

Creation of a seawater loop for the establishment of a hydrogen hub.

Mars
2024



AAP ZIBAC - 231A -
Public summary - GPMD

Objectives

Hydrogen production may require significant quantities of water to cool electrolyzers. The first hydrogen manufacturer to settle in the ZIP carried out a feasibility study of a seawater loop for its cooling needs. This study highlights the challenges of this technique:

- The cost of seawater intake (open intake) appears financially and technically unreasonable.
- The coastal well solution offers a lower network cost and water that is easier to treat, but operating costs are three times higher than industrial water: complex and expensive water treatment, energy-intensive pumping, and well operation.

The development of this solution requires detailed technical studies (geotechnical, hydrogeological, test pumping, simulations), an impact study, and additional authorizations. From a techno-economic perspective, it therefore appeared necessary to pool the facilities and procedures to enable economies of scale, carry out technical and environmental studies in advance, plan investment over several years, and implement governance and a water sales policy.

This study aims to analyze the opportunity to create, on the West industrial port platform, a supply network of industrial water from seawater capture and treatment to meet the needs of industrial processes.

Results

The proposed solution includes a supply and discharge pipeline, a seawater intake, and an intake point. The principle is to design a network pressurized by a pumping station to supply the primary circuit heat exchangers of industrial users and discharge the water from each exchanger into the Dunes Canal. The seawater loop first includes a water intake with a pumping capacity of 30,000 m³/h. The pumping station has a dual function: supplying seawater to industrial users in summer and serving as a flood control station for the Bourbourg Canal in winter.

The withdrawn water is then pumped via a DN1900 pipeline towards the future hydrogen hub over a distance of approximately 4.2 km. The water is then distributed to the various industries. Water discharged by each industrial user is then evacuated and released into the Dunes Canal via a DN1900 pressure pipeline over approximately 1.3 km. Four industrial users were considered as part of the project.

The investment is estimated at around €50M excluding VAT, and the energy balance shows a result of 0.15 kWh/m³ distributed.

RÉSUMÉ

The GPMD studied the technical feasibility of a shared seawater pumping facility among several industrial users, notably hydrogen producers, for whom seawater could be used to cool electrolyzers and thus preserve the industrial water resources of the area.

The study demonstrates the technical feasibility of such a facility, with a flood control function in winter and compliance with effluent temperature requirements even during the summer period.

The pumping capacities make it possible to supply four industrial sites with a pumped volume of 30,000 m³/h. The economic advantage lies in the sharing of such infrastructure, highlighting the importance for the GPMD of anticipating the study of such feasibility.

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Study carried out by SADE for the GPMD within the framework of the DKarbonation project (AAP ZIBaC), co-financed by ADEME.

CITATION DE CE RAPPORT

FONTAINE L., SADE, 2024. **reation of a seawater loop for the development of a hydrogen hub.** 26 pages.

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