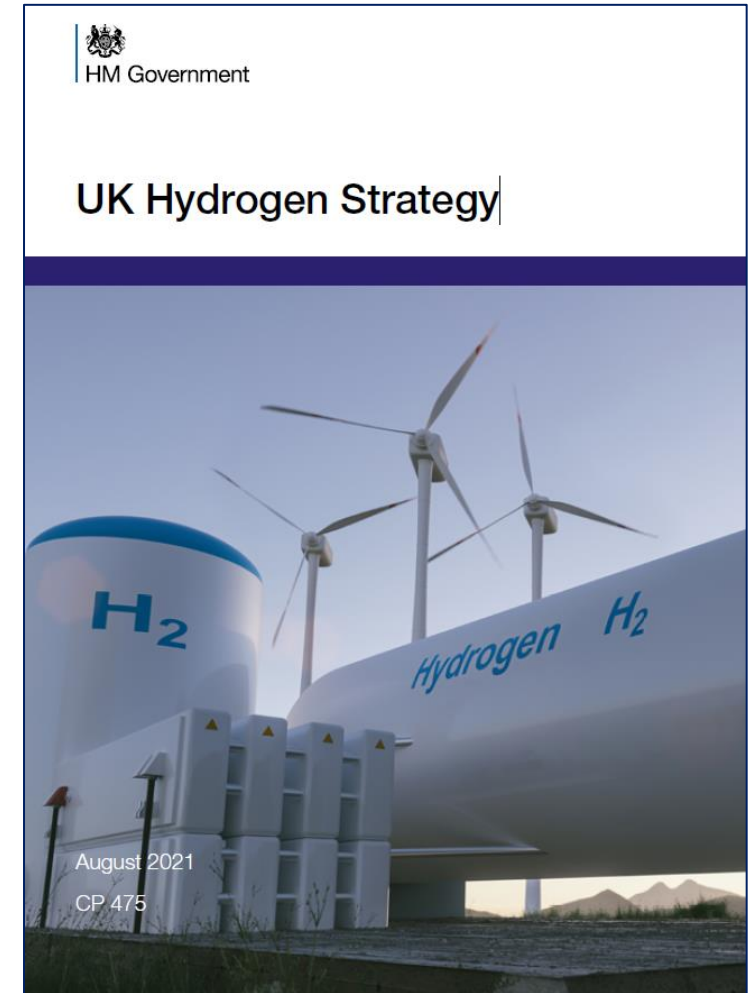


ZEMO Presentation

BEIS Hydrogen teams
Thursday 28th July



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**.



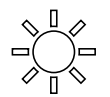
The UK's geography, geology, infrastructure, innovation and expertise make it **well suited to rapidly developing low carbon hydrogen**.



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**.

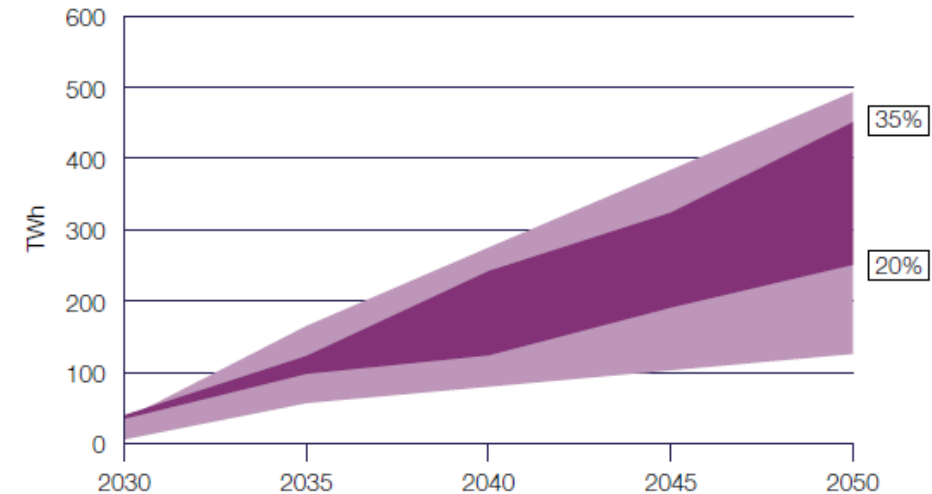


Hydrogen is **especially valuable** when **storing excess electricity from renewables**.

