

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

Deliverable: Hold public awareness meetings in
Kirkwall, Eday and Shapinsay to inform the public
of BIG HIT plans

DELIVERABLE 6.5

GRANT AGREEMENT 700092

STATUS: FINAL



This project has received funding from the Fuel Cells and Hydrogen 2 Joint Undertaking under grant agreement No 700092. This Joint Undertaking receives support from the European Union's Horizon 2020 research and innovation programme.

The contents of this document are provided "AS IS". It reflects only the authors' view and the JU is not responsible for any use that may be made of the information it contains.

Nigel Holmes¹

¹Scottish Hydrogen & Fuel Cell Association

Author printed in bold is the contact person/corresponding author

Version	Date	Revised by
Draft Rev 2.1	30 th Sept 2016	
Final	4 th October 2016	

Content

1	Executive Summary	3
2	Objectives	5
3	Description of work	7
3.1	Subsections, tasks (subsection, calibri 14, bold, black).....	7
3.1.1	Subsection subtitle (title 3, calibri 12, bold, black) Error! Marcador no definido.	
4	Conclusions.....	15
5	REFERENCES	16

Figures

Figure 1. Schematic of BIT HIT project in the Orkney Islands**Error! Marcador no definido.**

Tables

Table 1. BIG HIT WP6 Dissemination Activities and Timescale**Error! Marcador no definido.**

1 EXECUTIVE SUMMARY

The Orkney Islands of Scotland were selected by FCH2JU for the BIG HIT development of a new European-wide hydrogen project, building on the existing Orkney Surf 'n' Turf initiative. This wider European project is called BIG HIT (Building Innovative Green Hydrogen systems in an Isolated Territory: a pilot for Europe). BIG HIT is a five-year project, involving 12 participants based across six EU countries, and started in May 2016.

BIG HIT will create a replicable hydrogen territory in the archipelago of Orkney (Scotland) by implementing a fully integrated model of hydrogen production, storage, transportation and utilisation for heat, power and mobility. BIG HIT will absorb curtailed energy from two wind turbines and tidal turbines on the islands of Eday and Shapinsay, and use 1.5MW of PEM electrolysis to produce 50 tonnes per year of 'green hydrogen'. This will be used to heat two local schools, and transported by sea to Kirkwall in 5 hydrogen tube trailers, where it will be used to fuel a 75kW fuel cell (which will provide heat and power to the harbour buildings, a marina and 3 ferries when docked), and a refuelling station for a fleet of 10 fuel cell Renault Kangoo fuel cell range extended vehicles. The key elements of the BIG HIT project and links with the Surf 'n' Turf project are shown in Figure 1 below:

