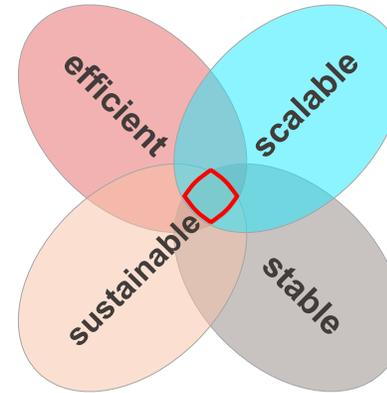


What is the status of clean solar fuel technology?

Prof. Sophia Haussener

Laboratory of Renewable Energy Science and Engineering
Ecole Polytechnique Fédérale de Lausanne

- A solar fuels device that is worthwhile to scale has to simultaneously optimize:
 - Performance
 - Cost
 - Sustainability
 - Lifetime

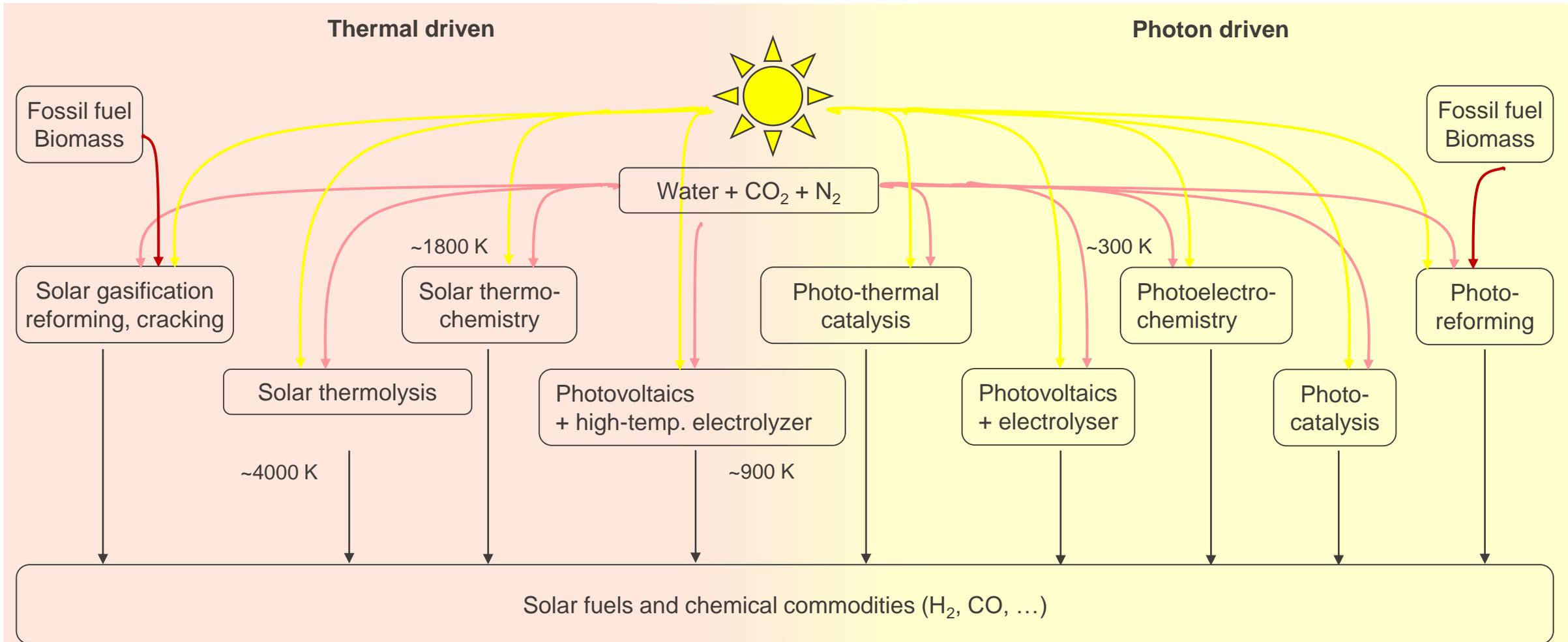


