Decarbonising Transport
An Opportunity to Innovate

Hydrogen for Aviation
Hydrogen South West

- Group of 10 leading organisations covering aerospace, shipping, hi-tech engineering and public utilities.
- Set up in 2022
- Partnership was set up to work together to create a collaborative infrastructure ecosystem that will bring the benefits of Hydrogen to the South West of England.
Energy & Aviation Today

- Aviation accounts for 2.5% of Global CO2 Emissions.
- Current Aircraft are fuelled by Jet fuel which is a refined kerosene-based fuel.
- Ground operations are currently diesel and electric.
- Electric aircraft have significant challenges.
  - Heavy
  - Short Range
  - Unviable short turnaround times
- Airports are currently supplied by tanker & fuel pipelines around the UK.
Hydrogen For Aviation

We commissioned Arup to build an evidence base of the potential role for hydrogen in aviation across our network.

- Energy demand forecast
- Scenario development
  - Jet Zero strategy
  - Aircraft development timeline
  - 4 Airports Modelled
- Scenario options
  1. Business as usual
  2. Kerosene and SAF only
  3. Optimistic hydrogen
  4. Conservative hydrogen
- Hydrogen and SAF demand
- Supporting infrastructure
Hydrogen For Aviation

How will the role of hydrogen emerge in multiple parts of the supply chain from manufacturing through to operations?

- Ground operations
  - Tugs, Busses, Generators, fire trucks, maintenance vehicles etc.

- Sustainable Aviation Fuel – Short term & Medium-term opportunity.
  - Aircraft can already run on SAF with minimal changes to the aircraft.
  - SAF’s main GHG saving is through the production of the fuel depending on what feedstock is used.

- Hydrogen – Long term opportunity
  - Hydrogen fuel cells.
  - Liquid hydrogen.
Projects Already in motion

- Live projects to construct SAF plants as part of Jet Zero commitment.
  - LanzaTech Project Dragon site in Port Talbot will be a potential future demand for WWU HyLine project.
  - Fulcrum building a plant near Stanlow.

- Bristol Airport have commitment to decarbonise ground operation vehicles as part of airport masterplan.

- Cardiff Airport look to become carbon neutral by 2040.

- Airbus are working on their Zer0e concepts that will look to bring a hydrogen powered commercial aircraft by 2035.
  - 4 concepts being looked at with different Fuel cell & Liquid Hydrogen technologies.

- ZeroAvia
  - Flight tests of hydrogen electric fuel cell engine already ongoing.
  - Partnered with Absolut Hydrogen to develop liquid hydrogen refuelling Infrastructure.

- Rolls Royce looking at developing engine technologies.
Role of the Networks

- Work undertaken to quantifies the potential hydrogen demand from each of the potential pathways. Bristol’s demand could be around 100k tonnes by 2050.

- Unlikely that early pre-2030 projects will require a small element of the gas network given initially low demand (ground operations and short-haul) and retention of network for methane.

- Post-2035 presents an opportunity for the gas networks to play a role, in line with rapid growth from clusters and GW-scale hydrogen production from industrial clusters.

- There is a natural opportunity to connect airports into industrial clusters and local hydrogen production projects.

- Conversion of existing kerosene pipelines is a key challenge as airports will require kerosene and hydrogen in the medium term whilst carriers don’t wholly convert to hydrogen.
Summary

- Opportunities will be case-by-case and depend on the availability of hydrogen, ambitions of airports and carriers – potential for disruptive technology and organisations (ZeroAvia).

- Uncertainty around whether production of hydrogen at airports will be viable, highly dependent on availability of electricity grid connections & hazardous zoning distances for liquid hydrogen.

- Need for further clustering partnerships like Hydrogen South West to keep close to all elements of the supply chain as there are currently a lot of unknowns.

- Understanding the likelihood of a network role for hydrogen is key for the planning of both gas and electricity grids in the 2030’s & when the likely timelines for the switch from tanker to pipeline will be needed.

- This is already being done for industry, so there needs to be the same development between GDN’s/DNO’s and aviation)
Thank you

Download The Hydrogen For Aviation Report

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