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**ECONOMIC DEVELOPMENT, ENVIRONMENT AND INFRASTRUCTURE SCRUTINY PANEL**

A meeting of the Economic Development, Environment and Infrastructure Scrutiny Panel was held on 9 January 2019.

**PRESENT:** Councillors Storey, (Chair), Arundale, Branson, Higgins, Lewis, McGloin, Walkington and Walters

**ALSO IN ATTENDANCE:** S Chaffer, H21 Commercial Manager, Northern Gas Networks  
M Lewis, Technology and Innovation Manager, Tees Valley Combined Authority

**OFFICERS:** D Carter, S Lightwing, P McGregor, C Orr

**APOLOGIES FOR ABSENCE** were submitted on behalf of Councillor Hubbard.

**DECLARATIONS OF INTERESTS**

There were no Declarations of Interest at this point in the meeting.

**1 MINUTES - ECONOMIC DEVELOPMENT, ENVIRONMENT AND INFRASTRUCTURE SCRUTINY PANEL - 5 DECEMBER 2018**

The minutes of the meeting of the Economic Development, Environment and Infrastructure Scrutiny Panel held on 5 December 2018 were taken as read and approved as a correct record.

**2 H21 PROJECT**

Simon Chaffer, H21 Commercial Manager, Northern Gas Networks (NGN) gave a presentation in relation to the H21 Project. The Leeds City Gate Project in 2016 confirmed that it was technically possible to convert the existing gas network in the UK to hydrogen. In 2018, OFGEM (Office of Gas and Electricity Markets) awarded £9 million to four gas networks: Cadent, Northern Gas Networks, SGN and Wales and West Utilities, to work together on how the network could be converted.

The Climate Change Act 2008 placed a duty on the Secretary of State to ensure that the net UK carbon account for all six Kyoto greenhouse gases for the year 2050 was at least 80% lower than the 1990 baseline by 2050. Currently that target was a long way off and the heat market provided a good opportunity to decarbonise through converting to hydrogen. The Government's Clean Growth Strategy recognised that hydrogen was a feasible option that would help decarbonise the network.

Hydrogen was carbon free and could be extracted from natural gas, whereas natural gas (methane) emitted carbon when lit. In the 1960s/1970s the UK had successfully converted from coal gas to town gas. It was proposed to utilise the existing gas infrastructure which would minimise the environmental impact. A transformation system would be needed to link into existing infrastructure and gas powered appliances would need to be converted.

By 2032 the current programme to replace gas mains would be completed and it was possible that funding currently awarded for that could then be used to replace infrastructure. There would also be a cost to replace appliances. In addition to the H21 Project, the Government had awarded £25 million to Arup, to consider everything inside domestic, commercial and industrial properties, that would need converting. This project was called Hy4Heat. The conversion of both the network and appliances would have to take place incrementally.

The H21 Project was now gathering critical evidence. Phase 1a was background testing. Assets such as pipes that were being replaced, were being removed from the existing network and taken for testing. Sections of pipe would undergo rigorous testing to ascertain whether they would leak hydrogen. Some of the pipes had been in-situ since the 1900s and previously been repaired with various chemicals. There were about 200 tests that could be carried out. Phase 1b was consequence testing - looking at how hydrogen would react if it leaked into

properties, or what might happen if a pipe was fractured.

For Phase 2, NGN were seeking a suitable site to use as the Field Trial Site to enable tests to be performed on operational scenarios in a more representative location to enhance the tests already completed. The H21 team would produce a 'conceptual design' that could be applied to whichever site was chosen. Testing would also ensure that the workforce would be safe to continue to operate in the same manner as they did now.

The strategic evidence compiled for the North of England conversion calculated that over 17 million tonnes of carbon would be removed per annum. The conversion would take from 2028 to 2035, and cover 12.5% of the UK population in Middlesbrough, Newcastle, York, Hull, Leeds, Bradford, Wakefield, Halifax, Manchester and Liverpool. It could support decarbonisation of transport with hydrogen fuelling stations and electric with decentralised and centralised generation. The total cost of implementation would be less than building a nuclear power station (over £20 billion) but decarbonise over five times the energy.

The H21 Project had identified what could potentially be implemented, but the Government would need to make a policy decision by the end of 2023 to meet the proposed timescales and the Climate Change Act targets. Converting to 100% hydrogen was one of the most viable options to deliver the Climate Change commitments, however other projects which involved blending hydrogen were also being considered. The cost of funding the project also needed to be determined by the Government.

