THE ASSOCIATION FOR RENEWABLE ENERGY & CLEAN TECHNOLOGY

Member discussion on a UK Low Carbon Hydrogen Standard

21st September 2021

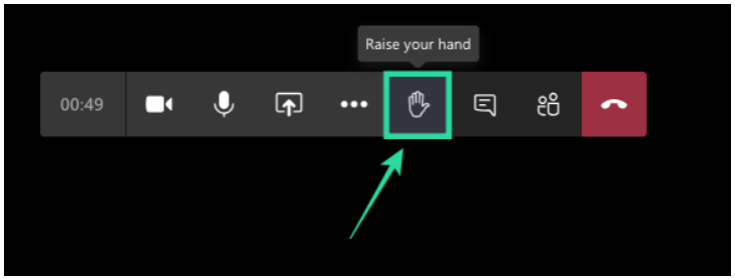
GREEN GAS HYDROGEN

@REAssociation

Decarbonising the economy

Meeting Housekeeping

- All please join as *muted* & *without video* (unless you are talking)
- Please note where the *conversation box* should you have any questions or wish to comment, or use the *raise your hand* button



- We will have *discussion* sessions during the meeting

The session will be recorded for accurate note taking.

Participants of the meeting will receive a copy of the slides and recording will be available upon request.

Thank you

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Hydrogen Package – all links

- Hydrogen Strategy released on 17th August.
- Wider package of policy documents released on same day along with the Strategy

  - ✓ Consultation on a Hydrogen Business Model - to stimulate private investment in new low carbon hydrogen projects
  - ✓ Consultation on the design of the £240 million Net Zero Hydrogen Fund (NZHF) - confirmed out to 2025 to support new hydrogen production projects
  - ✓ **Consultation on a UK Low Carbon Hydrogen Standard - will define what is meant by low carbon hydrogen. Only hydrogen meeting the standard to be incentivised and supported**
  - ✓ Further detail on projected costs of hydrogen production technologies out to 2050, and
  - ✓ Annex setting out the analysis and evidence underpinning the Hydrogen Strategy and consultations

UK Low Carbon Hydrogen Standard Proposals

- Consultation closes on **25th October**, response expected in early 2022.
- Setting out the methodology for calculating GHG emissions, and
- Setting out the maximum acceptable levels of GHG emissions associated with low carbon hydrogen.
  - ✓ Low carbon hydrogen producers seeking government support (e.g. Business Model or NZHF) would be required to follow the standard;
  - ✓ Any future changes to the standard would not apply to contracts already awarded through the Hydrogen Business Model;
  - ✓ BEIS are considering whether the standard could also be developed into a certification scheme.

Geographical scope

Standard will define a geographical scope, that could be:

- only UK production and use
- UK production only, with use or export
- UK and imported production included, for use only in the UK

- *Do you agree that the standard should focus on UK production pathways and end uses whilst supporting future export/imports opportunities?*
- *Would there be benefits in developing the standard into a certification scheme?*
- *Is international consistency important, or should the UK seek to develop a low carbon hydrogen standard based on the UK context?*
  - *If a UK standard differs to international standards, would this impact investment or cause issues for operations across borders?*
  - *What elements of existing low carbon hydrogen standards or definitions are most important to ensure international consistency?*

Allowable production pathways

Standard could be applicable to any existing and future hydrogen production pathways or a specific list.

- *Should the standard specify a list of hydrogen production pathways, which would be updated periodically or on request?*
- *If yes, what production methods could have significant potential?*
- *If not, can you suggest alternative options?*

Categorisation

BEIS are minded to adopt a single label of 'low carbon' that can be applicable to all production methods that meet the GHG threshold.

- Reference to other schemes like *CertifHy* which gives different labels for 'green' and fossil based hydrogen
- *'Applying different labels such as this could be used when assessing eligibility to access different levels of funding'.*

- *Do you agree that the standard should adopt one label of 'low carbon' hydrogen , or would it be valuable to have multiple categories?*
- *If multiple categories, what benefits would we get from adopting this approach in terms of emissions reductions and consumer confidence?*

System Boundary

BEIS are minded to set the system boundary at the point of production because it would have lower compliance costs, ability to interact with other GoOs schemes and would broaden access to hydrogen imports.

- *Do you agree that a UK low carbon hydrogen standard should be set at the 'point of production'?* [as opposed to point of use, or point of use+in use]
- *If no, what would be the advantages of the standard making assessment at 'point of use' or 'point of use' + in use emissions?*

Chain of custody

Two lead options: Book and Claim or Mass Balance

- *Which chain of custody (CoC) system would be most appropriate for a UK low carbon hydrogen standard: a mass balance or a book and claim system?*
- *Should other CoC options be considered instead? Provide details*

Hydrogen purity and pressure

- *If the system boundary was set at the point of production, should there be defined reference purity and pressure levels for a UK low carbon hydrogen standard? [*Concerns here is that if you don't, you may end up with significant emissions outside the system boundary if significant processing is required after the point of production to meet end user's requirements]
- *Should there be minimum pressure and purity requirements for hydrogen to meet the standard?*
- *What would be the potential implications for setting minimum purity and pressure requirements?*

Embodied emissions, GWP and materiality

- *Should embodied emissions (e.g. from manufacture, construct, maintain and decommissioning) be omitted from the calculation of GHG emissions under the standard?* BEIS minded to exclude them entirely as opposed to include them for hydrogen production only, or for the whole supply chain equipment.