... and needs to be built as a large-scale / scaled system

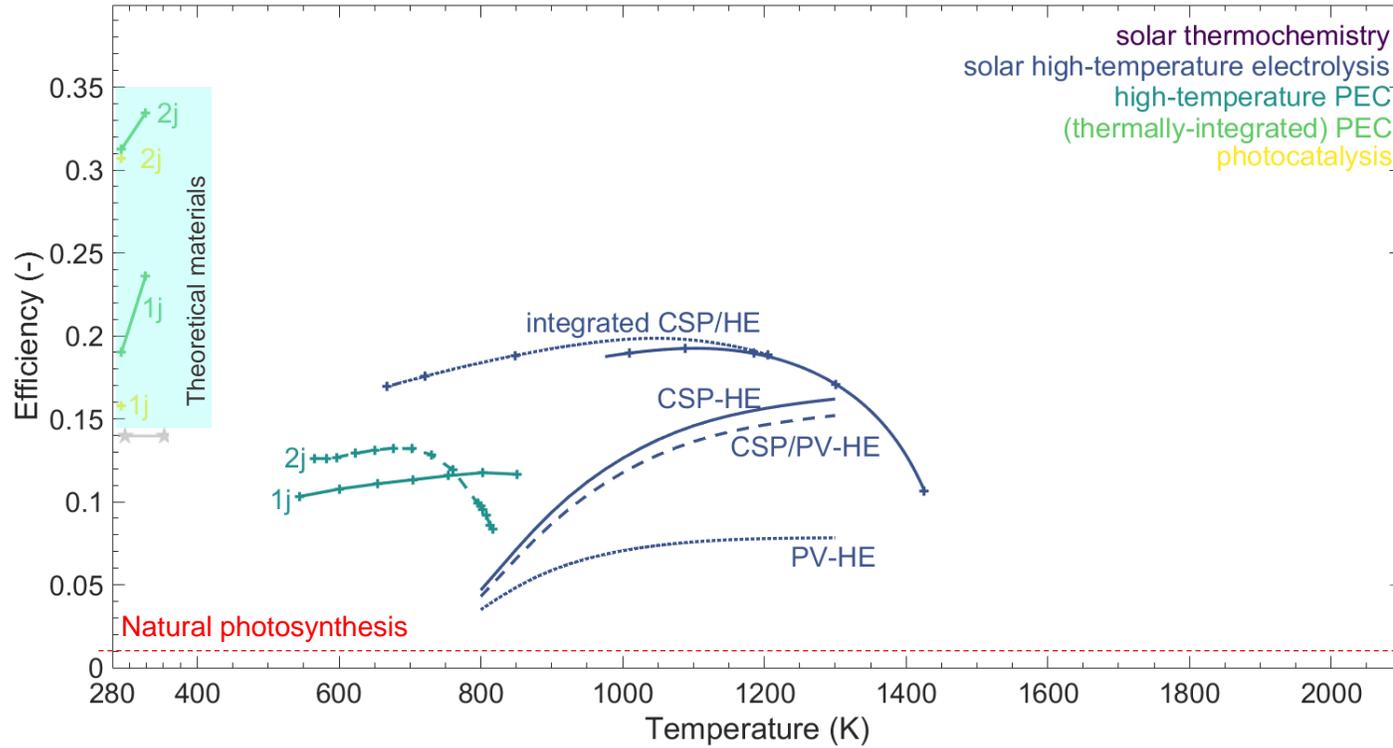
- Why direct solar fuel synthesis?
 - Is cheaper than indirect systems (e.g. PV+electrolysis)
 - Decentralized (where sunlight there is solar fuel)
 - Democratization of energy
 - Restructures supply chain (production where needed)
 - Reduces pressure on energy infrastructure

Technical Solar Fuel Approaches (Non-Biological)