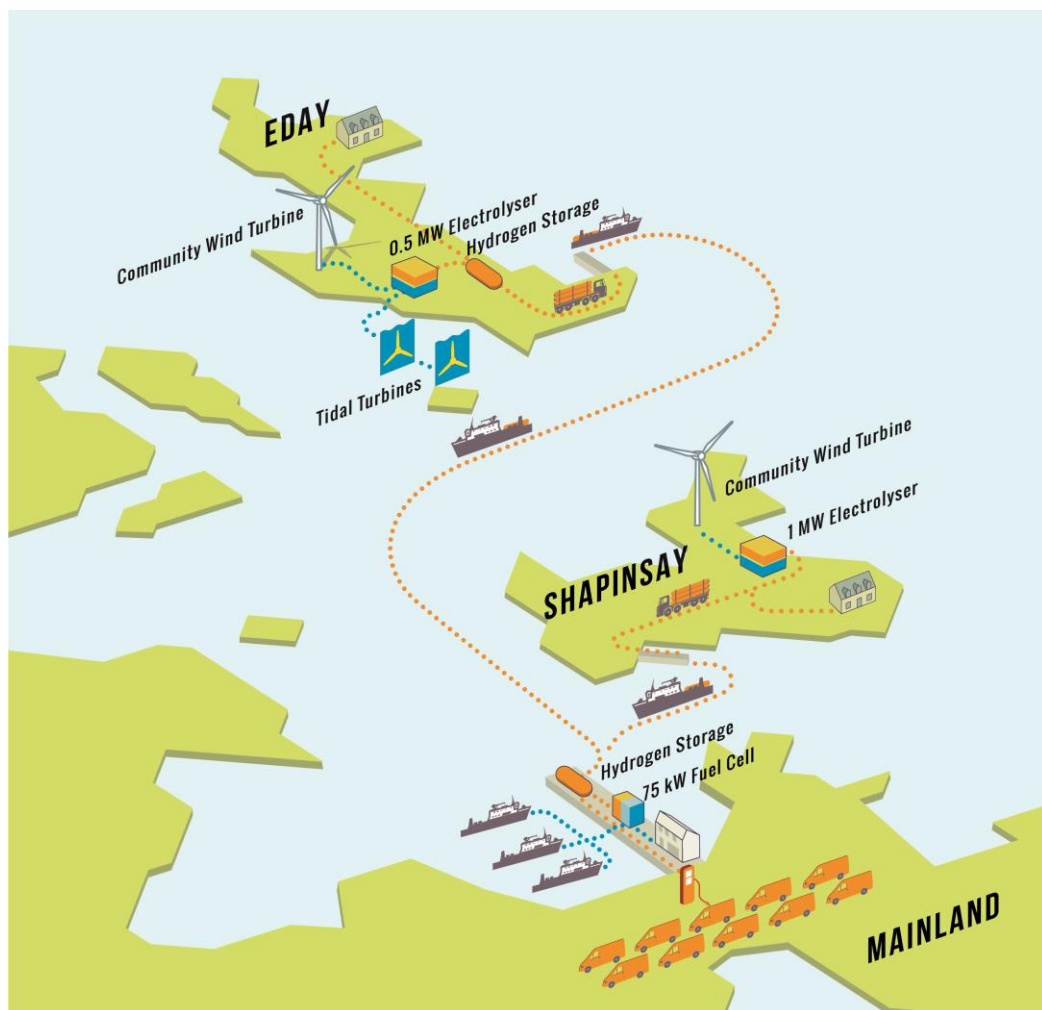


Figure 1. Schematic of BIT HIT project in the Orkney Islands

The Orkney Islands have over 50 MW of installed wind, wave and tidal capacity generating over 46 GWhr per year of renewable power, and has been a net exporter of electricity since 2013. Energy used to produce the hydrogen for BIG HIT will be provided by the community-owned wind turbines on the islands of Shapinsay and Eday, two of the islands in the Orkney archipelago. At present the Shapinsay and Eday turbines are often 'curtailed', losing on average more than 30% of their annual output, with their electricity output limited by grid capacity restrictions in Orkney. This was the reason for selecting Orkney Surf 'n' Turf project by the Scottish Government's Local Energy Challenge Fund, to develop hydrogen for energy storage and overcome local curtailments. Because of the closely aligned objectives and project partners shared between BIG HIT and Surf 'n' Turf, much of the initial dissemination activity has been carried out in close partnership.

The BIG HIT project was publically launched on 11th May 2016, with extensive press releases together with use of social media announcements on Linked In and Twitter. This public launch of BIG HIT was preceded by an announcement to the London stock market by ITM Power (listed company on London AIM) on 28th April as required by stock market disclosure regulations, with the official start date of BIG HIT on 1st May 2016.

This report provides an update on Deliverable 6.5, the first Deliverable from WP6 which is to hold public awareness meetings in Kirkwall, Eday and Shapinsay to inform the public of BIG HIT plans. This report also summarises the materials used during the public launch of BIG HIT on 11th May 2016, as these communications formed the basis for early engagement with the wider public stakeholders on Orkney, and other dissemination activities carried out in the first few months of BIG HIT.

As can be seen from the following description of the BIG HIT dissemination activities undertaken in WP6.5 the events in Eday, Kirkwall, and Shapinsay have been met. On Shapinsay where the main BIG HIT electrolyser is located there have been three public events carried out during this period, with strong support from the Shapinsay Development Trust in arranging and delivering these public meetings:

- 28th April 2016 - Announcement to the London stock market by ITM Power
- 1st May 2016 – the official start date of BIG HIT (not announced)
- 11th May 2016 - BIG HIT project public launched communications
- 7th June 2016 - EUSEW 'Energy Day' Workshop in Stromness, Orkney Mainland.
- 14th June 2016 – first EUSEW 'Energy Day' Public Workshop held in Shapinsay
- 14th June 2016 – Presentation by SHFCA at WHEC 2016 Conference in Zaragoza.
- 15th June 2016 - Eday workshop for the school pupils, with BIG HIT session
- 25th June 2016 - second EUSEW 'Energy Day' Public Workshop held in Shapinsay
- 29th June 2016 – Community group representatives from Western Isles visit Orkney
- 31st August 2016 – Presentation by FHA at the SHFCA 8th Annual Conference, St Andrews
- 22nd September 2016 – BIG HIT public evening event held in Kirkwall.

2 DISSEMINATION OBJECTIVES

BIG HIT is the most ambitious demonstration of the hydrogen economy concept to date and has set 8 strategic objectives, of which 3 are clearly linked to WP6 dissemination activities:

- Objective 2: A key aim of BIG HIT is to develop expandable solutions that can be replicated elsewhere, thus ultimately initiating a wider market for hydrogen and fuel cell technologies.
- Objective 6: Facilitate the planned roll out of hydrogen technologies through dissemination activities to engage with the local population, including public meetings on Eday, Shapinsay and in Kirkwall to raise awareness of FCH technologies, with experts from the partners answer questions in open session.
- Objective 7: Central to the success of BIG HIT is its ability to act as a demonstration of a hydrogen territory for other remote locations, through the participation of Malta as the follower territory, and the development of effective business models.

