



# **CCSA response to the consultation on a sustainable, regional approach to production, storage, transport and use of hydrogen as a fuel**

Thursday 18<sup>th</sup> December 2025

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The Carbon Capture and Storage Association (CCSA) is pleased to provide a response to Northern Ireland's Department for the Economy [consultation on production, storage, transport and use of hydrogen as a fuel](#). The CCSA brings together a wide range of specialist companies across the spectrum of Carbon Capture, Utilisation and Storage (CCUS) technology, as well as a variety of support services to the energy sector. The CCSA exists to represent the interests of its members in accelerating the commercial deployment of CCUS in the UK, EU and internationally through advocacy and collaboration to achieve net zero emissions by 2050.

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## **CCSA response**

### ***Hydrogen Production***

#### **1. Do you agree with the Department's support for the Low Carbon Hydrogen Standard?**

Yes. The CCSA recognise the need for a standard which can focus on local production pathways primarily with a view of supporting and aligning with future exports and import opportunities.

With reference to the UK low carbon hydrogen standard, the CCSA suggest that a low carbon hydrogen standard should be set at the 'point of production'. Point of production would have a lower cost of compliance, the ability to interact with other guarantee of origin schemes and the potential to broaden access to hydrogen imports. The CCSA would also note that it is important that the boundaries of production can be aligned across the business model and the hydrogen standard.

While the CCSA supports the standard in principle, embedding it into policy risks it becoming a condition in planning consents, which is an issue already subject to litigation in recent Development Consent Order (DCO) projects and is not desirable since it involves a doubling-up and overlap of regulatory regimes.

2. Is it economically and/or environmentally beneficial to utilise otherwise dispatched-down wind generation for hydrogen production? – Explain your reasoning, highlighting any disincentives/perverse incentives not to and the circumstances in which you see temporal and geographic correlation as being important.

3. Are there grounds (economic, environmental, social equity) for reforming the grid related charges for connecting electrolyzers as controllable loads?

4. What are the minimum conditions (e.g. scale, off-take market, supply chain, etc.) that would need to pertain to make a “private wire” connection to renewable power generation for electrolytical production of hydrogen viable?

### **5. Do you agree with the Department’s focus on UK and Ireland-wide funding streams to support the local industry?**

The CCSA support the focus on UK and Ireland-wide funding streams. We note that the lower hydrogen price will depend on the successful scale-up of blue hydrogen production, which will require major upfront investment.

Strategic planning is essential to ensure the effective and cost-efficient rollout of hydrogen infrastructure. The CCSA recommend the Department adopt a more strategic approach to growing the hydrogen economy, prioritising cost-effective solutions today while supporting cost reductions through economies of scale in the longer term. We also suggest, where possible, simplifying and following existing industry processes.

### **6. What sources of evidence, for example where demand growth is to arise from, should be used to help establish an energy security target for hydrogen in the region?**

The CCSA flag the **crucial role of ETS price** in boosting the demand for the hydrogen sector. A stable and robust ETS price would provide predictable returns on investments in low-carbon hydrogen projects, helping to ensure consistent demand for hydrogen, for instance as a fuel alternative in high-emission sectors like transport, heavy industry, and shipping.

The CCSA note the interconnection between different sectoral targets, mechanisms, and the hydrogen target. It is important to take support mechanisms for the demand side into consideration. Renewable energy and wider decarbonisation targets could also drive hydrogen demand. The CCSA also highlight that **a coordinated cross-border approach** would create larger, more diversified hydrogen markets that are better positioned to meet growing demand from both industrial users and consumers across multiple countries.

### **7. What would be a realistic target for low carbon hydrogen production in NI by 2035?**

As suggested in the Seventh Carbon Budget (CB7), **there is not sufficient electrolytic hydrogen to meet all the hydrogen demand in our pathway, so other sources of low-carbon hydrogen will be needed – this sheds light on the importance of CCS-enabled (blue) hydrogen production.** More generally, the low-carbon hydrogen in the near term plays an essential role in reducing costs, with green hydrogen then able to scale up at a lower cost.

The CCSA would like to suggest set the hydrogen target with reference to the UK Hydrogen Strategy vision - by 2030, the UK is a global leader on hydrogen, **with 5GW of low carbon hydrogen production capacity** driving decarbonisation across the economy and clear plans in place for future scale up towards Carbon Budgets 6, 7, and net zero, supporting new jobs and clean growth across the UK. We highlight the importance of the Department **taking the Hydrogen Refresh Strategy, which the CCSA has been expecting to be published this year, into consideration** when setting the low-carbon hydrogen production target – we believe that the Hydrogen Refresh Strategy, in line with the Hydrogen Update to Market<sup>1</sup>, will provide an updated view on the UK hydrogen target.

