



Fuels and Chemicals from Biomass and Waste

RESEARCH | TECHNOLOGY | CATALYSTS

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Headquarter (Lyngby)

Turnover 2008: ~5 mia kr
Catalyst volume: 40.000 tons

2000 employees

- 1700 in Denmark
 - 300 in R&D
- 300 abroad



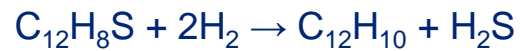
Catalyst prod. in Fr.sund



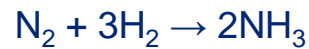
Catalyst prod. in Houston, Tx

Technology to Fuel, Feed and Clean the Planet

- Hydrotreating



- Ammonia



- Sulphuric acid



- Hydrogen plants



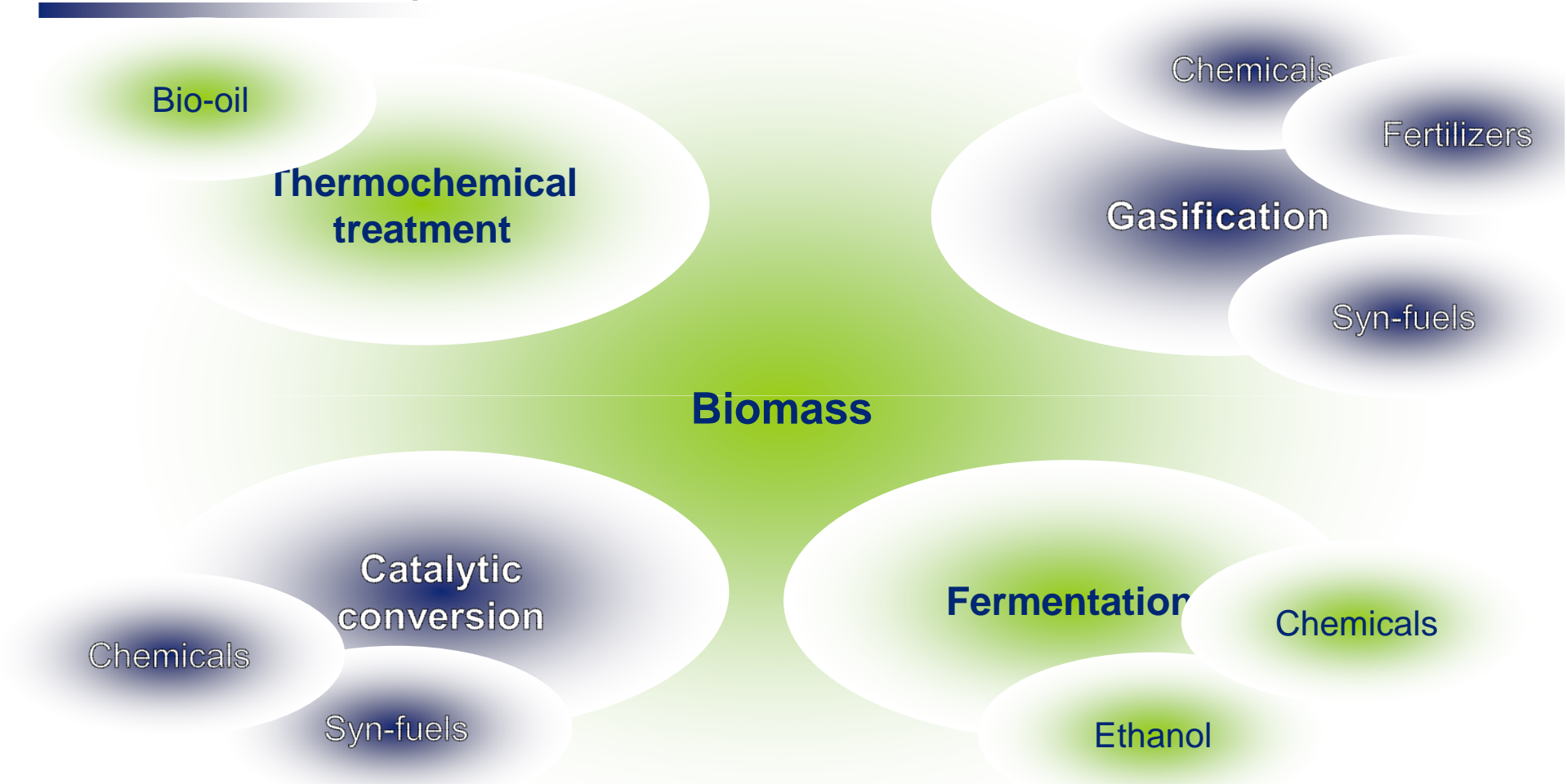
- Emission control

- Power sector

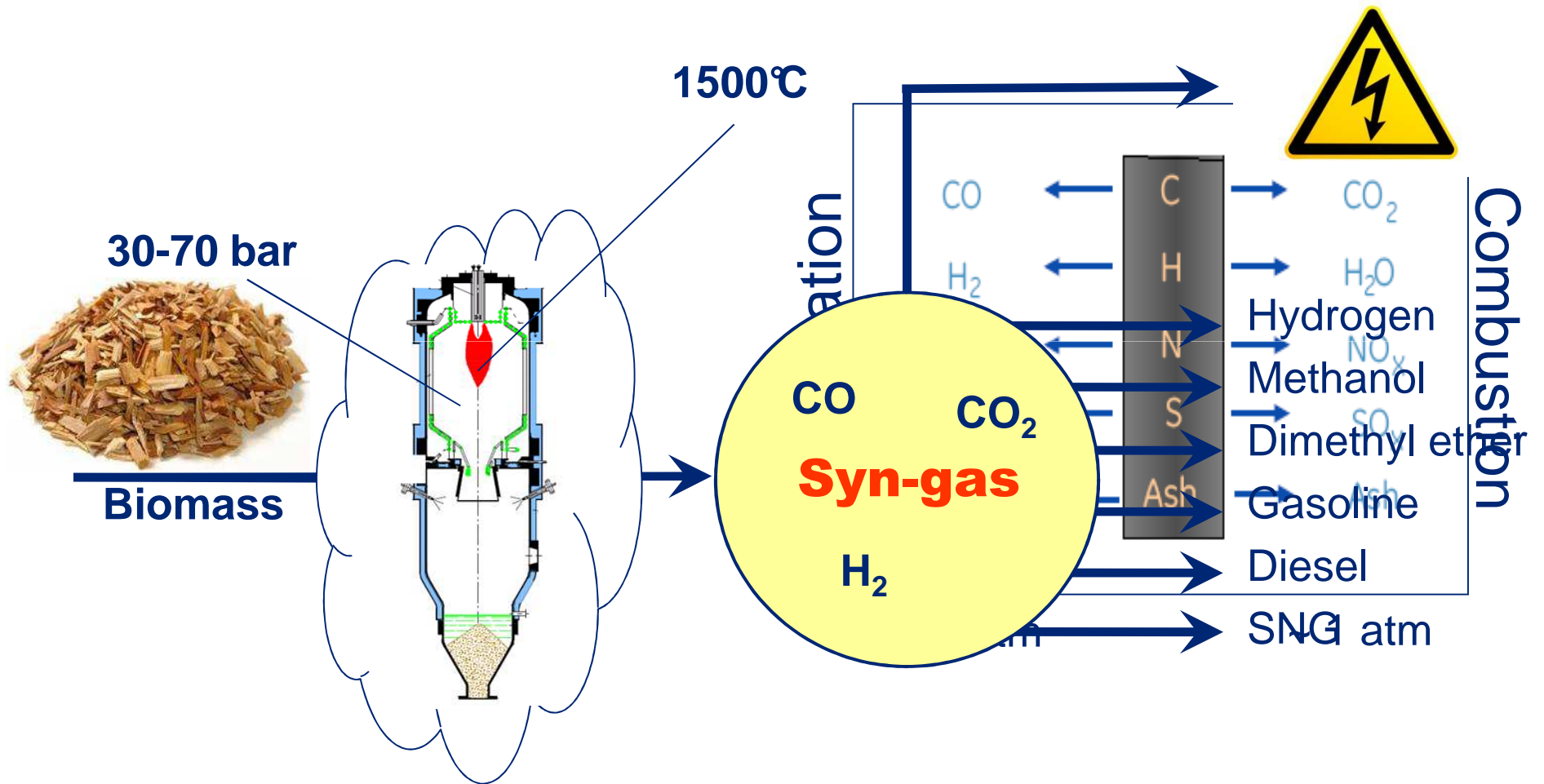
