Biorefinery – Hydrogen production

Assignment #3 (due, excel by e-mail, 24 May)

1. Implement CH_4 reforming in DWSIM and
   i. compare with your assignment #2 results for several reactor temperatures, off-gas release to atmosphere, kgCH4/kgH_2 and Lwater/kgH_2.
   ii. vary the water vapour/CH_4 ratio for each temperature, 1-6
   iii. which conditions maximize hydrogen temperature? Discuss the point were you have a compromise between minimum water consumption and maximum hydrogen production.

2. Implement Water gas Shift following the reformer in DWSIM to transform the CO in more hydrogen for reforming condition water/CH_4 =3 (molar basis).

   a) Recalculate kgCH_4/kgH_2 and Lwater/kgH_2 and discuss on how much more hydrogen is produced in comparison with 1.i

   b) How much CO_2eq is emitted in 2.a?. Justify

3. Try to implement an eletrolyser in DWSIM with the same hydrogen production per hour and calculate Lwater/kgH_2 and compare with reforming.