The BIG HIT project dissemination activity is split over 2 work packages: WP5 will provide the background information required for replication, including the business models and analysis of the social and environmental impact of the project. WP6, covered in this report, concerns the actual dissemination of information to maximise project impact. The key WP6 dissemination activities and deliverables are outlined in the following Table 1:

Deliverable Number	WP6 Deliverable name	Lead partner	Type	Dissemination level	Due date
D6.1	Exploitation and dissemination plan	SHFCA	R	PU	6
D6.2	Exploitation and dissemination plan v2	SHFCA	R	PU	30
D6.3	Exploitation and dissemination plan v3	SHFCA	R	PU	60
D6.4	Creation of Hydrogen Territories Platform	SHFCA	DIS	PU	9
D6.5	Hold public awareness meetings in Kirkwall, Eday and Shapinsay to inform the public of BIG HIT plans	SHFCA	DIS	PU	2
D6.6	Hold a press day	SHFCA	DIS	PU	12
D6.7	Hold first workshop in Scotland to encourage local interest in the project	SHFCA	DIS	PU	15
D6.8	Hold second workshop in Brussels during sustainable energy week	SHFCA	DIS	PU	58
D6.9	Hold final dissemination and exploitation workshop	SHFCA	DIS	PU	58

Table 1. BIG HIT WP6 Dissemination Activities and Timescale

The WP6 dissemination activities include the creation of a Hydrogen Territories Platform, a website that will include not only general project information, but also a toolkit of information to allow further replication. This platform will include a detailed description of the equipment, the operating methodology, business models etc. Other routes for dissemination include: through inclusion of the follower territory (Gozo, Malta), who will closely monitor the project with a view to replicating in their own location, and through associations representing 1400 other isolated territories. BIG HIT is using international associations representing isolated territories (including the Conference of Peripheral Maritime Regions of Europe, the Scottish Islands Federation and the European Small Islands Federation), so the results of the project become known within communities in Europe.

Dissemination activities will make full use of the BIG HIT partner expertise and resources including the following:

- Commercial insights and investment perspectives (OIC, ITM, SFC, GIA, SYM, CAL)
- Financial markets and institutional investors, through trading announcements (ITM)
- Development of codes and standards, and relevant policy links (FHA, SHFCA, ITM)
- Local acceptability of hydrogen technologies (CES, SDT, OIC, EMEC)
- Educational training, including skills and research (DTU)



BIG HIT Partners at Kick-Off Meeting, Kirkwall harbour 24th May 2016

BIG HIT is not as a stand-alone demonstration project, but an opportunity to catalyse activities in other isolated territories where the types of solutions developed can be replicated. The BIG HIT dissemination activities undertaken and planned reflect this approach.

3 DESCRIPTION OF DISSEMINATION ACTIVITIES

During the first two months since the launch of BIG HIT there have been a number of dissemination activities covering various types of activity, including:

- Public events and workshops
- Wider stakeholder visits and knowledge exchange
- Press releases and announcements
- Technical conferences and industry events

The key aims of WP 6.5 Deliverable were to: Hold public awareness meetings in Kirkwall, Eday and Shapinsay to inform the public of BIG HIT plans

As can be seen from the following brief description of the BIG HIT dissemination activities undertaken in WP6.5 the events in Eday and Shapinsay have been met – for Shapinsay where the main BIG HIT electrolyser is located there have been three public events carried out during this period on Shapinsay, with very strong support from the Shapinsay Development Trust in arranging and delivering these public meetings:

28th April 2016 - Announcement to the London stock market by ITM Power

1st May 2016 – the official start date of BIG HIT (not announced)

11th May 2016 - BIG HIT project public launched with communications

7th June 2016 - EUSEW 'Energy Day' Workshop in Stromness, Orkney Mainland.

14th June 2016 – first EUSEW 'Energy Day' Public Workshop held in Shapinsay

14th June 2016 – Presentation by SHFCA at WHEC 2016 Conference in Zaragoza.

