PROJECT AND OBJECTIVES
The BIG HIT project is a major first step towards creating a genuine hydrogen territory in the Orkney Islands. Orkney has over 50 MW of installed wind, wave and tidal capacity, generating over 46 GWh of renewable power per year, and it has been a net exporter of electricity since 2013. Hydrogen is proposed as a solution to minimise the curtailment problems in Orkney caused by the weak connection with the UK mainland. The hydrogen produced is used in thermal, power (co-generation) and transport applications locally.

NON-QUANTITATIVE OBJECTIVES
- BIG HIT aimed to perform a life cycle assessment study; this is now complete. The first report was submitted during the second year of the project, and the final report, including operational data, was submitted at the end of the project.
- The project aimed to perform a business model study for integrated energy systems based on hydrogen technologies across the islands. The first report was submitted during the second year of the project, and the final report, including operational data, was submitted at the end of the project.
- It aimed to perform a social life cycle assessment. The first report was submitted during the second year of the project, and the final report, including operational data, was submitted at the end of the project.
- The project aimed to set up the Hydrogen Territories Platform; this platform was launched. Four webinars have been conducted to date. The platform will be used in the Hydrogen energy applications for valley environments in northern Netherlands (HEAVENN) and Deployment of a H₂ ecosystem on the island of Mallorca (Green Hysland) projects as well, with a continuation of its activities and goals.
- BIG HIT aimed to perform a first analysis of lessons learned from the project about the connection of electrolysers in power grids with high penetration of renewable energy sources (optimal model), marinisation of electrolysers, etc. The outputs were included in the final report and in the deliverables related to project operation and maintenance.

PROGRESS AND MAIN ACHIEVEMENTS
- The main project equipment has been built: five H₂ trailers (250 kg of H₂ storage), a H₂ catalytic boiler (30 kW), a 1 MW electrolyser, five H₂ fuel cell vans and a 75 kW fuel cell (co-generation).
- The project developed the logistics of moving hydrogen through an archipelago (a multielement gas container moving H₂ between the islands by ferry, and logistics optimisation).
- BIG HIT developed the Hydrogen Territories Platform.

FUTURE STEPS AND PLANS
- The project finished in 2022. Some of the equipment and facilities remain operational in Orkney.
- BIG HIT performed an impact analysis. Final reports on the environmental and social impact and the business model analysis were published and made available to the public.
- The main project results, conclusions and lessons learned have been presented at the Hydrogen Territories Platform webinars.

QUANTITATIVE TARGETS AND STATUS

<table>
<thead>
<tr>
<th>Target source</th>
<th>Parameter</th>
<th>Unit</th>
<th>Target</th>
<th>Achieved to date by the project</th>
<th>Target achieved?</th>
<th>SoA result achieved to date (by others)</th>
<th>Year for reported SoA result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project’s own objectives</td>
<td>Hydrogen catalytic boiler power</td>
<td>kW</td>
<td>40</td>
<td>30</td>
<td>30 kW commissioned; 10 kW FAT completed</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Availability of fuel cell light-duty vehicles (including cars)</td>
<td>%</td>
<td>98</td>
<td>98</td>
<td>98</td>
<td></td>
<td>2017</td>
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<tr>
<td></td>
<td>HRS durability</td>
<td>years</td>
<td>10</td>
<td>5</td>
<td></td>
<td></td>
<td>5 years SoA in 2020 according to the FCH 2 JU MAWP</td>
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</table>
GREEN HYSLAND

DEPLOYMENT OF A H₂ ECOSYSTEM ON THE ISLAND OF MALLORCA

PROJECT AND OBJECTIVES

Green Hysland is developing all the infrastructure the island of Mallorca (Spain) needs to produce and consume at least 330 t of green hydrogen from newly built photovoltaic plants per year. Green hydrogen will have multiple applications on the island: a fuel supply for a fleet of fuel cell buses and other vehicles, generation of heat and power for commercial and public buildings, a new hydrogen refuelling station and injection into the island’s gas pipeline network. The project includes the development of a roadmap to 2050 in Mallorca and activities to replicate the experiments on seven other islands.

