Feasibility study of low-carbon ammonia production in Europe

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Objective of the study

- Ammonia production: transition to a low-carbon emitting process

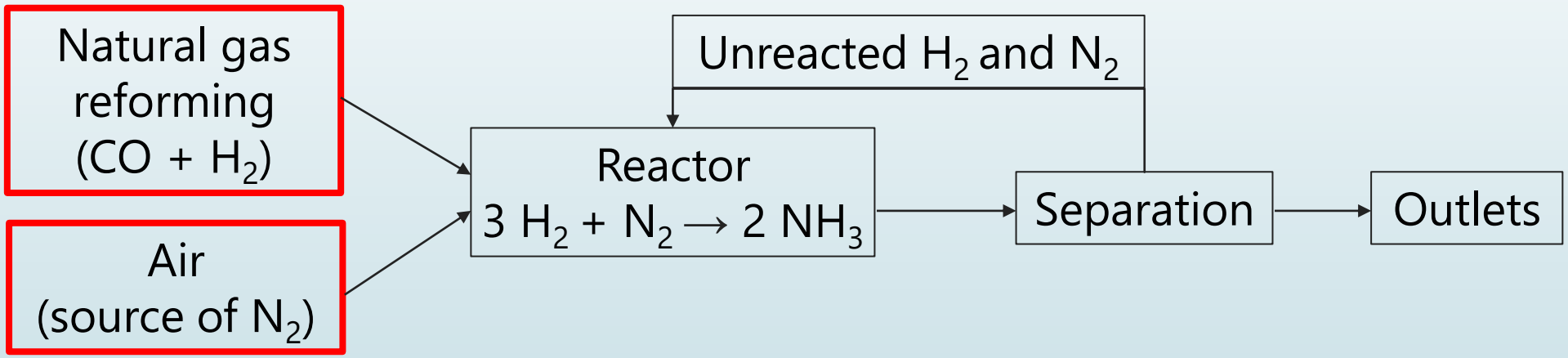
  → technological and economical feasibility for 2030

  → simulation with *Aspen Plus* and cost analysis (*Turton et al.*)

- Decarbonisation through water electrolysis with renewable electricity to produce pure H_2

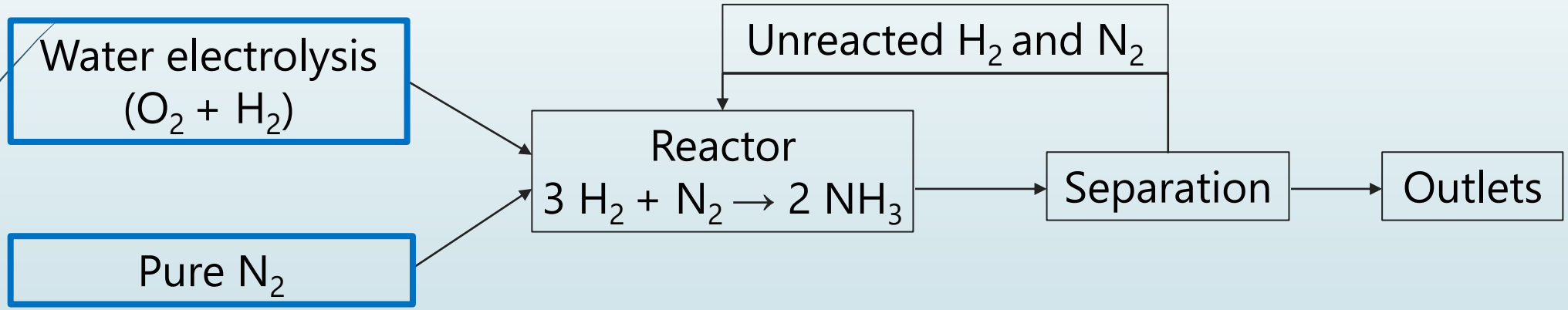
Modelling of the ammonia production

Common plants: → **2 t_{CO2}/t_{NH3}**



Modelling of the ammonia production

Decarbonised plant: → **0 t_{CO2}/t_{NH3}**



Cost analysis

- Main variables influencing the cost:
  - **Electricity price**

  (large consumption for the electrolysers)
  - **CO_2 emissions costs**

  (competitiveness compared to common processes)
  - **CAPEX**
  - **Raw material/product prices**

Cost analysis – electricity price

- Common ammonia plants:

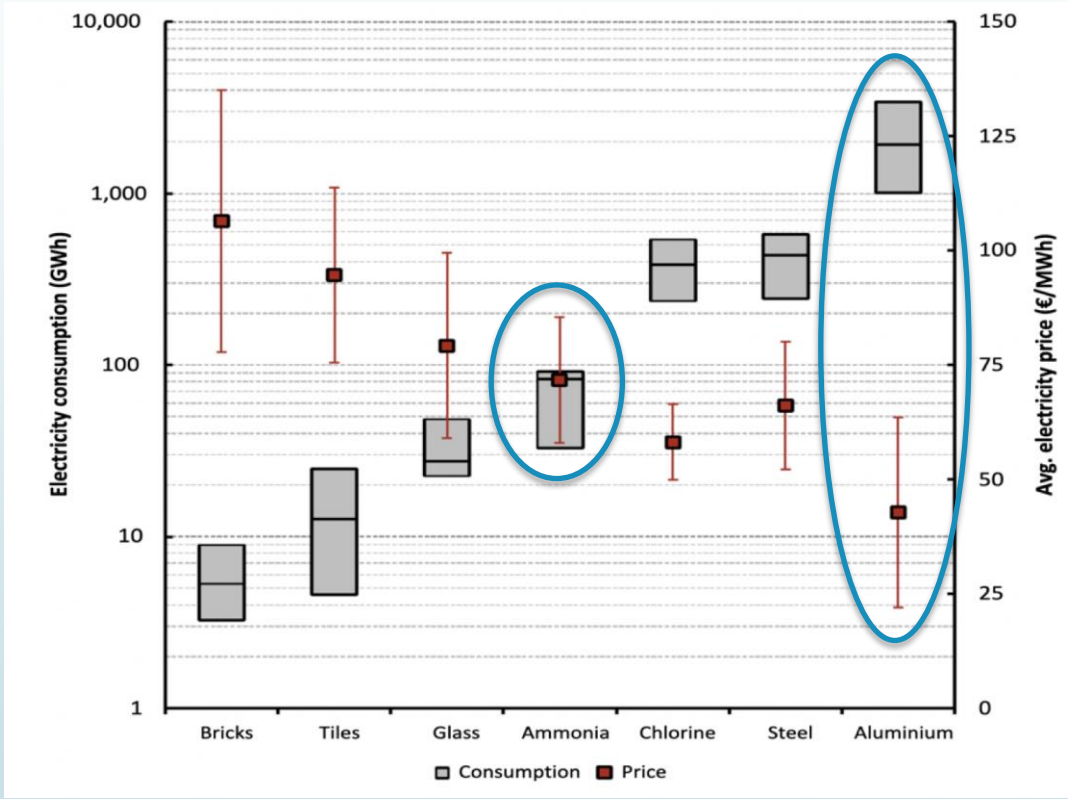
  70 €/MWh

- Decarbonised plant:

  40 €/MWh

- Peak shaving approach:

  30 €/MWh



Conclusion

Assumptions to be economically viable:

- Low electricity price
- Increase of the cost of the CO_2 emissions

This study only makes sense if the electricity is produced from renewable energies.

Thank you for your attention
Any question ?