

4. Power Plant Engineering

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POWER PLANT ENGINEERING

Deals with conversions of various forms of energy into electrical energy

Prime mover: Turbine

Steam turbine
(thermal PP)

Gas turbine
(thermal PP)

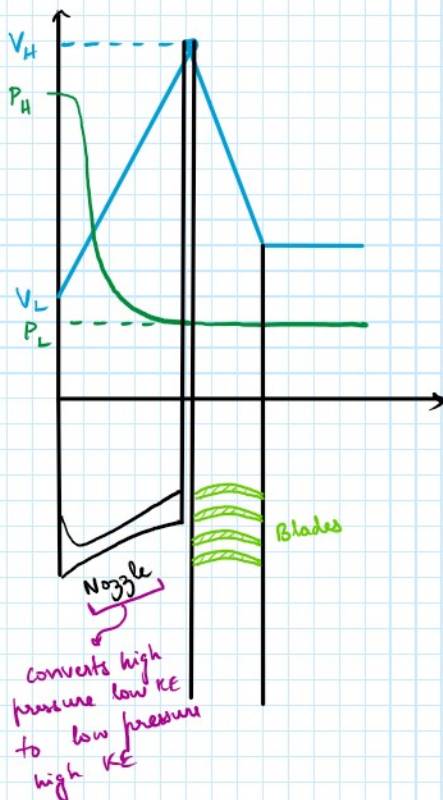
Water turbine
(hydel PP)

STEAM TURBINE

Impulse

$KE \rightarrow EE$

Eg: De Laval turbine

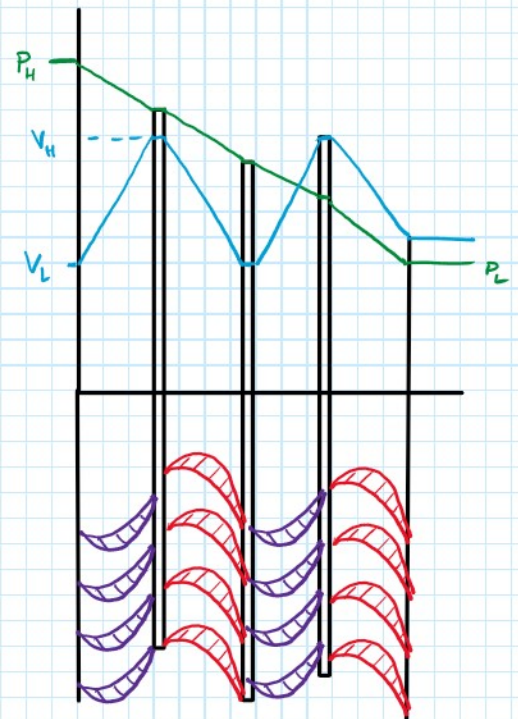


- Complete expansion of steam takes place in nozzle.

Impulse-reaction

$KE + \text{pressure} \rightarrow EE$

Eg: Parson's turbine



- Partial expansion of steam \rightarrow fixed blade

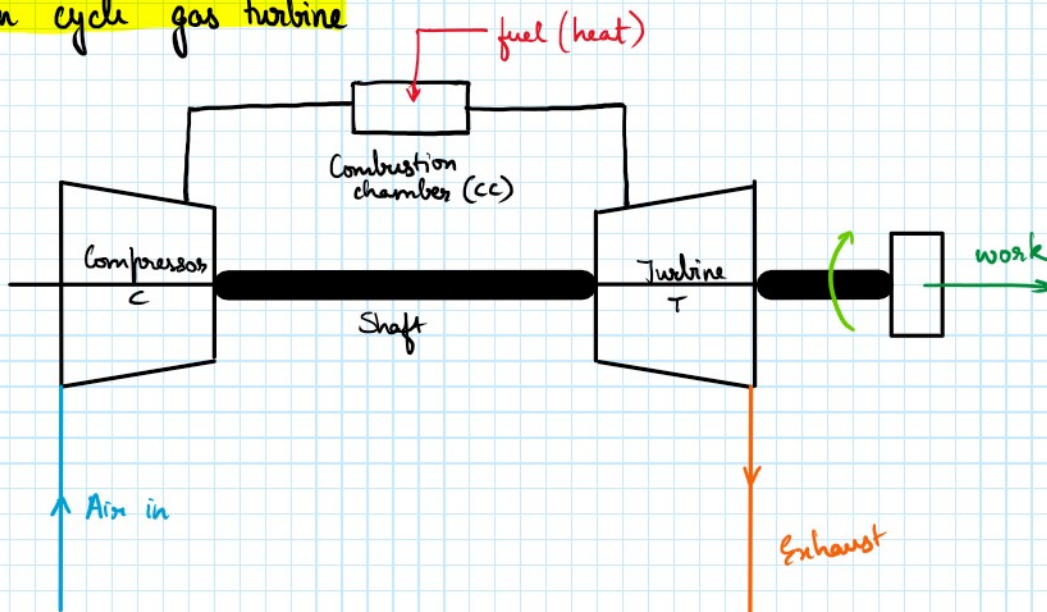
- Complete expansion of steam takes place in nozzle.
- Blades are symmetrical
- No change in pressure b/w ends of the moving blade.
- Low efficiency.
- High speed
- Less floor area for power generation
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more compact
- Small power generation
- Less stages for generation

- Partial expansion of steam → fixed blade
Further expansion → piston blade
- Blades are non-symmetrical (aerofoil)
- Pressure drops from inlet to outlet of the blade
- Relatively high efficiency
- Relatively low speed
- More floor area for power generation
↓
Bulky
- Medium & large
- More stages

GAS TURBINE

- Rotating type prime mover
- Converts heat energy of gas into mechanical work

Open cycle gas turbine



Closed cycle gas turbine

