Low Carbon Fuels Delegated Regulation
Eurogas assessment and recommendations

24 October 2024

Contents

The importance of low-carbon hydrogen and its derivatives

Eurogas believes that low-carbon hydrogen will represent an important part of the EU hydrogen mix and will have a crucial role in the development of the hydrogen market and infrastructure, providing the volumes necessary to materialize the overall and renewable hydrogen ambitions of Europe as stated in the REPowerEU.

Low carbon hydrogen and its derivatives can deliver GHG savings, and as for all renewable and low carbon energy, these GHG credentials should be the main benchmark when determining their value in a net zero future. Beyond the sole benefits of hydrogen, low-carbon hydrogen produced from natural gas with CCUS has co-benefits be it in the development of CCUS technologies or more generally for the growth a CCUS economy/infrastructure and in the overall abatement of GHG emissions of natural gas.

As noted in the Gas Package, imports of renewable and low-carbon hydrogen are likely to complement domestic production, and certain sectors are already foreseeing consumption of low-carbon hydrogen and its derivatives. Indeed, low-carbon hydrogen also opens the way for low-carbon derivatives, such as low-carbon methanol and low-carbon ammonia, both representing important pieces in the decarbonisation of hard-to-abate sectors, such as maritime and aviation transport, chemical and power generation. Contrary to RFNBOs, low-carbon fuels have only been indirectly incentivized in EU legislation, notably through policies at consumption level (e,g. FuelEU Maritime).

Against this background, Eurogas express concerns on several aspects of the Delegated Regulation, which would endanger the deployment of low carbon hydrogen and represent a hinderance for the realisation of the EU hydrogen ambitions as a whole. Additionally, these aspects could represent an obstacle in scaling up EU's hydrogen market and in strengthening European industry competitiveness vis-a-vis third countries.

Elements welcomed by Eurogas (+)

- (+) The **scope of the Delegated Act** (DA) which covers most of the Low Carbon Fuels (LCF) pathways, and excluding RCF, as they are covered by the RFNBO/RCF GHG Methodology DA (recital 5).
- (+) The overall **architecture of the draft DA**, which partly relies on **actual/project-based values** (with caveats for natural gas emissions e.g. **(-)** no possibility to deviate from certain Annex B values).
- (+) The **links made with other EU legislations** i.e. the Renewable Energy Directive (RED) and the Union Database, the Methane Emissions Regulation and the RFNBO/RCF GHG Methodology DA.
- (+) The **inclusion of CCS** (incl. for third countries and for all transport modes) and **CCU** (despite the need for clarification on whether it relates to permanent CCU only, or if it is also extended to long-lasting products).
- (+) The respect of the **70% as the sole GHG emissions reduction benchmark**, with no specific additional sub-benchmarks for e.g. carbon capture rate, methane leakages.

What should be improved (+/-) & what causes a real challenge (-)

Definition of incorporated process/dedicated infrastructure

To attribute emissions to rigid/elastic inputs, the text relies on the definition of incorporated process:

> "*Incorporated processes include processes that take place in the same industrial complex, or that supply the input via a **dedicated supply infrastructure**, or that supply **more than half** of the energy of all inputs to the production of the **renewable liquid and gaseous transport fuel of non-biological origin or recycled carbon fuel**.*" (*Footnote 4*)

Eurogas considers that:

- **(?)** The term "dedicated infrastructure" remains unclear: is it the intention of the EC to align with the definition listed in the EC Innovation Fund 2023 Auction - FAQ[1]: "*Dedicated infrastructure" is infrastructure that is dedicated to your project only and not (commercially) accessible by other market players.*"?
- **(-)** The threshold of more than half of the energy of all input provided to the LCF installation is arbitrary and not substantiated. Installations which are able to provide information about significant portions of their input should not be barred from using partial actual values (*see the section below on deviation from the default values below).*
- **(-)** Mentioning '*renewable liquid and gaseous transport fuel of non-biological origin or recycled carbon fuels*' is not consistent with the scope of this Delegated Act.
- **(?)** The text should clarify whether qualifying as an incorporated process also exempts from the need to use methane intensities reported under the methane regulation.

[1] Question 86 of the EC Innovation Fund 2023 Auction - Frequently Asked Questions, 23 January 2024

Deviation from natural gas default values

Natural gas is considered as an elastic input. If from an incorporated process, LCF producers can **(+)** deviate from each of the natural gas' Annex B default values (Annex A.7). **(-)** If not from an incorporated process, LCF can only deviate for the CH_4 Annex B default value (using value from the Methane Emissions Regulation – see the next section) but **(-)** have to use the Annex B default values for CO_2 and N_2O.

