Department for
Energy Security
& Net Zero

Innovative Hydrogen to Power Projects

A Call for Evidence on the potential for innovative hydrogen to power projects to accelerate deployment readiness and support technical demonstration

Closing date: 12 May 2025

March 2025

Any enquiries regarding this publication should be sent to us at:
hydrogenpower@energysecurity.gov.uk

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General information

Why we are issuing this call for evidence

The government is seeking technical evidence on innovative hydrogen to power projects that can deliver by 2030, ahead of enabling hydrogen infrastructure.

The successful roll out of dispatchable power technologies will be vital to achieve clean power by 2030 and to accelerate to net zero – defining priorities for this government. Hydrogen to power (H2P) is one low carbon technology capable of providing low carbon inter-seasonal storage, whilst providing a decarbonisation pathway for unabated gas. H2P plants face deployment barriers in the near term due to the critical dependence on access to enabling grid-scale hydrogen infrastructure, such as new build transport and storage facilities with long lead-in times. Innovative H2P projects that are not reliant on wider hydrogen infrastructure and can demonstrate operation by 2030 could play a crucial role to support the clean power mission by demonstrating deployment readiness of widescale H2P.

This call for evidence seeks to gather technical information to help us understand in more detail the type of innovative H2P projects that could deliver rapidly. This will help government consider the value, potential options, and risks associated with innovative projects that plan to deliver by 2030.

Call for evidence details

Issued: 31 March 2025

Respond by: 12 May 2025

Enquiries to:

Hydrogen to Power Team
Department for Energy Security and Net Zero
3-8 Whitehall Place
London
SW1A 2AW

Email: hydrogenpower@energysecurity.gov.uk

Call for evidence reference: Innovative Hydrogen to Power Projects Call for Evidence

Audiences:

We are seeking views from stakeholders with existing plans for deployment of innovative hydrogen to power projects before large scale hydrogen infrastructure is available. This includes (but is not limited to) the energy industry and project developers.

Territorial extent:

United Kingdom

How to respond

Responses should be provided online where possible at:
https://energygovuk.citizenspace.com/energy-security/innovative-hydrogen-to-power-projects

Email to: hydrogenpower@energysecurity.gov.uk

Write to:

Hydrogen to Power Team
Department for Energy Security and Net Zero
3-8 Whitehall Place
London
SW1A 2AW

When responding, please state whether you are responding as an individual or representing the views of an organisation.

Your response will be most useful if it is framed in direct response to the questions posed, though further comments and evidence are also welcome.

Confidentiality and data protection

Information you provide in response to this call for evidence, including personal information, may be disclosed in accordance with UK legislation (the Freedom of Information Act 2000, the Data Protection Act 2018 and the Environmental Information Regulations 2004).

If you want the information that you provide to be treated as confidential please tell us, but be aware that we cannot guarantee confidentiality in all circumstances. An automatic confidentiality disclaimer generated by your IT system will not be regarded by us as a confidentiality request.

We will process your personal data in accordance with all applicable data protection laws. See our privacy policy.

We may summarise responses and publish this summary on GOV.UK. The summary would include a list of names or organisations that responded, but not people's personal names, addresses or other contact details. We will also take into account any request from respondents for information to be treated as confidential when preparing such a summary.

Quality assurance

This call for evidence has been carried out in accordance with the government's consultation principles.

If you have any complaints about the way this call for evidence has been conducted, please email: bru@energysecurity.gov.uk.

Innovative Hydrogen to Power Projects Call for Evidence

The role of Hydrogen to Power (H2P)

We expect H2P – the generation of low carbon electricity from low carbon hydrogen – as a critical component of the future electricity system playing a core role to balance the system and reduce our reliance on unabated gas. The Clean Power 2030 Action Plan[1] sets out government's view on the value of long-duration flexible technologies, projecting a need of 40-50 GW of dispatchable and long-duration flexible capacity in 2030. As one of only two technologies alongside Power CCUS which can provide low carbon dispatchable generation, H2P can play a key role in delivering and maintaining a clean power system. As committed to in the response to the consultation on H2P need for and design of a market intervention[2], we are implementing a Hydrogen to Power Business Model (H2PBM) to de-risk investment by mitigating our identified key deployment barriers, such as cross-chain risks, specific to H2P projects. In addition to which, we will look to enable H2P to participate in the current Capacity Market as soon as practical in order to create a potential decarbonisation pathway for existing unabated gas generation.