15th June 2016 - Eday workshop for the school pupils, with BIG HIT session

25th June 2016 - second EUSEW 'Energy Day' Public Workshop held in Shapinsay

29th June 2016 – Community group representatives from Western Isles visit Orkney

31st August 2016 – BIG HIT presentation at SHFCA 8th Annual Conference in St Andrews

22nd September 2016 – BIG HIT evening public meeting in Kirkwall

3.1 Public Workshops and Outreach Events

There have been a total of five public workshops and related outreach events held in Orkney during the first few months of BIG HIT. These have included Eday, Kirkwall, and Shapinsay, as required by Deliverable 6.5. Details for each of these events is provided in the following sub-sections 3.1.1 to 3.1.5

Three of these public events were arranged as 'EU Energy Day' events, as part of the wider EU Energy engagement activities during June. This enabled the public events to be promoted through the EU Energy Day website, and represented a very significant proportion of the 2016 EU Energy Day events held in the Orkney Islands, and Scotland.

D6.5. Hold public awareness meetings in Kirkwall, Eday and Shapinsay to inform the public of BIG HIT plans

The public event in Kirkwall was held on the evening of 22nd September 2016, at the Old Town Hall.

3.1.1 24th May 2016 - BIG HIT public meeting in Shapinsay

24th May 2016 - BIG HIT public awareness evening meeting in Shapinsay. Link: <https://www.facebook.com/ShapDevTrust/photos/a.141770035905324.37298.116047575144237/1036827669732885/?type=3&theater>

Public Information and Consultation Event

The **BIG HIT** project includes the option to use carbon neutral, hydrogen powered, catalytic boilers to partially heat **Shapinsay School**. Our own turbine - Whirly - can provide the power to produce this hydrogen as part of Orkney's leadership in the EU funded BIG HIT project. This will help solve our curtailment and add to community income.

Come and listen to the presentations...ask some questions and let us know what you think.....



Speakers: **Dr Kris Hyde - ITM Power**
+ representatives from BIG HIT team

JOIN THE DISCUSSION at

The Club Rooms 7.30pm Tues May 24th

Hosted by Shapinsay Development Trust



Publicity on Facebook for Shapinsay public event held on 24th May 2016

This public engagement meeting in Shapinsay on 24th May was well attended, with over 20 members of the community present.



Kris Hyde of ITM Power speaking at the Shapinsay BIG HIT public meeting on 24th May

Kris Hyde of ITM Power delivered a presentation on hydrogen, benefits and potential safety concerns. He also touched on specific social, economic and environmental benefits that

the project can bring to the community in Shapinsay. A proposed lay out for the installation of the H2 catalytic boilers at schools was also shown. Following this presentation there was a Q&A session, with interventions from Kris Hyde, Jan Falconer (OIC) and Enrique Troncoso (FHA), to highlight the potential benefits (also in terms of international exposure of the island and the potential of BIG HIT for mobilizing further funding in the future), as well as the necessity to involve the community.

It was specifically stressed that no installations will be carried out in Shapinsay without the community's consent. Questions from the community were mainly related to the economics and potential costs beyond the project, in particular the economic viability of running the system and producing hydrogen without feed-in tariffs. No safety concerns were raised.

As preparation for this meeting on Shapinsay letters had been sent on 18th May to all of the Shapinsay householders by Jan Falconer of Orkney islands Council. These letters outlined the BIG HIT project and the opportunity for all of the householders to participate in the evening event on 24th May and provide their feedback as part of the consultation process for BIG HIT.

The Shapinsay meeting also prompted very positive feedback on social media, including this posting on Facebook by Stuart Roy McIvor *'Great presentation last night. And today on the ferry I saw all the folk from around Europe who have come to have a look. As I said to Nic you don't get people like that away from their desks to come all this way for no reason. Well done!'*

3.1.2 7th June 2016 - EUSEW 'Energy Day' Workshop in Stromness

On 7th June 2016 a EUSEW 'Energy Day' Public Workshop was held in Stromness, the second largest town on the Orkney Mainland (Kirkwall is the largest). This was an open public meeting about the Community Energy Scotland Surf 'n' Turf Hydrogen Challenge run in partnership with the Orkney Renewable Energy Forum (OREF). Link: <http://eusew.eu/energy-days/oref-open-meeting-cess-surf-n-turf-hydrogen-challenge-featuring-arcola-energy>

3.1.3 14th June 2016 – EUSEW 'Energy Day' Workshop in Shapinsay

On the 14th June 2016 the first of two EUSEW 'Energy Day' Public Workshops was held in Shapinsay on the topic of 'The Green Heart of Orkney? Steps towards a Hydrogen Island - BIG HIT.' This event was arranged and delivered by Nic Thake of the Shapinsay Development Trust, and there were five attendees. Link: <http://eusew.eu/energy-days/shapinsay-green-heart-orkney-steps-towards-hydrogen-island-big-hit-0>

3.1.4 15th June 2016 - Eday School workshop

A 'School Hydrogen Challenge' workshop was held with the school pupils of Eday primary school on 15th June 2016. This included a BIG HIT discussion session. As preparation for this meeting on Eday letters were sent to all of the householders on the island by Jan Falconer of Orkney islands Council. These letters were sent on 20th May, and outlined the BIG

HIT project and the opportunity for all of the householders to participate in the information events and provide consultation feedback.



