

Synthetic Methane for Power Storage

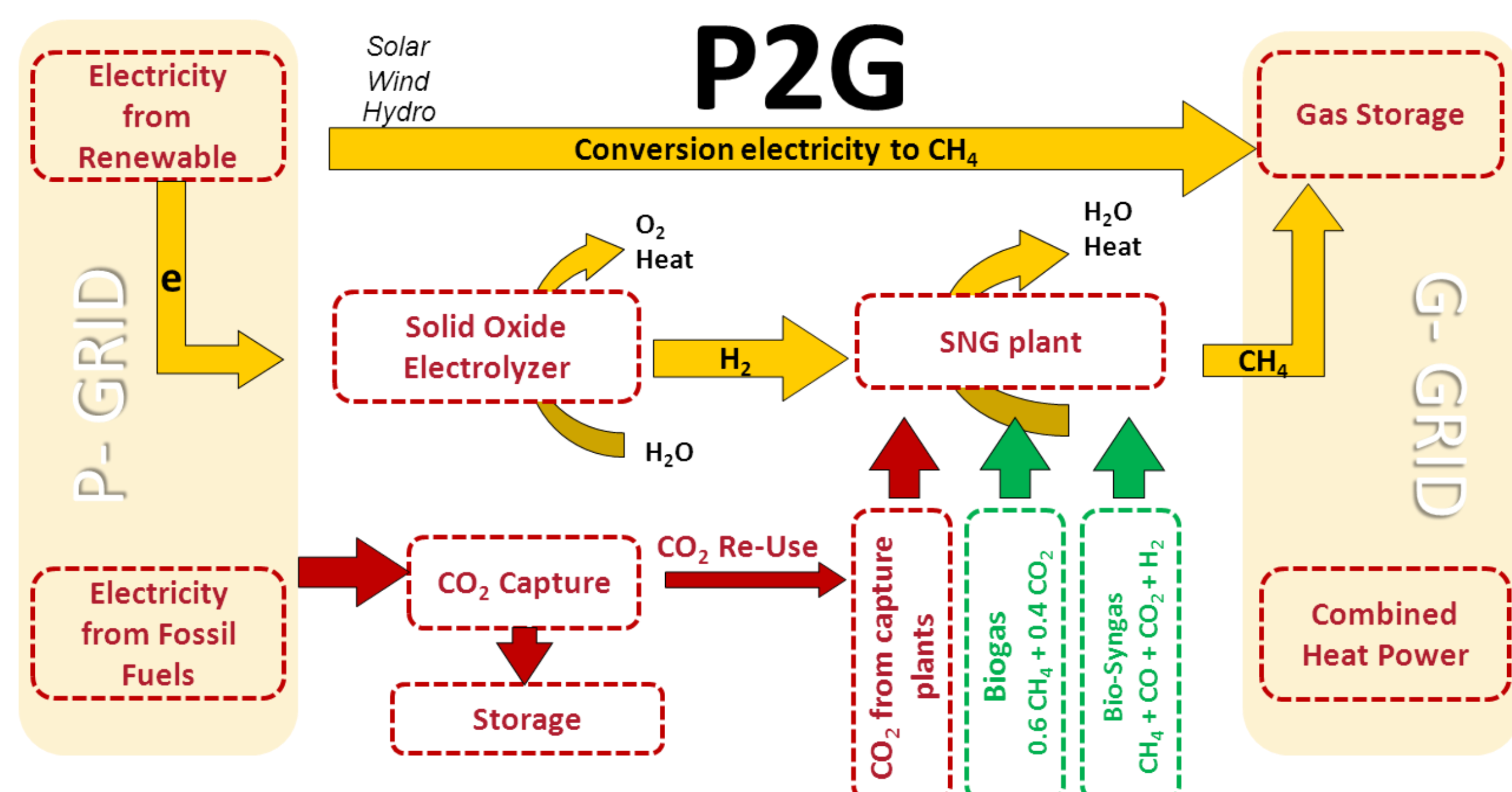
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With increased share of energy generated from variable renewable sources, storage becomes a critical issue to ensure constantly balanced supply/demand. Methane is a promising vector for energy storage and transport.

