

Network Innovation Competition 2020 Supplementary Answer form

Project Name	HyNTS FutureGrid Phase 1		
Question number	#7	Pro forma section	3
Question date	10/09/2020	Answer date	14/09/2020
Question summary	Please set out the current range of scenarios for the rollout of hydrogen and how the NTS would or would not be used under each.		

Answer (please retain document formatting and do not exceed 2 pages unless otherwise agreed with Ofgem)

Committee on Climate Change scenario: The Committee on Climate Change sees new hydrogen transmission pipelines: *"When technical feasibility is demonstrated and decisions made, production (primarily from natural gas) will require a significant infrastructure programme to build dedicated new hydrogen transmission pipelines, hydrogen storage capacity (e.g. salt caverns), large volumes of CCS and hydrogen production capacity. On this basis we have allocated the conversion of the gas grid to hydrogen to the Further Ambition scenario."*

Aurora Energy Research scenarios: The Aurora scenarios envisage a major role for hydrogen transmission, including the possibility of repurposed transmission pipes, although the report acknowledges that repurposing of pipes is an area of uncertainty at present:

"New and repurposed gas pipelines will be the cheapest form of transportation for transmission and distribution of large volumes of H₂, while trucks will provide a means of

distributing small volumes of H2. Salt cavern storage, pressurised tanks and pipelines are likely to provide the short- to medium-term storage options."

"The feasibility of repurposing gas pipelines for H2 transmission is uncertain."

"In the long term, ageing gas transmission assets could be converted to hydrogen either for transmission or to serve as linepack storage."

National Grid Future Energy Scenarios

A key message from the FES is that hydrogen will provide between 21 and 59% of 2050 net zero end-user energy needs: *Hydrogen and carbon capture and storage must be deployed for net zero, Industrial scale demonstration projects need to be operational this decade.*

ENA Pathways

The ENA Pathways report states that: *The capability of the gas networks, particularly high-pressure transmission system, to transport hydrogen needs to be proved. The capability to convert end-users safely and efficiently to hydrogen requires additional testing.* When discussing how the gas network needs to be configured, the Pathways report states: *The capability to blend hydrogen to high concentrations in the NTS, and the application of gas separation technologies, would enable the transmission of hydrogen produced at these coastal locations to other inland or southern areas of GB.*

Sectoral hydrogen use in UK net zero scenarios, 2050							
TWh	Committee on Climate Change	National Grid Consumer Transformation	National Grid System Transformation	National Grid Leading the Way	ENA Pathways	Aurora High Adoption	Aurora Targeted Adoption
Buildings	53	21	319	68	140		
Industry	120	10	118	67	59		
Surface transport	25	32	56	45	30		
Shipping	70	70	70	35	-		
Power generation	2	20	28	20	7		
TOTAL	270	152	591	235	236	515	212

<https://www.theccc.org.uk/publication/net-zero-technical-report/>

National Grid, Future Energy Scenarios 2020 <https://www.nationalgrideso.com/future-energy/future-energy-scenarios/fes-2020-documents>

Energy Networks Association, Pathways to Net Zero, 2019 <https://www.energynetworks.org/gas/futures/pathways-to-net-zero-report.html>

Aurora Energy Research, Hydrogen for a net zero GB: An integrated energy market perspective, June 2020 <https://www.auroraer.com/insight/hydrogen-for-a-net-zero-gb/>