

BIG HIT

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



WP6: Dissemination & Exploitation

Deliverable 6.6 – Press Day

2nd & 3rd May 2018 at All-Energy, Glasgow

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1 EXECUTIVE SUMMARY

This report provides an update on the Dissemination activities for BIG HIT Work Package 6 in advance of the opening Launch event in Kirkwall on 15th May 2018. This Press Day helped to significantly raise the profile of BIG HIT in advance of the opening launch, and provided an excellent platform for the launch event communications.

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 is creating 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’.

The key elements of the BIG HIT project and links with the Surf ‘n’ Turf project are shown in Figure 1 below. This schematic representation of BIG HIT has been used extensively in the communications and dissemination activities, as it helps to present the complete ‘Hydrogen Valley’ approach being deployed by BIG HIT in the Orkney Islands:



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

This graphic has been very effective for presentations and wider communications

The BIG HIT project location in the Orkney Islands is ideal for the demonstration project, but is located off the northern coast of Scotland. The Orkney Islands are a one-hour flight from either Edinburgh or Glasgow. In order to facilitate access and attendance at the Press Day it

was decided to hold this event in Glasgow at the All-Energy conference and exhibition, which runs over two days on 2nd and 3rd May 2018.

The All-Energy event in Glasgow was chosen as an accessible and high profile venue for the display of one of the five Calvera hydrogen tube trailers used for BIG HIT. The delivery of the final trailer was able to be planned to allow it to be displayed at All-Energy in Glasgow while in transit from the Calvera manufacturing facility in Zaragoza, Spain, to the Orkney Islands

All Energy attracts about 5,000 delegates from across the renewable energy industry from throughout the UK, Europe, and more widely. Through close cooperation with the event organisers, Reed Exhibitions, the Hydrogen Trailer was established as the highly visible centrepiece for the new ‘Hydrogen Zone’ at All-Energy 2018.

As well as being a visible centrepiece, the side of the trailer was also the backdrop for a series of presentations about hydrogen deployment activities and opportunities. This allowed the BIG HIT project to reach out to a wider audience on both days of the event, which is free to attend and open to both trade and public visitors on both days.

The Hydrogen Zone hosted a visit by the First Minister of Scotland, the Rt. Hon. Nicola Sturgeon, on 2nd May 2018. There was also a further high-level visit to see the BIG HIT Calvera trailer on the second day of All-Energy, by Clare Perry, the UK Minister for Business, Energy, and Industrial Strategy.



Figure 2. Ceclie Ratinet of Calvera and Nigel Holmes of SHFCA with the First Minister of Scotland, the Rt. Hon. Nicola Sturgeon (centre) in front of the BIG HIT hydrogen trailer at All-Energy.

The formal opening of the BIG HIT project facilities in the Orkney Islands was successfully carried out on the 15th May 2018, at an event attended by senior industry and government representatives including the Executive Director of the Fuel Cell and Hydrogen Joint Undertaking, and members of both the Scottish Government and the Government of Aragon.



Figure 3. Launch of the BIG HIT Project in Kirkwall, the Orkney Islands, on 15th May 2018

The BIG HIT project in the Orkney Islands has achieved wide recognition, both nationally and throughout Europe, and has been recently quoted by Brendan Devlin of the European Commission as part of a ‘global exemplar’ clean energy island initiative.

2 PRESS DAY OBJECTIVES

BIG HIT is possibly the most ambitious demonstration of the hydrogen economy concept to date and has a number of strategic objectives, of which 3 are clearly linked to WP6 dissemination activities and events such as the Press Day:

- Objective 2: 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, raise awareness of FCH technologies, with partner experts answering questions in open session.
- Objective 7: Act as a leading by example 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 press day focussed on Objective 6, to facilitate the planned roll out of hydrogen technologies through dissemination activities to engage with the local population and stakeholders, raising awareness of FCH technologies, and allowing experts from the project partners to present BIG HIT and answer questions in open session. These activities took place both at the press day and also in parallel conference and information sessions at the All-Energy in Glasgow on 2nd and 3rd May 2018.