High efficiency Conversion Chain

- Connect power grid with gas grid
- Hydrogen production from power surplus by high temperature electrolysis
- CO₂ methanation
- High thermal efficiency / System Integration



Matching variable supply

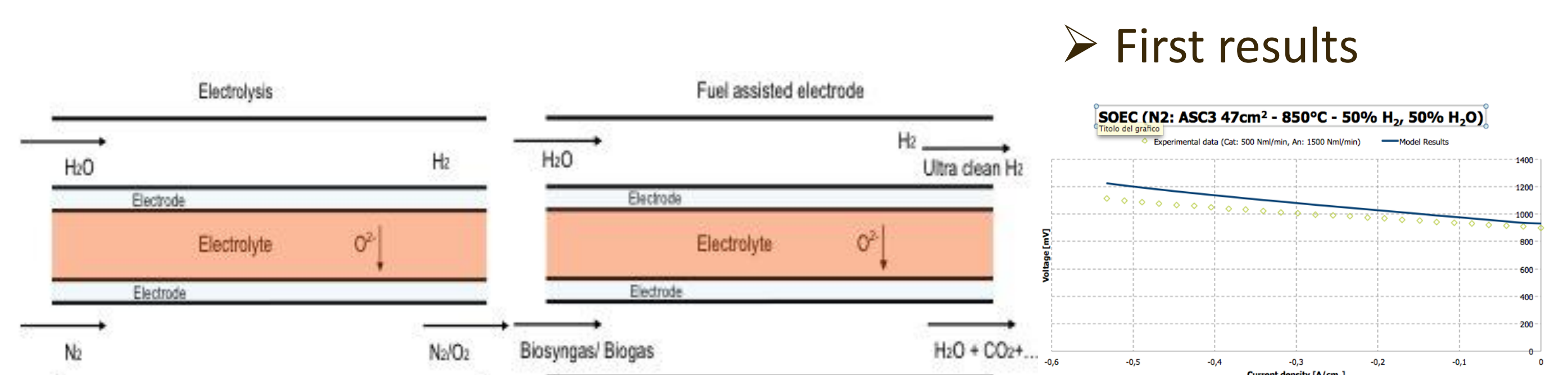
- Electrolyser versatile operational regime:
 - Full electric mode (SOE)
 - Fuel Assisted mode (FA-SOE)
 - Fuel cell mode (SOFC)
- Methanation of CO₂-rich gas streams:
 - Biogas
 - Producer gas (from gasification)
 - CO₂ from industrial processes
- Response to variable operational conditions
- Appliance response to synthetic methane

Acknowledgment

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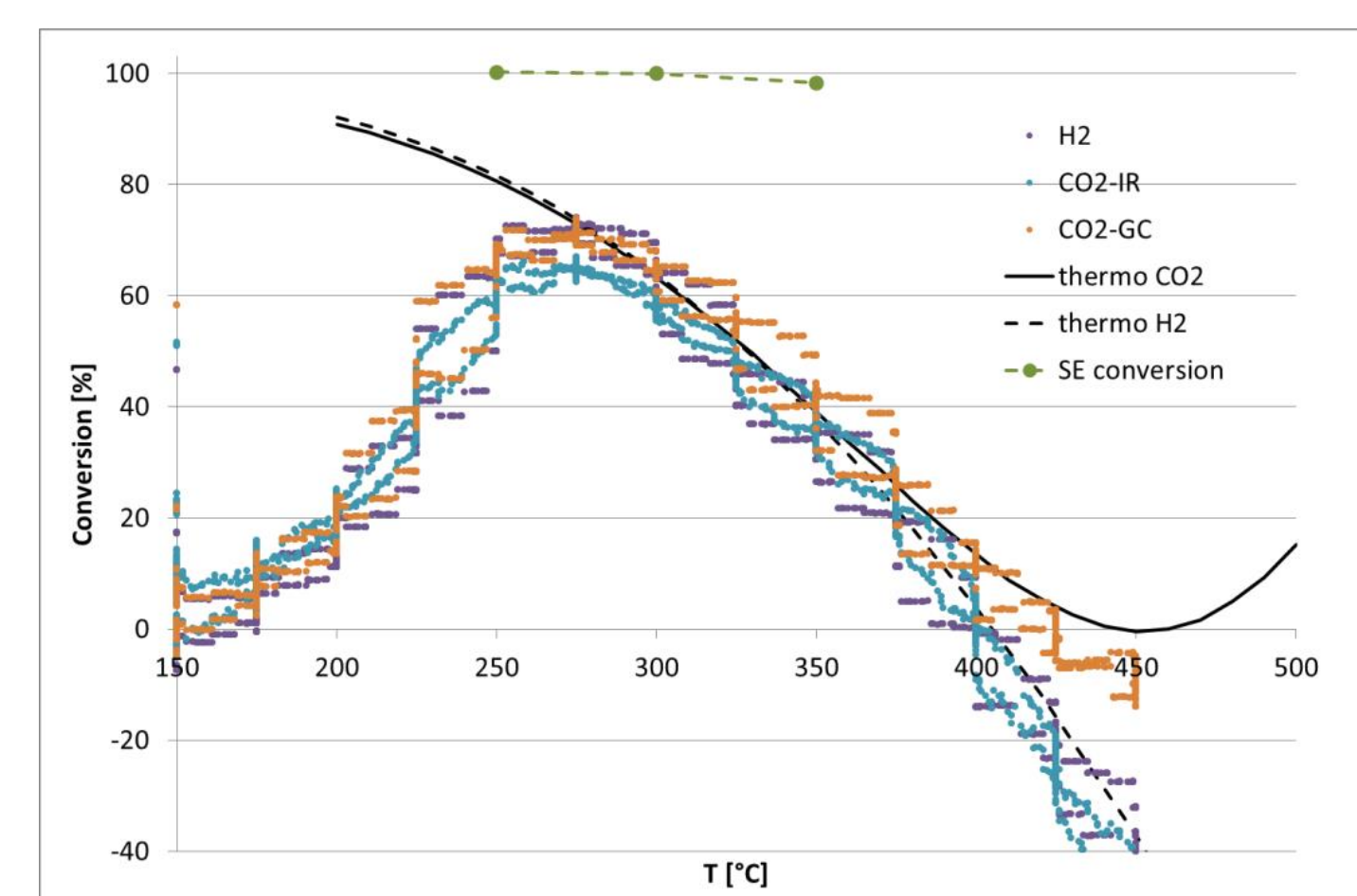
Solid oxide electrolyser cell

