

Launch Event

LOW-CARBON HYDROGEN: KEY ELEMENTS FOR A COMMON-SENSE APPROACH

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**Andrei Marcu
Olivier Imbault
Chiara Cavallera**

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The **objective** of this paper is, based on the analysis of the EU, UK, and US approaches, to suggest key elements for a common-sense low-carbon hydrogen regulatory framework, including an effective and comprehensive definition of low-carbon hydrogen that will support the development of the EU hydrogen market and enhance the EU's competitiveness in hydrogen technologies.

Key elements for a common-sense approach

- **Legislative Framework:** relevant regulations containing provisions and targets for low-carbon hydrogen.
 - It should ideally facilitate the transition to low-carbon hydrogen and aim to create a stable, predictable environment for stakeholders and investors.

- **Definition:** clear identification of what low-carbon hydrogen is. It should:
 - include specific criteria for greenhouse gas (GHG) emissions accounting, define lifecycle/system boundaries, accounting of emissions from different types of inputs, feedstocks, energy sources and pathways
 - it should be tailored to align with the practical realities faced by market players and the overarching challenge of establishing a robust business model.

- **Monitoring, Reporting, and Verification (MRV):** needed to ensure compliance with the regulation and reliability of data as well as ensuring that projects can deliver climate benefits.

Key elements for a common-sense approach

- **Financial Incentives:** grants, tax incentives, guarantees, contracts for difference, long-term agreements such as feed-in tariffs or power purchase agreements, State Aid. Financing can help:
 - bridging the cost gap between traditional, carbon-intensive hydrogen production and low-carbon alternatives.
 - reducing upfront and operational costs, and make low-carbon hydrogen projects more financially attractive, fostering market ramp up and technologies deployment.
- **Business Model:** Critical for commercial viability and long-term investment planning as well as for scaling up production, advancing technology, and reducing costs.
 - Must balance cost-competitiveness with fossil fuels and alternative solutions.
 - Requires regulatory support: clear definitions, robust MRV systems, and financial incentives + Role of the Private sector
 - An integrated approach that addresses both supply and demand is needed to create a business model that is profitable and sustainable in the long-term

EUROPEAN UNION UNITED KINGDOM

	EU	UK
Low-carbon hydrogen Legislative framework	<ul style="list-style-type: none"> - EU hydrogen strategy but no specific target in place for low-carbon hydrogen (targets are set for renewable hydrogen only) - Hydrogen and decarbonized gas market Package (approved) - Delegated Act on low-carbon fuels (to be approved) ➔ there is not a legal vacuum but the framework needs to be consolidated with the approval of the Delegated Act 	<ul style="list-style-type: none"> - UK hydrogen strategy, 10 GW of low-carbon hydrogen production capacity by 2030 (5GW electrolytic hydrogen, then any technology that meets the GHG threshold is eligible) - UK Low Carbon Hydrogen Standard (LCHS) ➔ consolidated framework, new versions of the LCHS can be published in the future
Low-carbon hydrogen definition	<ul style="list-style-type: none"> • Delegated Act on low-carbon hydrogen ➔ Carbon intensity limit 28.2 gCO₂e/MJ (3.4 kgCO₂e/kgH₂) ➔ Renewable hydrogen and low - carbon hydrogen are two different categories • The definition is not technology neutral • ‘Well to wheel’ approach - Full Lifecycle Assessment 	<ul style="list-style-type: none"> • UK Low Carbon Hydrogen Standard (LCHS): ➔ Carbon intensity limit 20.0 gCO₂e/MJ (2.4 kgCO₂e/kgH₂) ➔ The definition of low- carbon hydrogen includes renewable hydrogen • The definition is technology neutral • ‘Well to production gate’ approach-Lifecycle Assessment
Low-carbon hydrogen MRV	MRV included in the EU ETS (but gap – e.g. upstream methane emissions not covered)	MRV included in the UK Low Carbon Hydrogen Standard (LCHS)
Low-carbon hydrogen Financial incentives	<ul style="list-style-type: none"> - Innovation Fund - Important Projects of Common European Interest - No nuclear PPAs (at least until 2028) ➔ While some financing instruments for low-carbon technologies are in place, the majority of the hydrogen financing instruments focus on renewable hydrogen 	<ul style="list-style-type: none"> - Net zero Hydrogen Fund (NZHF) - Hydrogen Production Business Model (HPBM) - Contract for Differences (CfD) - Financing instruments under the Net Zero Innovation Portfolio ➔ low-carbon hydrogen financing instruments in place

General Approach of the US

Inflation Reduction Act (IRA), section 45V

Life-cycle GHG emissions (CO ₂ e)	Production tax credit per kg of H ₂	Investment tax credit in %
Less than 0.45 kg GHG/kg of H ₂	\$3.00	30%
0.45 to less than 1.5 kg GHG/kg of H ₂	\$1.00	10%
1.5 to less than 2.5 kg GHG/kg of H ₂	\$0.75	7.5%
2.5 to less than 4 kg GHG/kg of H ₂	\$0.6	6%
More than 4 kg GHG/kg of H ₂	\$0	-

Key differences in the approach to low-carbon H₂ ➔ result in different business models

CONCLUSIONS / RECOMMENDATIONS

- North America has the largest expected production capacity of low-carbon hydrogen by 2030 ([Hydrogen Council](#))
- The EU and the UK have not made significant progress on the low-carbon hydrogen market deployment in 2023, and it is unlikely that they will meet their 2030 targets ([ERCST H2 report](#))
- The hydrogen market is not taking off in the EU under the current regulatory framework and the total hydrogen demand decreased by 3% year-on-year ([Hydrogen Europe](#))
- This Delegated Act, when looked in the context of what the US and UK are doing, must be seen as a misnomer. It is not about the definition of low-carbon hydrogen, but about “how to get the best bang for the buck” in the hydrogen life cycle. It is also another example of over regulation when compared to other jurisdictions.

The Delegated Act:

- 1. Must be technology neutral**
- 2. Must be transparent and based on up-to-date scientific data**
- 3. Must be cost effective and globally sustainable**
- 4. Must ensure a level playing field on clean hydrogen markets**
- 5. Must be supported by a European clean/green industry strategy**



THANK YOU!