- Diesel truck producers



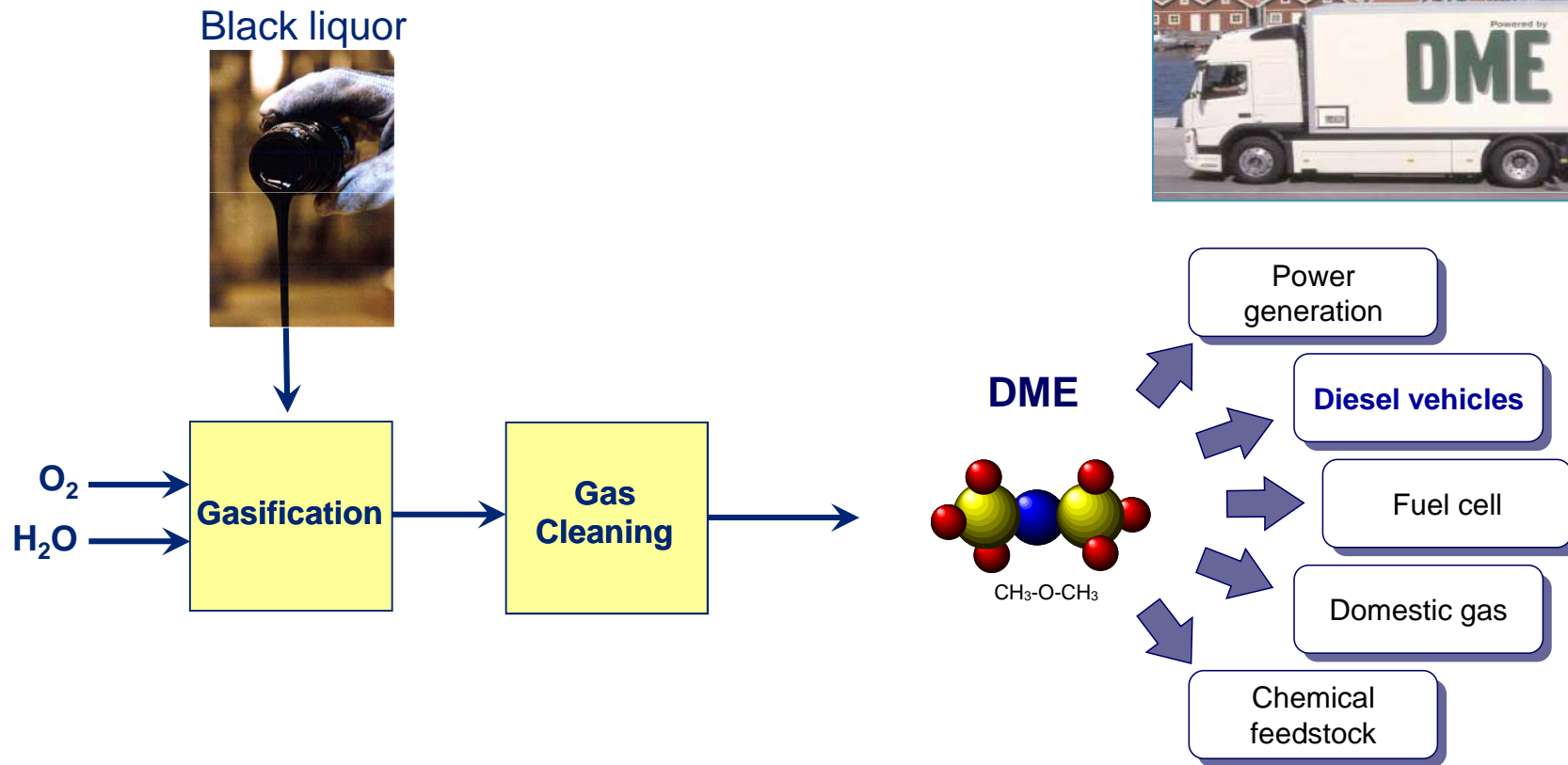
Conversion Options for Biomass



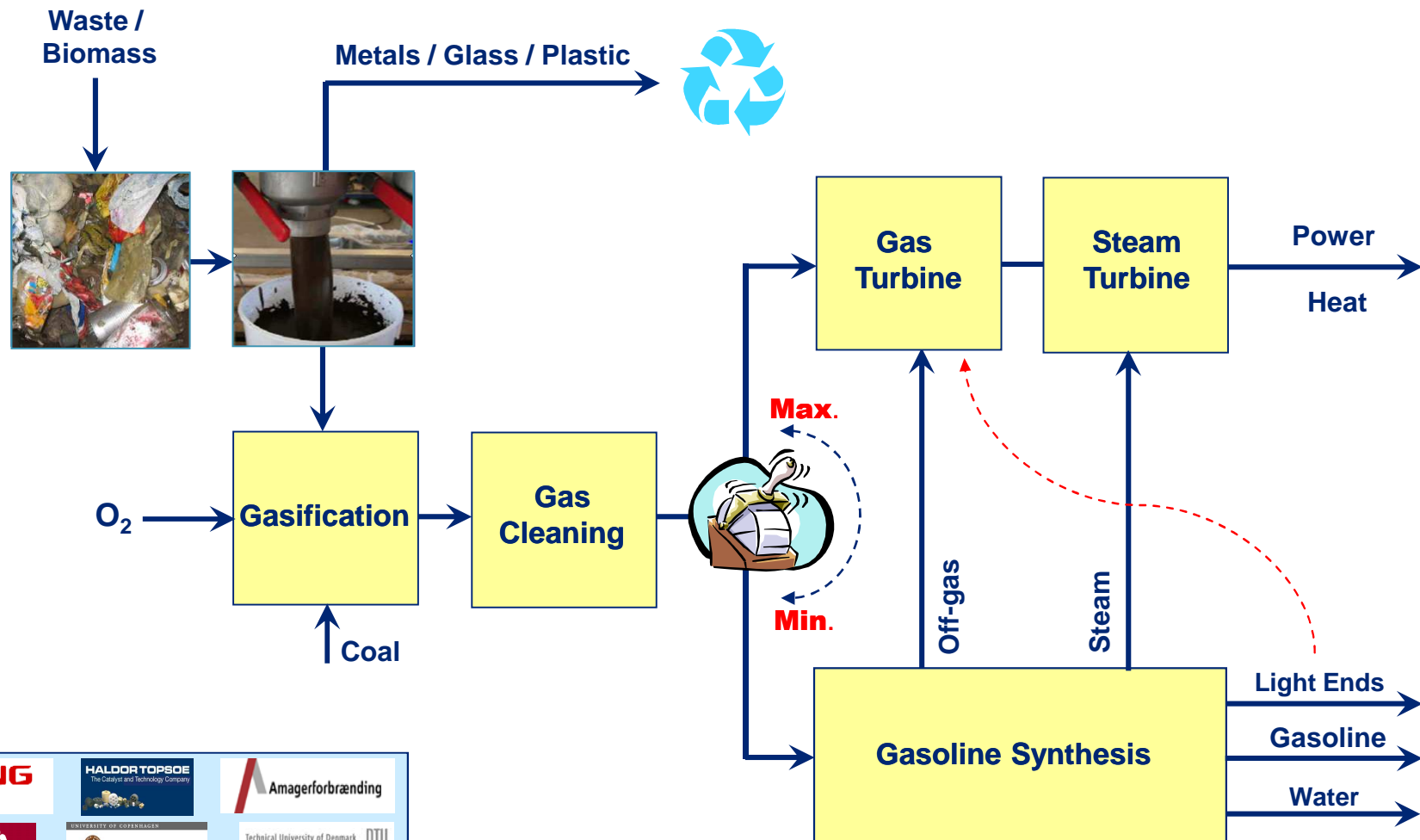
Gasification