- Development of mathematical Models for SOEC and FA-SOEC and thermodynamic analysis of electrolyser integrated systems
- Identification of suitable cells, theoretical and experimental evaluations
- Applications of clean synthetic methane, CHP/ μ CHP



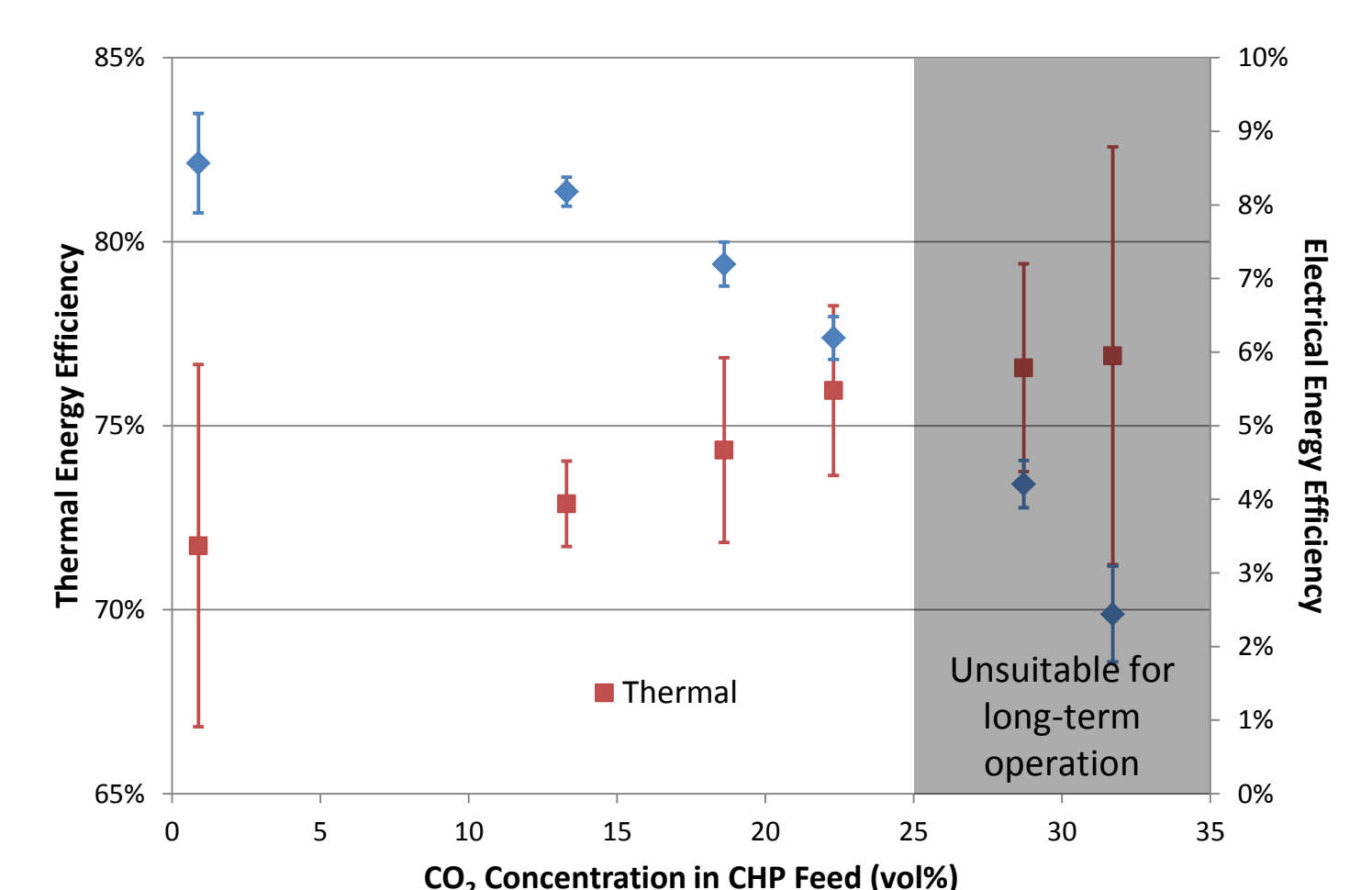
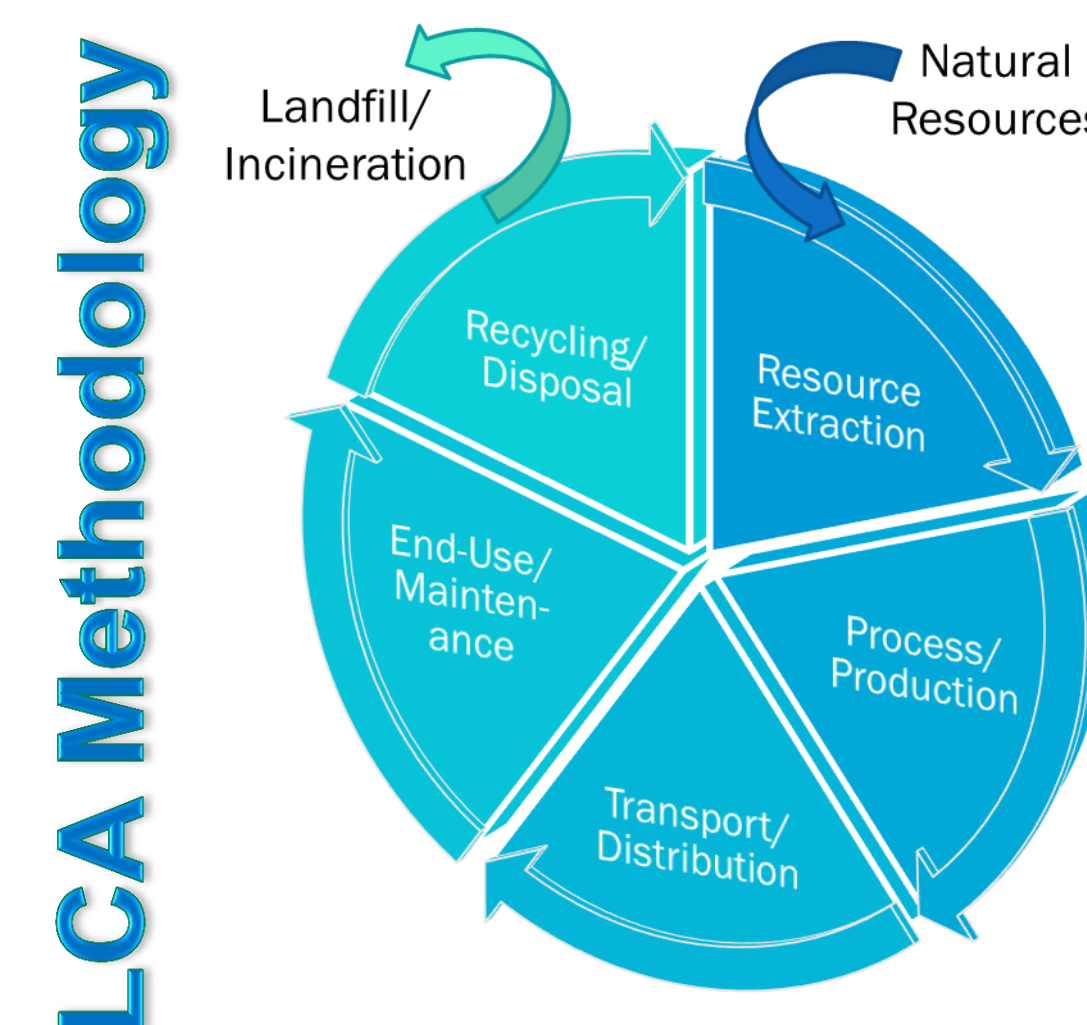
Innovative methanation

- Complete conversion, high methane quality
- Match high specification requirement at low operating pressure
- Stable response to variable supply
- Conceptual design and integration with SOE



Well-to-wheel efficiency: Life Cycle Analysis (LCA)

- End-point applications: co-generation (CHP) and solid-oxide fuel cell applications evaluated by teams of undergraduates [EnTranCe].
- LCA's, first streamlined, then comprehensive, performed by M.Sc. [EUREC] students using SimaPro software, based on ISO 14044:2006.



Partners / Project team



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