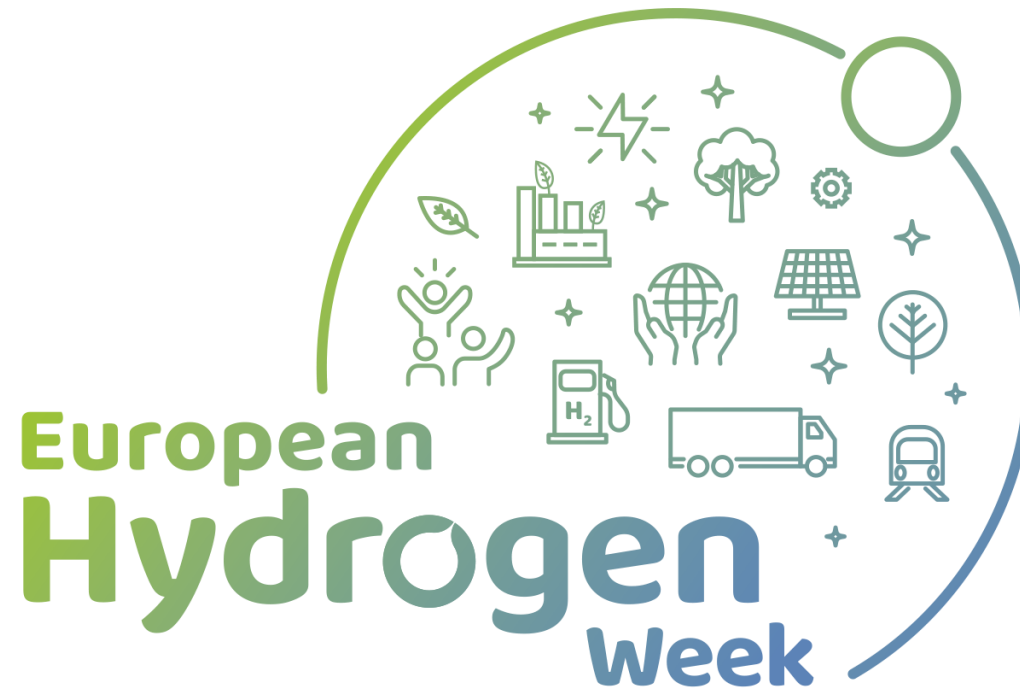


BIG HIT

Building Innovative
Green Hydrogen
systems in an
Isolated Territory: a
pilot for Europe



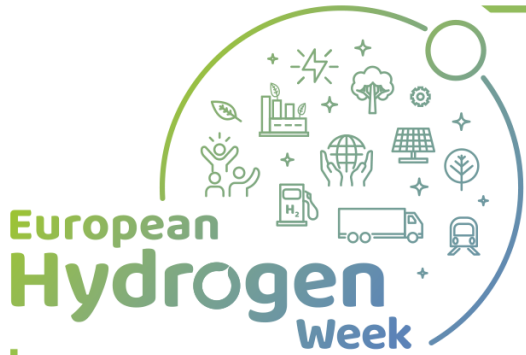
Jesús Simón
Aragon Hydrogen
Foundation

www.bighit.eu

jsimon@hidrogenoaragon.org

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#CleanHydrogen





Project Overview

Call year: 2015

Call topic:
FCH-03.2-2015:
Hydrogen
territories

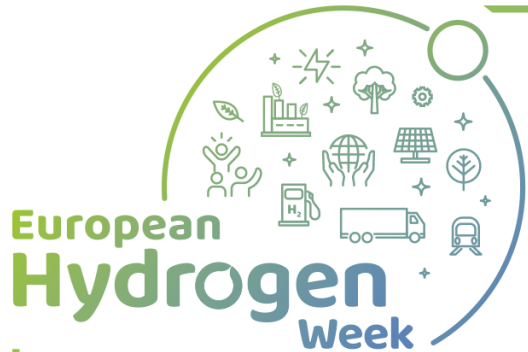
Project dates:
1st May 2016 - 30th April 2022

