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ETIP SNET
EUROPEAN TECHNOLOGY AND INNOVATION PLATFORM
SMART NETWORKS FOR ENERGY TRANSITION

Storage technologies and sector interfaces

MefCO$_2$

Short presentation of the project

MefCO2 (*Methanol fuel from CO2)*

Horizon 2020

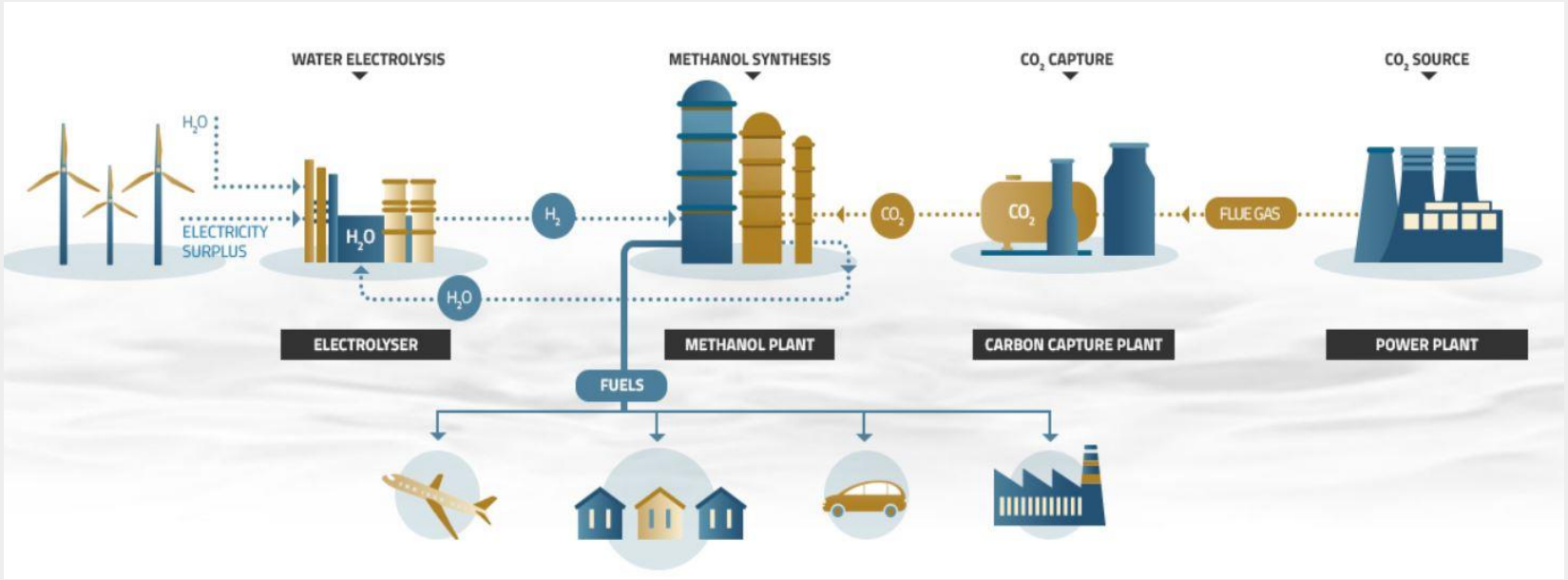
The EU framework programme for research and innovation

Budget

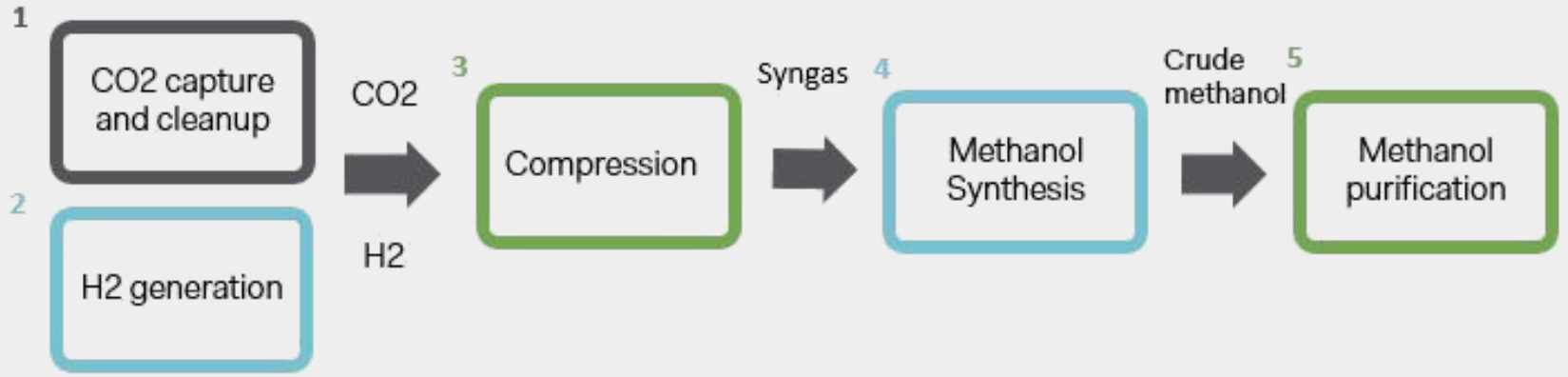
- Project budget €11 million
- Grant amount € 8,6 million

Objective

Synthesis of methanol from captured carbon dioxide using surplus electricity



Short presentation of the project



Short presentation of the project

Short presentation of the project

Key exploitable results addressing energy system integration

Largest plant of its kind

MefCO2 is the first plant to demonstate the whole process train.

