How the UK government is supporting the hydrogen economy

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Department for Energy Security and Net Zero

Hydrogen has a major role to play in the UK's energy future

Low carbon hydrogen will be vital for UK energy security, economic growth and to meet our legally binding commitment to achieve net zero by 2050

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.**

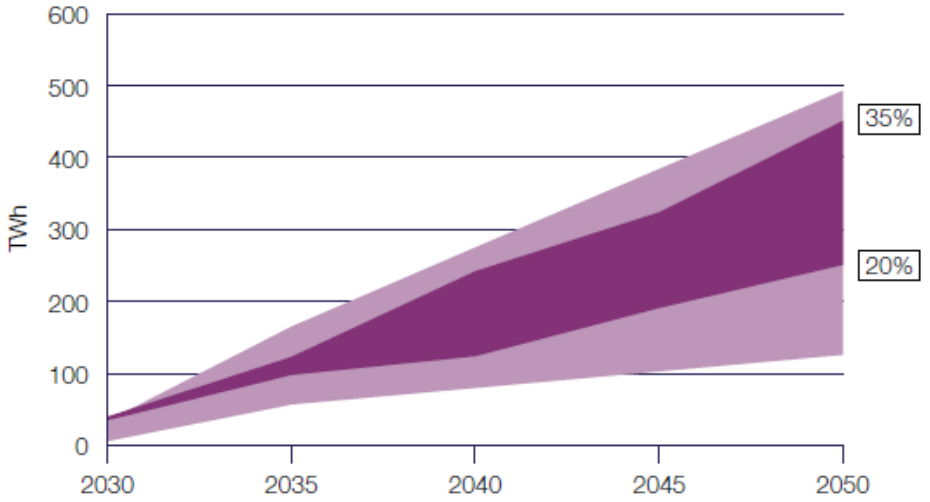
The Government's ambition is for up to **10GW of low carbon hydrogen production capacity by 2030** with at least half coming from electrolytic hydrogen.

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 could 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).

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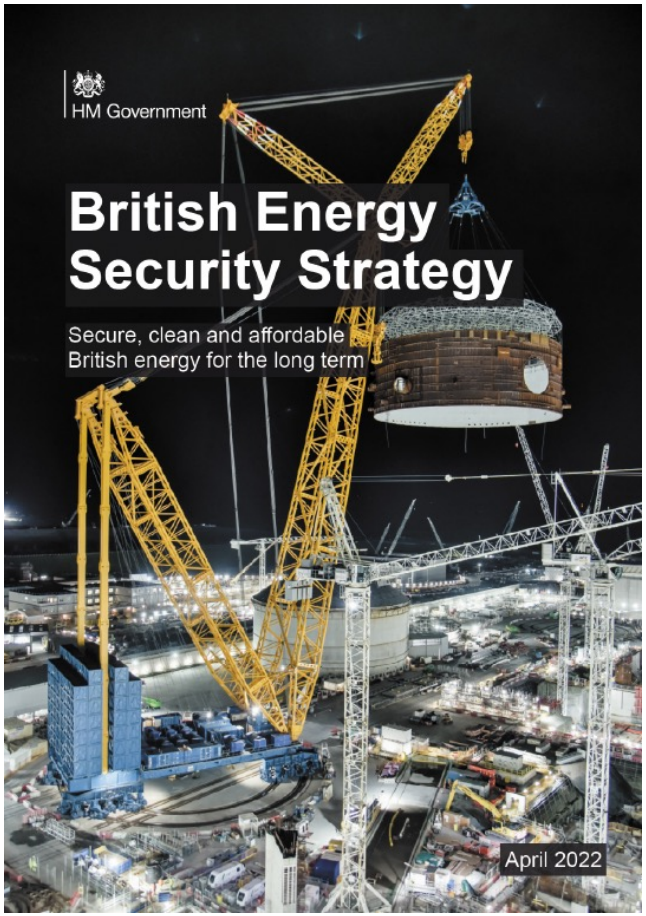
Government made further commitments in the British Energy Security Strategy last year



Doubling our ambition to **up to 10GW** of low carbon hydrogen production capacity by 2030, subject to affordability and value for money.