- Thermal and photon-driven, and combinations thereof

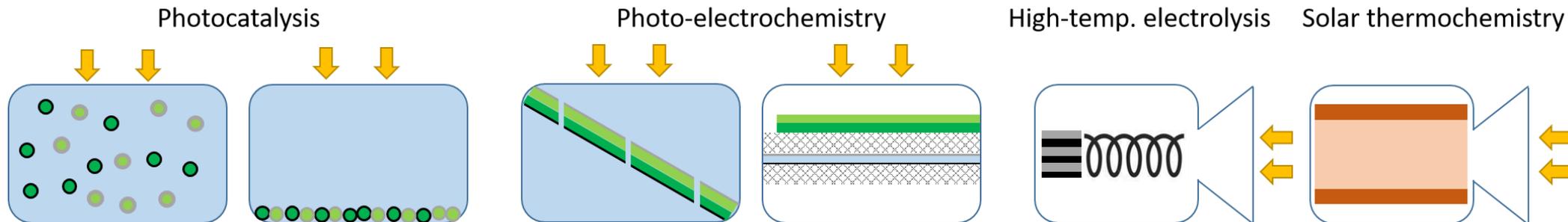
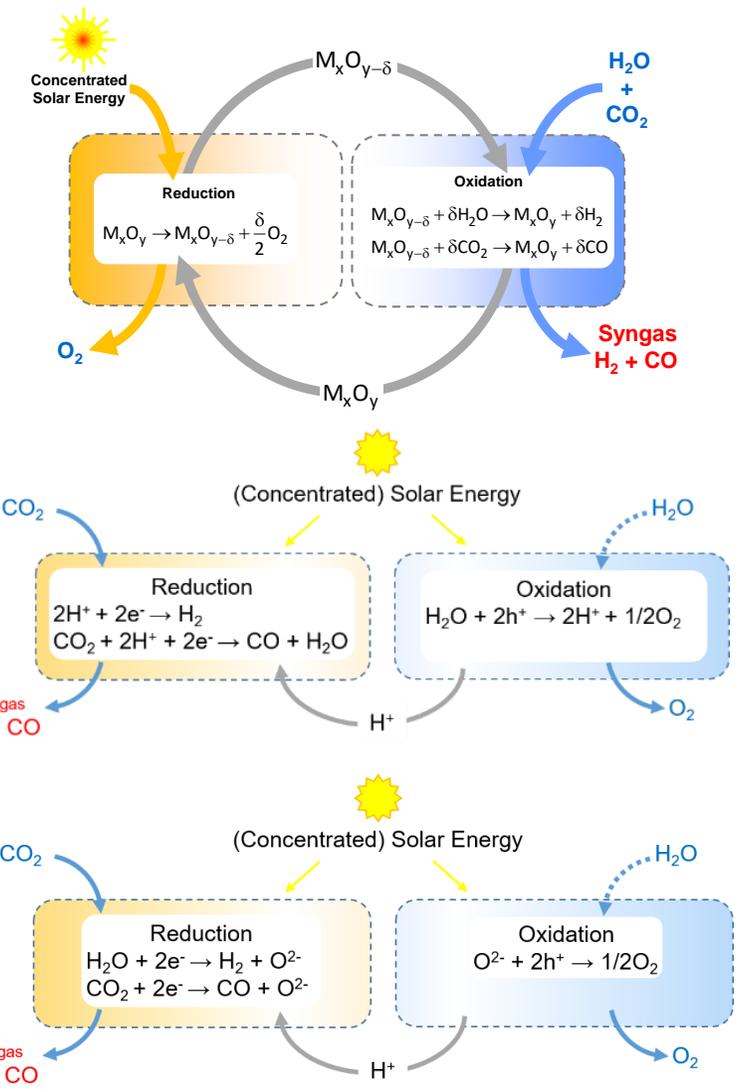


