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Certification of hydrogen and hydrogen-based products

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Content

Why is certification of hydrogen and hydrogen-based products important?

What are the links between the certification of hydrogen and hydrogen-based end products?

What are the connection points between different standards and between the EU hydrogen certification scheme and international standards?

Background for the discussion

- Most of the different building blocks of the EU hydrogen regulatory framework were already presented in different packages and pieces of legislation.
- However the issue of certification has not been fully addressed.
- Market for green and low-carbon products is ready for a rapid growth.
- To meet targets in the legislation both producers and consumers need reliable and transparent solutions to certify the renewable or low-carbon attributes/properties of hydrogen and hydrogen-based products. (i.a. green ammonia, green fertilizers or green steel)

Why is certification important?

- **Market creation:** Different hydrogen types have different properties or attributes. If the aim is to create a clean hydrogen market, a system to certify the clean properties/attributes is needed.
 - **Grey H₂:** 10,92 tCO₂e/tH₂ (Certifhy)
 - **“Taxonomy” H₂:** 3 tCO₂e/tH₂ (73.4% fossil fuel comparator of 94g CO₂e/MJ)
 - **Low-carbon H₂ Certifhy:** 4,36 tCO₂e/tH₂ (60% fossil fuel comparator 91 gCO₂e/MJ)
 - **Low-carbon H₂:** 3,384 3 tCO₂e/tH₂ (70% fossil fuel comparator 94 gCO₂e/MJ) In process
 - **Renewable H₂:** 3,384 3 tCO₂e/tH₂ (70% fossil fuel comparator 94 gCO₂e/MJ) + Additionality + T&G correlation. In process.
- **Targets compliance:** Proof that the hydrogen produced can be counted towards the targets in the legislation.
- **Harmonization:** Unification of criteria to enhance credibility and traceability.
- **Transparency:** Information should be easily accessible to facilitate informed consumer choices.
- **Avoid double counting:** Renewable or low-carbon properties should only be counted once to the legislative incentives.

Examples of different approaches

Name	Institution	Country	Bading/voluntary	Technology	Qualification
RED DAs	European Commission	EU	Binding for accountability towards the targets	RFNBOs	At <u>least</u> 70% fossil fuel comparator + Additionality + <u>Temporal</u> and geographical correlation
Certify	European Commission / Clean hydrogen partnership	EU	Voluntary	Renewable and low-carbon hydrogen	A reduction of 60% GHG emissions compared to hydrogen produced using SMR (Fossil fuel comparator = 91 gCO ₂ /Mj -> 10.92 tCO ₂ /tH ₂)
Taxonomy	European Commission	EU	Binding to qualify as “sustainable investment”	Renewable and low-carbon hydrogen	GHG emissions savings of 73.4% for hydrogen [3tCO ₂ e/tH ₂] and 70% for hydrogen-based synthetic fuels relative to a fossil fuel comparator of 94g CO ₂ e/MJ
CMS 70	TÜV SÜD	Germany	Voluntary	Renewable and low-carbon hydrogen	GHG emissions threshold
AFHYPAC		France		Renewable and low-carbon hydrogen	100% renewable
Low-carbon hydrogen standard	BEI	UK	Binding for producers seeking support from government schemes and policies	Open	Meet a GHG emissions intensity of 20gCO ₂ e/MJLHV of produced hydrogen or less for the hydrogen to be considered low carbon.
IPHE	IPHE	International initiative	Voluntary	Renewable and low-carbon hydrogen	Mutually agreed methodology for determining the greenhouse gas emissions associated with the production of a unit of hydrogen.
Green Hydrogen Standard	The Green Hydrogen Organization	International	Voluntary	Green hydrogen	Also considers environmental, social and governance aspects of green hydrogen.
Clean Hydrogen Production standard	US Energy Efficiency and Renewable Energy Office	US	Binding to get the US tax credit	Clean hydrogen	In process
CEN/CENELEC CLS JCT 6	CEN/CENELEC	EU	In preparation		
China hydrogen alliance	China hydrogen alliance	China		Low-carbon, clean and renewable hydrogen	The threshold level for low-carbon hydrogen is 14.51 kgCO ₂ e/kgH ₂ and the level for clean hydrogen and renewable hydrogen is 4.9 kgCO ₂ e/kgH ₂ . In addition, renewable hydrogen must be produced with renewable energy resources.