Publicity Flyer for 'BIG HIT & The Orkney Hydrogen Challenge' Workshop

The 'Hydrogen Challenge' workshop for the school pupils was organised with Arcola Energy, and the BIG HIT event took place during the school dinner break. Personnel at the workshop included Laura Rolinson of Arcola Energy, Mark Hull of CES and Jan Falconer of OIC.

3.1.5 25th June 2016 - EUSEW 'Energy Day' Workshop in Shapinsay

On 25th June 2016 the second Shapinsay EUSEW 'Energy Day' Public Workshop was held on the topic of 'The Green Heart of Orkney? Steps towards a Hydrogen Island - BIG HIT.' This event was arranged and delivered by Nic Thake of the Shapinsay Development Trust, and there were eight attendees. This second 'Energy Day' workshop was very stimulating with an excellent educated conversation about possible outcomes and future scenarios, and there was huge enthusiasm for BIG HIT. Link: <http://eusew.eu/energy-days/shapinsay-green-heart-orkney-steps-towards-hydrogen-island-big-hit>

3.1.6 22nd September 2016 – Public Evening Event in Kirkwall

On 22nd September 2016 a public evening event was held at Kirkwall Town Hall. This event included speakers from several BIG HIT partners, and was widely publicised including social media and in 'The Orcadian' local newspaper.

This public meeting was opened by Councillor James Stockan of Orkney Islands Council, who gave a very positive message about the benefits of involvement with innovative energy projects that could help to overcome local grid constraints and bring economic benefits to the communities in the Orkney Islands.



Councillor James Stockan of Orkney Islands Council (OIC) opening the meeting on 22nd Sept

The BIG HIT public meeting in Kirkwall had a very good turnout with 35 people attending, excluding the speakers.

Green Hydrogen – BIG HIT Opportunities for the Orkney Islands

Thursday, 22nd September
7.30pm – 9pm

Venue: Supper Room, Kirkwall Town Hall

You are invited to this public meeting in Kirkwall Town Hall to hear updates from partners in the European funded 'BIG HIT' project about their plans and the opportunities for using 'green' hydrogen produced from renewable energy in transport and heating.

Speakers include:

- Orkney Islands Council – Councillor James Stockan
- Overview of 'Green H2' activities in Scotland – Nigel Holmes, SHFCA
- Eday renewable energy development – Neil Kermode, EMEC
- The Shapinsay perspective – Nic Thake, SDT
- Community and Local Energy opportunities – Mark Hull, CES
- Harbour & Ferries – David Hibbert, OIC

The speaker updates will take about an hour, and will be followed by an open question and answer session. Refreshments will be available from 7pm.

To register your interest please email: nigel.holmes@shfca.org.uk

Publicity in 'The Orcadian' for the Public Event in Kirkwall on 22nd September

There was a very positive attitude from the audience towards the Surf 'n' Turf and BIG HIT projects, which reflects the great work already done by the partners in the Surf 'n' Turf project with previous communication as well as the more recent BIG HIT activities.

The audience gave a very clear message of Orkney as a 'can do' location with a very receptive attitude towards innovation and new thinking. It also sent a clear message about the appetite for further projects in the Orkney Islands. The following morning Nigel Holmes had a very constructive meeting with Steven Heddle, the Convenor of Orkney Islands Council, who was very clear that OIC fully supports of these innovative projects. Furthermore he saw this as a key driver for economic growth and employment opportunities in the Orkney Islands.



Nic Thake of Shapinsay Development Trust explaining the Shapinsay opportunities



David Hibbert of OIC, talking about the ferry logistics for the hydrogen trailers

The public meeting in Kirkwall also gave the opportunity for networking and informal discussions. All of these were positive, for example with one of the companies involved in the installation of the electrical networks on Eday (Bryan Rendall) who saw further opportunities for business and developing new competencies with smarter grid networks.

3.2 Wider stakeholder visits and Knowledge Exchange

On 29th June 2016 five community group representatives from Lewis, Barra and Watersay in the Western Isles of Scotland visited Orkney as part of a knowledge exchange with their counterparts in Orkney, arranged by Community Energy Scotland.