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

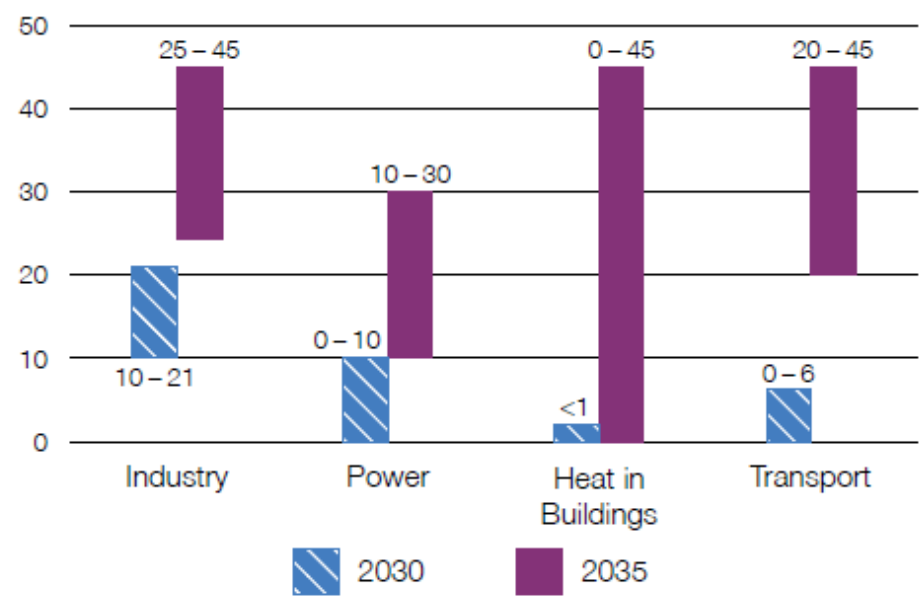
Source: Central range – illustrative net zero consistent scenarios in CB6 Impact Assessment. Full range – based on whole range from UK Hydrogen Strategy Analytical Annex. Final energy consumption from ECUK (2019).

Demand: in which sectors will hydrogen play a role in UK carbon budgets & net zero?

Our analysis suggests that hydrogen has a role to play in reaching net zero across a **range of sectors** by 2050.

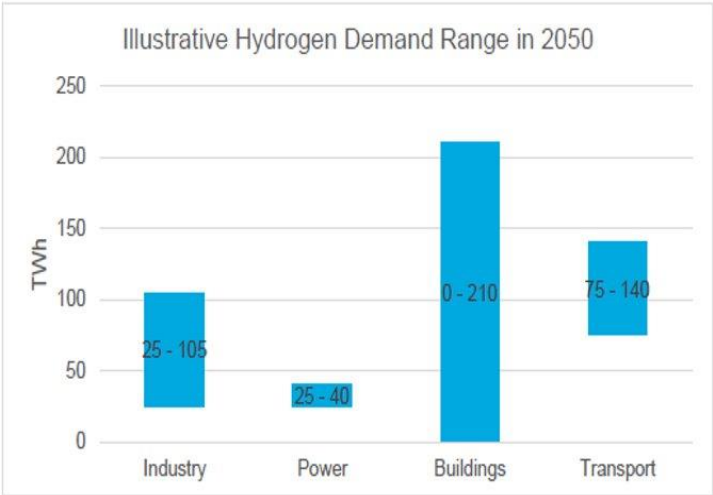
The ranges below illustrate our current understanding of the opportunity presented by **hydrogen in each sector**.

Figure 2.4: Illustrative hydrogen demand in 2030 and 2035



Source: BEIS analysis (see analytical annex). Note: figures do not include blending into the gas grid.

BEIS analysis suggests there could be hydrogen demand of **250-460 TWh by 2050**, delivering 20-35% of final energy consumption.¹



Note: Transport range excludes hydrogen use in cars and vans and aviation. These could add significant additional demand.

¹ UK Hydrogen Strategy: Hydrogen Analytical Annex (2021) p. 7.

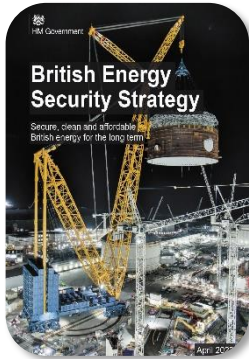
Hydrogen Production

What are we doing to drive forward new low carbon hydrogen production?



