



 OCTOBER 1ST, 2024

LUT'S HYDROGEN RESEARCH ACTIVITY

HYGCEL final seminar & visiting presentations

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On-going Projects

- HYGCEL, Hydrogen and carbon value chains in green electrification, 2021-2024 (LUT, TAU, UEF)
 - <https://www.lut.fi/en/hygcel>
- FinH2, Finnish runway to hydrogen business, 2022-2024 (VTT, LUT, Aalto)
 - <https://www.finh2.fi/>
- St1 P2 Methanol Lappeenranta – RRF application, 90 MEUR
- Bio-CCU, 2022-2024
 - <https://clicinnovation.fi/project/bio-ccu/>
- Power-to-X infrastructure, 2023-2025.
 - <https://www.lut.fi/en/news/lut-universitys-power-x-research-receives-sizeable-donation-finland-invests-new-e-fuels>
- Off-grid Hydrogen, 2023-2026
 - <https://clicinnovation.fi/project/offgridh2/>
- Threading CO2 – can we use CO2 to produce fibres!
 - <https://www.google.com/search?client=firefox-b-e&q=threading+co2+lut>

Power-to-X infrastructure (2023-2025)

- LUT University has received a 4 M€ donation for power-to-x (P2X) research from Business Finland.
- The objective is to create a modern and fully digitalized research and innovation infrastructure for the development of PtX fuels and chemicals.
 - Schedule:
 - Renovation of the laboratory spaces: 06-11/2024
 - Instrumentation: 01/2024-12/2025

Power-to-X infrastructure (2023-2025)

- Physical infrastructure:
 - Test benches 5-10 for low temperature water electrolyzers
 - Test benches for power electronics
 - Membrane separation and purification units for carbon capture from industrial sources (CCU) and direct air capture (DAC)
 - Multi-functional chemical reactors for hydrocarbon, methanol and/or ammonia synthesis
 - Power hardware in loop (PHIL) emulators for the system components
- Digital infrastructure:
 - Multiscale modelling of the unit processes / Digital twins
 - Digital combination of the unit processes for full P2X value chains
 - Cloud-based storage and sharing of the research data
- Digital co-creation:
 - Modern co-creation tools and platforms
 - Pilots for domestic, international and industry cooperation