At least half of the 10GW 2030 production capacity to come from **electrolytic hydrogen production**.

Setting up a hydrogen certification scheme by 2025

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.

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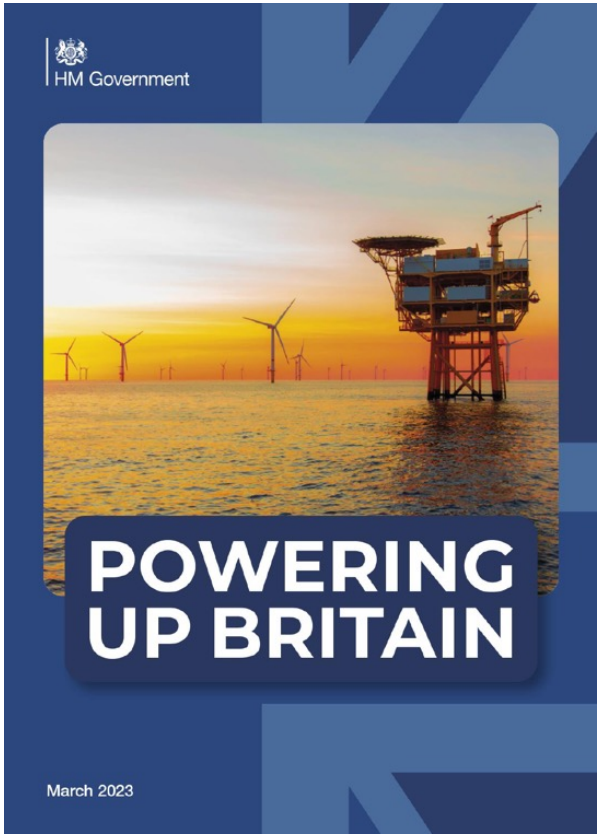
Powering Up Britain set out plans for delivery



Hydrogen headlines

- Confirmed the first **15 winning projects** from the £240 million Net Zero Hydrogen Fund.
- Shortlist of **20 electrolytic hydrogen projects** proceeding to the next stage of the electrolytic allocation process.
- Named **two CCUS-enabled hydrogen projects** that will progress to negotiations in Track 1 clusters.
- Announced **new IETF round for early 2024**, providing grants to industry for energy efficiency and GHG emissions improvements.

Source: Powering Up Britain: Net Zero Growth Plan (March 2023)

There is already a strong pipeline of projects and huge investment potential in the UK

Scotland

1. Fife Hydrogen Hub
2. Acorn Hydrogen
3. BEIS & Ofgem: H100 Heat Trial
4. CNES
5. EMEC
6. ERM (Dolphyn)
7. ERM (Salamander)
8. H2 Green
9. Hy2GO
10. Cromarty Firth Green Hydrogen
11. Repsol Sinopec
12. Scottish Power (Whitelee)
13. Shetlands Island Council
14. Octopus Hydrogen
15. Kittybrewster HRS
16. Aberdeen Hydrogen Hub
17. BayoTech

North West England

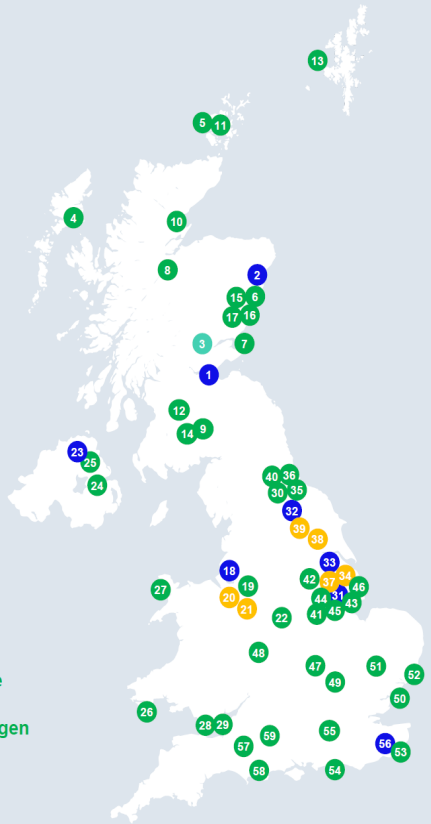
18. Hynet: HPP
19. Trafford Green /Carlton Power
20. Hynet: Phase 2 & 3 pipeline (Cadent)
21. Hynet: Salt Cavern Storage (INOVYN)
22. Octopus Hydrogen

