Introduction to CoMETHy

“Compact Multifuel-Energy To Hydrogen converter”

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CoMETHy = “Compact Multifuel-Energy To Hydrogen converter”

“a EC-7FP Collaborative Project co-funded by the Fuel Cells and Hydrogen Joint Undertaking (FCH JU)”

CoMETHy aims at the **intensification of hydrogen production processes**, developing an innovative compact and modular steam reformer to convert reformable fuels (methane, ethanol, etc.) to pure hydrogen, adaptable to several heat sources (solar, biomass, fossil, etc.), depending on the locally available energy mix.

12 project partners (Coordinator: ENEA) from 5 countries (D, GR, I, IL, NL - 3 Industries, 4 Research Organizations, 5 Universities)
the path towards fuel decarbonization

C-containing raw fuel (fossil, biomass, RDF, ...) → conversion process → C-containing raw fuel (fossil, biomass, RDF, ...) → HC storage & distribution → ICE vehicles

Stationary power prod

RES

CSP, PV, etc.

H₂O → H₂ storage & distribution

CO₂ capture → CO₂ re-use → Syn fuel

HC → CO₂ capture → CO₂ capture

conversion process

ICE vehicles

Stationary power prod

H₂ (FC) vehicles
The CoMETHHy project involves a molten salts heat storage system (ca. 550°C) that allows mismatch between the fluctuating solar source and the steady running chemical process. "Solar salts" (60% NaNO₃, 40% KNO₃, max 550°C) from different heat sources is the process heat transfer fluid.

The low-temperature steam reformer generates hydrogen separated by selective membranes.

Molten salts heater, SG, heat storage and CSP plants are being developed at the demonstration level in other 7FP projects.

Key components include:
- CSP plant
- Biomass/RDF combustor
- Low-temperature steam reformer
- Hydrogen separated by selective membranes
- SMR + WGS
- CO₂ removal
- Heat recovery
- Molten salts heat storage system

Chemicals involved:
- CH₄
- H₂O
- H₂
- CO₂
CoMETHy project

Advanced catalysts for low-temperature steam reforming (NG, biogas, ethanol)

Selective membranes for hydrogen separation

Membrane reformer

Coupling with CSP plants
CoMETHy-related presentations

Session 2a:
*Optimization of porous metal support for Pd deposition*
Processi Innovativi

Session 2b:
*Reactor modelling, simulation and operating parameters optimization*
Technion

Session 3a:
*Solar assisted reforming and CCS in novel process schemes for H$_2$ production-techno economic assessment*
Processi Innovativi

Session 3b:
*Integrated membrane reactor testing and modeling*
CERTH
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Thank you for your attention!

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