Process Systems Engineering A

Prof. Davide Manca
Dipartimento di Chimica, Materiali e Ingegneria Chimica “G. Natta”
Politecnico di Milano

LAB 3

Calculate the economic potential of level-2 related to the process conditions used in previous lessons considering the following costs of raw materials and products:

Species	**Cost [€/kmol]**
Benzene	12.5
Toluene	8.8
Hydrogen	2.1
Biphenyl	7.4

In the assessment of EP2, consider the value of heat of combustion of products (*i.e.* 4 €/MBtu).

Species	**ΔHc [MBtu/kmol]**
Hydrogen	0.123
Methane	0.383
Benzene	1.41
Toluene	1.68
Biphenyl	2.688

Consider 8000 working hours per year.

Evaluate the EP2 of the process considering the following two scenarios:

- Selling the Biphenyl and burning the Vent ("sell")
- Burning both the Biphenyl and the Vent ("burn")

Provide the following charts:

- Molar fraction of H_2 in the vent vs. Split factor, as a function of temperature
- EP2 (both "sell" and "burn") vs. Split factor, by imposing a selectivity of at least 96%
- EP2 (both "sell" and "burn") vs. Temperature, as a function of the split factor
- EP2 (both "sell" and "burn") vs. Conversion, as a function of the split factor