Community Energy Scotland members from the Western Isles shared learning experiences with counterparts in Orkney on a knowledge exchange which took place in late June 2016, arranged by Community Energy Scotland. The five visitors from Lewis, Barra and Watersay travelled to Orkney for the opportunity to see and hear about the challenges faced and responses of communities across Orkney. Both regions have abundant wind energy but tidal turbines, traditional water mills, health and social issues, fuel poverty, military assets, energy storage, charitable aims were all among the diverse topics covered in tours and meetings. This group also met with Nic Thake of the Shapinsay Development Trust, and heard about opportunities for Shapinsay. Link: <http://communityenergyscotland.org.uk/news/29-jun-2016-western-isles-and-orkney-exchange-knowledge-and-ideas.asp>

A group of 42 MSc Sustainable Energy Systems students from University of Edinburgh visited Orkney during June 2016 as part of their studies. EMEC hosted their visit to Orkney, and Nic Thake of the Shapinsay Development Trust travelled to Stromness on 13th June to present BIG HIT at the Heriot Watt ITIC lecture theatre. This was very well received, and Nic has received a number of follow-up enquiries from the Edinburgh MSc students since this event. Link:

<https://www.facebook.com/emecorkney/photospcb.1041861849232909/1041861499232944/?type=3>

3.3 Press releases and announcements

On the 28th April 2016 there was an announcement to the London stock market by ITM Power (listed company on London AIM) as required by stock market regulations on disclosure of material information to AIM market and ITM Power shareholders. This prompted significant media interest about the details for the BIG HIT project in advance of the main launch.

The 1st May 2016 was official start date of BIG HIT, this was not announced

On the 11th May 2016 the BIG HIT project was publically launched, with extensive press releases together with use of social media announcements on Linked In and Twitter. The full BIG HIT press release is included in Appendix 1 of this report, which also contains project partner statements, and was agreed between all partners in advance of release.

Communication about the start of BIG HIT included targeted updates in Orkney, including several interviews broadcast by Orkney Radio with members of the project.

3.4 Technical conferences and Industry events

On the 14th June 2016 Nigel Holmes of SHFCA gave a presentation at the World Hydrogen Energy Conference (WHEC 2016) in Zaragoza. BIG HIT was key example in the presentation about 'HFC Technologies Enabling Renewables in Scotland'. Link: <http://www.whec2016.com/>

As well as the presentation in the technical sessions, the exhibition and displays also included one of the new design hydrogen trailers manufactured by BIG HIT partner Calvera.



Calvera Hydrogen Trailer at WHEC 2016 13-16 June 2016 in Zaragoza

On the 31st August 2016 Enrique Troncoso gave an update at the 8th SHFCA annual conference in St Andrews about BIG HIT. This update followed immediately after the keynote presentation in the opening session on 'Scotland, EU, and International Energy System Opportunities'. The opening keynote in this session was by Jorgo Chatzimakakis, the Secretary General of Hydrogen Europe, immediately followed by BIG HIT:

Session 1: Scotland, EU, and International Energy System Opportunities.

- 14:00 **Keynote:** Jorgo Chatzimakakis, Secretary General of Hydrogen Europe
- 14:25 Orkney BIG HIT Project: Enrique Troncoso, Aragon Hydrogen Foundation
- 14:40 Development and deployment of fuel cell stationary power and CHP: Ben Todd, Arcola Energy
- 14:55 Heteroatom-doped Carbons for Hydrogen, Fuel Cell, and Electrolysis Applications in Japan: Stephen Lyth, Kyushu University, Fukuoka, Japan.
- 15:10 Science to Technology: Getting New Materials Out of the Lab: Mark Cassidy, University of St Andrews

BIG HIT presentation at SHFCA Annual Conference, St Andrews, 31st August 2016

4 CONCLUSIONS

BIG HIT is the most ambitious demonstration of the hydrogen economy concept to date and has set 8 strategic objectives, of which 3 are clearly linked to WP6 dissemination activities:

- Objective 2: A key aim of BIG HIT is to develop expandable solutions that can be replicated elsewhere, thus ultimately initiating a wider market for hydrogen and fuel cell technologies.
- Objective 6: Facilitate the planned roll out of hydrogen technologies through dissemination activities to engage with the local population, including public meetings on Eday, Shapinsay and in Kirkwall to raise awareness of FCH technologies, with experts from the partners answer questions in open session.
- Objective 7: Central to the success of BIG HIT is its ability to act as a demonstration of a hydrogen territory for other remote locations, through the participation of Malta as the follower territory, and the development of effective business models.

The BIG HIT dissemination activities undertaken in WP6.5 the events in Eday, Kirkwall, and Shapinsay have been met. On Shapinsay where the main BIG HIT electrolyser is located there have been three public events carried out during this period on Shapinsay, with very strong support from the Shapinsay Development Trust in arranging and delivering these public meetings.

Effective use has been made of communication channels, including industry market announcements, press releases, social media, and radio. The activities have engaged with industry and policy stakeholders, as well as the communities in the Orkney Islands and specifically the consultation with householders on the islands of Eday and Shapinsay which will host the electrolyser facilities.

