Department for Transport

Hydrogen's Role in a Decarbonised Transport System

Dr Mike Whiteley

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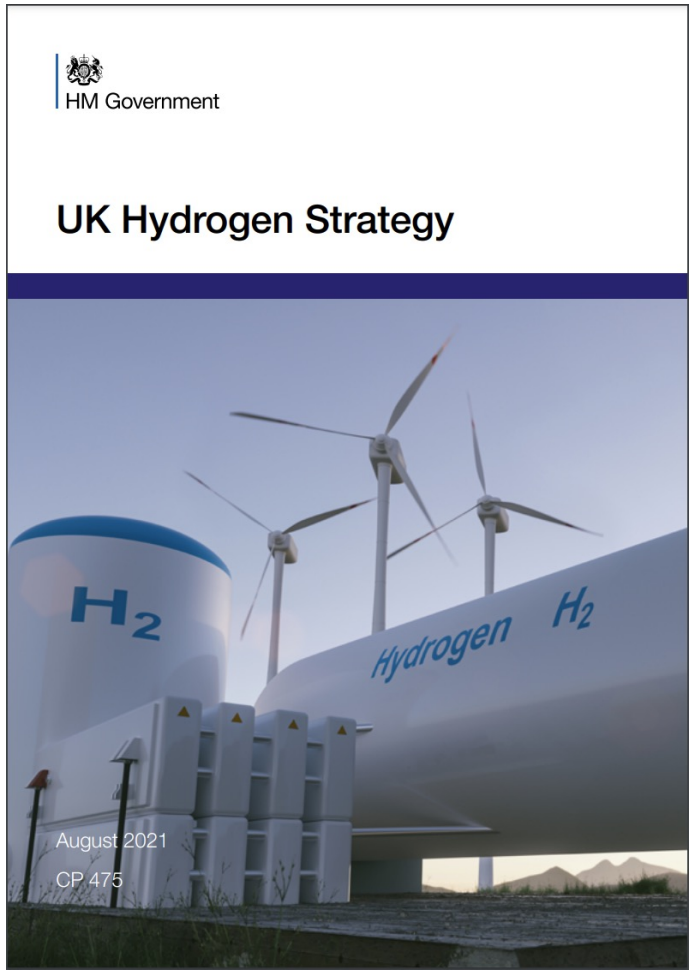
Transport Decarbonisation Plan

July 2021

> hydrogen, **fundamental** to achieving net zero in heavy transport applications and a major industrial opportunity. The UK's existing strengths and expertise along its value chain makes us well placed to generate significant quantities of green hydrogen from renewable electricity. Through bold initiatives such as our world first 'hydrogen transport hub' in the Tees Valley, we can now expand our innovation and infrastructure to create critical mass in its production and use.

UK Hydrogen Strategy

August 2021



> Hydrogen is likely to be **fundamental** to achieving net zero in transport, potentially complementing electrification across modes of transport such as buses, trains and heavy goods vehicles (HGVs). It is also likely to provide solutions for sectors that will not be able to fully decarbonise otherwise, including aviation and shipping.
>
> Transport is also a **crucial** early market for hydrogen, driving some of the earliest low carbon production in the UK.

Our past and present support programmes

Previous hydrogen for transport programmes

•£270 million last financial year through the Zero Emission Bus Regional Areas (ZEBRA) scheme (N.B. open to battery electric and hydrogen bids);

•£20 million for of our zero emission road freight demonstrator programme (completed March 2022) for feasibility studies;

•Up to £20 million for the 21/22 Clean Maritime Demonstration Competition, funding feasibility studies and technology trials in zero emission shipping;

•Up to £15 million in 21/22 for the ‘Green Fuels, Green Skies’ competition to support first-of-a-kind sustainable aviation fuel plants;

•£3 million Zero Emission Flight Infrastructure considered hydrogen.