Total project budget:
circa. 13m€

BIG HIT

% stage of implementation
15/11/2021: 85 %

FCH JU max. contribution: 5m€
Other financial contribution: circa.
8m€



Partners



CALVERA



FOUNDATION FOR THE
DEVELOPMENT OF NEW
HYDROGEN TECHNOLOGIES
IN ARAGON

#PRD2021
#CleanHydrogen



European
Commission



Technical University of Denmark



GIACOMINI
WATER E-MOTION



Project Summary



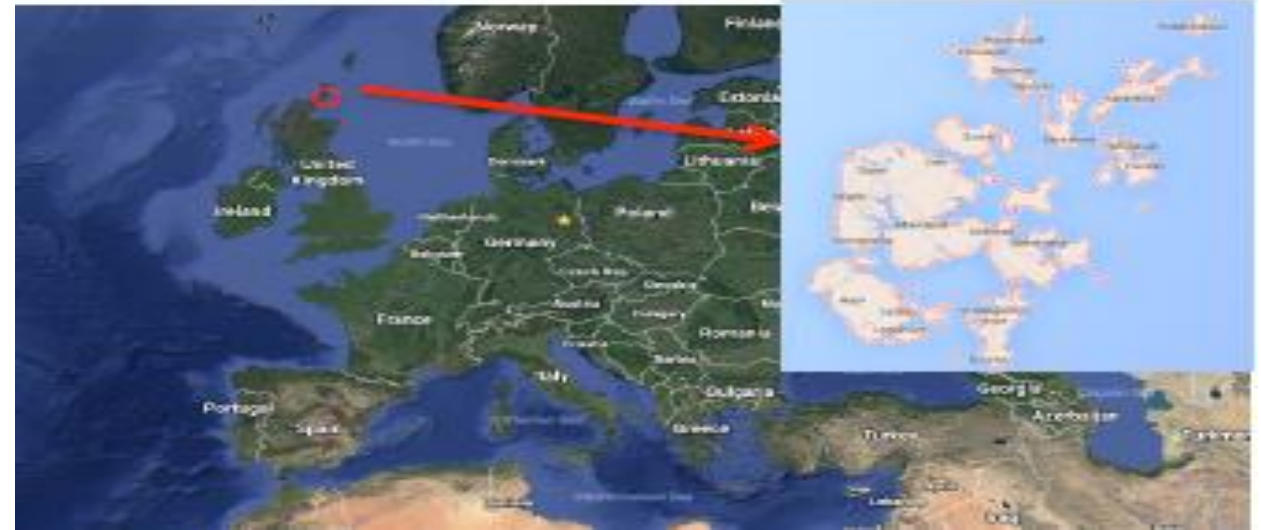
20 islands
~21.000 inhabitants



58MW RES
47MW wind +
wave/tidal

PROBLEM/NECESSITY

- Orkney-UK interconnector
30MW capacity
- Electricity grid overloaded
- 20-30% RES annual curtailment



SOLUTION FOR ORKNEY

- Transition to local low carbon economy,
- Electricity, transport and heat demand
via hydrogen
- Local energy storage



Project Summary

H2 Local Energy System

- ✓ Supply: green H₂ from wind & tidal
- ✓ Transport/distribution H₂ by road and ferry
- ✓ End-use: H₂ for heat, power & transport

BIGHIT
Building Innovative Green Hydrogen
Systems in Isolated Territories



Project Progress



Operation Phase

Concept
“Hydrogen
Territory”

Design & Engineering

Execution

Operation



Commercial
Project

25%

50%

75%

- H2 production: direct coupling wind turbine / electrolyser technically works (less curtailment than the expected)
- H2 logistics
 - H2 transported from Shapinsay (production site) to Kirkwall (HRS, FC harbour) by ferry - pioneer action
 - Certifications for maritime transport

- >200 kg H2 dispensed to the range extender FC vans, > 50,000 km - H2 mobility tested at islands with local production

Vehicle identification number (VIN)	Operating hours	Odometer (km)	Hydrogen consumption Kg
VF1FW0ZHC57328479	479	18 184	107
VF1FW0ZHC57328480	345	11 986	37
VF1FW0ZHC57328476	146	11 266	25
VF1FW0ZHC57328478	162	8 007	19
VF1FW0ZHC57328477	107	5 956	17
Total	1 239	55 399	205*

- H2 catalytic boilers commissioned at local school
- FC to provide power at local harbour integrated

Project Progress



Risks, Challenges and Lessons Learned

- Lessons learned related to the deployment of H₂ across entire value chain (legal, logistics, boundaries/interfaces) -> shared with EU (and at international level) through the project dissemination and replicability actions (HTP)
- Lessons learned from the technical point of view:
 - Re-design for maritime environments highly needed in H₂ facilities / equipment.
 - Logistical challenges islands / remote territories: take care in the planning and budget about aspects like geography (H₂ distribution), remoteness, materials, climate, allowances -> planning accordingly + contingency
- Operational competence: local training & up-skilling
- Ongoing local community involvement
- Exploitation as a commercial project: transition from an IA to a commercial project in progress

Exploitation Plan/Expected Impact

Exploitation

Facilities to be integrated in the overall Orkney Hydrogen Strategy (from an IA project to commercial)

Marinization / direct coupling with wind power & integration with tidal of PEM electrolyser

MEGCs H₂ tested and certified for maritime transport

Range extender FC vans & H₂ catalytic boilers (validation at real scale in a hydrogen island)

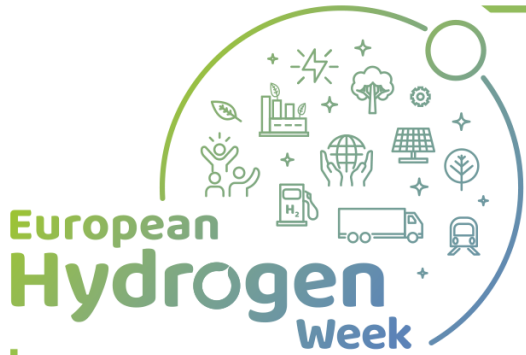
Impact

First EU hydrogen valley project: lessons learned pave the way to other initiatives (HEAVENN or GREEN ISLAND)

Reduction of CO₂ emissions

Hydrogen economy in Orkney

Social benefits: high qualified employment, training, reduction of RES curtailment, etc.