Northern Ireland

23. Skuunaq
24. GenComm/Belfast Met
25. NI Water

Wales

26. RWE Pembroke
27. Mentor Mon
28. Octopus Hydrogen
29. Protium Magor



North East England

30. BP: CCUS enabled hydrogen and green hydrogen
31. Uniper Humber Hub
32. H2NorthEast
33. H2 to Humber Saltend
34. Aldbrough storage (SSE)
35. Protium
36. EDF Tees Green
37. ECC pipeline (Nat Grid Ventures)
38. Project Union (Nat Grid Gas)
39. East Coast Hydrogen (NGN)
40. Tees Valley Transport Hub
41. Octopus Hydrogen
42. Anonymized
43. Project Mayflower

East England

50. Sizewell
51. Octopus Hydrogen
52. Lowestoft Port

South East England

53. Ryze
54. Shoreham Port Green Hydrogen Production
55. Viridor
56. Acorn: Project Cavendish

South West England

57. Bristol Airport
58. Canford Renewable Energy
59. Octopus Hydrogen

Yorkshire & Humber

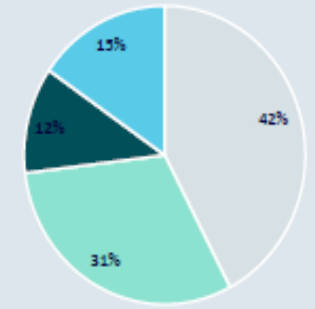
44. Yorkshire Energy Park
45. Oyster Project
46. Gigastack

East & West Midlands

47. Tyseley Energy Park
48. Shropshire Council
49. Octopus Hydrogen /MIRA Technology Park

CCUS enabled projects
Electrolytic projects
Storage & Distribution

Electrolytic end use (indicative)



Mobility (Road, NRMM, Aviation, Maritime) Industry Power Heat

Note: Includes plans and proposals for projects that are in the public domain. Many more projects are under development in all parts of the UK. Total UK pipeline estimated up to 20GW as of April 2022. Location of projects on this map is approximate.

Government has provided a clear signal that we are **committed to building a UK hydrogen economy**.

10 GW ambition could unlock over **£9 billion in private investment**.

We want to work with industry to understand and unblock the barriers to investment.

Source: Hydrogen T&S Analytical Annex, p9

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Delivering for hydrogen production projects

The **£240 million Net Zero Hydrogen Fund** (NZHF) will give mainly capex to low carbon hydrogen production projects. Successful projects for Strands 1 and 2 announced.

The **Hydrogen Production Business Model** (HPBM) operates like a CfD to cover the difference between the cost of production (strike price) and the sale price for hydrogen (reference price) for the first 10-15 years of a project's life.

Blue hydrogen projects apply for funding support through the **UK's Carbon Capture and Storage cluster programme**.

First bids were invited in 2021. HyNet and the East Coast Cluster were selected as the first two clusters.

Announced two CCUS-enabled hydrogen projects to progress to negotiations in the first two CCUS clusters - we expect to contract up to 1GW blue hydrogen to be in construction by 2025.

Launched Track-2 of the CCUS cluster sequencing process to establish two further CCUS clusters.

Electrolytic projects apply through **annual allocation rounds,** with the first launched in 2022 (for up to 250MW).

Published a shortlist of 20 electrolytic hydrogen projects which will proceed to the next stage of the electrolytic allocation process.

Aim to launch the second electrolytic allocation round later this year. We expect to have 1GW electrolytic hydrogen in operation or construction by 2025.