The CCSA also note that the previous UK Government’s ambition was to scale up low-carbon hydrogen production to 10-gigawatt (GW) by 2030, with at least 4 GW expected to come from CCUS-enabled (blue) hydrogen projects. Two CCUS-enabled hydrogen projects are in negotiations with the potential to provide up to 1GW of low-carbon hydrogen production capacity.

### ***Hydrogen transport and storage***

#### **1. Do stakeholders think Northern Ireland requires dedicated hydrogen pipeline infrastructure? – explain your reasons.**

The CCSA support the deployment of dedicated hydrogen pipeline infrastructure in Northern Ireland. We flag that the ability to connect to hydrogen infrastructure will underpin policy signals for deployment. We also consider T&S and broader volume-enabling measures to offer a more robust foundation for the hydrogen economy.

#### **2. Are there alternatives to underground caverns for high capacity, long-term storage of hydrogen that should be investigated?**

While considering the options for hydrogen storage, there are underground options such as salt caverns and aquifers for long-term storage, or storage in overground tanks, which is more suitable for short turnaround periods. The CCSA would highlight that storage cost is an area the Department needs to consider further, particularly for hydrogen producers who take on balancing responsibilities.

### ***Use of hydrogen***

#### **1. What actions can the Department take to encourage the development of e-fuels as a use for hydrogen?**

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<sup>1</sup> Hydrogen Update to Market – July 2025. [Link](#).

The CCSA agree with the Department's initiative to encourage the development of e-fuels as a use for hydrogen – by powering fuel cells in the maritime and aviation industries, blue hydrogen can provide an energy source and route to decarbonisation for the transport sector. We therefore highlight **the importance of ensuring low-carbon fuels are affordable and available – a stable demand and supply of low-carbon fuels are essential to the development of hydrogen as e-fuels.**

The CCSA flag that the priority should be to **create demand certainty by establishing clear policies that outline opportunities and approaches for developers, investors and decision makers** to drive the growth of the hydrogen sector in Northern Ireland – particularly the deployment of blue hydrogen projects and associated T&S infrastructure. We note that a stable and robust ETS price would also help ensure consistent demand for hydrogen by providing predictable returns on investments in low-carbon hydrogen projects. The CCSA recommend aligning with the UK Sustainable Aviation Fuel (SAF) mandate, which secures demand for SAF by

- obligating the supply of an increasing amount of SAF in the overall UK aviation fuel mix
- incentivising SAF supply through the award of tradeable certificates with a cash value

In terms of incentivising the supply of hydrogen as e-fuel and ensuring low-carbon fuels receive support comparable to renewable-derived fuels, the CCSA suggest that the UK SAF revenue certainty mechanism (RCM) could be funded, to which projects can apply. Several SAF technology pathways will require CCUS, so **it is vital that the RCM is aligned with the development and implementation of CCUS business models, infrastructure, and capture ambitions** to ensure that the supply of SAF can match the demand stimulated by targets.

Meanwhile, we would like to flag the concerns which should be addressed when developing e-fuels as a use for hydrogen:

- risk of fuel tinkering (i.e. uplifting fuel elsewhere to avoid higher UK fuel costs). To mitigate this, it is essential to introduce safeguards, such as an anti-tankering requirement
- the methodology for assessing greenhouse gas (GHG) emissions savings for low-carbon fuels, which has not yet been defined

2. What do you see being the sources of biogenic carbon for creating e-fuels?

### **3. What other sources of carbon do you see as being deemed sustainable for use in creating e-fuels?**

The CCSA highlight that there is an important role for Greenhouse Gas Removals (GGRs) complementing SAF production and low-carbon fuel production, both through the direct air capture (DAC)-enabled pathways as well as through utilisation of captured biogenic CO<sub>2</sub>.

Therefore, the GGRs capacity will be required to provide CO2 feedstock for sectors expected to rely on synthetic fuels, such as aviation and maritime.

- It is acknowledged in the CCC's CB7 report, DAC is expected to have a role in providing a feedstock to produce Power to Liquid (PtL) fuels for both maritime and aviation sectors. Developing a strategic supply of PtLs production capacity may be useful to develop domestic know-how and manage risks associated with importing other fuels.
- CO2 used to produce SAF will increasingly need to be captured from sustainable bioenergy sources (more often located at dispersed sites, such as anaerobic digestion (AD) plants) to decarbonise the hard-to-abate aviation sector. Activities such as energy-from-waste, anaerobic digestion and biogas upgrading (to biomethane) to create products, such as bio-aviation fuel, can create additional CO2 removals and biogenic (or part-biogenic) CO2 streams.