What the Hydrogen Territories Platform (HTP) is?

Interregional platform that will help members understand how regions can successfully replicate the BIG HIT project concept of hydrogen-based integrated local energy systems, in their respective territories.

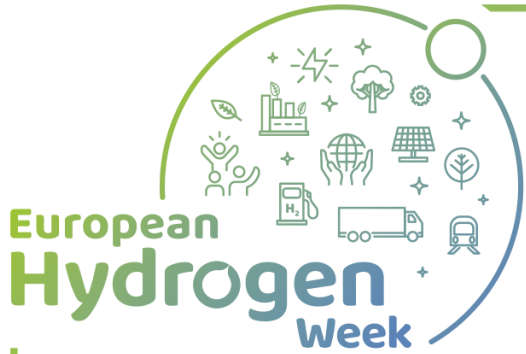
Tools:

- Website
- Replicability tool
- Webinars (send an email if you want to be invited to the following webinars or receive the recordings from previous ones).

The Platform is chaired by the Foundation for Hydrogen in Aragon (FHA) and the Scottish Hydrogen and Fuel Cells Association (SFHCA), in the framework of the BIG HIT project and with the support of their project partners.

Website (<http://h2territory.eu/>)





What the Hydrogen Territories Platform (HTP) is?

HTP Webinars 2021

HTP1 on 23 March 2021: sharing experience with BIG HIT, HEAVENN, and GREEN HYSLAND.

Youtube recording here: <https://youtu.be/uCWfD3mv7rA>

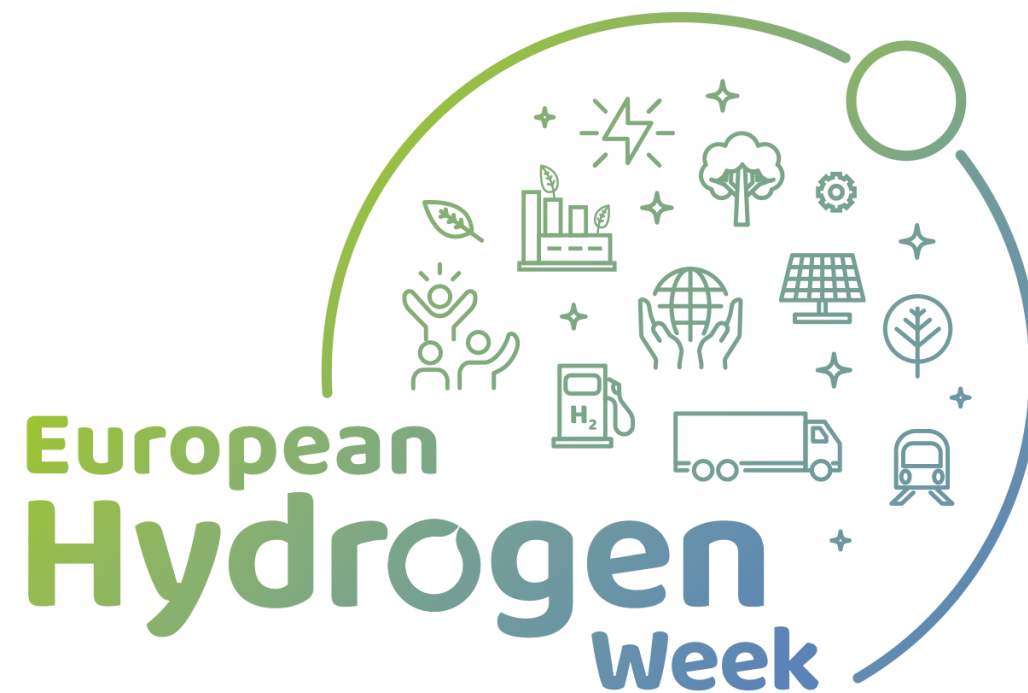
HTP2 on 16 June 2021: building your H2 valley / island project ideas and consortium partners.

Youtube recording here: https://youtu.be/_GsnqHD82fQ

HTP3 on 29 September 2021: safety and technical design for H2 valley / island projects.

Youtube recording here: <https://youtu.be/2pm9Mk-OTqw>

HTP4: commissioning and operational excellence for H2 valley / island projects (coming soon)



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