Theoretical Efficiency Limits



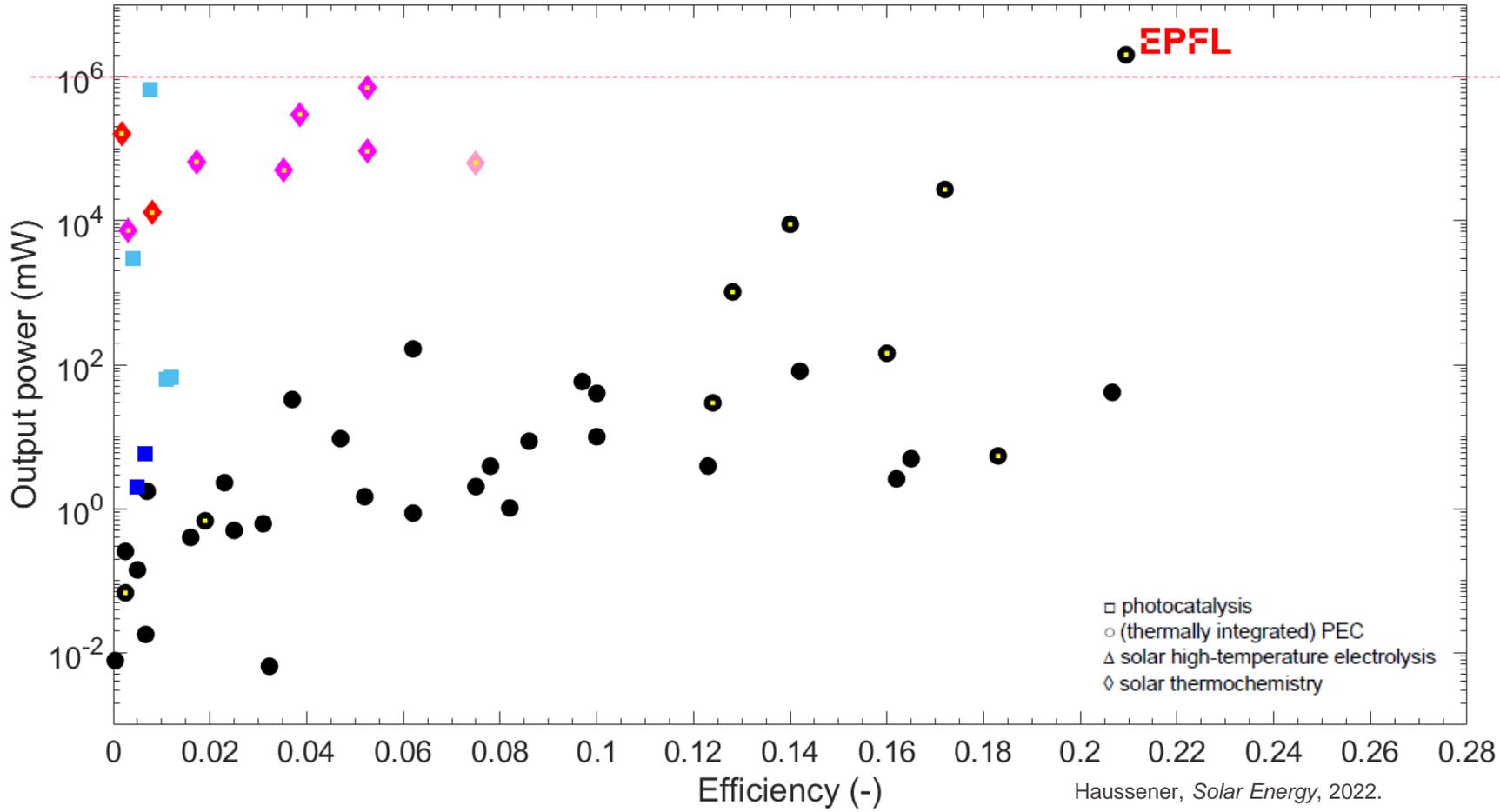
solar thermochemistry
solar high-temperature electrolysis
high-temperature PEC
(thermally-integrated) PEC
photocatalysis

Haussener, *Solar Energy*, 2022.





Comparison - Scale



EPFL



<http://www.sohhytec.com>

Industry

Steel production
Fertilizer production ...

Fuel/Mobility

Electricity/(Seasonal) storage



Thank you for your attention

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Solar fuel. the smarter way.

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