Technical dissemination of BIG HIT has also begun with presentations being delivered at significant conferences such as WHEC 2016 in Zaragoza, as well as at the SHFCA 8th Annual Conference held in St Andrews. This is raising the profile of BIG HIT within the sector, and will play a key part in identifying further replication opportunities and supporting Objective 2.

In support of Objective 6 the BIG HIT project members have worked very closely together on the communication and dissemination activities, and significant use has been made of the links with the 'Surf 'n' Turf' project on Eday through partners OIC, ITM Power, CES, and EMEC. This has helped to provide clear and consistent messages about the use of hydrogen to overcome local grid constraints and deliver local benefits to the communities in the Orkney Islands.

5 REFERENCES & APPENDICES

APPENDIX 1: BIG HIT Public Announcement - press release from 11th May 2016:

Orkney Islands selected for €10.9 million EU 'BIG HIT' project

Building Innovative Green Hydrogen systems in an Isolated Territory: a pilot for Europe (BIG HIT)

11th May 2016

The Orkney Islands of Scotland have been chosen for the development of a new European-wide hydrogen project, building on the existing Orkney Surf 'n' Turf initiative. This wider European project is called BIG HIT (Building Innovative Green Hydrogen systems in an Isolated Territory: a pilot for Europe). BIG HIT is a five-year project, involving 12 participants based across six EU countries, and starts in May 2016.

The local authority partner in BIG HIT is Orkney Islands Council, providing local input together with the Shapinsay Development Trust (SDT), Community Energy Scotland (CES), and the European Marine Energy Centre (EMEC). Calvera, Giacomini, ITM Power, and Symbio FCell are the industry partners providing equipment and technical expertise. Technical University of Denmark (DTU) is the technical partner and the Scottish Hydrogen & Fuel Cell Association (SHFCA) is dissemination partner. The Ministry for Transport and Infrastructure (MTI) represents Malta as the lead follower territory for project replication. The overall BIG HIT project coordinator is Fundación Hidrógeno Aragón (FHA, The Foundation for the Development of New Hydrogen Technologies in Aragon).

The Orkney Islands have over 50 MW of installed wind, wave and tidal capacity generating over 46 GWhr per year of renewable power, and has been a net exporter of electricity since 2013. Energy used to produce the hydrogen for BIG HIT will be provided by the community-owned wind turbines on the islands of Shapinsay and Eday, two of the islands in the Orkney archipelago. At present the Shapinsay and Eday turbines are often 'curtailed', losing on average more than 30% of their annual output, with their electricity output limited by grid capacity restrictions in Orkney. The otherwise curtailed capacity from the locally owned Shapinsay wind turbine will be used to split the component elements of water, by the process of electrolysis, to produce low carbon 'green' hydrogen and oxygen using a 1 MW PEM electrolyser.

BIG HIT builds on foundations laid by the Orkney Surf 'n' Turf initiative, which will see production of hydrogen on the islands of Eday and Shapinsay using wind and tidal energy. These are both world leading pilot and demonstration projects, which aim to put in place a fully integrated model of hydrogen production, storage, transportation and utilisation for low carbon heat, power and transport. These projects address a number of operational and development challenges including the logistical and regulatory aspects for transport of hydrogen fuel between islands, and the orientation and familiarisation with new hydrogen building and transport technologies.

Orkney Islands Council will be taking a significant part in the BIG HIT project, by providing 10 electric vans which will each be fitted with a hydrogen fuel cell. A hydrogen refuelling station will be constructed in or near to Kirkwall at a site still to be selected. These adapted vans will

form part of the Council's fleet – their hydrogen fuel cells will give them a wider range than their battery-powered electric counterparts. As part of demonstrating the potential scope hydrogen has for practical uses in Orkney, the Council also intends to install small hydrogen-powered boilers at two of its premises. Gavin Barr, the Council's Executive Director of Development and Infrastructure, said: *'BIG HIT has the potential to reduce costs to the Council whilst maximising a sustainable resource which is readily available locally and currently being underutilised due to our lack of connectivity to the national grid. BIG HIT will build on what is being achieved through Surf 'n' Turf and communities can look forward to hearing more about the project as it evolves.'*

Shapinsay Development Trust works to secure the future of the resilient island community of about 300 people in Shapinsay, one of the many inhabited islands in the Orkney archipelago. Shapinsay islanders are empowered and resourced by the efforts of the Trust in whose work many of them are intimately involved as trustees, volunteers or employees. Service Manager Nic. Thake said *'BIG HIT offers an opportunity for Shapinsay to address the curtailment of its community owned turbine in a way that helps demonstrate an innovative energy option that will be available to island groups in the future. This project offers a glimpse of a sustainable future where small islands can provide their own integrated transport, heat and power system by deploying their own generational capacity. We are proud to be part of this project and, small as we are, look forward to working with partners to achieve its aims.'*

