

REMAP2

Publieke samenvatting / Public summary

Aanleiding

Climate targets call for industrial feedstock, products and processes to become climate neutral and circular and accordingly the climate agreement has identified the electrification of the chemical industry as an important element. In future energy systems, methanol will play an important role, as it has the potential to be used as a chemical building block and as a transportation fuel. However, the production of e-methanol remains more expensive than fossil methanol due to feedstock costs (renewable electricity and CO₂) and stand-alone methanol production units have an energy deficit of approximately 40% due to their thermal balance. Therefore, there is a need for innovative and breakthrough technologies which make competitive use of electricity and CO₂ to produce e-methanol.

Doelstelling

REMAP2 will develop a process for producing methanol that is 100% electrically driven and eliminates the energy deficit in separation by drastically reducing the energy consumption in the methanol-water distillation. This is done through using a closed loop heat pump assisted distillation system (cl-HPAD) in downstream processing which brings a significant energy benefit (80% reduction compared reference process and 25% reduction compared to the next best heat pump assisted technology). This 14 month project aims to: • Bring the radically electrified methanol production and purification process a step closer to TRL6 and increase the future application of large scale e-methanol production by electrifying the downstream process and increasing its energy efficiency. •

Projectinformatie / Project information

Projectnummer / Project number

TIND23-03473469

Subsidiebedrag / Grant amount

€ 440.825,00

Algemene informatie / General information

Penvoerder / Secretariat

Nederlandse Organisatie voor toegepast-natuurwetenschappelijk onderzoek TNO

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Assess and verify energy, economic and environmental advantages of implementing the REMAP2 process in a renewable-dominated energy system. • De-risk the mechanical design and business case of cl-HPAD. • Develop the design of a 5 t MeOH/day separation section for cl-HPAD to demonstrate under industrially relevant conditions.

Korte omschrijving

The activities undertaken in this project are to ensure that complete electrification of the e-methanol process can be deployed within 10 years of project completion. Since most of the challenges are in the HPAD concept, special attention will be provided to modelling, process and system design of HPAD by TU Delft with support of TNO and Sulzer, which will be used to generate a new integrated process design. Basic engineering design and costing for pilot TRL 6 will be done by CB&I Nederland, a McDermott company supported by TNO and SWERIM. The modelling and design will be supported by TRL4 methanol water cl-HPAD tests such that the whole HPAD concept can be easily scaled to a commercial scale. The environmental impact assessment of the REMAP2 use cases is led by Ecomatters and will be done through generation of a Life Cycle Inventory (LCI) with input provided from the process development work. The definition of the implementation plan involves all partners including the industrial advisory board (Tata) and is led by TNO. The implementation plan is prepared to address elements of the TECOP model (Technical, Economic, Commercial, Organisational and Political).

Resultaat

At the end of the REMAP2 project, an optimised process flowsheet for the radically electrified methanol production and purification process will be available. This will be accompanied by the roadmap to realising the innovations required including: • Quantification of the cost benefit and CO₂ reduction of REMAP2 process compared to state-of-the-art approach and alternative electrification options in e-methanol production. • Business cases for technology supplier and end user. • Validated models of the cl-HPAD column and robust

procedures for process designs. • Basic engineering
TRL6 design of a cl-HPAD field test unit and cost
estimate for the next phase.

De data in deze applicatie is afkomstig van de Rijksdienst voor Ondernemend Nederland (RVO) en wordt in
samenwerking met de Topsector Energie ontsloten.

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