We expect to run allocation rounds annually, and move to competitive allocation as conditions allow

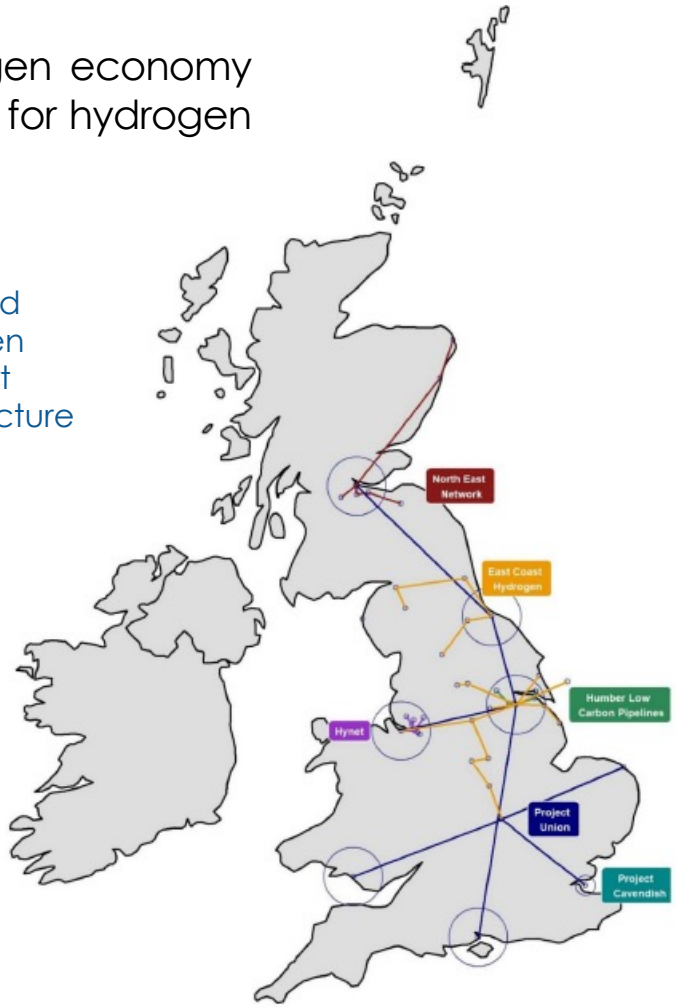
Developing business models for hydrogen transport and storage infrastructure

Hydrogen T&S infrastructure needs to scale up to support the hydrogen economy grow. We have committed to designing, by 2025, **new business models** for hydrogen T&S infrastructure.

Key priorities / next steps

- **Published a consultation** on hydrogen T&S infrastructure business models, and will publish the government response in due course.
- **Published a research study** on hydrogen T&S infrastructure requirements up to 2035.
- Set up a new **Hydrogen Advisory Council T&S infrastructure Working Group** in the autumn.
- The Net Zero Hydrogen Fund can provide **DEVEX support** for associated on-site T&S FEED costs. The Hydrogen Production Business Model can also **support small scale T&S costs.**
- Continue to develop the evidence base to take **strategic decisions in 2026** on the role of hydrogen for decarbonising heat.

Proposed hydrogen transport infrastructure projects



Graphic: Hydrogen T&S Consultation Analytical Annex, p11

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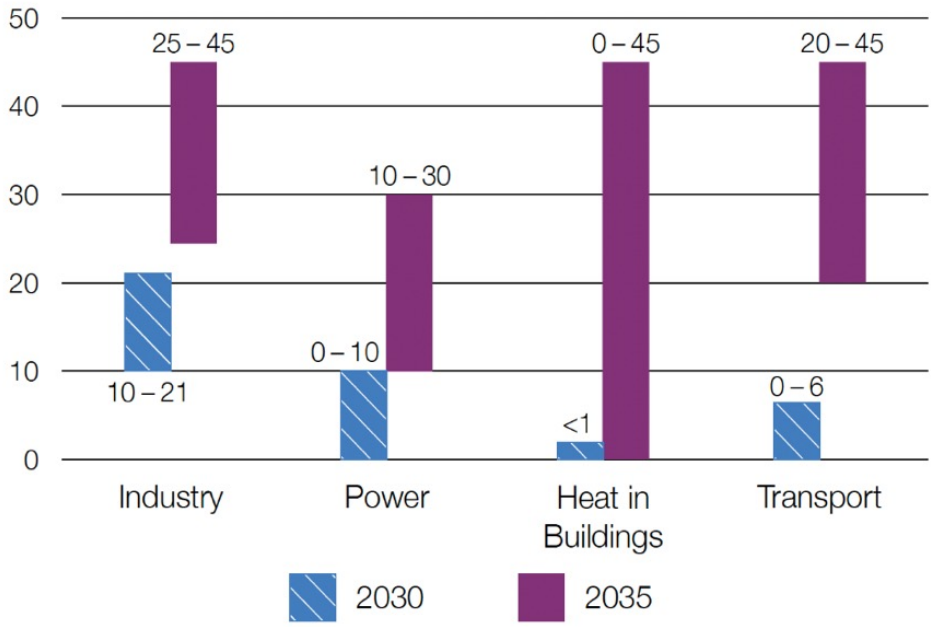
Stimulating and building demand for hydrogen

