Department for the Economy: Energy Strategy – Call for Evidence

Hydrogen mobility Ireland Response, 20th March 2020

Introduction

Hydrogen Mobility Ireland (HMI) is a group of industrial partners from across the energy, transport and fuel industry who are committed to the development of hydrogen as an affordable, practical and green transport fuel. The group has a strategy to roll-out a network of hydrogen refueling stations across the Island of Ireland (32 counties) by 2030 and includes a number of partners:

- BOC Gases Ireland
- Bord Gáis Energy
- Bord na Móna
- Coras Iompair Éireann (CIE)
- Energia
- Ervia/Gas Networks Ireland
- ESB Generation and Trading
- GenComm Project (represented by Belfast Metropolitan College)
- Harris Group (LDV)
- Hyundai Cars Ireland
- Hydrogen Ireland (represented by Dublin City University)
- Indaver Ireland
- Maxol
- Toyota Ireland

MEMBERS

This document provides a collective view from the full members of the group on the important role that Hydrogen for Mobility could play in the Energy Transition. We respond to the two sections of the consultation most relevant to Hydrogen Mobility: '3. The Energy Transition in Northern Ireland' highlighting HMI's ambitions in Northern Ireland and the role that Hydrogen could play in the energy transition, followed by a response to the questions of Section '8. Transport'. The consultation questions that are being responded to are included in bold, followed by HMI's response.

Some HMI members will also respond bilaterally to represent their own companies' individual views on the project and to respond on non-hydrogen related aspects.

The HMI Group also benefits from the input of policy stakeholders who attend the Group meetings as observers. For the avoidance of doubt, this document has been prepared only by the full members of the group and does not reflect the views of the policy stakeholders.

3. The Energy Transition in Northern Ireland

Is your organisation undertaking or planning to undertake projects to support the energy transition? If so, please provide further details.

Hydrogen Mobility Ireland brings together industrial members who plan to roll-out a network of Hydrogen Refuelling Stations (HRSs) across the Island of Ireland to supply Hydrogen as a green, affordable and practical fuel for the decarbonisation of transport. HMI has set out a measured an achievable pathway for the introduction of Hydrogen and roll-out of Hydrogen Refueling Stations across the Island of Ireland in our Report "***A Hydrogen Roadmap for Irish Transport 2020-2030***" (HMI Report).

http://www.element-energy.co.uk/wordpress/wp-content/uploads/2019/10/20190930-Hydrogen-Mobility-Ireland-Final-External-Report.pdf

This document confirms that industry partners are ready to invest in developing Hydrogen production and distribution infrastructure for Ireland and in bringing the appropriate vehicles, as part of a coordinated project. It also demonstrates that with sustained effort in the period 2020 to 2030, Hydrogen can become a commercially viable green transport fuel. This is achieved, whilst helping the integration of large quantities of renewable energy into the Irish energy system, as hydrogen can be produced from renewable electricity sources very flexibly (i.e. modulating production to match the output of intermittent generators and or mismatches with between generation and demand).

The large-scale production of hydrogen to supply Hydrogen Mobility will reduce the costs of producing and distribution hydrogen for all uses, thereby catalysing the use of hydrogen for decarbonizing other "hard to abate" segments of the Irish energy system, namely industry and heat. This is particularly important for areas where there are no clear abatement alternatives to hydrogen, for example used as an industrial feedstock or for high temperature heat. As such, encouraging investment in Hydrogen for Mobility now will enable hydrogen to make significant contributions to decarbonisation across all sectors beyond 2030.

HMI are currently seeking funding and planning permissions for the first step of this pathway: A first large scale deployment of Hydrogen Fuel Cell electric vehicles (30 buses and 60 taxis) and associated infrastructure in Dublin. This will be preceded by a one year trial of 3 Hydrogen buses in Dublin. In parallel Energia are installing a Hydrogen refueling station opening in Belfast later this year, which will fuel a fleet of 3 buses. Both projects expect to make heavy use of Wrightbus vehicles. Wrightbus (based in Ballymena) have been a supporter of the HMI group and are a global leader in the development of fuel cell buses, with a commitment to reducing prices to a commercial level.

The planned deployments will demonstrate both an at scale business model for hydrogen production and distribution, and the deployment of fleets of fuel cell vehicles, to catalyse the further roll-out of the HMI strategy and support a move to a commercial model in the period from 2023 to 2030.

8. Transport

Q30 - What would be an appropriate pathway to decarbonised energy for transport to 2050?

Hydrogen will play an important role in any pathway to decarbonised energy for transport for two key reasons:

a) The relatively high energy density and fast refueling time of Hydrogen as a vehicle fuel mean it is well suited for difficult to decarbonise vehicles such as heavy commercial, high-use and public transport vehicles without significant operational changes for the end-user
b) Hydrogen can be easily transported and stored to support the management of intermittent renewables energy and allow the use of otherwise curtailed energy for hydrogen production.

A pathway to enable Hydrogen to make a meaningful contribution to emissions reductions in mobility up to 2030 and therefore make significant emissions reductions beyond this, has been plotted in our Report "***A Hydrogen Roadmap for Irish Transport 2020-2030***" (HMI Report).

This report demonstrates that HMI have industrial partners ready and willing to invest in developing Hydrogen production and distribution infrastructure for Ireland, to enable Hydrogen to become a commercially viable and zero emission transport fuel by 2030.