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 PRESS DAY ACTIVITIES

Since the launch of BIG HIT there has been a very significant number of dissemination activities covering various types of activity. The Press Day was scheduled to allow a significant amount of profile and awareness of BIG HIT to be built up in advance of the Launch event in Kirkwall on 15th May 2018. The schedule of activities included:

- Wider stakeholder and public engagement in the Orkney Islands
- Press announcements and Press Day on 2nd May 2018 (with BIG HIT trailer)
- First hydrogen refuelling completed at Hatston, Kirkwall on 9th May 2018
- Public event : the BIG HIT opening Launch on 15th May 2018 in Kirkwall

The following sections detail the BIG HIT dissemination activities for the Press Day and related events on 2nd and 3rd May 2018 as publicity and preparation for the Launch.

The All-Energy Conference and Exhibition was held in Glasgow on 2nd and 3rd May 2018 alongside the Sustainable Urban Mobility (SUMS) Conference. Energy Systems and zero emission transport applications featured prominently. In the main conferences, there were presentations by BIG HIT about the use of hydrogen on the Orkney Islands, and Hydrogen also featured in the speeches of the First Minister and Energy Minister in the Scottish Government.

The Hydrogen Hub was located on the main Exhibition floor with a wide range of presentations throughout both days of the show. The Hydrogen Hub was located in front of Calvera’s mobile energy storage unit which is used in the Orkney Islands and this was a superb advertisement for the BIG HIT project.



Information about hydrogen fuel cell applications was found in the main conference agenda and in All Energy's sister conference on Sustainable Urban Mobility.

Nigel Holmes, Chief Executive of the Scottish Hydrogen Fuel Cell Association (SHFCA), gave a presentation on transport and renewable energy generation in the Orkney Islands. This began by looking at the Scottish Government's target for CO₂ reduction and the growth in renewable energy generation in Scotland and he emphasised the need to convert renewable energy to hydrogen. The presentation then went on to outline the BIG HIT project, and how this was creating a local hydrogen economy in the Orkney Islands.

The BIG HIT project and other activities in the Orkney Islands with hydrogen were picked up many times in the All-Energy Conference, and another highlight was when Paul Wheelhouse, the Scottish Government Energy Minister, praised Orkney's work on the local grid network and hydrogen storage in his plenary speech.

3.1 Press Day and BIG HIT Press Releases

Communications about BIG HIT on the Press Day centred on the about delivery of the fifth Calvera hydrogen trailer to the BIG HIT project (see Appendix 1).

This was part of the build up to the Launch in Kirkwall on 15th May, and the BIG HIT press activity was concentrated in the run up to the Launch. This included a Press Day held at the All-Energy exhibition and conference in Glasgow on 2nd May 2018. The series of press releases in advance of the BIG HIT Launch, highlighted different aspects of the project and allowing the project partners to emphasise aspects of their project activities:

- 2nd May 2018 – All-Energy press day announcement about delivery of the fifth Calvera hydrogen trailer to the BIG HIT project (see Appendix 1).
- 9th May 2018 – announcement of the first refuelling of a Symbio hydrogen vehicle in Kirkwall from the ITM Power refueller at Hatston (see Appendix 2).
- 15th May 2018 – press announcement of BIG HIT project opening launch event (see Appendix 3).

3.2 Scottish First Minister Visit to 'Hydrogen Zone' 2nd May 2018

The Hydrogen Zone hosted a visit by the First Minister of Scotland, the Rt. Hon. Nicola Sturgeon, on 2nd May 2018. The visit was part of a scheduled visit to the exhibition floor, taking in a number of displays. It was noted that the First Minister spent a significant amount of time at the BIG HIT trailer, and was particularly interested in the use of the trailer to help address the issues of curtailed renewable energy from wind turbines in the Orkney Islands. The work undertaken by the European Marine Energy Centre (EMEC) as part of BIG HIT was explained to the First Minister by Neil Kermode (see Figure 3).