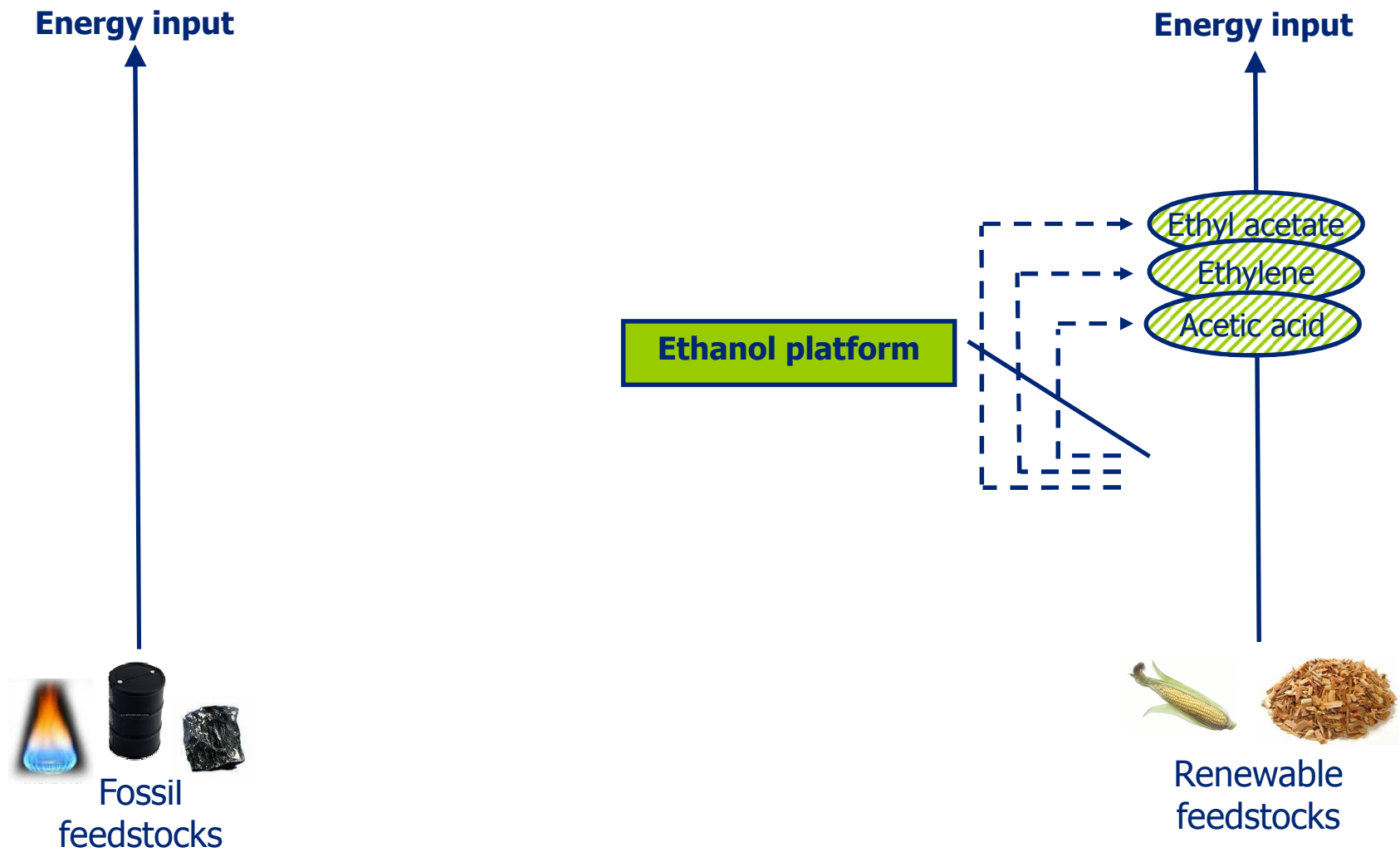
Dimethyl ether from Black Liquor



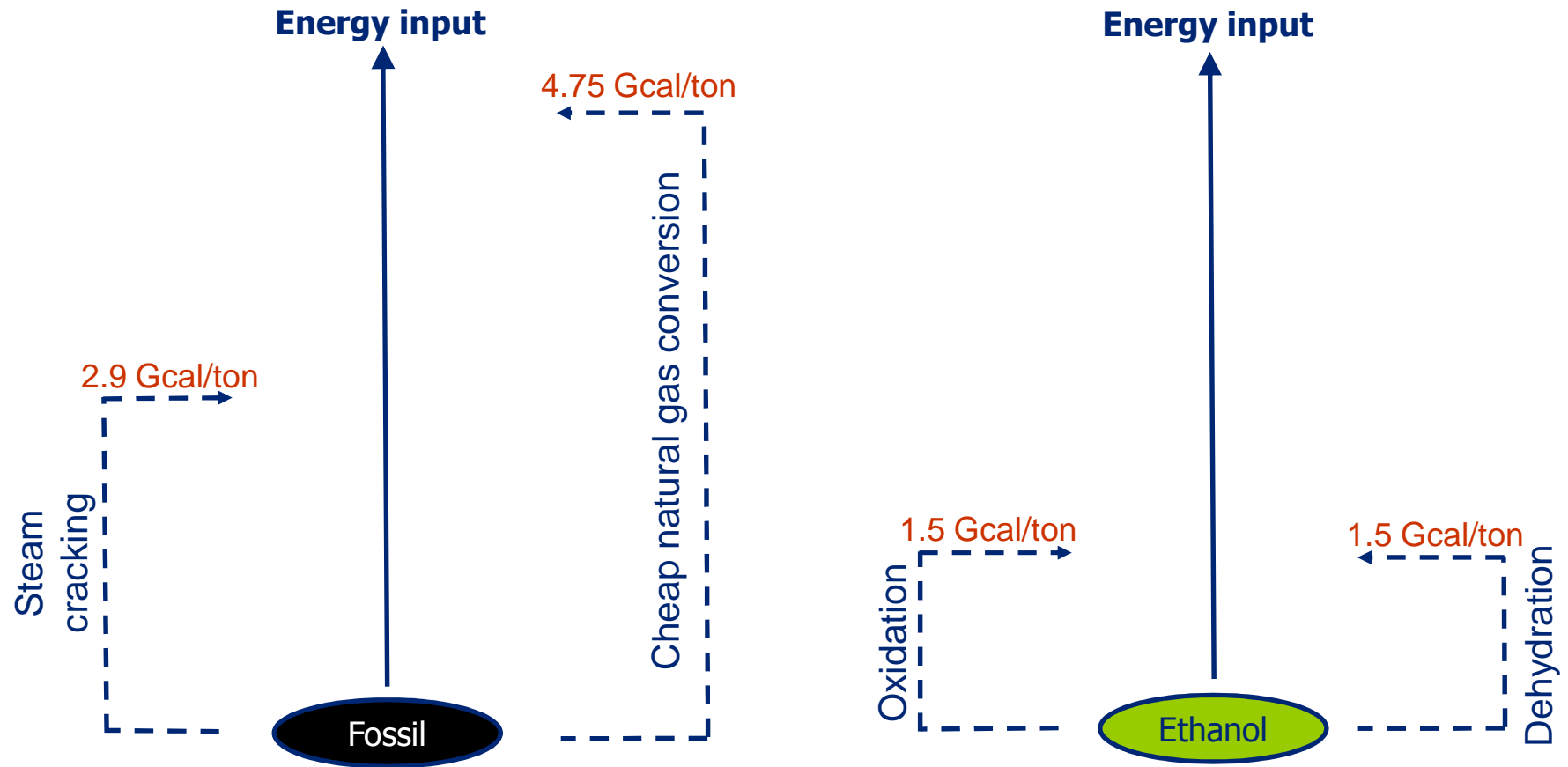
Waste Processing and Biorefinery Integration



