



Hydrogen Utilisation and Green Energy Project

Project Overview

The HUGE project aims to...



Provide communities with energy security and self-sufficiency through increasing awareness and facilitating uptake of hydrogen utilization from excess renewable energy.



Increase the awareness of hydrogen as a viable energy option for a variety of end uses in the public infrastructure domain - housing, transport and industry.



Facilitate the decision - making and implementation of hydrogen solutions for public infrastructures and energy storage, suitable for cold climates and dispersed settlements.

The ambition of the HUGE project was to raise awareness of the use of green hydrogen as a viable energy vector for remote and rural communities in housing, transport, and industry.

Whilst many communities in the Northern Periphery and Arctic Programme Area are challenged by low economic diversity, result of their peripheral locations, dispersed demography and lack of critical mass, they have abundant amounts of renewable energy resources available locally.

The HUGE project outputs are:

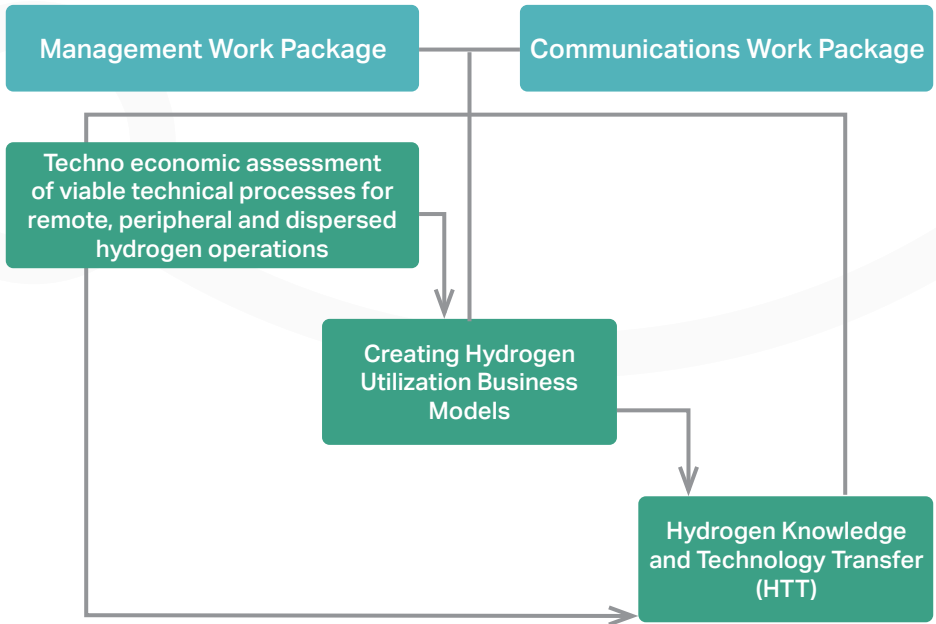
- To provide communities with energy security and self sufficiency through increasing awareness and facilitating uptake of hydrogen utilization from excess renewable energy.
- To increase the awareness of hydrogen as a viable energy option for a variety of end uses in the public infrastructure domain housing, transport and industry.
- To facilitate the decision making and implementation of hydrogen solutions for public infrastructures and energy storage, suitable for cold climates and dispersed settlements.

The HUGE project achieved this through:

- Providing the necessary tools to assess the hydrogen renewable energy chain opportunities in the NPA area and beyond.
- Increasing readiness to invest in integrated hydrogen solutions suitable for constructing, maintaining and running housing and public infrastructures.
- Facilitating decision making by building capacity in infrastructure providers to exploit the abundance of natural resources to their full potential through raising awareness about the benefits that can be delivered by employing a hydrogen Economy.
- The Hydrogen Utilization & Green Energy (HUGE) project was a €1.4 million 3 year project. The project was funded by the Northern Periphery and Arctic (NPA) Programme and lead by the Environmental Research Institute, North Highland College UHI. The project ran from mid 2019 to mid 2022.



The HUGE Project Structure



TEA Tool

The TEA tool combines process modelling and engineering design with economic evaluation. The TEA tool, increases readiness to invest in hydrogen utilization solutions suitable for constructing, maintaining and running housing and public infrastructures in cold climates and dispersed settlements.

Lead Partner: Action Renewables

HUB Model

The HUB model contains scenarios, implications and guidance for creating business models for hydrogen product and service development. It outlines relevant management tools and knowledge required to orchestrate the green hydrogen business ecosystem.

Lead Partner: LUT University

HTT Platform

The hydrogen knowledge transfer platform promotes knowledge sharing and information exchange between actors in the hydrogen energy in conjunction with small scale renewable energy production, supply and demand, and transport to end user.

Lead Partner: National University Ireland Galway

HUB Model

The HUB model contains scenarios, implications and guidance for creating business models for hydrogen product and service development. It also outlines relevant management tools and knowledge required for ecosystem orchestration.

