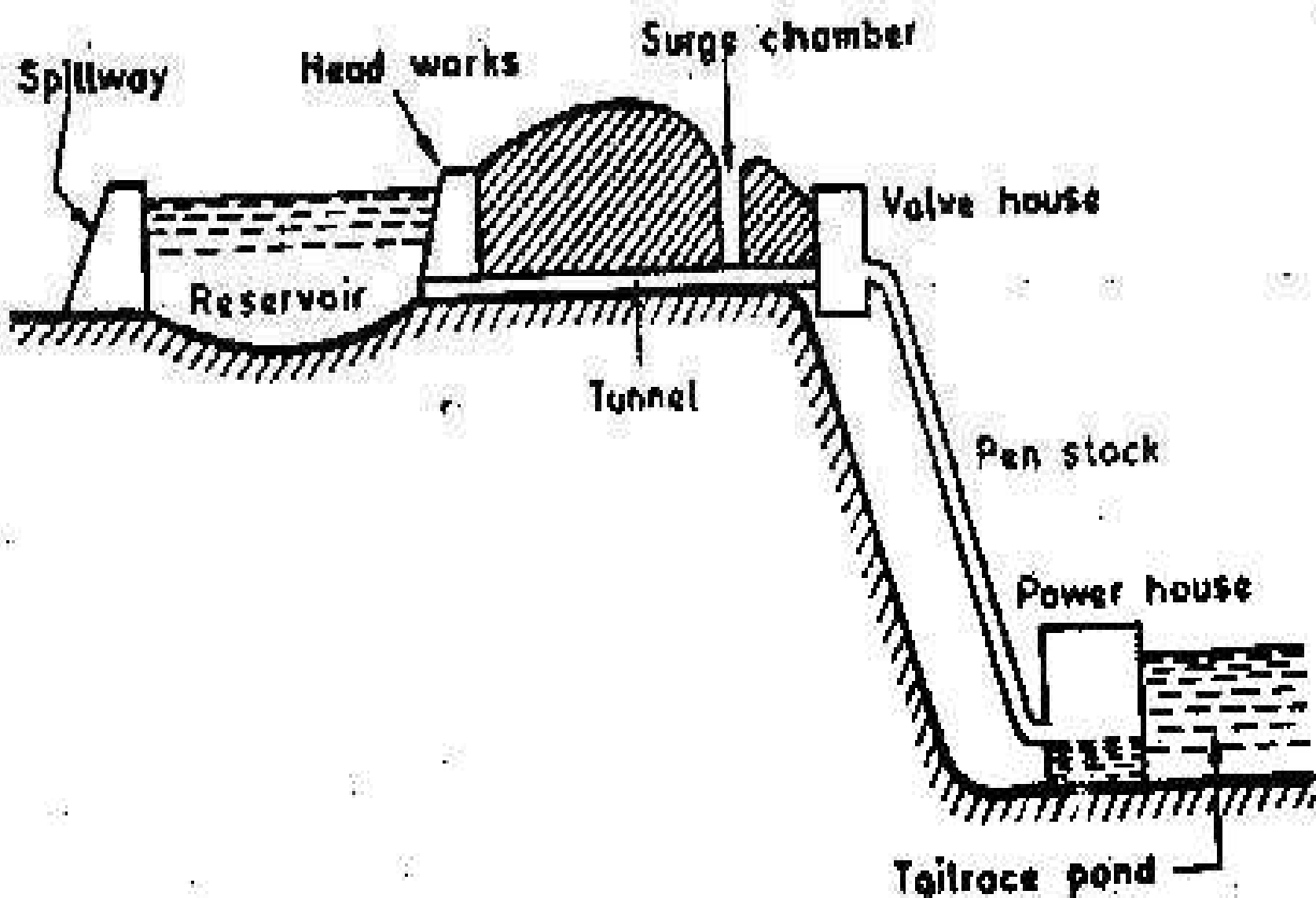
1. It must near to source of water .
2. It must near to transmitted tools
▪
3. It needs to strong land which has low price .
4. We can extend the station.