Community Energy Scotland (CES) is a registered Scottish charity and has been at the forefront of community energy developments in Scotland. CES has been leading the Surf 'n' Turf project which will work closely with BIG HIT. CES Project Manager in Kirkwall, Mark Hull, said: *'CES's Kirkwall team is looking forward to working with local partners and companies from across Europe to scale up hydrogen as a clean fuel that helps keep the value of Orkney's renewable energy close to home. In particular, it's great to welcome a second community generator – and another CES member – into the hydrogen network that Surf 'n' Turf has established.'*

European Marine Energy Centre (EMEC) is the first and only centre in the world to provide developers of both wave and tidal energy converters with purpose-built open-sea testing facilities, and also is host to the Surf 'n' Turf project funded by the Scottish Government's Local Energy Challenge Fund. Neil Kermode, Managing Director of EMEC said: *'Hydrogen is a really useful product, and BIG HIT is building on the work started on Eday with the Surf 'n' Turf project. Once you have made hydrogen you can do many different things with it, including heating and transport. By innovating around local grid constraints using hydrogen we are opening up huge new markets.'*

Calvera specialises in the manufacture of storage and transport systems for compressed gas, and particularly Hydrogen for high pressure. The company has provided bespoke systems for 30 years to industrial and medical gas companies and is a certified official supplier to these organizations. Calvera is composed of 2 production facilities, with a workforce of 60 people, and provides turnkey solutions including European approvals. In addition, the company maintains and refurbishes gas transport systems.

Giacomini is a leader in the field of components for heating and cooling, and has been involved for more than 10 years in the field of hydrogen as renewable energy source using an innovative condensing boiler based on a hydrogen catalytic burner.

ITM Power is an energy storage and clean fuel company. committed to clean sustainable energy solutions based on water electrolysis using Polymer-Electrolyte-Membrane (PEM) technologies. ITM Power will be providing the project's electrolysis, the hydrogen refuelling station and will be conducting much of the safety analysis. Dr Graham Cooley, CEO, ITM Power commented: *'BIG HIT is a major step in turning the Orkney Islands into a genuine Hydrogen*

Territory. The deployment of 1.5 MW of electrolysis and the operation of hydrogen logistics to provide a transport fuel and renewable heat is a very important step.'

Symbio FCell is the European leader in hydrogen Fuel Cell systems designed for the transportation markets. Fabio Ferrari, CEO, Symbio FCell commented: *'BIG HIT will demonstrate the huge value of a full hydrogen ecosystem, a comprehensive environmental-friendly value chain that provides energy independence, cogeneration of renewable heat and electricity, as well as zero emission solutions for sustainable mobility and transportation.'*

Danmarks Tekniske Universitet (Technical University of Denmark, DTU) is one of Europe's foremost technical universities with world class expertise in fuel cells, electrolysis, hydrogen storage and related technologies. Centre Manager Eva Ravn Nielsen from DTU Energy and FCH Test Center (for fuel cell and hydrogen technologies) comments: *'It is exciting to contribute to the demonstration of a hydrogen society in the Orkney Islands. We need these new technologies to balance the future energy system with increasing amounts of intermittent renewable energy.'*

Scottish Hydrogen & Fuel Cell Association (SHFCA) is the sector body for the development and deployment of hydrogen and fuel cell technologies in Scotland. Nigel Holmes, CEO of SHFCA said *'BIG HIT is another important step for developing low carbon energy systems capability in Scotland, and we are delighted to be part of this Europe wide team. BIG HIT demonstrates the important role of hydrogen and fuel cells for realising additional local benefits from renewable energy, and this great project will help many other islands and communities to achieve similar benefits.'*

The Ministry for Transport and Infrastructure (MTI) promotes and develops the transport sector in Malta by means of proper regulation and by the promotion and development of related services, businesses and other interests, both locally and internationally.

The Foundation for the Development of New Hydrogen Technologies in Aragon (FHa) is a non-profit private entity founded in 2003 to carry out the organization, management and deployment of a wide range of actions with the purpose of promoting the use of the hydrogen as an energy vector. Based in Huesca, Spain, its team of experienced professionals performs R&D as well as consultancy projects, in cooperation or assisting local, national and international companies, contributing to their industrial modernization and to improve their competitiveness. FHA co-organizes the World Hydrogen Energy Conference (WHEC 2016) to be held in Zaragoza, Spain, from the 13th to 16th June.

Financial support for the BIG HIT project through the European Commission's Fuel Cells Hydrogen Joint Undertaking (FCH 2 JU). The FCH 2 JU selected BIG HIT as the only hydrogen project of its kind to receive funding, and €5 million has been allocated to the project, which has total estimated costs of €10.9 million.

Supported by



BIG HIT Announcement about Project Start ends.