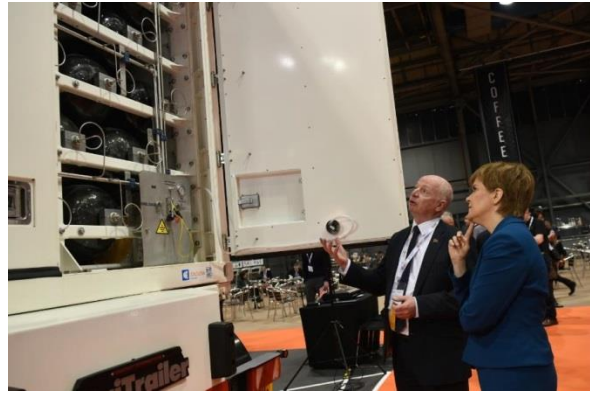


Figure 4 (above left). Nigel Holmes of SHFCA welcomes the First Minister of Scotland, the Rt. Hon. Nicola Sturgeon, to the BIG HIT hydrogen trailer centre of the Hydrogen Zone at All-Energy.

Figure 5 (above right). Neil Kermode, Chief Executive of EMEC, points out some of the innovative features of the BIG HIT hydrogen trailer to the First Minister of Scotland, the Rt. Hon. Nicola Sturgeon.

3.3 Handover of Fifth Calvera Hydrogen Trailer to BIG HIT

The handover of the fifth hydrogen tube trailer from Calvera to BIG HIT project team was carried out as part of the Press Day, and was widely reported in the national media.



Figure 6. Cecile Ratinet (centre left) of Calvera hands over the fifth hydrogen tube trailer to Jon Clipsham (centre right) of EMEC at the Hydrogen Zone. The handover is witnessed by Enrique Troncoso (on right), the BIG HIT Technical Coordinator on behalf of the Aragon Hydrogen Foundation.

3.4 BIG HIT ‘Hydrogen Hub’ Presentations

The Hydrogen Hub area immediately in front of the BIG HIT hydrogen trailer was used on both days for a series of presentations on hydrogen and fuel cells topic.

The presentations were ‘drop in’ theatre style, with delegates able to sit down or stand and listen for as long or as little time as they wished. The ‘Hydrogen Hub’ presentations were

very well attended by exhibition delegates, and are part of the wider stakeholder activities for BIG HIT. Speakers from BIG HIT partners included SHFCA, Calvera, and EMEC.

BIG HIT Hydrogen Hub Presentations. Day 1, Morning

10:45-11:30 BIG HIT: opportunities for hydrogen & fuel cells with renewable energy. Nigel Holmes, Scottish Hydrogen & Fuel Cell Association (SHFCA)

11:30-12:00 The role and value of energy storage in enhancing safety. Jacqueline Edge, Imperial College London

12:00-12:30 Hydrogen Fuel Cell lighting and surveillance equipment. Simon Meades, Taylor Construction Plant Ltd with BOC

12:30-13:00 Lessons from Levenmouth. David Hogg, Bright Green Hydrogen

13:00-13:30 Renewable hydrogen and sector shifting. Bill Ireland, Logan Energy

BIG HIT Hydrogen Hub Presentations. Day 1, Afternoon

14:00-14:30 Sustainable energy futures for cities and industries: Tekena Fubara, Doosan Babcock

14:30-15:00 Hydrogen and fuel cells opportunities. David Butler, Scottish Enterprise

15:00-15:30 The case for hydrogen for zero emission commercial vehicles. Richard Kemp-Harper, Arcola Energy

15:30-16:00 The role of multiple fuel cell CHP. Jon Cape, iPower Energy Ltd

BIG HIT Hydrogen Hub Presentations Day 2 (morning only)

