

### AquaCore: Direct usage hydrogen

**LOCATION:** Helgoland, Germany

**SYSTEM/TECHNOLOGY:** Hydrogen

**SERVICES:** Solution development / Feasibility studies

**INDUSTRY BRANCH/TYPE OF PLANT:** Green Energy, Power Generation

**CLIENT:** Versorgungsbetriebe Helgoland GmbH (local utility operator)

**ACTIVITY PERIOD:** 2022

#### Project description

Three projects in the AquaVentus family have joined forces for an initial project to supply the island of Helgoland with climate-neutral heat using green hydrogen: AquaPrimus (offshore electrolysis), AquaDuctus (pipeline) and AquaCore (local direct utilization).

In the value chain, an offshore wind turbine (WT) with electrolysis unit from the AquaPrimus subproject will be installed in the area of the wind farms off Helgoland. It autonomously produces green hydrogen for local direct applications. The electricity for electrolysis is generated directly from the WTG. Surplus electricity from the WTG will be transported to the mainland by cable. Using an innovative hydrogen pipeline from the AquaDuctus project, the green hydrogen produced will be piped directly to the Helgoland utilities after landing at the Nordostbohlwerk. There it will be converted into heat and fed into the district heating network.

The AquaCore schedule is based on the AquaPrimus and AquaDuctus subprojects. Realization is scheduled to take place by 2026.

#### INP Services

- Preparation of the technical feasibility study for the direct use of hydrogen in the currently fossil-fueled CHP (transformation planning fossil to hydrogen)
- Development of a plant concept, investigation and design of different plant components
- Design of possible hydrogen-based gas turbines, gas engines and boilers, design of electric boilers, etc.
- Identification of further possible heat sources as well as concept for the integration of a high-temperature seawater heat pump into the overall system
- Investigation of space requirements and possible integration into the existing utility generation plant
- Investigation and evaluation of the annual hydrographs for heat and electricity
- Modeling and simulation of all essential consumption scenarios over the course of the year, as well as the energy generation scenarios

#### POINTS OF CONTACT



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## INP Reference

required for this purpose

- Development of a profitability analysis and calculation of the amortization periods, taking into account investment costs, heat production costs and economic key figures
  - Consideration of variants and recommendation based on technical and economic aspects with regard to the required heat and power demand coverage
  - Calculation of CO<sub>2</sub> reduction
  - Modeling and simulation of all essential consumption scenarios over the course of the year, as well as the required energy generation scenarios
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