- *Do you agree that a UK low carbon hydrogen standard should include a Global Warming Potential (GWP) factor of hydrogen (to account for fugitive losses from supply chain). If not, are there other options for accounting of the GWP outside the UK low carbon hydrogen standard?*

- *Should a 'materiality" threshold for total emissions be included in the LCAs of hydrogen pathways?*

Inclusion of CCU

- *Should CCU with proven displacement of CO_2 from fossil origin or with proven permanent abatement of CO_2 be included as an allowable benefit in GHG calculations under the standard?*
- *If yes, what a suitable minimum time would be for proven permanence, and which applications should be eligible?*
- *Should CCU credits only be for biogenic carbon, and not allowed for fossil carbon sources?*

- CCU could be included only with proven displacement of CO_2 from fossil origin
- CCU could be included only with proven permanent abatement of CO_2 - minimum, defined period of time would have to be defined before carbon can return to the atmosphere
- No credit

Accounting for low carbon electricity

Range of options considered by BEIS to account for low carbon electricity and the evidence required to demonstrate that electricity comes from a low carbon source – not mutually exclusive.

Allow low carbon electricity to be claimed based on:

- physical links – e.g. totally off grid, use of curtailed / constrained power or no import from the grid
- Traded activities: retirement of GoOs, or PPA plus GoOs retirement
- Traded activities with further conditions such as temporal correlation (e.g. at a hourly level), geographical correlation and additionality considerations
- Allow electrolysers to plug into existing grid – average carbon intensity of the grid would need to be used if no local or temporal carbon intensity value available sand this need to be sufficiently low, or proof that grid electricity has only been used during times of low carbon generation and/or market prices are low.

Low carbon electricity questions

- *How should government policy take into consideration hydrogen production pathways using grid electricity as primary input energy now?*
- *What options should BEIS consider for accounting for the use of electricity under a UK low carbon hydrogen standard? Do you agree with the options proposed?*
- *What evidence should BEIS consider around the use of electricity as primary input energy for hydrogen production?*
- *How should low carbon electricity use in hydrogen production be accounted for to support the deployment of electrolysis production?*
- *Should other conditions be included to mitigate any negative impacts or potential unintended consequences (such as driving additional high carbon power generation)*

Additionality

Range of options considered by BEIS – not mutually exclusive:

- ✓ No requirement
- ✓ New build requirement
- ✓ Pay existing levies
- ✓ Fund contribution

- *Should a UK low carbon hydrogen standard include a need for additionality and why?*
- *Should additionality considerations also apply to renewable heat and other input energy vectors such as biomethane?*

Accounting for waste fossil feedstocks

- Consider as a fossil feedstock without counterfactuals
- Consider as a fossil feedstock with counterfactuals – any GHG emission from feedstock processing is counted as a fossil emission (like above) and in addition avoided emissions from the displacement of a counterfactual feedstock are credited to the H_2 production chain

- *Should waste fossil feedstocks be considered with counterfactual?*
- *What are the implications of supporting the use of any particular waste streams in hydrogen production?*

Mixed inputs

- *What is the most appropriate way to account for hydrogen produced from a facility that has mixed inputs (high and low carbon)?*

✓ Averaging across all consignments – all hydrogen produced has the same GHG emission intensity

✓ Separate consignments – with separate GHG emission intensities

✓ Separate consignments but with averaging – with separate GHG emission intensities but also an average intensity which need to meet a benchmark

GHG Methodology

- ***Units:*** *What are the most appropriate units to calculate GHG emissions of low carbon hydrogen? gCO_2e/MJ LHV (Lower Heating Value)?* This is BEIS preferred approach as in line with most existing standards

- ***Allocation of emissions to by-product hydrogen****: What allocation method should be adopted for by-product hydrogen and why?* (usually done on an energy basis but this could mean over-allocation of emissions to hydrogen when by-product does not have any energy content. Could be done an enthalpy-basis?)

- ***Negative emissions:*** *Should the standard allow for negative emissions to be reported?*

- ***Non-GHG impacts:*** *Should non GHG impacts be taken into account? (e.g. air quality)*
  - *If yes, what criteria or factors should be taken into account and how?*

GHG emissions threshold

- *Do you agree that an absolute emissions threshold be adopted, rather than a percentage saving based on a fossil comparator?*
- *Should the standard adopt a single threshold or several, and why?*
- *Should the GHG emissions threshold be set at a higher level in the early stages of hydrogen deployment, with a trajectory to decrease over time?*
- *What would be an appropriate level for a point of production emissions threshold under a UK low carbon hydrogen standard?*
- *Could some net zero hydrogen production pathways be disadvantaged by a 15-20g CO_2/ MJ LHV emissions threshold.*
- *How could we ensure that a low threshold does not impact projects on a trajectory to net zero at the early stages of hydrogen market development?*

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- *How could we ensure that a low threshold does not impact projects on a trajectory to net zero at the early stages of hydrogen market development?*
- *Should the standard provide for some limited leeway on the threshold for existing hydrogen production facilities? E.g. 10%?*

GHG emissions threshold if downstream emissions included

- *What would be an appropriate level if downstream emissions up to the point of use were included?*

- Downstream distribution may only add up to 5-10 CO_2/ MJ LHV (with exception of long-distance compressed road transport or liquefaction which will add more emissions.

Delivery and administration

- ✓ Standard administered by BEIS
- ✓ Industry-led organisation
- ✓ Mixed model of governance

- ✓ Standard could use default or actual emission data to assess operator compliance with the standard

- ✓ Options for reporting:
- ✓ Self-reporting
- ✓ Annual third-party verification
- ✓ Annual third-party verification plus consignment reporting

- *Which type of organisation would be best placed?*
- *Should default data, actual data or a hybrid approach be used?*
- *What should be the options for reporting and verification?*
- *Appropriate frequency of verification?*
- *Over what period of time should the standard be introduced?*

Thank you

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