10:30-11:00 Tidal energy and hydrogen: New market opportunities for ocean energy. Jon Clipsham, The European Marine Energy Centre

11:00-11:30 Transport and distribution of hydrogen and low carbon fuels. Cecile Ratinet, Export Manager, Calvera

11:30-12:00 Green hydrogen: The South Australian road map. Eoghan Quinn, WorleyParsons/Advisian

12:00-12:30 Hydrogen fuel cell lighting and surveillance equipment. Simon Meades Taylor Construction Plant Ltd with BOC

12:30-13:00 Commercial benefits of artificial intelligence for hydrogen systems. Daniel Aklil, Pure Energy Centre

4 CONCLUSIONS.

Effective use has continued to be 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. All BIG HIT project members worked very closely together on the communication and dissemination activities, including the Press Day.

5 APPENDICES

APPENDIX 1: BIG HIT Press release for All-Energy Press Day 2nd May 2018

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BIG HIT: High Five for ‘Green Hydrogen’ in the Orkney Islands

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

Press Release. Embargoed Until 11:15 on 2nd May 2018 (All-Energy, Glasgow)

BIG HIT celebrates another milestone with the handover at All-Energy of two hydrogen tube trailers from Calvera, which increases the Orkney fleet to five hydrogen tube trailers. These new trailers will transport ‘Green Hydrogen’ in the Orkney Islands from where it is produced locally using renewable energy to where it is used. This is a significant step towards creating a Hydrogen Territory in the Orkney Islands as part of the €10.9 million EU supported BIG HIT project.

The ‘Green Hydrogen’ is being produced at the European Marine Energy Centre facility on the island of Eday, and is transported to Kirkwall using the fleet of Calvera hydrogen tube trailers carried by the inter-island ferry service. This locally produced ‘green hydrogen’ supplies the hydrogen fuel cell installed at Kirkwall Harbour and will also be used for the Orkney Islands Council fleet of five Symbio Kangoo fuel cell range extended zero emission vans. The new Calvera tube trailers can each carry up to quarter of a tonne of hydrogen gas.



Hydrogen & Fuel Cell Deployments in the Orkney Islands of Scotland

The Orkney Islands of Scotland were 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 started in May 2016. The official opening of the BIG HIT project will take place in Kirkwall on 15th May 2018, see <https://www.bighit.eu/> for more details.

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 is 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 wind 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 by the BIG HIT project 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 has established production of hydrogen on the island of Eday using wind and tidal energy. BIG HIT and Surf ‘n’ Turf are both recognised as world leading pilot and demonstration projects, which put in place a fully integrated model of hydrogen production, storage, transportation and utilisation for low carbon heat, power and transport. These projects have successfully 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.

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 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 Aragón).

Orkney Islands Council has taken a leading role in the BIG HIT project, by purchasing 5 electric vans which have each been fitted with a hydrogen fuel cell by Symbio to provide twice the normal operational range. These adapted Renault Kangoo vans are part of the Council’s operational fleet, and the hydrogen fuel cells give these them a wider range than their battery-powered electric counterparts. As part of demonstrating the potential scope hydrogen has for practical uses in Orkney, a small hydrogen-powered boiler will be installed at Council premises on the island of Shapinsay.

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.

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 is work closely with BIG HIT on areas such as hydrogen logistics. CES Project Manager in Kirkwall, Mark Hull, said: *‘CES’s Kirkwall team is 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.’*

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 Kermod, Managing Director of EMEC said: *‘By piloting the generation of hydrogen from renewable energy sources, BIG HIT is helping avoid grid shortcomings, while supporting further development of renewable energy projects in Orkney. It is breaking through the barriers to delivering renewable transport and heat, opening up new markets around the world.’*

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.

