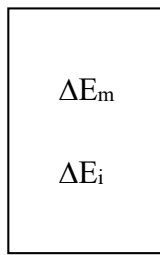


b) 1. Hauptsatz der Thermodynamik

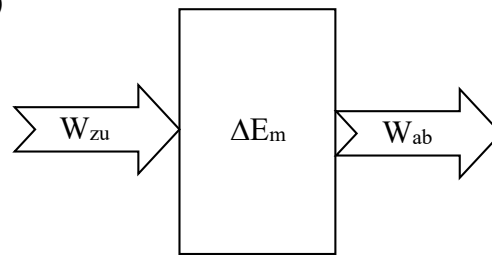
1. a) $\Delta E_m + \Delta E_i = Q_{zu} + W_{zu} - Q_{ab} - W_{ab}$

b)

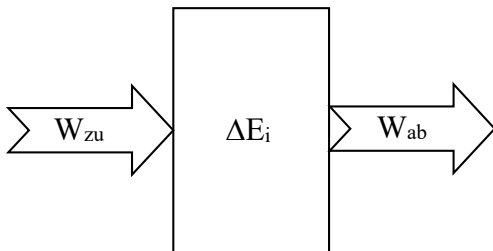


$\Delta E_m + \Delta E_i = 0$

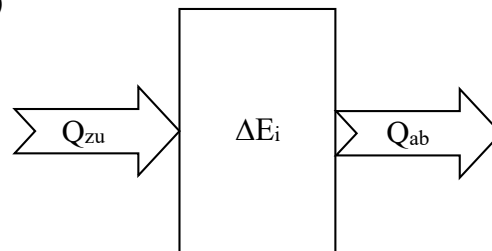
c)



d)



e)



2. 420 m 3. 0,25 mg; 1,8 % 4. a) 9,1 K b) 18 K c) 238 K; 1538 N 5. 3,88 K

6. a) Bewegungsenergie → Spannenergie → innere Energie b) 30,3 m/s = 109 km/h c) 328 km/h

Lösungen II.4

1. 0,25 kJ 2. 67,5%; durch Reibung wird mechanische Energie in innere Energie umgewandelt

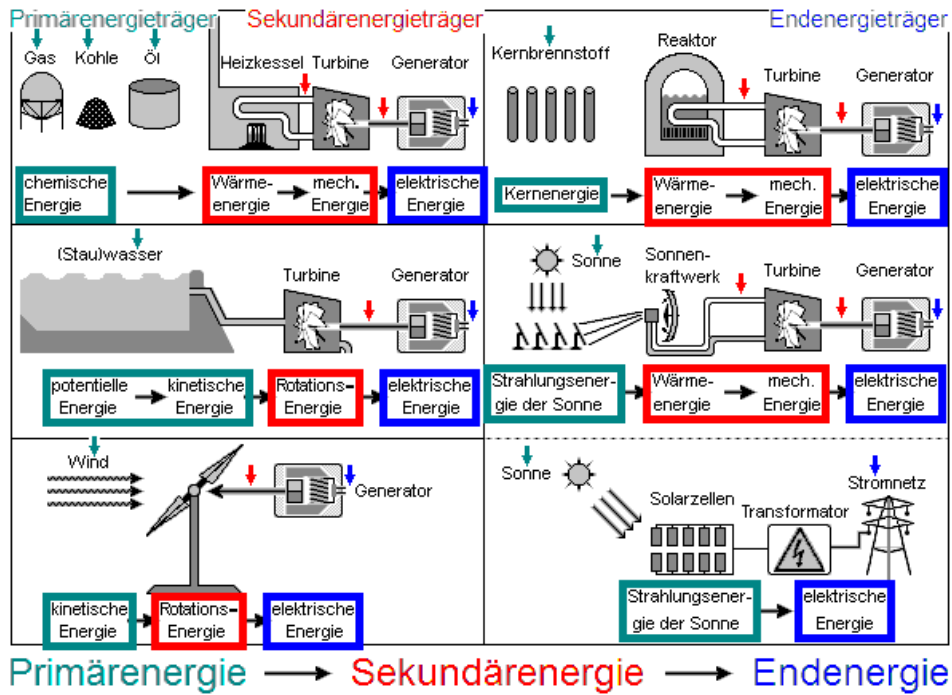
3. a) etwa 2 h b) 102 kW 4. a) 134,4 kJ b) 26%

5. a) 1,9 MJ = 0,53 kWh b) 4,4 h c) 0,39 ℓ

6. a) Glühbirne erhitzt sich (innere Energie!) b) 110 kWh → 19 €

Lösungen II.5

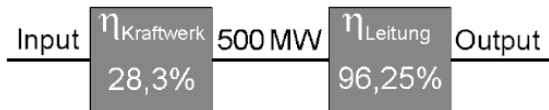
1.



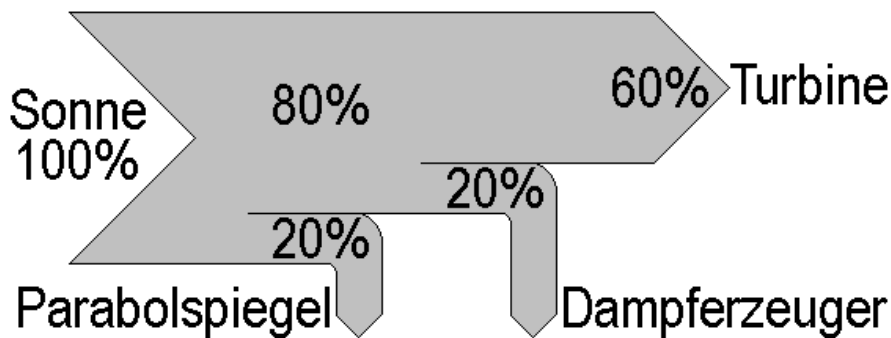
2. $P_{\text{Input}} = 1 \text{ MW}$; $P_{\text{Output}} \approx 0,59 \text{ MW}$; $\eta_{\text{gesamt}} \approx 59\%$

3. $P_{\text{Output}} \approx 33 \text{ kW}$; $\eta_{\text{gesamt}} \approx 28\%$

4. $P_{\text{Input}} \approx 1,77 \text{ GW}$; $P_{\text{Output}} \approx 0,481 \text{ GW}$; $\eta_{\text{gesamt}} \approx 27,2\%$



5. $\eta_{\text{Tur}} = 50\%$; $\eta_{\text{Gen}} \approx 83\%$



6. $\eta_{\text{Heizk}} \approx 76,9\%$; Primärenergiebedarf: $\approx 144\%$; Raffinerieverluste: $\approx 14,4\%$