

ERCST Reflection Note

*Low-Carbon Hydrogen
Delegated Act: a turning
point for the hydrogen
market ramp-up?*

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1. Introduction

On 8 July 2025, the European Commission officially published the Delegated Act establishing the methodology for assessing greenhouse gas (GHG) emission savings from low-carbon fuels, of which low-carbon hydrogen is a central component (hereinafter, Low-Carbon Hydrogen Delegated Act)¹.

This Reflection Note aims to critically assess the Delegated Act and its significance within the broader framework of EU hydrogen policy. It brings together key remarks and insights that emerged during the ERCST event “Low-Carbon Hydrogen Delegated Act: a turning point for the hydrogen market ramp-up?”, which took place on 25 September 2025.

2. Key Points

- **Market:** The European Union adopts a ‘well-to-wheel’ approach, applying a full lifecycle assessment (LCA) to low-carbon hydrogen. This methodology accounts for emissions arising from the supply of inputs, processing, transport, distribution, and the combustion of the fuel at its end use. In contrast, other jurisdictions such as the United Kingdom and the United States apply a ‘well-to-gate’ approach, which limits the assessment to emissions up to the point of production. While the EU’s definition is consistent with the regulatory framework for renewable fuels of non-biological origin (RFNBOs) and evaluates emissions across the entire value chain, it raises challenges from a market-creation perspective. By extending the scope to end-use emissions, the EU framework reduces low-carbon hydrogen certificates fungibility.
- **Definition:** In the EU, it should be noted that the definition of low-carbon hydrogen is actually a definition of the greenhouse gas emissions savings achieved through its use, encompassing emissions generated during both the production and utilization phases of the hydrogen lifecycle.
 - Gas Directive, Article 2 (11) - definition: “low-carbon hydrogen” means hydrogen the energy content of which is derived from non-renewable sources, which meets the greenhouse gas emission reduction threshold of 70% compared to the fossil fuel comparator for renewable fuels of non-biological origin set out in the methodology for assessing greenhouse gas emissions savings from renewable fuels of non-biological origin and from recycled carbon fuels, adopted pursuant to Article 29a(3) of Directive (EU) 2018/2001.

¹ The publication came ahead of the 5 August 2025 deadline set by the Gas and Hydrogen Markets Directive.

3. Overview of the Delegated Act

The methodology considers full life cycle emissions and indirect emissions, therefore accounting for GHG emissions from the supply of inputs, processing, transport, distribution, and use.

- **Upstream CO₂ emissions of natural gas:** The Delegated Act differentiates between
 - **Natural gas transported through pipelines:** the Low-Carbon Hydrogen Delegated Act sets the default upstream emissions value for natural gas transported through pipelines at 4.9 gCO₂/MJ.
 - **Liquefied natural gas (LNG):** LNG is excluded from the default emissions value due to higher life-cycle emissions from liquefaction, shipping, regasification, and methane losses. EU producers of low-carbon hydrogen using LNG must calculate these additional emissions using a methane intensity methodology to be established in a delegated act, which, pursuant to Article 29(4) of the Methane Regulation, is planned to be adopted by August 2027². According to this Delegated Act on methane, natural gas and LNG importers, including LNG importers, will be legally required to report value chain emissions as of August 2028. In the interim period, operators must rely on default methane intensity values to be found in Part B, Table 1 of the DA Annex.
- **Country or region-specific default values (Art 3):** the EU Commission will assess the introduction of country or region-specific default values of upstream emissions by 1st July 2028 (2028 impact assessment).
- **Use of biomass or biofuels:** Biomass or biofuels can be used to lower the GHG intensity of low carbon fuels when they are used as fuels driving the process rather than feedstock and when the feedstock already includes a biogenic share.
- **CCUS:** actual carbon capture rates should be taken into account as well as leaks and full chain emissions.
- **Treatment of solid carbon co-product:** If solid carbon is produced it is not considered emitted if it is permanently stored (following relevant EU rules) or chemically bound in durable products listed under Commission Delegated Regulation (EU) 2024/2620. Otherwise, it is assumed to be oxidised at end of life and must be counted as CO₂ emissions.
- **Electricity:** the following calculation methods are provided
 1. Yearly average grid emissions intensity in the country of production (Annex Part C).
 2. Hourly average values, based on day-ahead forecasts from transmission system operators (with harmonised methodology once available).
 3. Full load hours method:

² Emissions of methane associated with the transport of fossil gas will likewise have to be disclosed based on the EU Methane Transparency Database expected in 2027.

- If the plant operates within the number of hours when renewable/nuclear set the marginal price emissions are considered equal to 0 g CO₂eq/MJ.
 - If exceeded emissions equal to 183 g CO₂eq/MJ.
 - if this third method is chosen, it must apply to all electricity consumed in the process, even if some of it could otherwise be counted as renewable.
4. Marginal technology method: hourly emissions based on the marginal technology setting the clearing price, if published by the TSO.

