

Hydrohub HyChain 4 - development of hydrogen value chains – decision making under uncertainty

Building a trusted distributed dataset and a decision-support-tool for transition pathways



Project number SI-20-06
Project leader(s) Sebastiaan Hers
E-mail sebastiaan.hers@tno.nl

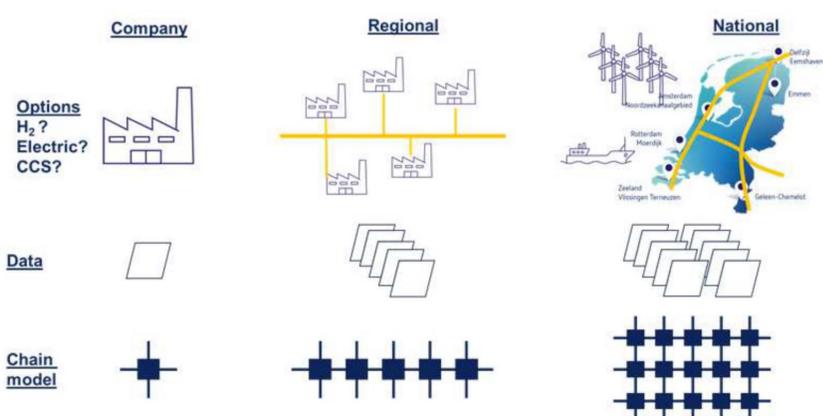
Partners Deltalinqs, Dow, ISPT, Nouryon, OCI Nitrogen, Port of Rotterdam, Stedin, Vopak, Yara, Kalavasta, Quo Mare, TNO
Budget 660 k€
Duration 2020-2021

Incentive

Accelerate the deployment of hydrogen value chains and implementation of the hydrogen economy in The Netherlands and across Europe.

Objective

Create a decision support tool – a common dataset and model - that supports informed multi-stakeholder decision making on attractive investments for development of the hydrogen economy as an integral part of the energy transition challenge of the industry. In addition develop a sustainable service model that secures long-term access and maintenance of the tools and data.



Approach

- Local (Industries at specific locations and sites) - evaluate transition technologies within a company to adopt hydrogen in the energy mix and compare with alternatives (e.g. direct electrification, CCS). Synergies and new developments (a syngas cluster, steel-to-chemicals development) are assessed - with a focus on industries in South-West Netherlands region and Port of Rotterdam area.
- Regional (infrastructure operators, utilities providers, tank park operators and groups of industries) - assess decisions on type, sizing and location of infrastructures, storage facilities, and the location of production sites and import facilities for hydrogen.
Matching supply-demand in time and selection of most

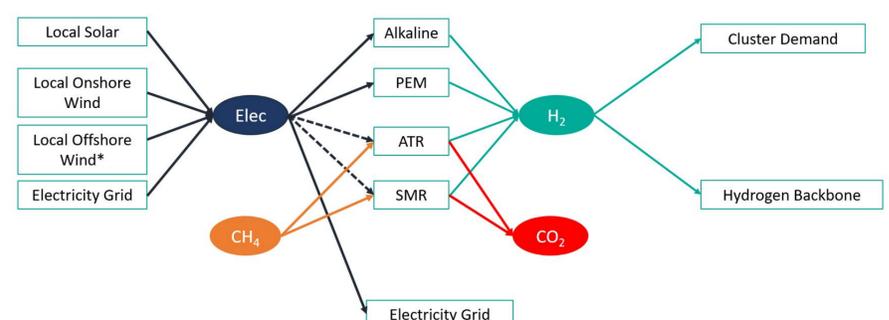
economic options.

- National (grid operators) - gas grid transformation through deployment of a hydrogen backbone linking regions, enabling transmission and large-scale storage for stable supply and export.

Results

The first steps for this project involve proto-typing of modules for the national energy system and two regional modules for the industrial clusters in Zeeland and Rotterdam. Over the course of 2020 two proto-type modules for the decision support tool were developed by the modelling team in close cooperation with industry partners. By summer the module for the Dutch energy system was finalized and evaluated in a series of expert sessions with industry expert and experts in energy system and market analysis and modelling. Recently the proto-type module for the industry cluster in Zeeland was established and is currently under evaluation.

National model – base model development NL



Next steps

Prototyping of the module for the Industrial cluster in Rotterdam will start up by December 2020. By March next year an integral evaluation of the three coupled modules and coupling with a detailed market model for electricity, hydrogen and methane is planned to be realized. At that stage of the project, the integral evaluation will provide the basis for model enhancement, detailing the existing prototypes towards the end of the year for further validation and scenario analysis.