Achieve **vision set out for demand in the 2020s Roadmap in the Hydrogen Strategy**, including engaging industry and wider stakeholders, policy and regulatory development, and supporting innovation projects and trials.

Key priorities / next steps

- Supporting **H2 fuel switching** in large industrial clusters, dispersed sites and for NRMM.
- Exploring need/case for market intervention to support **H2 to power** applications.
- Early rollout of **H2 transport** (e.g. buses); R&D across sectors like HGVs, maritime and aviation, and in an integrated manner via the multi-modal Tees Valley Hydrogen Transport Hub.
- Supporting **H2 for heating trials** and creating an enabling environment (e.g. legislative changes, developing technical standards)
- Continued work to assess and develop the **role of gas blending and H2 storage** in balancing supply and demand in early development of the market.

Illustrative hydrogen demand in 2030 and 2035



Graphic: UK Hydrogen Strategy, p51

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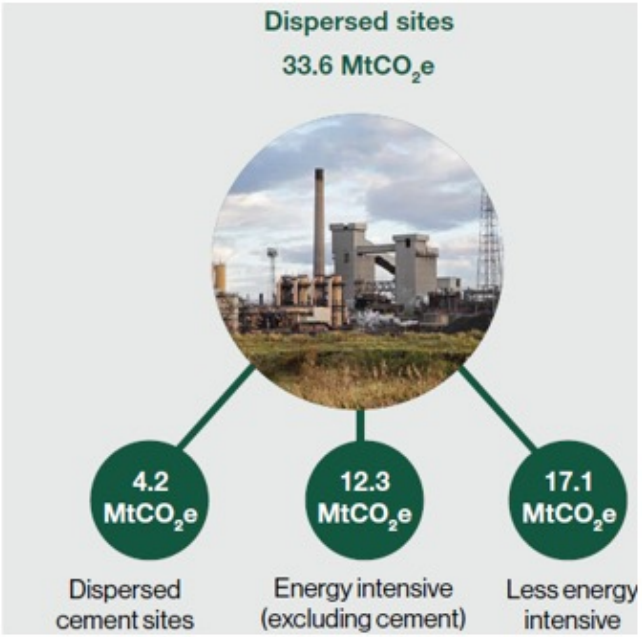
Using hydrogen to decarbonise industrial fuel and feedstock

Work with the UK's vital industrial sector to achieve net zero by 2050. Needed in tandem with other decarbonisation measures including resource and energy efficiency, electrification, CCUS and bioenergy.

Key priorities / next steps

- Aim for industry to replace **50TWh of fossil fuels with low carbon alternatives** by 2035.
- Deliver the **Industrial Energy Transformation Fund** and industrial-focused programmes in the **£1bn Net Zero Innovation Portfolio.**
- **Revise standards and regulation.** E.g. BSI sponsorship for hydrogen-ready boilers and engagement with industry on regulatory options to support fuel switching.
- **Strategic planning** for H2 production, transport and storage infrastructure, to ensure H2 supply for industry along with other sectors.
- Inform **evolution of the UK ETS** as hydrogen becomes an increasingly important way to decarbonise.