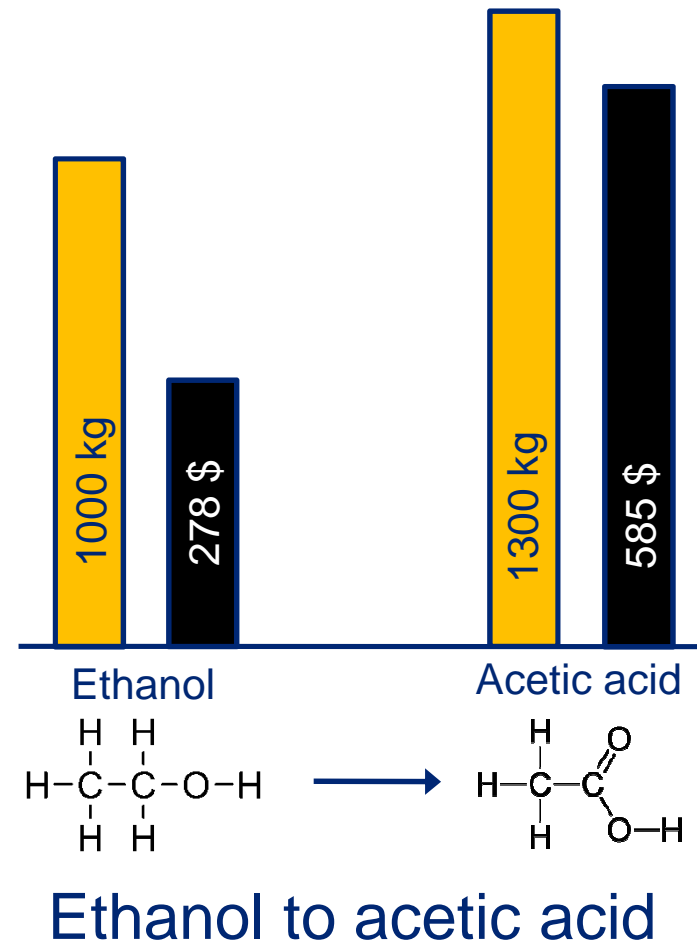
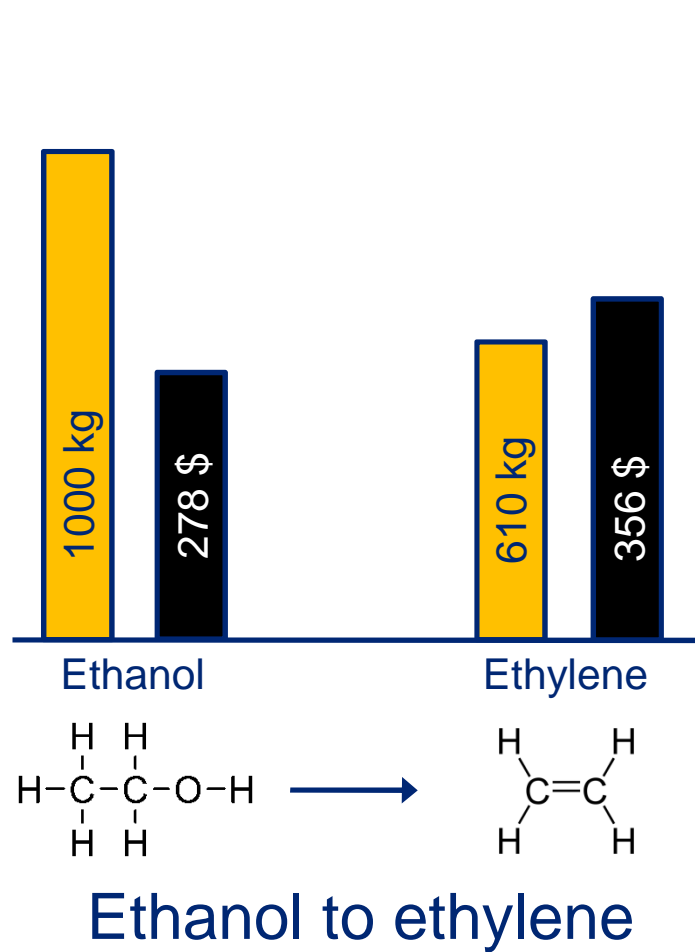
Energy Input for the Production of Chemicals