- Integration with existing power plant
- Carbon capture
- On-site H2 generation
- Syngas conversion

High flexibility

MefCO2 demonstrated over **20%/min** load change. The main process units (electrolysers, reactor, compressor) are capable of very fast adaptation.

Applications:

- Load following for generation gap
- Frequency regulation

CO2 emission reductions

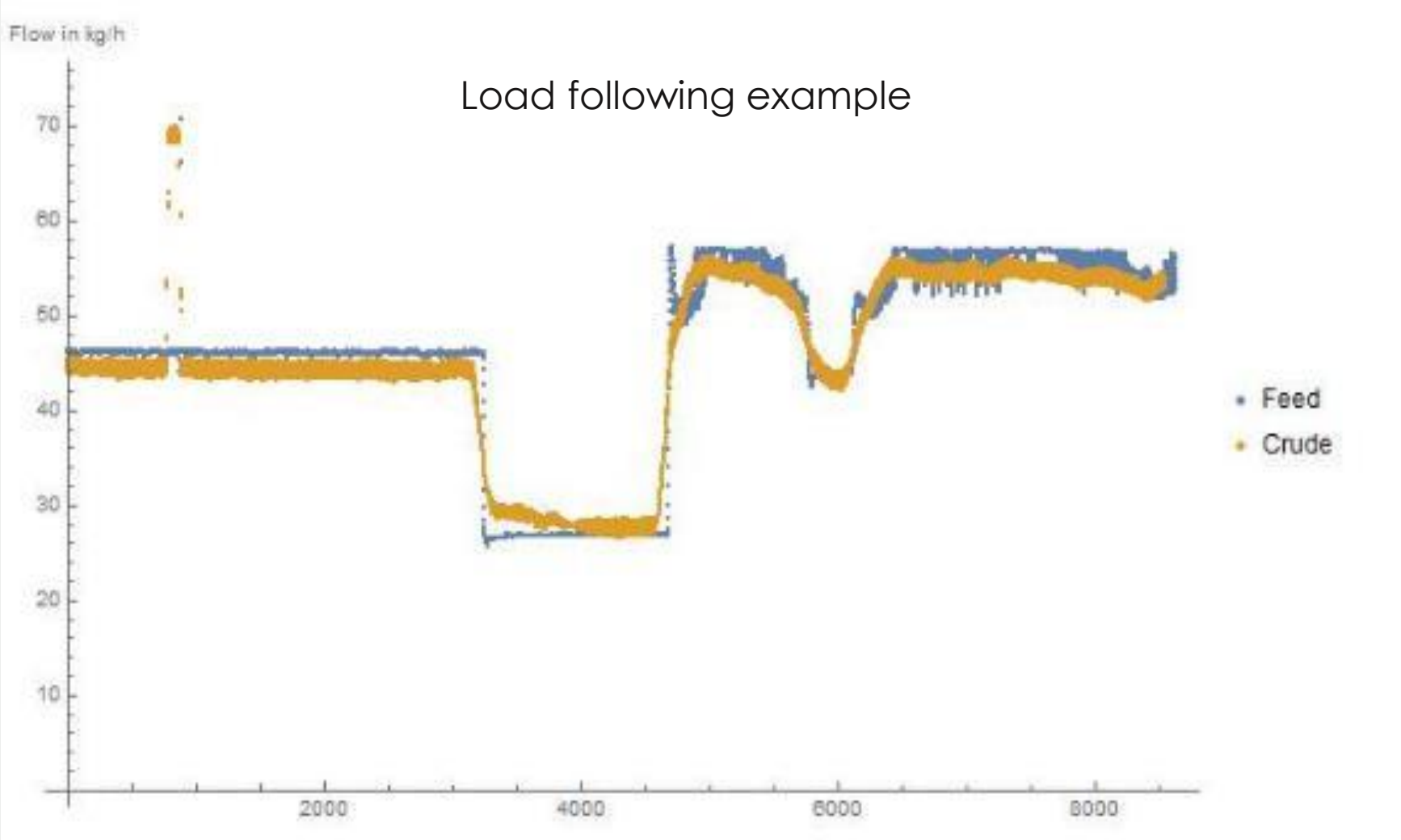
Life cycle analysis shows that significant reduction is achieved when using renewable power (68% less than SMR)

Applications:

- Renewable fuel from non-biological origins

The technology can be applied to other sectors as well (e.g. steel industry, Fresme project) and other CO2 emission sources

Key exploitable results addressing energy system integration



Lessons learned and barriers to innovation deployment

- RED II lowers entry barriers for CCU fuels from electricity and waste gas
- RED II specifically incentivizes non-crop and non-bio based production
  - E-fuels (RFNBO) where H_2 is generated from electricity
  - Recycled carbon fuels (RFC) where H_2 is generated from waste gas streams
  - In both cases CCU from unavoidable industrial emissions

A separate 2021 EC delegated act must clarify GHG accounting

  - E-fuels: Is renewable electricity additional, electrolysis not diversion from other use?
  - RFC: How will heating value of H_2 be replaced and what is the net GHG footprint?

- Reduction of electrolyzer CAPEX (mass production) can improve investment case

Deployment prospects of the most promising solutions

- Potential for commercial business case of RFNBO in EU/EEA already exists
  - Deployment for production where renewability of electricity is proven
    - Where grid electricity is 100% renewable (Norway, Iceland)
    - Low emission factor and additional grid electricity renewable (France, Sweden,...)
  - Sales of product in markets with strong incentives for CO2 reduction
    - UK, France, Italy, Sweden ...
  - Transposition of RED 2 will strengthen market demand

Needs for future R&I activities coming out of the project (if any !)

- Constituent elements of the plants all exist at smaller scale
- Commercial units are already targeted

- But Larger scale demos can contribute

  - Real-world load following
  - Catalyst development