We also note that there is increasing demand from the aviation sector for durable, high-quality GGR credits - the CCC's recent CB7 report estimates up to 60% of demand for removals would come from the aviation sector and highlights the cost-competitiveness between synthetic fuels and DACCS on a cost of abatement basis. With these factors in mind, the CCSA would like to flag that the use of a mix of local and internationally located DACCS in combination with BECCS and SAF deployment could offer UK taxpayers the ideal mix of decarbonising a critical industry at the lowest cost. As GGRs are deployed to meet aviation sector demand, we expect to see a movement down the cost curve and become more accessible to other segments of the economy.

4. Should hydrogen be used in the power sector in a centralised (power stations) or decentralised manner (fuel cells/engines) or both?

**5. Do you see a role for local hydrogen blending in the gas network? If so, please provide evidence for how it can be economically viable.**

The CCSA highlight that hydrogen blending could play a transition role whilst demand for hydrogen is developing, and once hydrogen storage options are fully utilised. We support hydrogen blending as a transitional option and strategic enabler for the development of the hydrogen economy, as it can provide not only the reduction in UK Emission Trading Scheme (ETS) costs, but also:

- **cross-chain benefits** – hydrogen blending can create synergies across the energy system by de-risking projects. For example, blending may help mitigate volume risks between hydrogen production and T&S, such as delays in infrastructure projects
- **job creation and Gross Value Added (GVA)** – the development of the hydrogen economy more broadly – including production, infrastructure, and associated supply chains – has the potential to create significant employment opportunities and contribute positively towards the economy. While hydrogen blending may not be the

primary driver, it could play a role in unlocking early hydrogen volumes and supporting sector-wide growth.

- Hydrogen UK analysis estimates that the hydrogen sector could support more than 29,000 direct jobs by 2030, and create more than £7bn in annual GVA<sup>2</sup>. Early implementation of hydrogen blending may contribute to the development of these employment opportunities.

**The CCSA stresses that the value of blending is greatest in the early stages of the hydrogen market.** We would therefore suggest further clarity on any potential implementation timeline to support effective planning and delivery, following up on the decision on hydrogen blending.

The CCSA would reiterate that hydrogen blending may only be justifiable where the Department can demonstrate that the benefits clearly outweigh the potentially high costs associated with adapting existing assets connected to the gas network. We note that it could be economically viable if:

- The support for a free-market approach is regarded as the preferred technical delivery model for hydrogen blending, which allows the market to decide where is best for injection
- The hydrogen production business model will be amended to provide the appropriate mechanism to commercially support blending
- Certificates associated with blended hydrogen will be available for trading, as in the case of non-blended volumes.

To inform the Department's decision-making and implementation process for hydrogen blending, the CCSA recommends reviewing lessons learned from other countries that have implemented hydrogen blending. While these international experiences provide valuable insights, the Department should recognise that not all lessons may be directly applicable to the Northern Ireland context.

6. In light of the cited research, how can hydrogen for transport in Northern Ireland be cost competitive?

**7. Are there other major uses for low carbon hydrogen that the Department should consider? Explain your reasoning.**

The CCSA would like to highlight the need for appropriate approaches for hydrogen to power (H2P), which falls in the low-carbon dispatchable category - as noted in the Clean

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<sup>2</sup> Hydrogen UK (2024): Economic Impact Assessment for the Hydrogen Sector to 2030. [Link](#)

Power 2030<sup>3</sup>, up to 2.7 GW through a combination of hydrogen to power and gas CCS is included in the clean power pathways; it also identifies a need for 2 to 7GW of low-carbon dispatchable capacity (a combined target for biomass, power BECCS, gas CCUS and H2P), but there are currently no specific targets for H2P capacity in the UK. NESO's Future Energy Scenarios 2025<sup>4</sup> suggest that after 2030, low-carbon dispatchable power could be built up to replace the need for the remaining unabated gas generation – the capacity reaches 38 GW in 2050 with an average build rate of 1.8 GW per year between 2030 and 2050, as projected in the CB7<sup>5</sup>.

To enable the development of the hydrogen economy, we highlight that the current lack of a finalised H2P-specific business model, supporting infrastructure, and clear government targets and allocation rounds limit progress. If H2P is to be deployed at large scale, it will require large hydrogen storage capacity to balance supply, similar to the role gas storage currently plays in the energy system. We would therefore suggest:

- Delivering demand certainty (i.e. a sustained project deployment pipeline, and clear targets, for H2P projects), which remains the most important action.
- Providing strategic direction, infrastructure coordination, regulatory certainty, and business model support. Enabling infrastructure is the foremost constraint to deployment of both CCS and H2P by 2030. For CCS-enabled hydrogen and power projects, timely delivery of CO2 transport and storage infrastructure is essential. Projects will not progress without land access, strategic siting, and coordination of enabling infrastructure.
- Clarity on early hydrogen networks, including any associated hydrogen storage networks to balance supply and demand, and users to enable project coordination.
- A clear long-run ambition for flexible power (i.e. for a GW-target encompassing power CCUS, H2P) beyond 2030, along with specific short-term goals and a clear line of sight for future funding to ensure progress is made.