	GHG for which deviation from Annex B is possible
Natural gas obtained from an incorporated process	CO_2, CH_4, N_2O
Natural gas **not** obtained from an incorporated process	CH_4

However, the default value for CH_4 deviates from the values used in the JRC report backing the RED Annexes V/VI default values and the RFNBO/RCF GHG Methodology DA. It should also be noted that both still rely on the JEC WTT 4a report dating from 2014, even though the same report has been updated in 2020 with a different set of values, and not only for CH_4.

	JRC report backing RED default values (2019)	**RFNBO/RCF GHG Methodology DA**	**Draft LCF DA Annex B (Sep 2024)**	**JEC WTT v4a (2014) Pathway GMCG1**		**JEC WTT v5 (2020) Not referenced in the legislations in other columns - Pathway GMCG1**
	Upstream GHG emissions					Upstream GHG emissions
CO_2 (g_{CO2}/MJ_{NG})	5.4	No disaggregated value	5.4	5.4 = 1.79 *(production & conditioning)* + 3.07 *(NG long distance pipe)* + 0.54 *(distribution)*		**5.16** = 1.78 *(production & conditioning)* + 2.28 *(NG long distance pipe)* + 1.10 *(distribution)*
CH_4 (g_{CH4}/MJ_{NG})	0.17		**0.2** *(calculated, based on GWP 25, from 5 g_{CO2eq}/MJ_{NG})*	0.1709 = 0.089 *(production & conditioning)* + 0.081 *(NG long distance pipe)* + 0.0006 *(distribution)* *(calculated with GWP 25)*		**0.1523** = 0.089 *(production & conditioning)* + 0.062 *(NG long distance pipe)* + 0.0012 *(distribution)* *(calculated with GWP 25)*
N_2O (g_{N2O}/MJ_{NG})	1.67 E-04		1.67 E-04 *(calculated, based on GWP 298, from 0.05 g_{CO2eq}/MJ_{NG})*	1.67 E-04 = 0 *(production & conditioning)* + 0.0001 *(NG long distance pipe)* + 2.78E-05 *(distribution)* *(calculated with GWP 298)*		**1.67 E-04** = 0 *(production & conditioning)* + 0.0001 *(NG long distance pipe)* + 2.78E-05 *(distribution)* *(calculated with GWP 298)*
Total (g_{CO2eq}/MJ_{NG})	9.7 *(calculated assuming GWP: 1/25/298)*	9.7 *(only value reported)*	10.45 *(calculated)*	9.7 *(calculated assuming GWP: 1/25/298)*		9.0 *(calculated assuming GWP: 1/25/298)*

Eurogas recommends to:

- At least: align the Annex B values with the values of the RFNBO/RCF GHG Methodology DA.
- Consider how to revise the Annex B values in light of the more recent JEC WTT v5 report of 2020.
- Unlock the possibility to demonstrate better performance for natural gas for all GHG (CO_2, N_2O and CH_4) and in all production setups. There is no reason to unfairly restrict producers knowing more information about the CO_2 and N_2O footprint of the natural gas they source only because it is not from an incorporated process.

Alignment with Methane Emission Regulation implementation

(+) Eurogas welcomes the mirroring of requirements between imported/EU natural gas and the overall effort to link the LCF DA with the Methane Emissions Regulation in order to deviate from the conservative Annex B values. (-) In the absence of methane intensity value, the EC is proposing to apply a premium of +40% to the Annex B values.

Eurogas considers that the rationale for applying a +40% premium to the Annex B values in the absence of methane intensity value should be made explicit: is it the EC's intention to make a parallel with the conservatism factor of +40% used in the Renewable Energy Directive to translate typical values to default values (see JRC (2019 report)?The text remains unclear on the measures to be taken while waiting for the different implementation stages of the Methane Emissions Regulation:

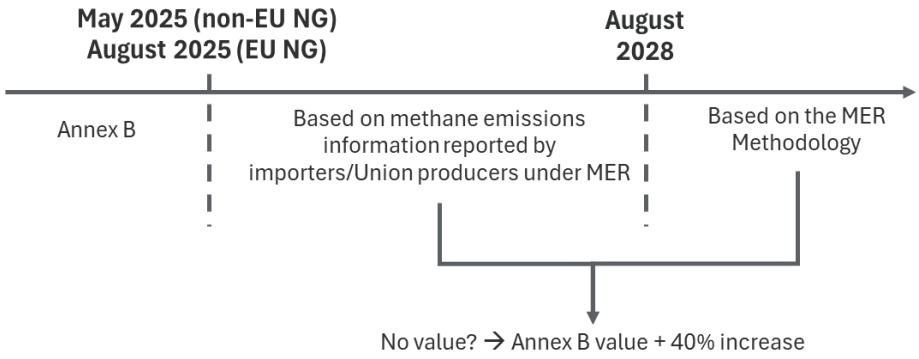
For LCF from EU natural gas:

The methane intensity of the production of fossil-based elastic inputs that increase the heating value of low-carbon fuels produced in the Union shall be calculated in accordance with the methodology set by the Commission in accordance with Article 29(4) of Regulation (EU) 2024/1787.	Methodology to be published in 2027, for a reporting obligation in 2028. Reporting of the values only for gas contracts concluded after August-2024, best efforts for others.
Until such date when that methodology is established, the methane intensity shall be calculated based on the methane emissions reported by Union producers in accordance with Article 12 of Regulation (EU) 2024/1787.	Legal requirement from August 2025
Where no methane intensity value is available, the methane intensity shall be calculated by applying a 40% increase on the relevant value for the upstream methane emissions per unit of fuel included in Part B.	
Until such date when Union producers are required to submit methane emissions reports in accordance with Article 12 of Regulation (EU) 2024/1787, the methane intensity shall be determined based on the values included in Part B of this Annex.	Legal requirement from August 2025

For LCF from non-EU natural gas:

The methane intensity of the production of fossil-based elastic inputs that increase the heating value of low-carbon fuels produced outside the Union shall be calculated in accordance with the methodology set by the Commission pursuant to Article 29(4) of Regulation (EU) 2024/1787.	Methodology to be published in 2027, for a reporting obligation in 2028. Reporting of the values only for gas contracts concluded after August-2024, best efforts for others.
Until such date when that methodology is established, the methane intensity shall be calculated based on methane emissions information reported by importers in accordance with Article 27(1) and Article 28(1), (2) and (5) of Regulation (EU) 2024/1787.	Legal requirement from May 2025
Where no methane intensity value is available, the methane intensity shall be calculated by applying a 40% increase to the relevant value for the upstream methane emissions per unit of fuel included in Part B of this Annex.	
Until such date when importers are required to submit methane emissions reports in accordance with Article 27(1) and Article 28(1), (2) and (5) of Regulation (EU) 2024/1787, the methane intensity shall be determined based on the values included in Part B of this Annex.	Legal requirement from May 2025

Summary of the timelines:



Eurogas welcomes the possibility to deviate from the Annex B conservative values, especially when considering the +40% premium – which imposes a significant wedge on LCF (derivatives). Nevertheless, Eurogas would welcome the confirmation that the Delegated Regulation - for the period 2025 until the establishment of the MER Methodology in 2028 - would mirror the methane emissions information provided under the MER, or, if the European Commission is envisioning additional criteria to define the acceptability of data from which the methane intensity to be used in the Delegated Act would be derived. This is an important factor creating uncertainty for FIDs.

GHG savings and protection of first movers

LCF have to meet the GHG emissions savings threshold of 70 % compared to the Fossil Fuel Comparator for RFNBO set out in the RFNBO/RCF GHG Methodology DA adopted pursuant to RED Article 29a(3) (Gas Directive Art. 2 (11)-(13), Art. 9, Delegated Regulation Annex A.2).

While this link with the RFNBO/RCF GHG Methodology DA is welcome to ensure alignment between the different hydrogen (-derivatives) production pathways, it should be noted that **(-)** there are no measures safeguarding investments that will be realised between the adoption of the LCF DA and any future revision of the RFNBO/RCF GHG Methodology DA changing the Fossil Fuel Comparator.

- Eurogas underlines that industrial project timelines extend beyond the usual time period between two revisions of EU secondary legislation: it is therefore critical to protect first movers. In particular, Eurogas considers that the text should provide a general grandfathering clause for all projects having taken FID before the end of 2030 to safeguard nascent projects from potential future restrictions under the LCF DA. This grandfathering should, however, not prevent early movers from capitalizing on any additional flexibilities introduced pursuant to Article 3 of this draft DA.

