EASE's Recommendations on Certification of Renewable and Low-Carbon Hydrogen

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Executive Summary

Power-to-gas (PtG) and power-to-liquid (PtL) technologies are a key enabler of sector integration. By converting renewable and low-carbon electricity into other energy carriers, PtG and PtL facilities can contribute to the higher integration of vRES, introduce additional flexibility to the energy system, and help in the decarbonisation of the EU economy in line with the Paris agreement.

The upcoming revision of the 'Gas Package' presents a unique opportunity for the EU to clarify the regulatory framework applicable to PtG and PtL facilities and to create a supportive environment for the development and deployment of these technologies. In light of this, EASE has prepared some key recommendations for the certification of hydrogen produced through PtG, which we invite the EU institutions to consider.

Introduction

PtG and PtL allow using electricity to produce renewable and/or low-carbon Hydrogen (H_2) and other energy carriers. In this sense, PtG and PtL are key enabling technologies for the development of sector coupling[1] as they contribute to integrating different energy infrastructures and vectors.

In this document, we will focus solely on hydrogen produced through PtG (i.e. by electrolysis), thereby making recommendations on its certification based on the nature of the electricity used in the electrolysis process. Other technologies to produce hydrogen such as Steam Methane Reforming (SMR) are not considered in this paper.

PtG and PtL concepts could offer the following **key advantages**:

- CO_2 emissions reductions by replacing high-carbon hydrogen with:
  - ✓ Renewable hydrogen produced via electrolysis and powered by renewable electricity (e.g. bio, hydro, wind and solar) with zero carbon intensity; or
  - ✓ Low-carbon hydrogen produced via electrolysis and powered by low-carbon electricity where the resulting hydrogen has a carbon intensity below 36.4 g/MJ.
- The possibility to indirectly channel renewable electricity into energy end-use sectors such as chemicals, refineries, mobility, etc., where efficient.
- Contribution to maximising and optimising the ever-increasing production from variable renewable energy sources, increasing system flexibility and reducing the costs of decarbonisation. This will support the growing share of renewable power generation while reducing curtailment of renewables. This needs to be assessed at a local level and will very much depend on the grid specificities.
- Contribution to security of supply by reducing fossil fuel import dependency.
- The ability to be a medium for the storage of energy in the form of gas or liquids that can complement RES generation and act as long-term seasonal storage of clean electricity.

[1] See Trinomics B.V., Nov-2018, "*Sector coupling: how can it be enhanced in the EU to foster grid stability and decarbonise?*", study requested by the ITRE committee.

EASE's recommendations

1. **Definition**: develop a harmonised definition for renewable and/or low-carbon hydrogen based on a transparent methodology in order to avoid fragmentation of the market.

   The certification of the produced hydrogen should be classified with reference to its carbon footprint and the nature of the electricity used for its production, whether it is renewable or not.

   - When H_2 is produced in a PtG facility powered entirely by renewable electricity (e.g. bio, wind, solar), it is certified as **"renewable"** hydrogen, provided its carbon footprint is zero.
   - Where H_2 is produced in a PtG facility powered by low-carbon electricity, the resulting hydrogen should be certified as **"low-carbon"** where its carbon footprint ("well-to-gate") does not exceed 36.4 grams of CO_2 equivalent per MJ of H_2. This threshold, agreed among stakeholders part of the CertifHy project, corresponds to a 60% GHG emission reduction compared to the production of hydrogen using current best available technique.[2]

   A harmonised definition and comprehensive and fair life cycle assessment (LCA) methodology for assessing the GHG emission savings of low-carbon hydrogen needs to be developed.

2. **Guarantees of Origin**: develop a mutual recognition of Guarantee of Origins to facilitate cross border trade.

3. **Registry**: launch an EU-wide certification system and align it with national registries in a timely manner.

4. **Administrative barriers**: minimise administrative barriers to the certification of renewable and/or low-carbon hydrogen while also ensuring a robust certification system.

5. **Level playing field**: ensure fair and effective competition between technologies and energy carriers and between imported H_2 and H_2 produced in the EU.

   a) Technology and market developments will guide the role that different technologies, including PtG, and energy carriers will have. These developments have to be based on a level playing field, avoiding selecting the "winners" today through administrative decisions.

   - **Develop well-functioning markets for all required services, including flexibility. Such markets should be open to the participation of all energy resources** and

[2] You can read more about the CertifHy project here: certifhy.eu/

should be neutral on whether such participation is direct (i.e. same energy carrier) or indirect (i.e. energy conversion to a different energy carrier);

- **Develop cost-reflective use-of-network tariffs for all energy carriers**, aligning the economic signals / incentives given to customers with the actual cost structure and ensuring that the total current tariff proceeds are sufficient to recover total current network costs;
- **While respecting the "polluter pays" principle, harmonise the taxes and fees applied to all energy resources** – i.e. national tax design according to the same principles; equitable allocation of energy policy related costs among all energy carriers' / energy consumers; and
- **From an operational / physical perspective, develop an appropriate coordination between the different energy carriers across all timeframes** – i.e. coordination of infrastructure planning, risk preparedness, system operation, etc.

b) Imports of H_2 into the EU may present several issues, which need to be highlighted and addressed in the future:

- In the EU, the production of hydrogen and synthetic gases is covered by the Emissions Trading System (ETS). However, the ETS is limited to CO_2 emissions within the EU and does not cover emitters in other countries. Thus, H_2 produced in the EU through a method that results in CO_2 emissions would be in a disadvantaged competitive position compared to the same H_2 produced outside of the EU. This potentially creates a barrier for decarbonisation and sector coupling.

Conclusion

The upcoming revision of the 'Gas Package' presents a unique opportunity for the EU to clarify the regulatory framework applicable to PtG facilities and to create a supportive environment for this technology, which can bring numerous advantages to the energy system as well as play a crucial role in the decarbonisation of the whole EU economy. In this context, EASE invites the EU institutions to consider the abovementioned recommendations and welcomes discussion and feedback from stakeholders.

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About EASE:

The European Association for Storage of Energy (EASE) is the leading member - supported association representing organisations active across the entire energy storage value chain. EASE supports the deployment of energy storage to further the cost-effective transition to a resilient, low-carbon, and secure energy system. Together, EASE members have significant expertise across all major storage technologies and applications. This allows us to generate new ideas and policy recommendations that are essential to build a regulatory framework that is supportive of storage.

For more information please visit www.ease-storage.eu

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Disclaimer:

This response was elaborated by EASE and reflects a consolidated view of its members from an Energy Storage point of view. Individual EASE members may adopt different positions on certain topics from their corporate standpoint.

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