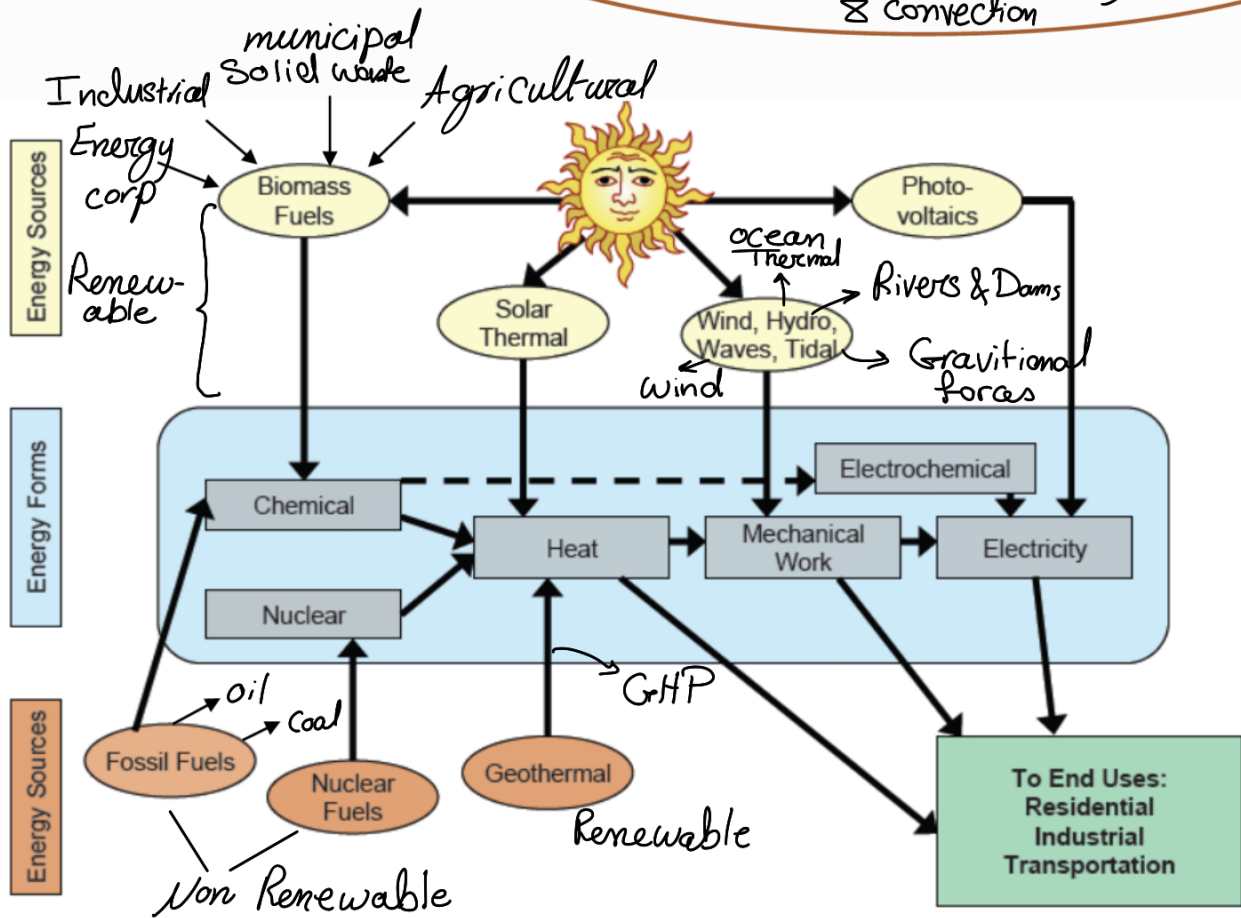
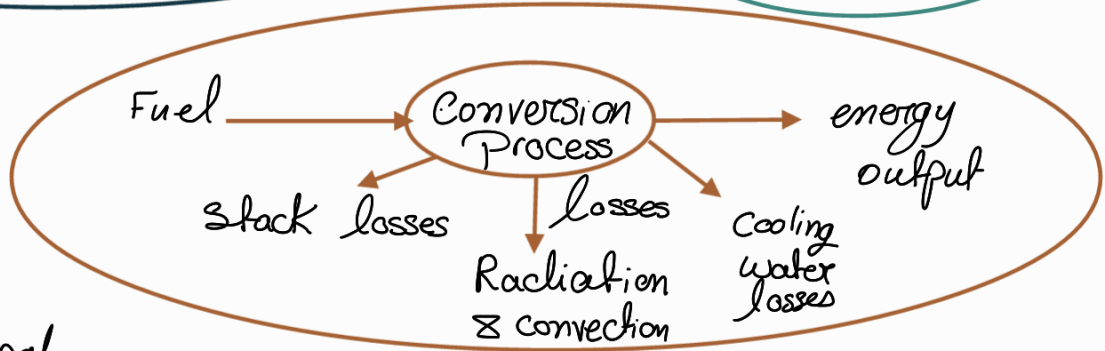
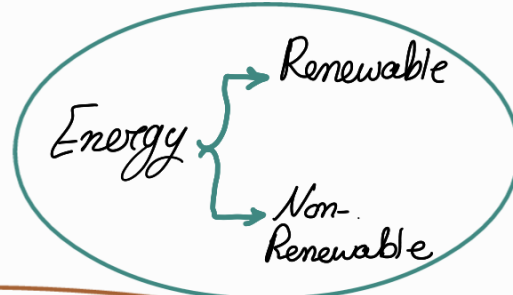
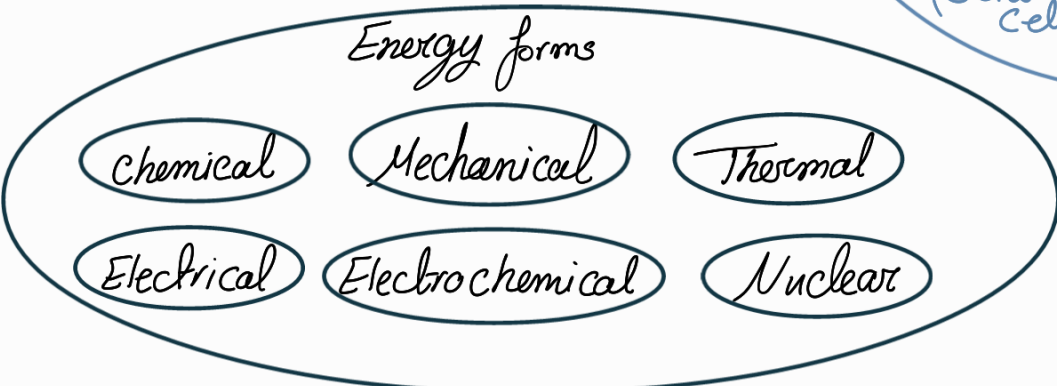
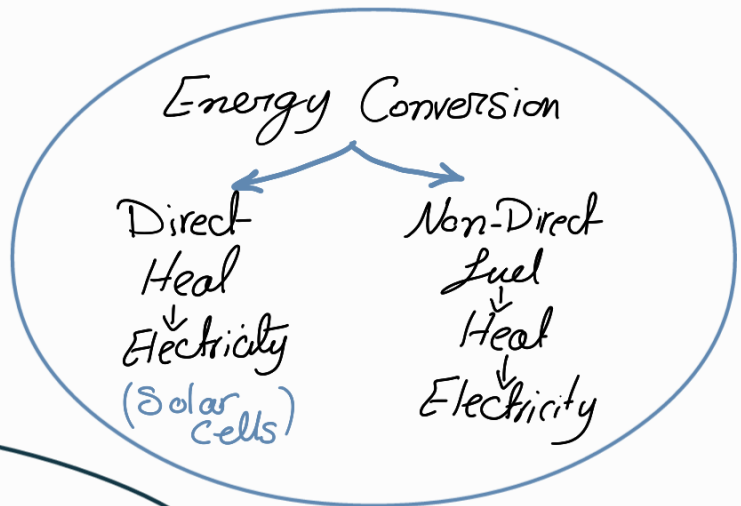
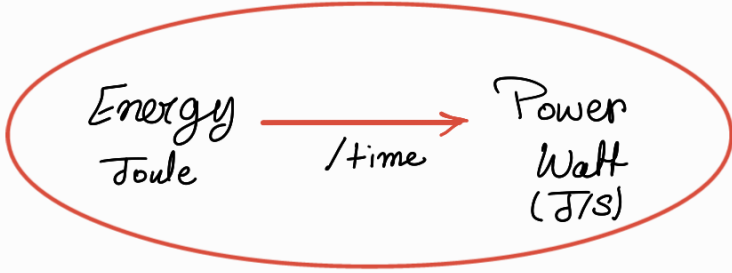
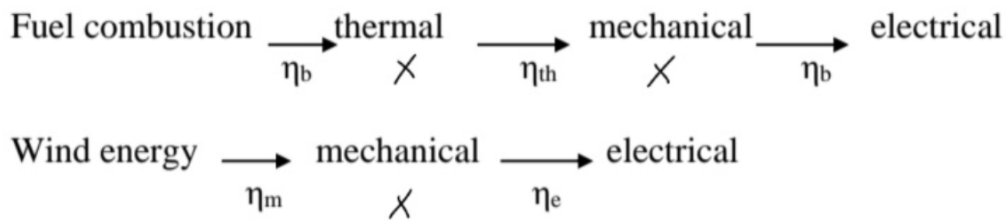


# Energy Conversion Principles



# Energy Cost-

Energy Conversion Processes are irreversible



## Energy Cost-

1. Operating cost- : operation & maintainana + fuel
2. Fixed Cost- : initial investement / independant of production
  - Interest-
  - Taxes
  - Insurana
  - General salaries and General maintainana
  - Depreciation → Sinking fund method

### Sinking fund

Annual Deduct. →  $A = S * i / \left[ \left( 1 + \frac{i}{y} \right)^{ny} - 1 \right]$  → useful life

Sinking fund      interest rate      Annual contribution

$$S = P - P * S\%$$

### FCR → interest → Depreciation

$$FCR = \left[ i + \frac{i}{(1+i)^n - 1} + insurance + taxes \right]$$

## Annual Cost

$$\text{Total Annual Cost} = \text{Annual Operation} + \text{FCR} \times \text{Capital cost.}$$

## Energy unit cost

$$\text{COE} = \frac{\text{FCR} \times \text{Capital cost} + \text{Annual operation cost}}{\text{Annual Generate Energy}}$$

rated Power  $\times$  load factor  $\times$  8760

## Payback Period

$$\text{P.P} = \frac{\text{additional investement}}{\text{annual savings}}$$