Government is planning to establish the H2PBM alongside developments in the production, transport and storage business models to ensure a coherent investment framework and enabling infrastructure is available for H2P. We recognise this framework will take time to implement. Therefore, to make progress towards our Clean Power 2030 mission we committed in the December Hydrogen Strategy Update to the Market[3] to engage with industry seeking views for bringing forward innovative H2P projects that could deliver ahead of large-scale hydrogen infrastructure coming online.

Innovative H2P projects

To support the Clean Power 2030 Action Plan, we would like to understand the value in innovative projects which could begin power generation from 100% low carbon hydrogen by 2030 ahead of large-scale infrastructure being available. Enabling first-of-a-kind (FOAK) innovative projects would generate learning and provide evidence on the operation of technologies and technical approaches that can help advance the success of larger H2P deployment.

In particular, we are seeking evidence on projects that could deliver first generation of electricity from 100% hydrogen by 2030, within a plant of sufficient scale to provide beneficial learning to subsequent large-scale H2P deployment. We envisage that such projects will intend to deploy commercially following commissioning and successful demonstration of the

[1] DEZNZ (2024) Clean Power 2030 Action Plan: A new era of clean electricity
[2] DESNZ (2024) Hydrogen to Power. Government response to consultation on the need, and design, for a Hydrogen to Power market intervention
[3] DESNZ (2024) Hydrogen Strategy Update to the Market: December 2024

technology in operation. Due to the lead times of key components and civil engineering required, projects achieving this ambition would need to perform substantial work before the H2PBM is available, so we will use this call for evidence to assist in considering the value of, and options for providing other forms of support for projects that could achieve this 2030 goal.

Call for Evidence Questions

Delivering FOAK H2P plants on a timescale that generates low-carbon electricity by 2030 introduces constraints that could impact the scale, configuration and other characteristics of the plant. Critical factors include the extent to which large volumes of hydrogen, financing and key technologies are available in the near-term. We are interested in the impact these factors will have on the likely scale and nature of early H2P plants compared to those deployed once large-scale infrastructure is available. We also wish to understand the extent to which projects delivered within these constraints can generate benefits to widescale H2P deployment.

1. **What scale, configuration and other H2P plant characteristics do you consider most likely to achieve the ambition for H2P plant operation by 2030?**

2. **What technical and other findings from operation of such a plant could be applied to widescale H2P deployment?**

Current industry plans for H2P deployment by 2030

We are seeking evidence about specific plans under development for projects that aim to generate electricity from 100% low carbon hydrogen by 2030, or could be accelerated to achieve this.

3. **Do you have plans currently under development to implement innovative H2P plants which could be delivered using 100% low carbon hydrogen by 2030?**

4. **For any plans identified in Question 3, please outline:**

    a. **The current stage and key future milestones.**

    b. **The anticipated plant capacity (in MW).**

    c. **The number of hours operation per year that your planned configuration can enable.**

    d. **The anticipated cost categories in the plans and any details.**

    e. **The status of your planned hydrogen supply, including any planned hydrogen production, storage and transport arrangements.**

Risks and dependencies

We are also seeking evidence on the delivery risks and mitigations associated with your plans outlined in Questions 3 and 4, acknowledging that ambitious FOAK projects will naturally carry inherent risks. Please consider with respect to technology risks, supply chains, and external

non-financial factors, the extent to which addressing risks by delivery of an innovative H2P plant, or plants, could impact wider H2P deployment.

5. **What specific technical improvements to critical technologies do you envisage achieving or testing during your planned implementation of an innovative H2P plant? Please consider both individual components and integration of systems.**

6. **What is your assessment of supply chain risks associated with the delivery of your planned projects? How do you plan to manage these?**

7. **What additional external, non-financial, factors do you consider significant risks to delivering innovative H2P plants by 2030 and how do you plan to mitigate these risks?**

Role of Government

The government intends to use information received through this call for evidence to understand the value of, and potential options for supporting delivery of early innovative H2P plants to support the 2030 Clean Power Mission.

8. **Do you have any views for the role government can play in accelerating the delivery of innovative H2P plants by 2030, in addition to existing and committed-to policies?**

9. **Do you have any further evidence on rapid delivery of H2P plants that you wish to make government aware of?**

This publication is available from: https://www.gov.uk/government/calls-for-evidence/innovative-hydrogen-to-power-projects

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