In terms of creating job opportunities, it was anticipated that the network conversion could bring tens of thousands of jobs to the north-east. As well as engineers and construction workers, new appliances would need to be designed, produced and built for use with hydrogen. A social science study was being undertaken with Leeds Beckett University to consider people's perception of converting to hydrogen and the opportunities this might bring. NGN was working with Universities to help people understand and share the opportunities. Teesside University was also working with the TVCA on hydrogen conversion.

Members were keen to discuss the safety aspects of hydrogen since it was as explosive as natural gas, but also less dense. Similar to natural gas, hydrogen did not smell, and it was likely that a smell would be added to it, following public consultation. Some form of hydrogen detector would also need to be developed.

**AGREED** that the information provided was received and noted.

### 3 **TEES VALLEY COMBINED AUTHORITY - HYDROGEN VEHICLE PROJECT**

Mark Lewis, Technology and Innovation Manager, TVCA (Tees Valley Combined Authority) gave a presentation on hydrogen in the Tees Valley. Hydrogen could reach all sectors: domestic heat, transport and industry.

Hydrogen reduced emissions and improved air quality. When hydrogen was used in vehicles, only water was produced and not particulates. There were some energy efficiency losses when converting natural gas to hydrogen. Hydrogen could also be produced from water using electricity, and electricity could be produced using the vast wind energy resources in the north east.

The TVCA had been working with the Teesside Collective Cluster on getting industrial carbon capture and storage in place, as well as the Clean Gas project. This would enable Tees Valley to make a big contribution to the H21 Project.

The Tees Valley already had the UK's largest existing industrial hydrogen network. Hydrogen was used to make fertilisers and polyurethane intermediates as well, with the Ethylene Cracker. The Tees Valley also had the largest merchant hydrogen producer: BOC Linde as well as extensive hydrogen storage capacity. The Teesside Collective CCS network would provide decarbonised hydrogen at low cost.

There were also other opportunities for 'green' hydrogen including: Dogger Bank wind farms,

Hartlepool Nuclear Power, Biomass Power and large scale waste processing which provided opportunity for gasification. Teesside was a compact area with adjacent port, rail, road and industrial opportunities and was ideal for the demonstration of hydrogen for heat and transport.

Although air quality in the Tees Valley was not as poor as in some other areas of the UK, the challenge of emissions from heavy goods transport could be addressed with hydrogen as well as electric vehicles. Vehicles could travel much further on hydrogen than using electric. Since Tees Valley was an industrial region, all the refuelling structure could be based in one place. It was highlighted that other countries, especially China, were leading the way with the use of hydrogen vehicles and there was competition from other European countries for decarbonising heat networks. Germany had already developed its first hydrogen train.

Another innovation was using fuel cells. Transport For London used a hydrogen fuel cell to heat its office. Electric vehicles with a fuel cell, using hydrogen, could travel much greater distances than solely electric or hybrid vehicles.

The TVCA had bid for funding from the OLEV (Office of Low Emission Vehicles) to install two hydrogen refuelling stations in the Tees Valley. Two possible sites had been identified in Middlesbrough and Redcar. One opportunity was the use of dual fuel for HGVs such as waste collection trucks or road sweepers, which would help address air quality issues on the A66. Another was busses. An example was given of a bus refuelling station in Aberdeen that supplied the largest hydrogen bus fleet in Europe, while maintaining a small footprint. The electrolyzers could power up to 20 buses a day and were designed to extend to dispense to cars also.

Opportunities existed to use the franchise system to encourage low carbon transport, although it was acknowledged that technology was expensive and required initial support or subsidy from the public sector. A business case was being developed by a consortium including Northern Rail, Network Rail and the TVCA to establish the cost of running a hydrogen rail system. The Tees Valley, with its railway heritage, would be an ideal location.

Hydrogen could also be used as a raw material and energy source in an industrial setting and this was also being explored.

In summary, the TVCA's three priorities for converting to hydrogen in the Tees Valley were: carbon capture and storage, rail, and vehicle refuelling.

**AGREED** that the information provided was received and noted.

#### 4 **OVERVIEW AND SCRUTINY BOARD UPDATE**

The Chair gave a verbal update on items discussed at the Overview and Scrutiny Board meeting held on 8 January 2019.

#### 5 **ANY OTHER URGENT ITEMS WHICH IN THE OPINION OF THE CHAIR, MAY BE CONSIDERED**

Councillor Branson gave a summary of the highlights of the Westminster Energy, Environment and Transport Forum Conference that he attended on 4 December 2018. A written report had also been circulated to Panel Members prior to the meeting.