Graphic: UK Industrial Decarbonisation Strategy, p17

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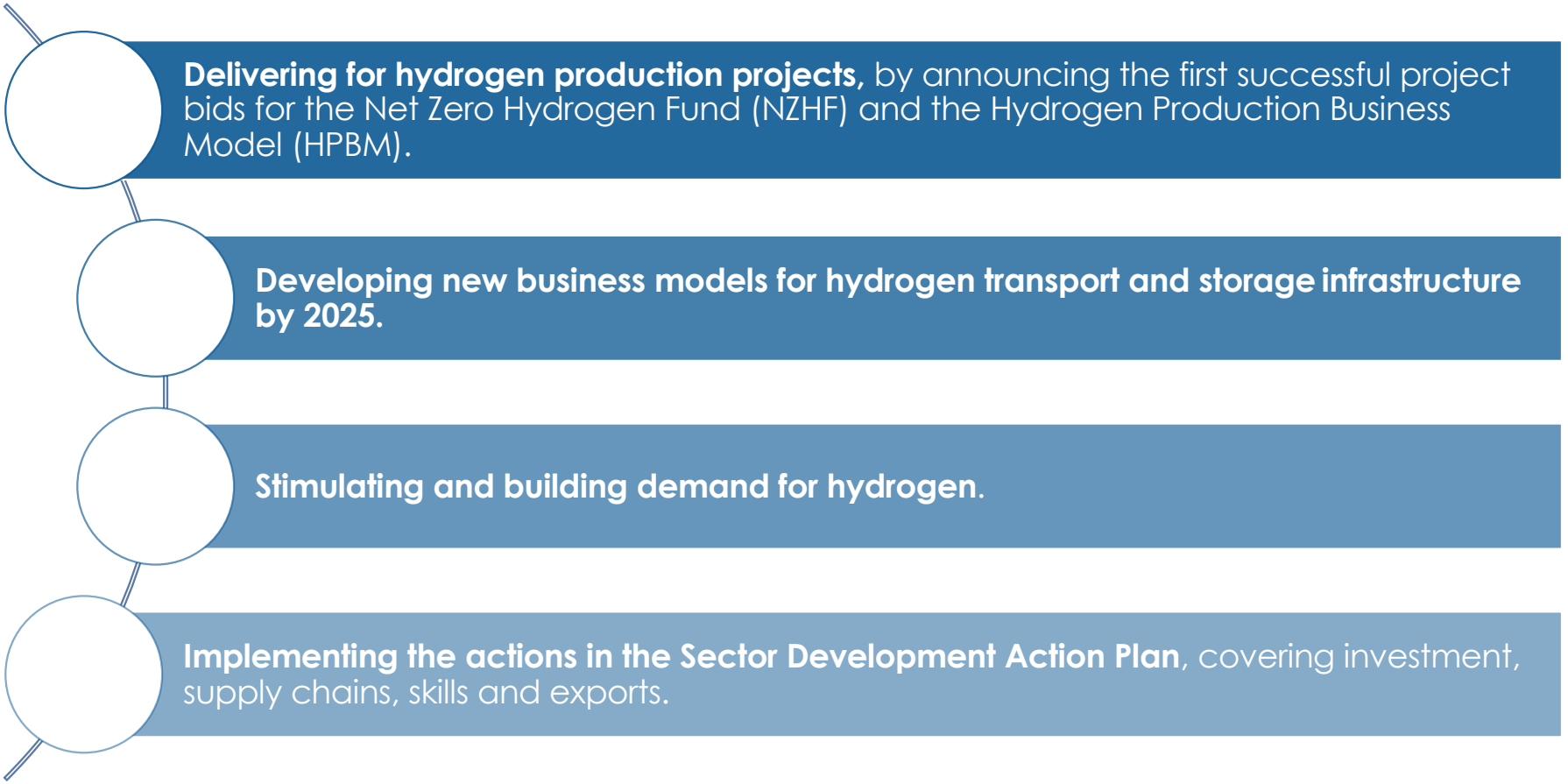
Government will continue to build the momentum behind the UK hydrogen economy



Thank you for listening

Any questions?

Get in touch:
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