Symbio is the European leader in hydrogen Fuel Cell systems designed for the transportation markets. Fabio Ferrari, CEO, Symbio FCell commented: *'BIG HIT is demonstrating the huge value of a full 'Hydrogen Valley' 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 support the demonstration of a hydrogen society in the Orkney Islands. These new technologies are today helping to show how we can use hydrogen to balance energy systems of the future with increasing amounts of intermittent renewable energy such as marine, wind, and solar.'*

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 *'The delivery of these two hydrogen tube trailers is another important step by BIG HIT. This project is developing our low carbon energy systems capabilities in Scotland, and we are delighted to be part of this Europe wide team. BIG HIT is demonstrating 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.

The BIG HIT 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, Hydrogen Europe and Hydrogen Europe research. The FCH 2 JU selected BIG HIT as the only hydrogen project of its kind to receive funding in 2016, and €5 million has been allocated to the project, which has total estimated costs of €10.9 million. For more information about BIG HIT see <https://www.bighit.eu/>



BIG HIT Press Release ends.

For further information about BIG Hit and interviews please contact Nigel Holmes

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APPENDIX 2: BIG HIT Press release for First HRS Refuelling at Hatston 10th May 2018

BIG HIT Project Fuels Up with ‘Green Hydrogen’ in Orkney Islands

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

Press Release. Embargoed until 07:00 on 10 May 2018

The first refuelling of a hydrogen vehicle in the Orkney Islands has taken place using locally produced, renewable hydrogen. The ‘Building Innovative Green Hydrogen Systems in an Isolated Territory’ (BIG HIT) project has carried out the first refuelling of the fleet of five, zero emission, Renault Kangoo vans equipped with the Symbio hydrogen range extender at the ITM Power refuelling station in Hatston. This is a major first step towards creating a genuine hydrogen territory in the Orkney Islands.

An important pilot project for Europe, BIG HIT is a five-year project, involving 12 participants based across six EU countries, funded in May 2016 by the EU FCH JU. The Orkney Islands of Scotland were chosen for this development because of the need to store excess renewable energy and utilise the stored energy locally for transport and heat. The project therefore represents a blue print for renewable hydrogen deployment for island systems and new hydrogen territories.



Hydrogen & Fuel Cell Deployments in the Orkney Islands of Scotland

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 is 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 wind turbines are often ‘curtailed’, losing on average more than 30% of their annual output, limited by grid capacity restrictions in Orkney. This wasted energy from the locally owned Shapinsay wind turbine will be used by the BIG HIT project to produce renewable hydrogen using a 1 MW PEM electrolyser supplied by ITM Power. Storing excess renewable energy as renewable hydrogen in this way increases the utilisation of the installed wind capacity without the need to reinforce the grid connection.

Commenting on the BIG HIT announcement, Dr Graham Cooley, CEO of ITM Power said: “The Orkney Islands are the ideal test bed for the creation of a fully-fledged hydrogen territory with

hydrogen produced and used sustainably. We are pleased to have helped develop the project and that ITM Power's equipment is part of this important European initiative."

Fabio Ferrari, CEO of Symbio, added: 'BIG HIT is demonstrating the huge value of a full 'Hydrogen Valley' 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.'

BIG HIT builds on foundations laid by the Orkney Surf 'n' Turf initiative, which has established production of hydrogen on the island of Eday using wind and tidal energy. BIG HIT and Surf 'n' Turf are both recognised as world leading pilot and demonstration projects, which put in place a fully integrated model of hydrogen production, storage, transportation and utilisation for low carbon heat, power and transport. These projects have successfully 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.

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 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 Aragón).

Orkney Islands Council has taken a leading role in the BIG HIT project, by purchasing 5 electric vans which have each been fitted with a hydrogen fuel cell by Symbio to provide twice the normal operational range. These adapted Renault Kangoo vans are part of the Council's operational fleet, and the hydrogen fuel cells give these them a wider range than their battery-powered electric counterparts.

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.

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 is work closely with BIG HIT on areas such as hydrogen logistics.

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.

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 provides turnkey solutions including European approvals. In addition, the company maintains and refurbishes gas transport systems.

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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.