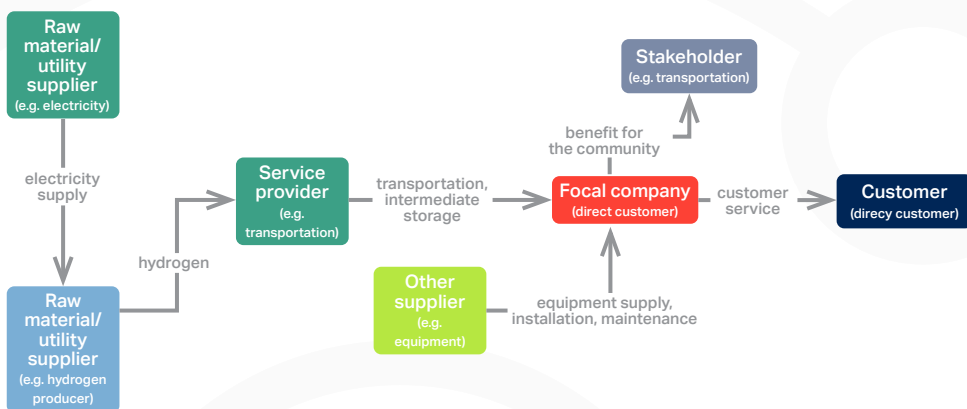
A stakeholder analysis identifies and analyses customer and business value factors for technology adaptation in different stakeholder groups. The results are incorporated into the ecosystem analysis, aiming at building a value map.

The map for each case region is built based on collected data from each region. The objective is to develop an understanding of existing (or projected) business ecosystem and to create a map depicting business actors and value streams between them. The map is then verified against business actors and partners.

A finalized ecosystem map describes the relationships between business actors and can be utilized for identifying missing actors/resources thus signalling the business opportunities and for refining the business model of the focus organization. The map provides systematized input for commonly used business model developing tools.

HUB maps for the HUGE partner case regions are analysed to develop a generalized model suitable for multiple applications across any region.

A Supply Chain Quality Matrix is available to allow consideration of a range of factors that impact the potential strength, or weakness, of a supply chain. The model has been weighted so that slightly more importance is given to economic factors.



TEA Tool

The Techno-Economic Assessment (TEA) tool has several parts that all aim to be combined to aid an analysis of potential hydrogen projects and inform viability. The tool includes:

- Technology scale evaluation. This tool aims to classify the scale of a hydrogen project supply chain by investigating whether it is of macro (spread across a wide geographical area, likely of multiple countries), meso (likely located within one country but over multiple regions or towns) or micro (likely to be located within on defined site) scale. This evaluation investigates renewable technologies and suggests suitability for each region.
- The Hydrogen Hotspot map has also been developed to show the spread of hydrogen supply chain infrastructure across the region. A range of supply chain areas are identified. The map is interactive, and the user can zoom in and click on an organisation for more information on each individual spot.
- A cashflow analytics tool has also been developed which allows a user to identify the costs of a range of inputs required to develop a project – the purchase cost of land, equipment, staff costs etc – and input these into a piece of modelling software. Once input this tool assesses the level of potential financial return on a year-by-year basis and identify a break even point.

Combining these tool helps gives businesses, communities or organisations a high level overview of how to build a green hydrogen project that is suitably sized, with suitable technologies, and is economically viable.

The TEA tool can be used as a standalone tool or in conjunction with the HUB model.

The Hydrogen Hotspot map will continue to be updated beyond the lifetime of the project.



HTT Platform

The Hydrogen Training and Knowledge Transfer (HTT) platform has been designed to improve the learning experience and future development of hydrogen technologies in the NPA area, the HTT platform has become a valuable communication tool to reach a wider audience by combining knowledge transfer, stakeholder engagement and e-learning into a single virtual platform.

HUGE website

Planned and created as a friendly communication tool, the website presents videos, statements, files, databases, and project tools to act as an interface between stakeholders and hydrogen experts.

www.huge-project.eu

E-learning hub

Updated searchable databases are available containing hydrogen training courses per region and language, hydrogen academic courses per country, and general hydrogen knowledge.

Knowledge transfer

Promoted with online seminars directed to the NPA communities with the participation of hydrogen experts on road, maritime, and aviation transport technologies. Recordings and presentations are available to download.

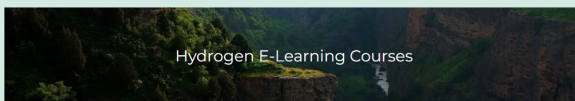
Hydrogen Forum

A unique hydrogen forum has been developed in collaboration with three European funded Interreg projects (GenComm, SEAFUEL, and HUGE). The Hydrogen Triple Alliance has organised the first interregional virtual forum where businesses, communities, and organisations involved in hydrogen technologies can interact.

www.communityh2.eu



Home Project Courses H2 Solutions H2 Forum Contact



HOT Service

The TEA Tool, the HUB Model, and the HTT Platform combine to provide the Hydrogen Operational Technical (HOT) Service.