However, the pathway to commercially viable clean hydrogen fuel requires support and commitment from the public sector to help overcome the barriers associated with low hydrogen demands in the early years of the vehicle roll-out and also the early costs associated with low volume production as the industry ramps up to 2030. There are two main policy requests:

1. An incentive program for hydrogen-fueled vehicles, particularly for the larger vehicle segments and heavy-use fleet vehicles
2. An incentive scheme which rewards the production of clean hydrogen on a €/kg sold basis – this helps underpin early investments in clean hydrogen production and distribution assets.
    a. This could be provided through the Renewable Transport Fuel Obligation (and discussions have taken place

Given this supports, Hydrogen Mobility Ireland members can invest in the roll-out of hydrogen to decarbonise transport and enable Hydrogen Mobility to make significant contributions to the decarbonisation of transport.

Q32 – What energy infrastructure is needed to facilitate the uptake of electric vehicles in line with UK Government's 'Road to Zero' targets?

The wider uptake of Hydrogen Fuel Cell electric vehicles, in which hydrogen is used to make electricity to drive a vehicle, will require a joined-up network of hydrogen refueling stations across Ireland. These refuelling stations will require the production of H_2 from the electrolysis of water using green electricity. This electrolyser can be located at the renewable electricity generation site, which will require tube trailer trucks to distribute hydrogen, or at point of use.

in turn require sites to produce hydrogen, from either the electrolysis of water using green electricity, and tube trailer trucks to distribute hydrogen across the Island.

The HMI report details a strategy to deploy 76 refuelling stations and 27 production sites across the Island by 2030, to provide hydrogen to 9% of buses, 2% of cars and 2% of trucks and 1% of trains. 21 of these stations are located in urban clusters Northern Ireland, and 21 on the road network across the Island.

The report also details a strategy for implementing this network in phases, starting with clusters of stations for the large cities (to serve fleets which are "captive" to that city) and progressing through other smaller conurbations and stations on connecting roads. The strategy is based on ensuring the relatively large (and hence economically viable) stations can be built from the start of the roll-out. By

ensuring these are deployed alongside large fleets of heavy use vehicles, demand is ensured from day 1 and as a result the stations can be deployed on a semi-commercial basis for the first stations, moving into a fully commercial basis as the expansion of hydrogen takes root,

Having this network in place by 2030 allows hydrogen fuel cell electric vehicles to be taken up as a serious alternative to battery electric vehicles for consumers, in order to support the target of no new petrol and diesel cars sold by 2035. A nationwide Hydrogen Refuelling Station network will also make significant contributions to the decarbonisation of HGV road transport, due to the suitability hydrogen fuel cells for heavy duty usage.

Q33 – How will transport integrate with other energy uses (e.g. homes with solar generation, battery storage, EV charging) and what can government do to optimize the opportunities represented by this integration?

Green Hydrogen as a fuel can be used to provide energy for the decarbonisation of transport, heating and industry. The costs of Hydrogen production and distribution reduce with the volumes of Hydrogen produced, meaning that Hydrogen for transport can reduce the costs of hydrogen to a level that catalyses the use of Hydrogen to decarbonise heating and industry. Hydrogen for transport therefore acts in synergy with Hydrogen for other uses.

Hydrogen also facilitates the widespread uptake of renewable energy for power, as it can be produced from curtailed renewable energy and stored and transported. Hydrogen produced from curtailed renewable energy can be sold for use in mobility, thereby improving the investable case for renewable energy generation and facilitating the further development of renewable energy projects.

Indeed it is likely that as the grid becomes saturated with an increasing share of renewable energy it will become increasingly challenging to develop renewable electricity projects for the sale of electricity to the electricity grid only (as the captured price from the grid for this electricity will fall). By allowing new renewable projects access to another market (hydrogen sales to transport, industry and heat), hydrogen will actively facilitate the development of renewable energy for Ireland In the UK this is already being discussed for large renewable projects built after 2025.

Q34 -- To what extent can alternative low carbon transport fuels contribute to decarbonisation of the transport sector?

The ability to provide hydrogen as a zero emission transport fuel is limited by the number of FCEVs purchasing hydrogen and thereby justifying investment in Hydrogen production infrastructure. Without certainty of vehicles to use hydrogen, the significant cost and planning challenges faced in delivering refueling stations, will prevent their introduction, and without the refueling stations they need to operate Hydrogen vehicles will not be ordered. Hydrogen Mobility Ireland has therefore plotted a measured and achievable pathway for the introduction of Hydrogen in Ireland in our Report "***A Hydrogen Roadmap for Irish Transport 2020-2030***" (HMI Report)

This report describes a strategy to roll-out Hydrogen Refueling Stations to decarbonise 9% of buses, 2% of cars and 2% of trucks and 1% of trains on the Island of Ireland with green hydrogen by 2030, and to bring Hydrogen Mobility commercial operation. From this platform Hydrogen for Mobility could rapidly scale to allow green Hydrogen to make any significant contribution that is needed to support the decarbonisation of the transport sector.

The limiting factor for Green Hydrogen production to meet decarbonisation will be clear signals from market and Government on the uptake of fuel cell electric vehicles. Hydrogen production and refuelling infrastructure can take 1-2 years from first commissioning to being ready to use, and

require certainty of future demand. This certainty could be provided through confirmation of the supports outlined in Q30, and in setting targets for zero emission fleets.

Q35 – Do you have any data/research to help inform and reduce the carbon intensity of our transport energy in order to achieve net zero carbon by 2050?

Yes - our Report "***A Hydrogen Roadmap for Irish Transport 2020-2030***" contains a achievable pathway for the introduction of Hydrogen in Ireland, including the justification for this pathway. Analysis is also included on the costs of hydrogen production and distribution and total costs of fuel cell electric vehicle ownership, and how both of these are expected to vary up to 2030.

http://www.element-energy.co.uk/wordpress/wp-content/uploads/2019/10/20190930-Hydrogen-Mobility-Ireland-Final-External-Report.pdf