Symbio is a European leading parts manufacturer, specialized in hydrogen fuel cell kits that can be incorporated into various types of electric vehicles and are associated with a range of digital services.

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.

Scottish Hydrogen & Fuel Cell Association (SHFCA) is the sector body for the development and deployment of hydrogen and fuel cell technologies in Scotland.

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About the FCH JU. The Fuel Cells and Hydrogen Joint Undertaking is a unique public-private partnership supporting research, technological development and demonstration activities in fuel cell and hydrogen energy technologies in Europe. Its aim is to accelerate the market introduction of these technologies, realising their potential as an instrument in achieving a carbon-lean energy system. The three members of the FCH JU are the European commission; the fuel cell and hydrogen industries, represented by Hydrogen Europe; and the research community, represented by research grouping Hydrogen Europe Research.

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BIG HIT Press Release ends.

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APPENDIX 3: BIG HIT Press release for Grand Launch on 15th May 2018

BIG HIT Creates Exemplar ‘Hydrogen Islands’ Energy System for Orkney

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

Press Release. Embargoed until 14:00 on Tuesday 15th May 2018

Today the official opening of BIG HIT took place in Kirkwall, the Orkney Islands, bringing together communities, industry, and politicians who are all working together to deploy one of Europe’s leading energy systems. This will enable more renewable energy to be produced and used locally in the Orkney Islands of Scotland and also support similar deployments more widely.

Energy Minister Paul Wheelhouse said: *“We are very supportive of the BIG HIT initiative because it will help alleviate grid constraints in the Orkney Islands by enabling excess renewable energy generated locally, but what cannot be transmitted to the mainland to be stored and used to produce hydrogen. As a versatile and low carbon energy solution, hydrogen therefore has the great potential to play an important role in transport, heating, and industry. “This innovative project will add to our growing understanding of the potential role of hydrogen in Scotland’s future energy system, as identified in Scotland’s Energy Strategy which I published in December. “The Scottish Government has already supported a number of world-leading hydrogen demonstration projects, such as; the Orkney Surf’n’Turf project; and the introduction of zero emission hydrogen buses and hydrogen refuelling stations in Aberdeen.”*

This ‘Building Innovative Green Hydrogen Systems in an Isolated Territory’ (BIG HIT) project is a major first step towards creating a genuine hydrogen territory in the Orkney Islands. BIG HIT has been widely recognised as the leading project of its kind in Europe. BIG HIT is a five-year project, involving 12 participants based across six EU countries, funded by the EU FCH JU. The Orkney Islands of Scotland were chosen for this development because of the need to store excess renewable energy and utilise the stored energy locally for transport and heat.



Hydrogen & Fuel Cell Deployments in the Orkney Islands of Scotland

The BIG HIT project provides a blue print for renewable hydrogen deployment for island systems and new hydrogen territories. This will benefit communities and businesses who want to use more locally generated renewable energy.

Orkney Islands Council Leader James Stockan said: *“Orkney is at the heart of the BIG HIT project, which aims to demonstrate how hydrogen produced locally using renewable energy can be used sustainably in ways which benefit islands and other remote communities. Our community is the ideal test bed for this important initiative. The Council has ambitions to become carbon neutral and so it was great to see the Council’s new zero-emission vans - the first vehicles to have a ‘fill-up’ of Orkney-produced hydrogen – at the launch event, providing clear evidence that BIG HIT is up and running.”*

Mark Hull, Head of Innovation for Community Energy Scotland, added: *“The launch of this project is the hard earned result of a truly unique partnership of technical, public and local community partners coming together. We are looking forward to seeing it not only lead the way internationally, but also create real benefit to the local community, especially in Shapinsay and Eday.”*

Neil Kermod, Managing Director of the European Marine Energy Centre said: *“By piloting the generation of hydrogen from renewable energy sources, BIG HIT is helping avoid grid shortcomings, while supporting further development of renewable energy projects in Orkney. It is breaking through the barriers to delivering renewable transport and heat, opening up new markets around the world.”*