NON-QUANTITATIVE OBJECTIVES

• Green Hysland aims to develop public awareness and create a basis for skills development. The project has been presented at almost 120 events.
• Thirteen workshops have been conducted and 15 activities have been organised jointly with other EU projects.

PROGRESS AND MAIN ACHIEVEMENTS

• Green Hysland has delivered and installed a 2.5 MW electrolyser.
• The project has awarded the tender for the Empresa Municipal de Transports (EMT) in Palma H₂ buses.
• It has completed the conceptual design of the six project sites.

FUTURE STEPS AND PLANS

• The H₂ plant will go into operation. The electrolyser was delivered in December 2021 and the plant was expected to be operational in March 2023.
• The tender for H₂ buses was launched in December 2021 and was awarded in March 2022. They were expected to be delivered in the first quarter of 2023 (first bus available and in operation in March).
• During 2023, tenders are expected to be launched for the purchase of the fuel cells for the Puerto Deportivo Naviera Balear, Lloseta and hotel sites in Palma, and for a fleet of 10 vehicles (rental cars and vans). The project is working on defining the technical and administrative specifications of the tender documents.
• The sites are expected to receive the equipment at the end of 2023. Around 2 years of operation of the complete ecosystem is expected within the project period.

QUANTITATIVE TARGETS AND STATUS

<table>
<thead>
<tr>
<th>Target source</th>
<th>Parameter</th>
<th>Unit</th>
<th>Target</th>
<th>Achieved to date by the project</th>
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</thead>
<tbody>
<tr>
<td>MAWP addendum (2018–2020)</td>
<td>Commitment of public authorities</td>
<td>M€</td>
<td>–</td>
<td>6.25</td>
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<tr>
<td>Project’s own objective</td>
<td>Electrolyser</td>
<td>MW</td>
<td>7.5</td>
<td>2.5</td>
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https://greenhysland.eu/
HEAVENN
HYDROGEN ENERGY APPLICATIONS FOR VALLEY ENVIRONMENTS IN NORTHERN NETHERLANDS

PROJECT AND OBJECTIVES
HEAVENN is a large-scale demonstration project bringing together core elements – production, distribution, storage and local end use of H₂ – into a fully integrated and functioning hydrogen valley that can serve as a blueprint for replication across Europe and beyond. The main goal is to make use of green H₂ across the entire value chain, while developing replicable business models for wide-scale commercial deployment of H₂ across the entire regional energy system.

NON-QUANTITATIVE OBJECTIVES
• HEAVENN aims to achieve certification of regulations, codes and standards. All relevant green H₂ value chains will be tested against the CertifHy protocol.
• Safety issues will be covered by permitting procedures.

PROGRESS AND MAIN ACHIEVEMENTS
• The salt barge hull has been delivered to the Netherlands and will be operational around June 2023. Salt cavern testing is ongoing and has been successful so far.
• Emmen hydrogen refuelling station was delivered in June 2022 and has been successfully used by Qbuzz and other companies to refuel at 350 bar. A large proportion of the mobility applications (i.e. vehicles) have been ordered or purchased and will be delivered this year.
• Work package 4 is currently on hold. Work packages 5, 6 and 7 are operating mostly on schedule.

FUTURE STEPS AND PLANS
Securing co-funding is a prerequisite for the project to succeed. Talks with governments about State aid will continue, aiming to speed up the process and secure all co-funding.

Project ID: 875090
PRD 2023: Panel 6 – H2 valleys
Call topic: FCH-03-1-2019: H2 valley
Project total costs: EUR 96 191 883.00
 Clean H₂ JU max. contribution: EUR 20 000 000.00
Project period: 1.1.2020–31.12.2025
Coordinator: Stichting New Energy Coalition, Netherlands

https://heavenn.org/