Hydro power stations

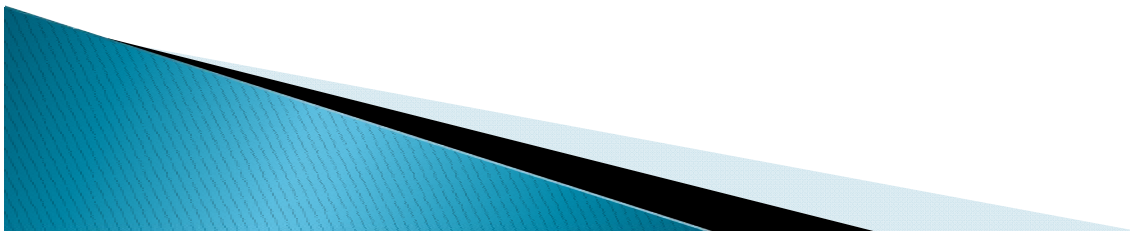
It depends on two deferent levels in the river.





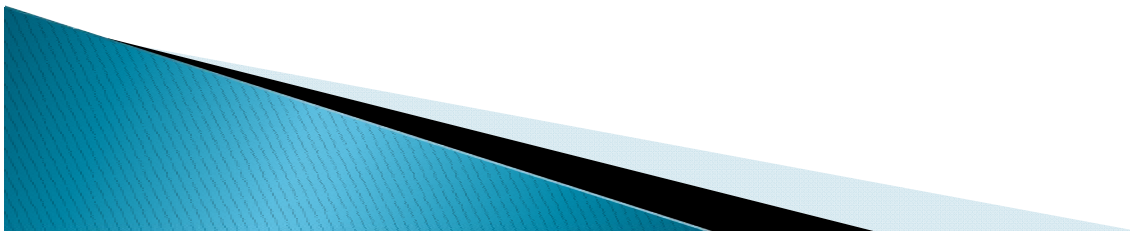
Advantages of this stations .

- 1. Running cost is very low because it depends on water .**
- 2. The response is very high to supply the sudden increasing in load.**
- 3. It is clean .**
- 4. Efficiency is equal (90 : 95 %) .**