Clive Brookes, the Chair of Eday Renewable Energy added *“Eday Renewable Energy are proud and pleased to be part of BIG HIT and the emerging Hydrogen economy here in Orkney. This is an exciting time for the community of Eday and will create new opportunities for making better use of renewable energy generated from wind and tidal sources on Eday”.*

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 is 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 wind turbines are often ‘curtailed’, losing on average more than 30% of their annual output, limited by grid capacity restrictions in Orkney. This wasted energy from the locally owned Shapinsay wind turbine will be used by the BIG HIT project to produce renewable hydrogen using a 1 MW PEM electrolyser supplied by ITM Power. Storing excess renewable energy as renewable hydrogen in this way increases the utilisation of the installed wind capacity without the need to reinforce the grid connection.

Prof Roger Putnam CBE, Chairman of ITM Power, added: *“BIG HIT is an important blue-print for the design of hydrogen energy systems utilising intermittent renewable energy. The project perfectly illustrates the use of electrolysis for energy storage and its subsequent use as a clean fuel and for renewable heat. ITM Power are delighted to be part of such an important project”*

BIG HIT builds on foundations laid by the Orkney Surf ‘n’ Turf initiative, which has established production of hydrogen on the island of Eday using wind and tidal energy. BIG HIT and Surf ‘n’ Turf are both recognised as world leading pilot and demonstration projects, which put in place a fully integrated model of hydrogen production, storage, transportation and utilisation for low carbon heat, power and transport. These projects have successfully 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.

Fernando Palacin, the Managing Director of The Foundation for the Development of New Hydrogen Technologies in Aragon, coordinators of the BIG HIT project, said: *“Hydrogen technologies provide solutions to some of the most important challenges that humankind has to face in terms of sustainability, environmental concerns, and a better use of local renewable resources for improvement the socio-economic structure of the region or territory where they are deployed. They*

also offer public & private entities business opportunities, allowing them to increase competitiveness and social cohesion. The BIG HIT European project is a pioneer project and the first step worldwide towards establishing a real locally-integrated hydrogen economy, The Foundation is delighted to join and lead this consortium to demonstrate and make visible & tangible the benefits of hydrogen technologies in Orkney”.

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 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).

Orkney Islands Council has taken a leading role in the BIG HIT project, by purchasing 5 electric vans which have each been fitted with a hydrogen fuel cell by Symbio to provide twice the normal operational range. These adapted Renault Kangoo vans are part of the Council’s operational fleet, and the hydrogen fuel cells give these them a wider range than their battery-powered electric counterparts.

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.

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 is work closely with BIG HIT on areas such as hydrogen logistics.

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.

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 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.

Symbio is a European leading parts manufacturer, specialized in hydrogen fuel cell kits that can be incorporated into various types of electric vehicles and are associated with a range of digital services.

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.

Scottish Hydrogen & Fuel Cell Association (SHFCA) is the sector body for the development and deployment of hydrogen and fuel cell technologies in Scotland.

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.

About the FCH JU. The Fuel Cells and Hydrogen Joint Undertaking is a unique public-private partnership supporting research, technological development and demonstration activities in fuel cell and hydrogen energy technologies in Europe. Its aim is to accelerate the market introduction of these technologies, realising their potential as an instrument in achieving a carbon-lean energy system. The three members of the FCH JU are the European commission; the fuel cell and hydrogen industries, represented by Hydrogen Europe; and the research community, represented by research grouping Hydrogen Europe Research.

The BIG HIT 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, Hydrogen Europe and Hydrogen Europe research. The FCH 2 JU selected BIG HIT as the only hydrogen project of its kind to receive funding in 2016, and €5 million has been allocated to the project, which has total estimated costs of €10.9 million. For more information about BIG HIT see <https://www.bighit.eu/>



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For further information about BIG HIT and interviews please contact Nigel Holmes

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