1. Onsite electrolysis => exercise

- Q: How big an electrolyser is needed to produce the daily amount of H_2 for a filling station (HRS), under the following assumptions?:
  - 1000 cars/day, equivalent of 50 L gasoline/car (LHV_gasoline: 33MJ/L
  - car average consumption : 7L/100km
  - a FCEV consumes 1 kg H_2/100km (HHV_H_2 : 142 MJ/kg)
  - electrolyser efficiency 78% HHV
  - compression energy needed to 400 bar
  - the electrolyser operates 50% of the time

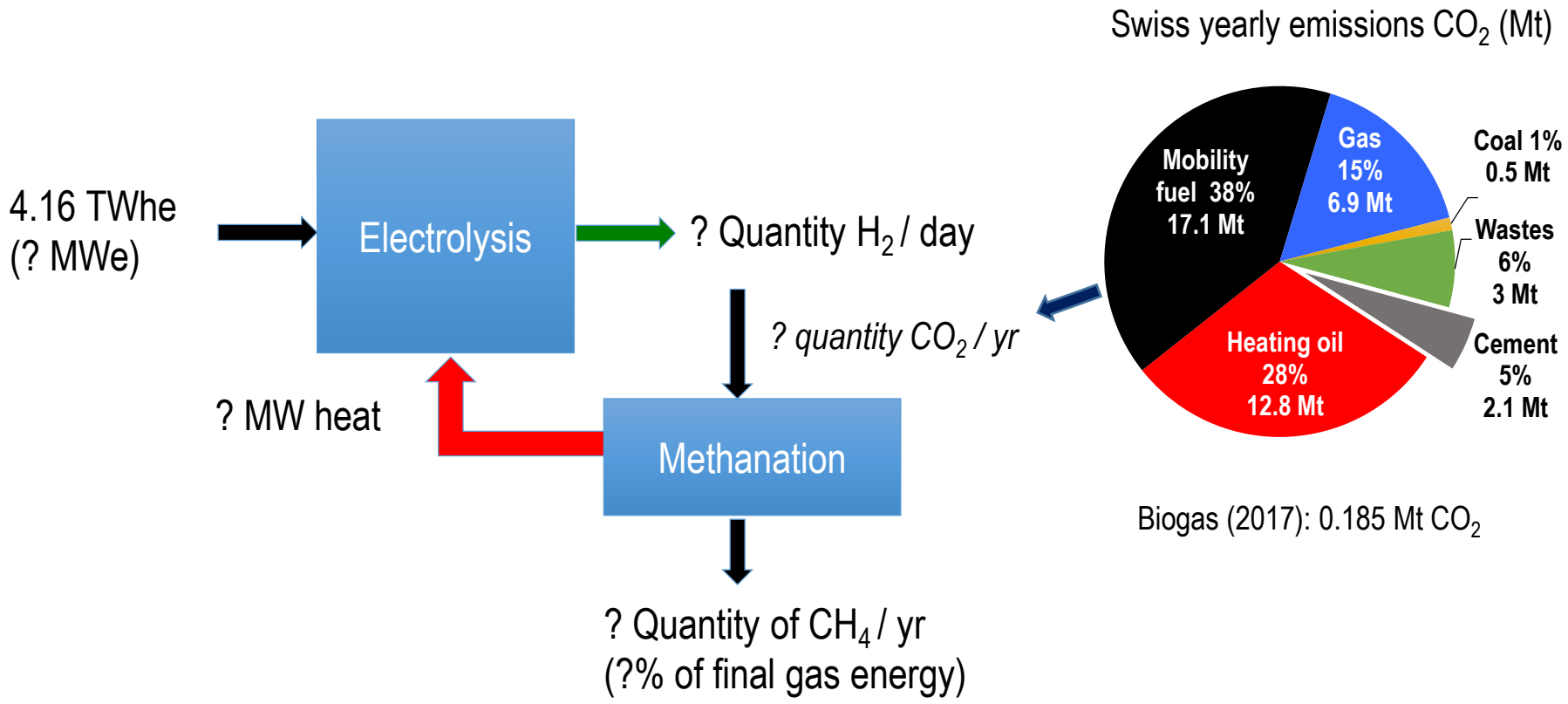
2. Exemple: P2G instead of hydro-pumping (CH - 2017)

Electrolyser efficiency = 90% LHV

Methanation conversion rate = 95%

Energy of formation at 200 C = 177524 J/mol CO2

Assuming the H2 and CO2 enter and leave the reactor at 200C, solve for each missing values.



Objective « 30/30 » of Swiss gas industry: 30% of renewable gas in the grid by 2030