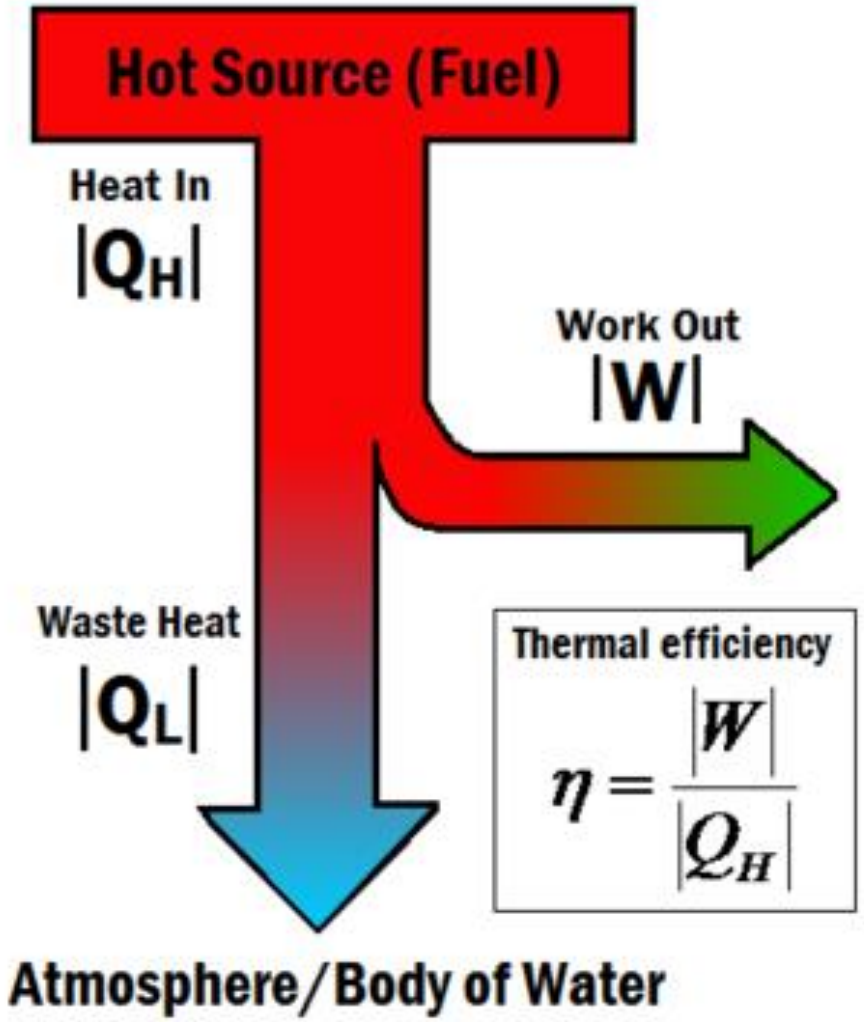
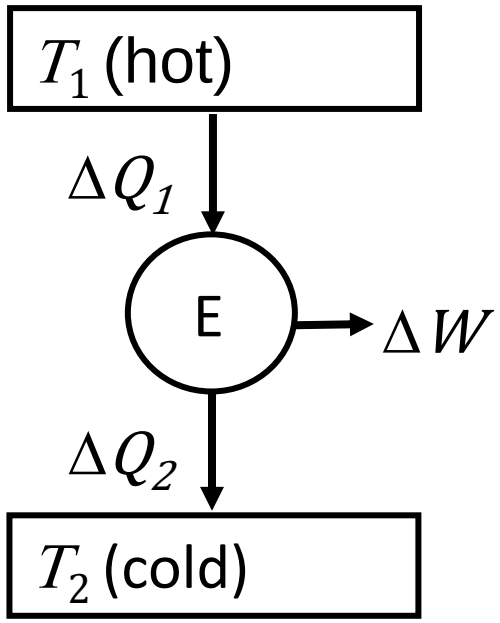
Efficiencies



What information do we get

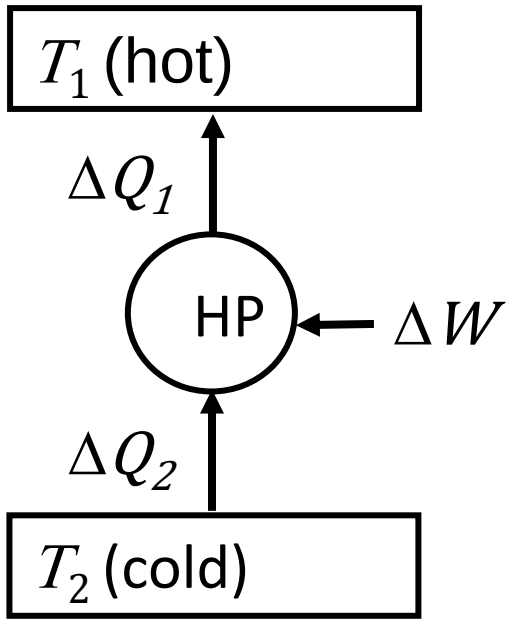
- Ratio of “energy” got out vs. “energy” put in
- Heat engine:

- $\eta = \frac{work\ got\ out}{heat\ put\ in} = \frac{W}{Q_1}$



What information do we get

- Ratio of “energy” got out vs. “energy” put in
- Heat pump:
- $\eta = \frac{heat\ got\ out}{work\ put\ in} = \frac{Q_1}{W}$



What information do we get

- Ratio of “energy” got out vs. “energy” put in
- refridgerator:

- $\eta = \frac{heat\ got\ out\ of\ cold\ body}{work\ put\ in} = \frac{Q_2}{W}$