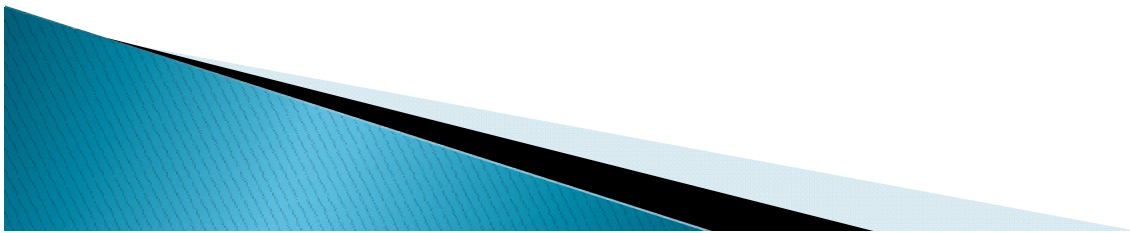
Disadvantages

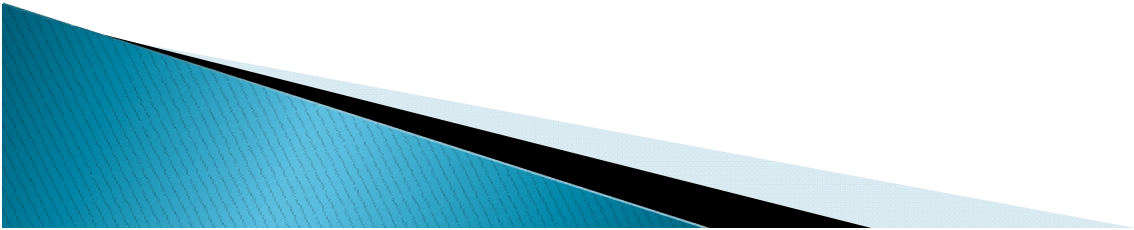
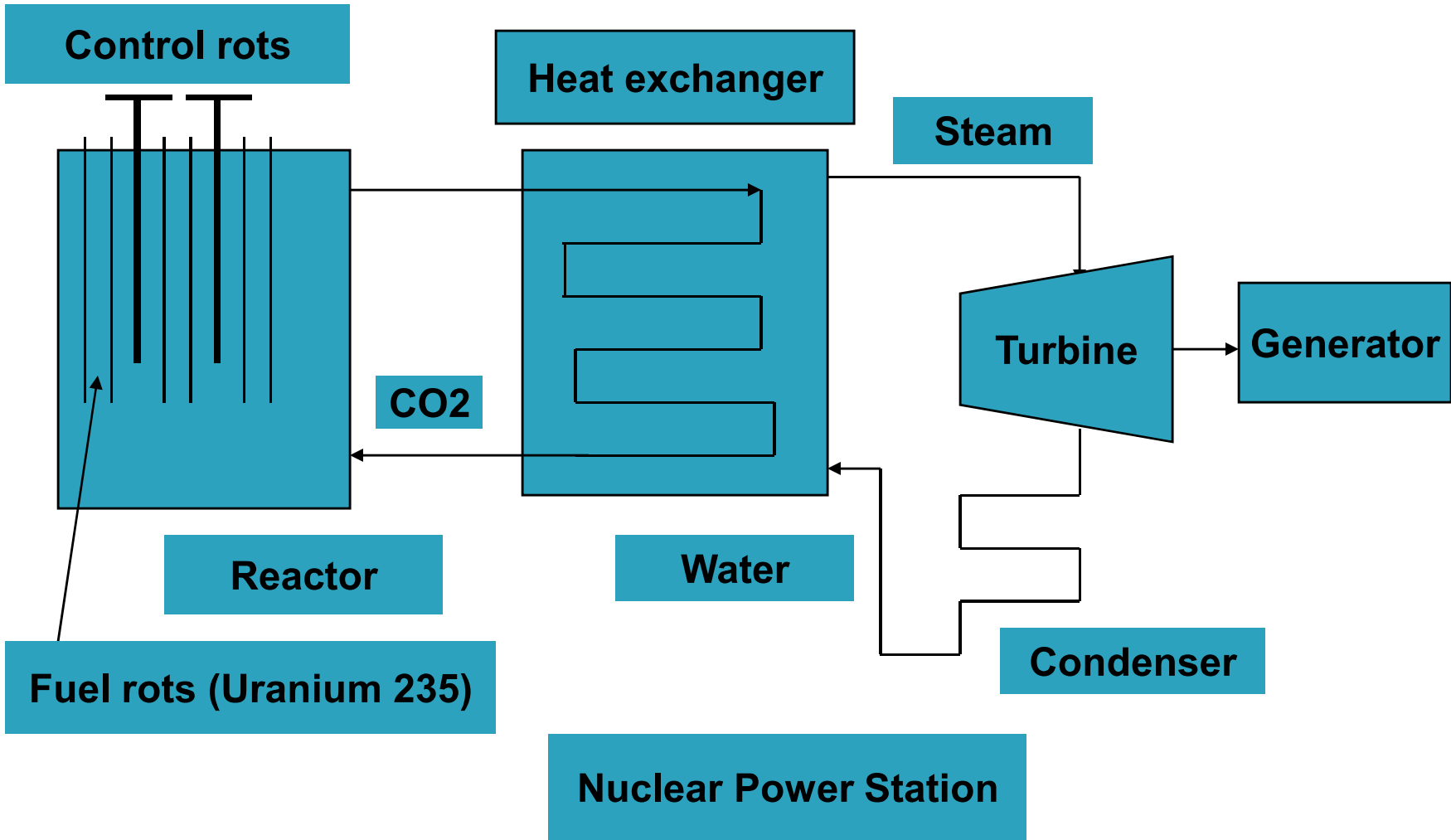
1. It has high construction cost .
2. It has high T.L costs .
3. Constructed far from the loads
▪
4. Takes more time to construct .