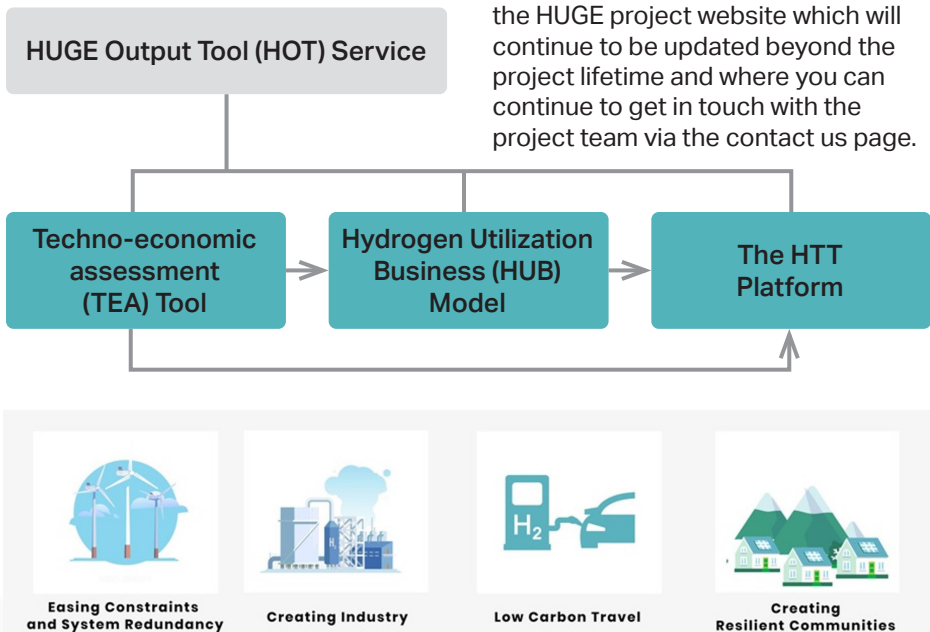
The HOT service fosters more robust and dynamic communities by allowing them to exploit the abundance of natural resources to create a versatile business sector and energy resilience through energy storage. This positively impacts the economic, social, and demographic development in the partner areas.

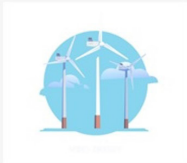
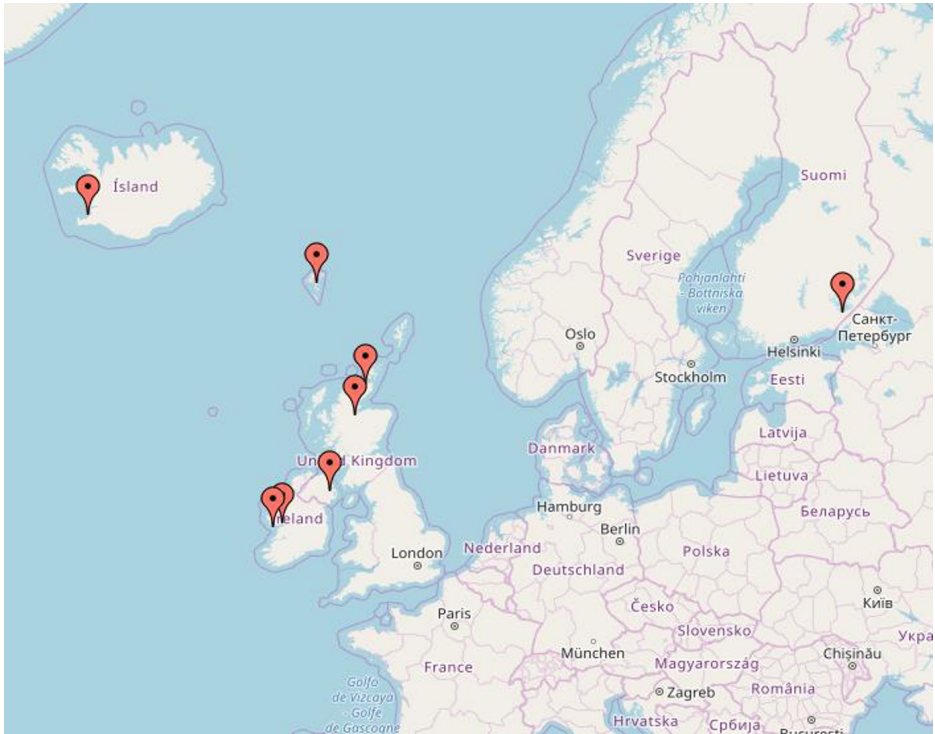
The HOT service is transboundary and allows a variety of stakeholders and end users full social and economic utilisation of renewable resources by catalysing a green hydrogen economy.

A full list of outputs available from the HUGE project can be found below:

- HUGE e-learning courses
- Hydrogen course search
- Webinar recording collection
- Best practice examples
- Housing solution database
- Public infrastructure database
- Cashflow Analytics Tool
- H2 Hotspot Map
- Ecosystem Mapping Tool
- Supply Chain Model
- H2 Forum

All of the outputs can be found on the HUGE project website which will continue to be updated beyond the project lifetime and where you can continue to get in touch with the project team via the contact us page.





Easing Constraints and System Redundancy



Creating Industry



Low Carbon Travel



Creating Resilient Communities



www.huge-project.eu | info@huge-project.eu