•£3 million last year to support the development of a Hydrogen Transport Hub in Tees Valley, [and £4.8 million to support the development of a hydrogen hub in Holyhead, Wales (subject to business case approval)];

•£20m towards the Hydrogen for Transport Programme, delivering passenger cars and infrastructure across the UK;

Hydrogen for transport programmes this year

•Through the £206m UK Shipping Office for Reducing Emissions, (or UK SHORE), as part of the refresh of the National Shipbuilding Strategy, we will build on the success of last year's Clean Maritime Demonstration Competition. Hydrogen expected to play a major role.

•This March we announced the West Midlands Combined Authority had received funding for 124 hydrogen fuel cell buses and accompanying refuelling infrastructure through our Zero Emission Bus Regional Areas scheme, one of the most ambitious hydrogen bus projects in Europe.

•In May 2022 we announced the second phase of the Zero Emission Road Freight Demonstrator (ZERFD) programme with £200m of funding. This project will rollout vehicles and infrastructure for both battery and hydrogen fuel cell HGVs in the weight categories between 40 – 44t.

Renewable Transport Fuels Obligation

- The UK's regulatory tool for ensuring the provision of sustainable, renewable fuels to de-carbonise the UK transport sector
- Stimulates jobs in R&D and the renewable fuel supply chain
- Volume-based targets on fuel suppliers
- Met through tradeable certificates ("RTFCs") per litres
- A way for hydrogen suppliers to de-risk investment in transport supply infrastructure by lowering the cost per kg
- Current hydrogen requirements are for green (electrolytic) with a link to renewables (not grid)
- Some anaerobic digestion is covered depending on feedstock
- Consultation response is due soon on additionality

https://www.greencarreports.com/news/1114608_california-to-fall-short-of-100-hydrogen-fueling-stations-by-2020

BEIS Support and Policy

British Energy Security Strategy

ESS published 7 April 2022, committing to:

- ✓ Double our ambition to **up to 10GW low carbon hydrogen production capacity by 2030**, with **at least half of this from electrolytic** hydrogen
- ✓ Aim to run **annual allocation rounds for the hydrogen business model**, moving to price-competitive allocation by 2025 as soon as legislation and market conditions allow
- ✓ **Up to 1GW of electrolytic hydrogen** in operation or construction by 2025, alongside existing commitment for **up to 1GW of CCUS-enabled hydrogen** by 2025
- ✓ **Design, by 2025, new business models for hydrogen transport and storage** infrastructure
- ✓ Set up a **hydrogen certification scheme** by 2025

Hydrogen Investment Package

HIP published 8 April, including:

- Hydrogen **Investor Roadmap**
- Government responses to consultations on:
  - **Hydrogen business model** (revenue support)
  - **Net Zero Hydrogen Fund** (capital co-funding)
  - UK low carbon hydrogen **standard** (emissions)
- Indicative **Heads of Terms** for H2 business model
- Market engagement for electrolytic allocation round
- **Industrial Hydrogen Accelerator** programme

… Ahead of **launch of NZHF on 25 April** & opening **joint allocation round** for electrolytic projects **summer 2022**

The role of hydrogen in net zero & the UK's energy transition

The case for hydrogen in the UK context

Low carbon hydrogen will be **critical for achieving net zero**, particularly in "hard to electrify" **UK industrial sectors,** and can provide flexible energy deployment across **heat, power and transport**.

The UK's geography, geology, infrastructure, innovation and expertise make it **well suited to rapidly developing low carbon hydrogen.**