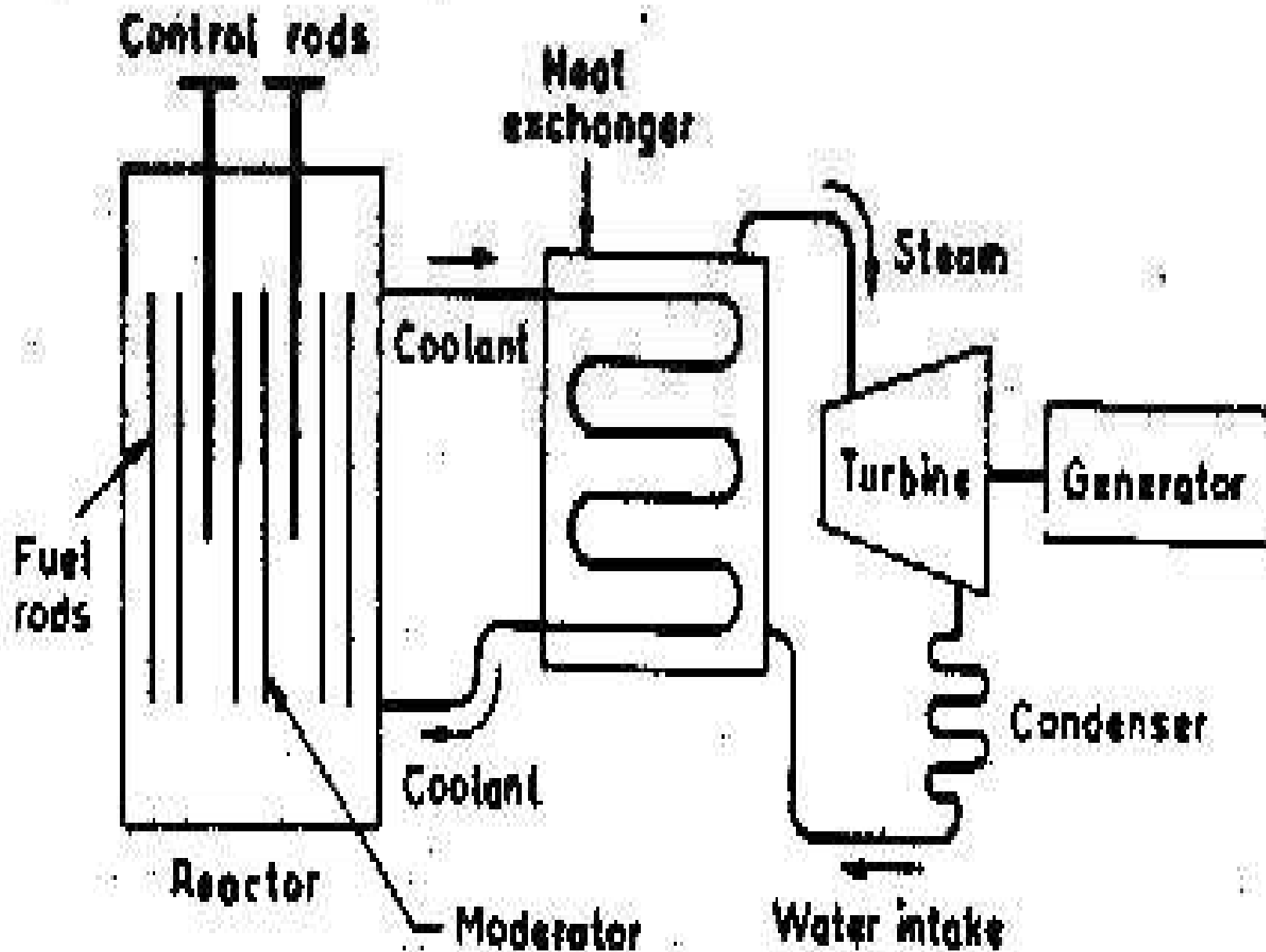


Nuclear power stations

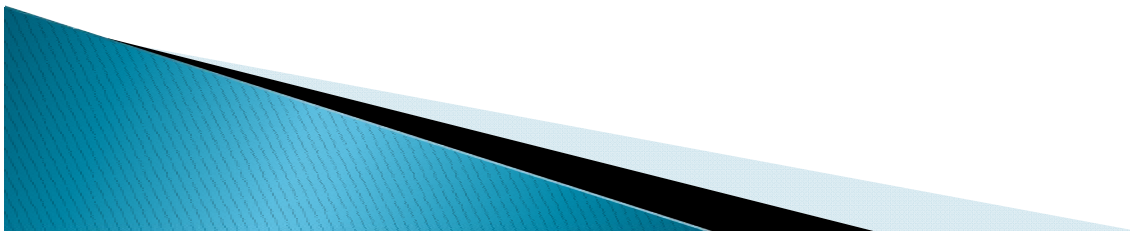
When Uranium 235 is crashed with neutrons, releasing neutrons and heat energy . These neutrons then participate in the chain reaction of fashioning more atoms.







Advantages and disadvantages are similar to hydro power station added to that it has higher protection cost and it is constructed in the desert.



Gas power stations

- ▶ It depends on the outage of gases from the refine petrol factory which produces high pressure gas.

