

A2H2(O): Air to water capture for offshore hydrogen production

Publieke samenvatting / Public summary

Aanleiding

Green hydrogen is thought to be a promising option for sustainable energy production, storage and transport in the long-term energy transition. In the Netherlands, offshore installations have been identified as an inevitable enabler of the envisioned energy system. To enable large-scale offshore electrolysis, enormous amounts of Ultra-Pure Water need to be produced, where this is currently provided by desalinating seawater. Although desalination technology is mature, it has some serious setbacks related to production and disposal of concentrated brine and chemicals for maintenance. This combined with frequent and irregular maintenance creates significant technical, economic and environmental challenges for currently planned state-of-the-art integrations, leading to a risky business case for equity and debt financing parties to finance offshore green hydrogen projects. A2H2(O) aims at developing an alternative to the currently proposed integration for offshore hydrogen production, without discharging any waste products into the environment, increasing the energy efficiency of the integrated system and possibly reducing the levelized cost of hydrogen, maintenance and fundability.

Doelstelling

The goal of the A2H2(O) project is to assess the technical and financial feasibility of the integration of Solaq's technology in offshore green hydrogen production systems. The proposed integration might prove to have technical, economical, and

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environmental advantages over state-of-the-art water desalination systems, thus contributing both to the improvement of integrated offshore energy systems as well as the spatial, environmental and social integration of offshore green hydrogen systems. In doing so, A2H2(O) potentially improves the business case of green hydrogen production in the offshore environment and accelerates the interlinked energy and hydrogen transition by enabling the wider availability of green hydrogen to end-users.

Korte omschrijving

During A2H2(O), a consortium of Solaq International B.V., TNO, CEW and Douna Machinery B.V. will research the integration of Solaq's technology in an offshore green hydrogen context. It is necessary to evaluate the current technology as well as to further research and develop Solaq's technology specifically for offshore green hydrogen production, to calculate how this compares with current state-of-the-art water treatment technologies in terms of reliability, costs, Balance-of-Plant, weight, volume and footprint, and to research what potential inherent benefits the integration has in terms of environmental impact. A2H2(O) will be carried out in 4 work packages: 1. State-of-the-art research, 2. Technical design and validation, 3. Development of the A2W technology adapted for offshore green hydrogen production, 4. Market assessment A2W and (lab) analysis, finalisation of results. TNO and CEW will provide technical expertise and modelling in context of green hydrogen and water requirements and quality, Solaq will provide in-house expertise in A2W technology and develop a test-setup of the technology adapted for integration with green hydrogen electrolyzers together with Douna

Resultaat

1. Technical validation of the regeneration unit in a lab-scale test-setup, such that a full-scale system can be developed for a follow-up pilot project, 2. LCOH comparison resulting in economic validation of the proposed integration including a finalized consortium for the pilot project, validated business

model(s) for the further development and followup financing of further (technical) development, 3. Virtual validation of Solaq's module into an offshore electrolyser system through the continued development of an existing model which simulates the dynamic interactions between assets in the envisioned energy system, 4. Finalized research assessment on the qualitative impact

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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