8. Are there sectors/uses where low carbon hydrogen should be used instead of other alternative renewable fuels?

### **Hydrogen sector development**

#### **1. In your opinion how can policy aid the development of hydrogen-related supply chains?**

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<sup>3</sup> Clean Power 2030: Advice on achieving clean power for Great Britain by 2030. [Link](#).

<sup>4</sup> Future Energy Scenarios: Pathways to Net Zero. [Link](#).

<sup>5</sup> The Seventh Carbon Budget: Advice for the UK Government. [Link](#).

The CCSA flag that **the development of the hydrogen market** will be critical to providing the necessary certainty to industry and investors, which could support wider growth of low-carbon hydrogen and hydrogen-related supply chains. The approach needs to be backed up by a policy which can simultaneously encourage the development of a market and engage the supply chain and skilled workforce. It is also worth mentioning that **further clarity is needed on what the intended mix of hydrogen technologies and scale of deployment** the Northern Ireland Government envisage. There is also an urgent need to protect and develop the existing supply chain capabilities in hydrogen, de-risk supply chain investments and **back early movers in ‘High Value’ areas, support sector wide initiatives and ‘Best Practice’**, and continue to engage with the supply chain as deployment continues.

The CCSA highlight that the **development of a hydrogen industry will assist in retaining highly skilled jobs within the Northern Ireland economy**. The transition is a matter of policy, not specific projects. Every project would look to bring forward jobs and provide support to the local economy in different ways as a starting point – if the Northern Ireland Government is requesting more than this, then this must be made clear. The CCSA would support the Northern Ireland Government in liaising with the UK Government to ensure the hydrogen and CCUS sectors are included in future skills and workforce development. We note that without blue hydrogen, the overall hydrogen economy will remain at a nascent level, given the difficulties in developing green hydrogen projects.

In addition to this, **providing specific details on how the Department will support hydrogen projects** would be highly valued by industry. The CCSA consider that this policy (or its accompanying guidance) needs to be more specific as to what developers are expected to produce, and what decision makers can consider.

## **2. What skills or courses should be considered to train or upskill the industry workforce to develop the hydrogen sector?**

It is worth mentioning that the transitioning could be based on an established workforce – it is estimated that over 90% of the UK’s oil and gas workforce have medium to high skills transferability to adjacent sectors, with CCUS and hydrogen identified as two of the key focus areas.

### ***Regulatory framework***

#### **1. What are the priority regulatory issues for the local hydrogen sector?**

The CCSA note that **streamlining environmental permitting as well as planning processes for first-of-a-kind (FOAK) projects and emerging low-carbon and clean energy technologies**, such as CCUS, hydrogen and engineered greenhouse gas removal technologies (for e.g. DACCS, BECCS, WECCS), is paramount to these technologies being deployed, taking FIDs and contributing to net zero goals.

- For instance, CCUS applied to industrial, power, and hydrogen production facilities all need long-term certainty that the water needed to operate plants will be available. It is equally important that water abstraction licences have certainty for the duration of a plant's lifetime for them to continue to contribute to decarbonisation once they have been commissioned.

The uncertainty in the permitting and regulatory approval timelines is a significant barrier to investment. We therefore suggest that progress needs to be made by the Department, through enabling policy, to **ensure these delays are minimised and projects can progress towards deployment on established time frames**. The Department could enable understanding, resourcing, simplifying, and streamlining the permitting and consenting pathway for projects and ensure that this is communicated to stakeholders.

- For instance, the EU have recently extended the period where temporary derogations from meeting best available techniques (BAT) for emerging techniques can be given for 9 months, to 30 months. We would recommend Northern Ireland refer to their process when considering the time frameworks for BAT, such as CCS-enabled hydrogen production.
- We flag that **regulatory flexibility is crucial** to enable successful deployment of hydrogen, especially CCS-enabled hydrogen, given their FOAK nature at this stage of the market development.

We also suggest **streamlining and aligning between regulators for the onshore capture, transportation, and safe storage**. We would request clarification on how the Department intends to ensure that regulatory bodies are sufficiently resourced to enable the planning and permitting process along the CCS-enabled hydrogen value chain to be successfully implemented. We note that establishing **a broader market framework for low-carbon hydrogen is essential** to supporting the development of a fully connected hydrogen network. The necessary development of these criteria should focus on improving clarity while remaining **aligned with existing regulation**, as undefined or overlapping requirements risk slowing the progress of hydrogen project deployment, thus making Northern Ireland less attractive for low-carbon hydrogen investment

2. Do you agree with the Department's intention to appoint the Utility Regulator as the economic regulator for hydrogen?

3. Do you agree with the Department's intention to adopt the Low Carbon Hydrogen Certification scheme?