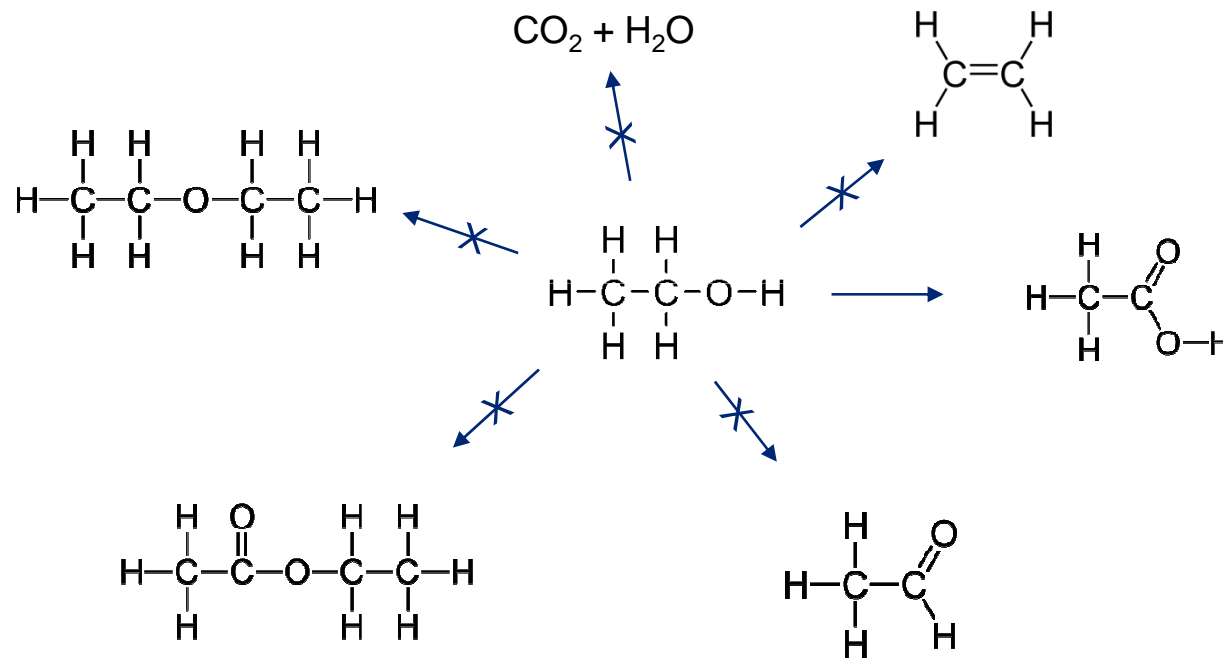
Energy Efficiency: Ethylene and Acetic acid



Economic Evaluation: Ethylene and Acetic acid



Oxidation of Ethanol to Acetic Acid



Tunable parameters

- Temperature
- Pressure
- Catalyst
- Feed composition
- Oxygen amount

Conclusion

- The production of chemicals is in some cases the best use of our limited bio-resources.
- Conversion of waste to energy will become an important aspect of future resource management.
- New business opportunities will emerge as the renewable chemical industry becomes established.

Thank you for your attention!

