

MefCO₂ Final dissemination event



Introduction to the Project Results

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What were our goals?



The challenge



1. To **demonstrate a low carbon methanol production** route which can be transformed into other high volume base chemicals.
2. To define an **indirect electrification route of road and maritime transport** which can be deployed using existing ICEs with no or small modifications.
3. To test bench for the provision of grid services using **flexible electrolysers**.
4. To **improve the business case for CCS** by using part of captured CO₂ and turning it into a revenue generation source.

The objectives



1. Demonstration of existing Power to Fuels (P2F) and Power to Chemicals (P2C) technology using **captured CO₂ as feedstock**.
2. **Integration** of different **technologies** with different renewable sources.
3. Testing under **flexible operation conditions**.
4. Overall impact analysis (**LCA**) and **technology roadmap/business plan**.



What are the results?



The Technology Roadmap will show the path towards the improvement of current results



MefCO₂ pilot plant, Niederaussem

➤ Pilot plant

- Methanol production: 1t/day
- CO₂ capture: 1.5t/day
- PEM electrolyser (600kWel) with improved dynamic response: 120 m³/h

➤ LCA & Thermo-economic analysis

- Technological, economic and environmental parameters analysed.
- Business case supported on simulations for technology scale-up.

➤ Test campaign under flexible operation conditions

1. Design capacity production test
 2. Turndown capacity production test
 3. Load following test
 4. Hot standby mode test
 5. Real conditions simulation
- Ongoing methanol production
 - Stable operation achieved within 40%-90% range
 - Maximum rate of load change under testing
 - Prel. estimates: C-efficiency > 90% in steady-state
 - Test campaigns will be completed in ~1000h

➤ Novel catalysts & overall process engineering improved

- More than 60 catalysts synthesised and tested
- Patent Pending GB1701382.2 – Catalyst suitable for methanol synthesis
- Several scientific publications





Thank you



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