The joule (J): One joule is the work done, or energy expended, by a force of one newton moving one meter along the direction of the force.

\[ 1 \text{J} = 1 \text{N} \times 1 \text{m} = 1 \text{kg m}^2/\text{s}^2 \]

The calorie (cal): 1 cal is the amount of heat required to raise the temperature of 1 g of water by 1 °C.

1 calorie = 4.184 J

First and Second Law of Thermodynamics:

\[ S = \frac{q}{T} \]

\[ \Delta S \approx 0 \text{ (or should be negative) for high quality (or low disorder) energy (electricity)} \]

Max. Eff. = \[ 100 \times \frac{q_h - q_c}{q_h} = 100 \times \frac{T_h - T_c}{T_h} \]

US Energy consumption by source

What is the maximum percentage of heat at 900°C that could be converted into electricity at 100°C?