EC plan and connection points between standards

First phase:, Bio fuels model (certification)

- No liquid market for hydrogen
- No hydrogen infrastructure in place yet
- Most of projects are integrated with consumption close to demand
- Not based on GOs, biofuels can not be traded in a pipeline across the EU
- Will require physical link between production and consumption



Second phase: Book and claim, (GOs)

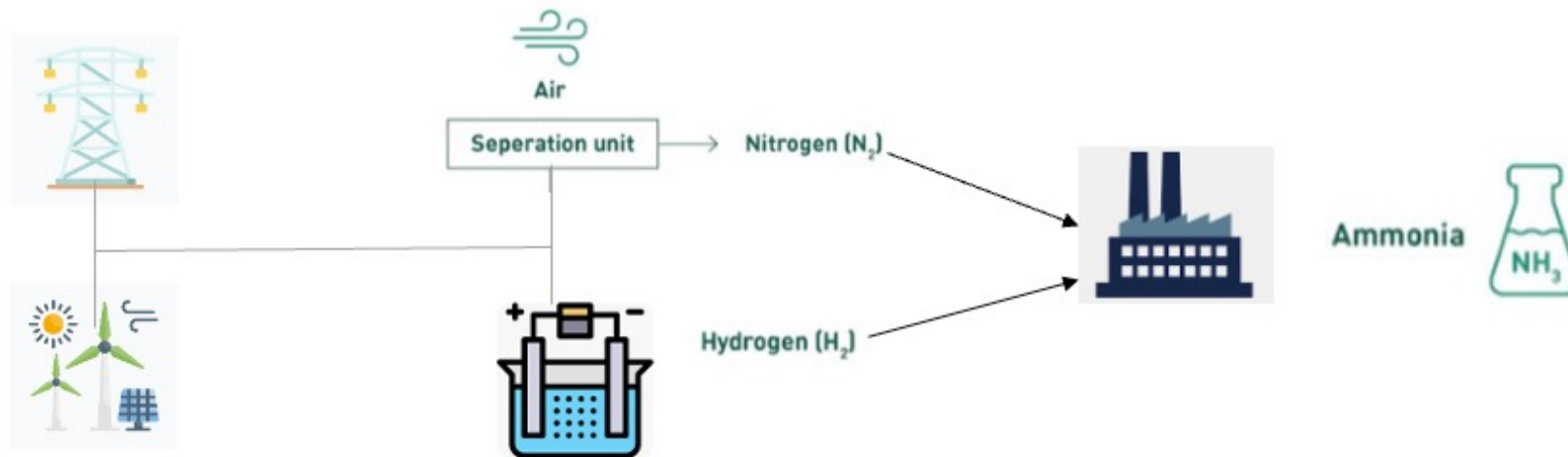
- Liquid hydrogen market
- Infrastructure already in place
- Creation of the union database
- Hydrogen GOs can be traded without the need of proving a physical link between production and consumption

What are the connection points between standards for biofuels?

- Voluntary schemes are invited to apply for recognition by the EC
- To be recognized, schemes should fulfil the criteria set by the EC including regulatory, transparency, traceability, specific auditing skills.

What are the links with hydrogen-based products

- In the future there will be also markets for decarbonized hydrogen-produced steel, decarbonized ammonia, etc. Certification schemes for low-carbon products will also emerge as a consequence.
- The same electrolyzer may produce both RFNBOs (renewable hydrogen) and low-carbon hydrogen, e.g. if the electrolyzer is connected to both the grid and to a RES facility.
- Ammonia example (in the EU around 39% of the hydrogen produced is used for ammonia production):
 - If ammonia is produced from an electrolyzer that produces both renewable and low-carbon hydrogen, how is it possible to know if the ammonia produced can be accounted towards the targets in the RED and how is this ammonia going to be certified? As green? As low-carbon?



Relation between EU scheme and international standards

- **REPower EU** refers to the importation of 10 Mt of renewable hydrogen by 2030
- **The hydrogen bank** will have two legs, one to support domestic hydrogen production and one for hydrogen imports.
- **International partnerships:** The EC will support the development of three major hydrogen import corridors via the Mediterranean, the North Sea area and, as soon as conditions allow, with Ukraine.
- The DA on additionality mentions that requirements will also apply to imports
- Several questions remain open:
 - How are we going to apply terminology in the DA such as “bidding zone” to third countries?
 - How can we ensure that third countries also apply the same strict criteria as EU producers?