Low-carbon hydrogen will be eligible for EU-wide certification, complementing the framework already in place for renewable hydrogen (Renewable energy Directive). If hydrogen qualifies as RFNBO or low-carbon, the producer can be eligible for certain benefits (nonetheless, eligibility for benefits does not automatically create a sustainable business model for low-carbon hydrogen):

- Renewable and low-carbon gases benefit from network tariff discounts under the Hydrogen and Decarbonized Gas Market Package
- The Clean Industrial Deal State Aid Framework (CISAF) allows EU Member States to support renewable and low-carbon hydrogen by simplifying the process compared to the standard state aid notification procedure

3.1. EU vs UK approach to low-carbon hydrogen emissions accounting

Emission source / category	European Union (EU)	United Kingdom (UK)
System Boundaries/Approach	<i>'Well to wheel' approach</i> <i>Full Lifecycle Assessment</i>	<i>'Well to production gate' approach</i> <i>Lifecycle Assessment</i>
Feedstock upstream emissions	Included	Included
Electricity input emissions	Included	Included
Heating / cooling / steam	Included	Included
Other material inputs	Included	Included
Fugitive emissions	Included	Included
Compression and purification	Included	Included
Transport and distribution to end consumer	Included	Excluded
Hydrogen storage and liquefaction	Included	Included only if onsite and not separately metered
Fossil waste feedstock diverted from counterfactual use	Included	Included
Use	Included	Excluded
Equipment manufacturing	Excluded	Excluded
GHG thresholds	Carbon intensity limit 28.2 gCO ₂ e/MJ (3.4 kgCO ₂ e/kgH ₂) Low-carbon hydrogen Delegated Act	Carbon intensity limit 20.0 gCO ₂ e/MJ (2.4 kgCO ₂ e/kgH ₂) UK Low Carbon Hydrogen Standard

4. Key takeaways from the discussion

- The Delegated Act is as a necessary step toward defining and operationalising the concept of low-carbon hydrogen in the EU. However, several unresolved issues continue to undermine investor confidence and hinder the scaling of projects.
 - (i) **Methane emissions:** the methodology to accurately quantify methane is not established yet and will only be adopted by 2027. Until then, operators must rely on default methane intensity values, making it challenging to certify lower emissions or allocate methane emissions precisely.
 - (ii) **Origin of gas:** the distinction between pipeline and LNG gas in the Delegated Act acknowledges their differing emission intensities but does not resolve the technical difficulty of tracing gas origin.
 - (iii) **Grandfathering clause:** precision and clarity are needed on how grandfathering applies to existing installations, and which facilities can qualify as “existing.” It is also important to ensure that first movers, those who have already invested in projects under higher cost and higher risk conditions, are not penalised for their early action.
 - (iv) **Nuclear PPAs:** the exclusion of nuclear PPAs delays the full operationalisation of the Delegated Act. The planned review in 2028 postpones regulatory certainty for at least three years. This deferral restricts investment decisions for projects that could otherwise be viable by relying on nuclear-generated electricity.
 - (v) **SMR performance limitations:** the technical characteristics of steam methane reforming (SMR) constrain compliance with the 70% greenhouse gas reduction threshold. SMR processes typically enable capture of 60–65% of emissions (85% in best cases)³, leaving a substantial share unmitigated due to combustion-related sources. As a result, most existing SMR facilities are unable to qualify as low-carbon hydrogen producers under the current framework, even with retrofitted CCS. This risks discouraging decarbonisation efforts in existing assets
- **Over-regulation and complexity:** the Delegated Act exemplifies the cumulative complexity of EU hydrogen regulation. Extensive cross-references to other legislative instruments including the Methane Regulation, the Union Database, and the EU ETS rules create a fragmented compliance environment. The level of technical detail, further compounded by the inclusion of the ‘well-to-wheel’ approach, may impose a disproportionate administrative burden relative to the sector’s maturity.
- **Competitiveness and cost challenge:** the cost differential between low-carbon and fossil hydrogen remains structurally high. Current carbon prices under the EU ETS are insufficient to close this gap. In the absence of additional support mechanisms, low-carbon hydrogen projects face negative investment incentives compared with fossil-based production and with international competitors operating under lower cost and lenient regulatory constraints.

³ <https://www.fertilizerseurope.com/wp-content/uploads/2023/11/Ammonia-Roadmap-Fertilizer-Europe-FINAL-Sept-22-2023.pdf>

5. Way forward

After its publication on 8 July, the European Parliament and the Council had two months to review the delegated act, with the option to extend the period by another two months. This extension was granted, moving the deadline to 10 November. If no objections are raised by then, the delegated act will enter into force 20 days after its publication in the Official Journal of the EU.

6. Conclusions

- The Delegated Act should be considered within the broader context of EU hydrogen policy. It represents a necessary regulatory milestone but is not, on its own, a market enabler. EU hydrogen policy must be reframed around decarbonisation objectives, with the Hydrogen Strategy updated to reflect current priorities, most notably, the urgent need to establish a functioning hydrogen market and safeguard European industrial competitiveness.
- The proposed definition of low-carbon hydrogen is a step in the right direction, as it seeks to cover and regulate all possible cases with a resolutely technical approach. However, an attempt to be fully comprehensive, it inevitably leaves room for dispute on specific details. Persistent uncertainties such as the treatment of nuclear PPAs, the scope of grandfathering, the methodology for methane emissions, and the questions around tracing gas origin illustrate the challenges of such an exhaustive framework.
- The EU's decision to adopt a full lifecycle ('well-to-wheel') approach ensures that emissions along the entire value chain are taken into account but poses challenges for market creation by reducing the low carbon hydrogen certificates fungibility. This approach creates barriers for the development of a future market for low-carbon certificates, which would be essential to scale the low-carbon hydrogen market.
- A coherent demand-side framework is needed, alongside a paradigm shift in supply-side policy. The latter should be fully technology-neutral and focused primarily on outcomes (emissions reduction) rather than on specific technologies.
- Low-carbon hydrogen should be treated on an equal footing with renewable hydrogen, securing access to EU financing mechanisms and full recognition as a viable decarbonization solution at the European level. This is essential to replace the approximately 7 million tonnes⁴ of grey hydrogen currently consumed by the EU industry.

⁴ [https://www.europarl.europa.eu/thinktank/en/document/EPRS_BRI\(2025\)767227](https://www.europarl.europa.eu/thinktank/en/document/EPRS_BRI(2025)767227)