August 2021

- Sets out up to **£1bn in UK Govt support** for hydrogen and other low carbon technologies, including **over £400m for hydrogen** specifically.
- **Consultations** (since responded to) on **Hydrogen Business Model**, **£240m Net Zero Hydrogen Fund (NZHF)** and a **UK standard for low carbon hydrogen (LCHS)** (since finalised).
- **Twin track approach**, supporting a variety of production methods, including electrolytic and CCUS-enabled hydrogen
- Sets out innovation and demonstration funding for hydrogen applications across **industry, power, heat and transport**.



April 2022

- Doubling our ambition to **up to 10GW** of low carbon hydrogen production capacity by 2030, subject to affordability and value for money, with at least half of the 10GW 2030 production capacity to come from **electrolytic hydrogen production**.
- Aiming to hold **annual allocation rounds** for electrolytic hydrogen, with the first launched in 2022.
- Designing, by 2025, **new business models for hydrogen transport and storage** infrastructure.
- Setting up a **hydrogen certification scheme** by 2025.
- Responses to HBM, NZHF and LCHS consultations, BM Heads of Terms, and NZHF launched (S1 and 2), alongside Hydrogen Investor Roadmap.

Hydrogen Strategy: Update to Market

July 2022

- **Launch of joint allocation round** for electrolytic projects from the Net Zero Fund and hydrogen business model supporting hydrogen production equivalent to fuelling 45,000 buses a year.
- Hydrogen Champion appointed to help drive industry investment and deployment, alongside the update to market document (sections on demand, production etc) and the Sector Development Action Plan and Research and Innovation brochure.

July 2022

Comparison: Requirements under the LCHS and RTFO

UK Low Carbon Hydrogen Standard

Description	<ul style="list-style-type: none"> Sets a threshold for GHG emissions allowed in the production process for hydrogen to be considered 'low carbon hydrogen'. Compliance is required to determine eligibility for government support e.g. hydrogen business model (HBM) and Net Zero Hydrogen Fund (NZHF).
Scope	<ul style="list-style-type: none"> UK wide, covering domestic production. Future certification scheme would cover imports.
Emissions Threshold	<ul style="list-style-type: none"> 20g CO₂e MJ H₂ (point of production emissions).
Requirements on electricity input	<ul style="list-style-type: none"> Must use energy certificates for electricity used to prove there has been no 'double counting' (REGOs). Must prove contractual links to any electricity claimed as low carbon, i.e. Power Purchase Agreements. Must prove 'temporal correlation', matching generation to consumption per 30 minutes. Grid electricity above the threshold is permitted, provided the threshold is not exceeded on a monthly basis.
Additional requirements	<ul style="list-style-type: none"> There is no 'additionality' requirement, meaning producers can use existing generation assets for hydrogen production.

Renewable Transport Fuel Obligation

Description	<ul style="list-style-type: none"> Operational legally-binding obligation on larger fuel suppliers to show a certain percentage of their fuel comes from renewable and sustainable sources. Currently, hydrogen is eligible for support under the RTFO as a renewable fuel of non-biological origin (RFNBO) or as a biofuel.
Scope	<ul style="list-style-type: none"> UK wide, renewable fuels must be sold in the UK to gain certificates, but can be produced globally (provided compliant).
Emissions Threshold	<ul style="list-style-type: none"> 65% LCA GHG savings against a baseline (set by reference to the average GHG intensity of fossil fuel) This equates to 32.9gCO₂e/MJ (point of use emissions).
Requirements on electricity input	<ul style="list-style-type: none"> Must use energy certificates for electricity used to prove there has been no 'double counting' (REGOs). Must prove contractual links to any electricity claimed as low carbon, i.e. Power Purchase Agreements. Must prove 'temporal correlation', matching generation to consumption per 30 minutes. Each 30 minute consignment must be proven to be zero carbon – no averaging is permitted (or grid use not linked to a specific asset).
Additional requirements	<ul style="list-style-type: none"> Hydrogen producers must be linked to new build matched generation, or recommissioned or life extended generation or curtailed energy from existing generator.

Therefore, key points of difference are; i) **use of grid mix** – the RTFO in practice does not allow this, whilst the LCHS does if the monthly average emissions threshold is not exceeded; ii) **additionality** – the LCHS does not have any additionality requirements at this stage whilst the RTFO does. These reflect the different scheme aims; RTFO supports wholly renewable fuels, whereas the LCHS supports low carbon hydrogen and seeks to build the hydrogen economy.

Key delivery timelines