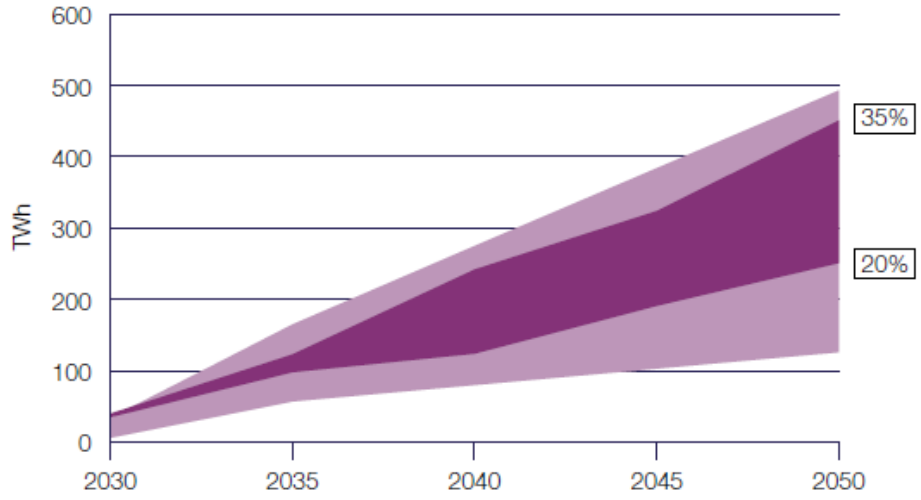
The Government's ambition is for **10GW of low carbon hydrogen production capacity by 2030** with at least half coming from electrolytic hydrogen.

Beyond decarbonisation, we will harness economic opportunities from the outset – **12,000 UK jobs** & unlocking **£9bn investment.**

Why do we need to act now?

By 2050, low carbon hydrogen will be comparable in scale to existing electricity use in the UK – but there is **virtually no low carbon hydrogen production or use** today.

Figure 1.2: Hydrogen demand and proportion of final energy consumption in 2050



% = hydrogen as proportion of total energy consumption in 2050

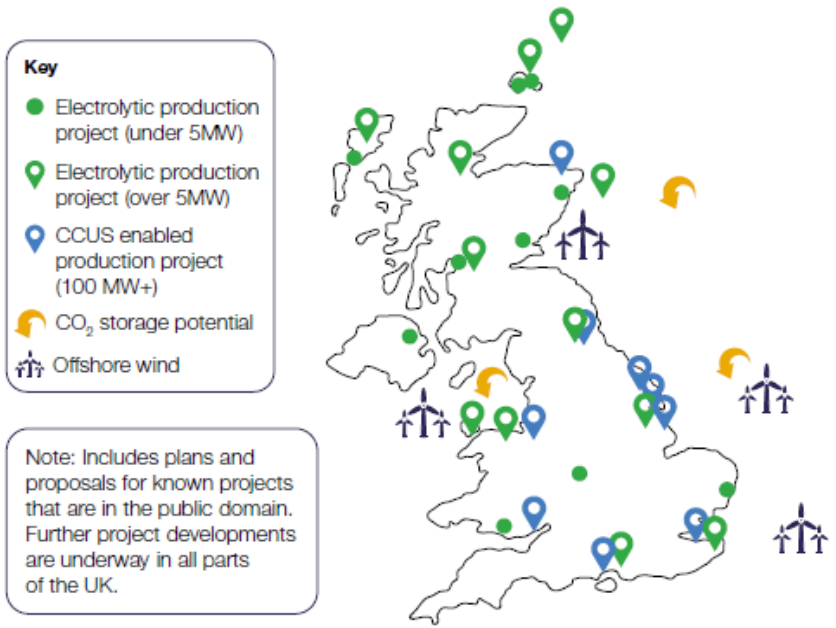
Source: Central range – illustrative net zero consistent scenarios in CB6 Impact Assessment. Full range – based on whole range from UK Hydrogen Strategy Analytical Annex. Final energy consumption from ECUK (2019).

Production: a ‘twin-track’ approach to rapidly scale up low carbon hydrogen

Twin track approach

The UK is taking a **‘twin track’ approach**, supporting a variety of production methods including both electrolytic & CCUS-enabled hydrogen.

Figure 1.3: Proposed UK electrolytic and CCUS-enabled hydrogen production projects



Key commitments

- ✓ Ambition for **10GW of low carbon hydrogen production capacity by 2030**
- ✓ Launch **£240m Net Zero Hydrogen Fund** in early 2022 for co-investment in early hydrogen production projects
- ✓ Deliver **£60m Low Carbon Hydrogen Supply 2** innovation competition
- ✓ Launch **UK standard for low carbon hydrogen**
- ✓ Finalise **hydrogen business model** in 2022, enabling first contracts to be allocated from Q1 2023

Thank You

mike.whiteley@dft.gov.uk