GHG emission intensity of electricity

As a general principle, Eurogas favours the possibility of recognising the efforts made by LCF producers to reduce the GHG footprint of the LCF produced, only if these efforts can be duly substantiated. The intention of the European Commission to allow for some project specific actual values is a critical step in the right direction.

However, it should be noted that one possibility is not being made immediately available for LCF producers: **(-)** to showcase better performance of the electricity that they use. This is despite the critical importance of the electricity footprint in several LCF production pathways: beyond its central role for electrolysers-based LCF production, **electricity has also a critical importance in the energy input** of the steam methane reforming (4%) and methane/LPG pyrolysis (15%) processes[2].

In the draft text, the same strict criteria as for RFNBO are applied, resulting in either zero carbon intensity or the average electricity grid carbon intensity (Annex A.5, A.6). Eurogas believes that here, a more differentiated approach should be adopted, allowing LCF producers to claim the specific carbon intensity of a power source. One of the tools here could be low-carbon PPA, which if supported more widely would also encourage investments in low-carbon electricity generation and reduce risks of cost fluctuations on the short-term power market. Onsite power generation can also represent a promising alternative to reduce the GHG footprint of LCF nevertheless, the acceptability of this pathway remains to be clarified.

But, Eurogas acknowledges that opening this possibility would create new challenges, notably if alignment with the electricity requirements for RFNBO was sought. Nevertheless, Eurogas underlines that the requirements to be mirrored should be contrasted by the incentives put in place: while RFNBO enjoy a vast array of policy incentives (through targets notably), low carbon only benefits from limited recognition/incentives.

Eurogas encourages the European Commission to revisit the proposed approach on the demonstration of better GHG footprint for the electricity being consumed.

It should also be noted that the LCF DA alignment with Article 27(6), second subparagraph of Directive (EU) 2018/2001 (Annex A.5 and A.6) would entail **(-)** stricter criteria compared to those foreseen for the RFNBOs.

Eurogas believes that it was not the EC's intention to only include the direct connection between the renewable installation and the LCF facility. Therefore, the text should refer to full Article 27(6) of Directive (EU) 2023/2413.

CCUS and consideration of solid carbon

Low carbon hydrogen has different production pathways, among which methane/LPG pyrolysis is a very relevant one to deliver significant GHG emissions reduction. Through thermal energy, the bond between carbon and hydrogen in the CH_4 molecule is broken. As a result, hydrogen and solid carbon are obtained as co-products. There are no direct CO_2 atmospheric emissions as the reaction takes place in the absence of oxygen and the resulting carbon is thus in its solid state.

When considering the text of the Delegated Act, **(+)** Annex A.12 states that emissions from processing (e_p) shall only include '*direct atmospheric emissions from the processing itself [...], as well as any CO_2 stream that leaves the plant and is captured at the carbon capture plant and considered under e_{ccs} or e_{ccu}*'. Therefore, solid carbon being neither atmospheric emissions nor a CO_2 stream, is not covered by the provision and would seem to be considered as avoided emissions. **(-)** However, the text then mentions that solid carbon could be considered as a reduction in emissions under e_{ccs} (Annex A.17) which would lead to double crediting.

[2] DVGW-EBI, Ecological evaluation of hydrogen supply, 2022.

Overall, the provision in A.12/A.17/A.18 tend to contradict each other, with no clear steering on the exact accounting of solid carbon.

In order to improve its consistency, Eurogas recommends aligning provisions in A.12/A.17/A.18 by explicitly mentioning the status of solid carbon: should it be considered as avoided processing emissions (Annex A.12) or should it be treated a co-product, notably accounted under e_{ccs} (Annex A.17)? If the latter is confirmed, clarification should also be provided for solid carbon used for CCU applications.
In addition, **(?)** the rules related to the allocation of the GHG emissions of co-products (Annex A. 15) do not clearly mention how they should be applied to solid carbon. Solid carbon is not a fuel/electricity/heat, but it has an energy content (i.e. Annex A.15 not applicable). Only the Q&A of the RFNBO/RCF DAs provides an answer, noting that all products with an energy content should be considered as fuels[3].

Default values for CCS

In general, Eurogas welcomes the possibility for LCF producers to rely on certified values. However, in cases where the CCS value chain is not operated by the LCF producer, the obligation to use certified values might not be available or pose a hurdle to projects.

In order to improve the overall consistency of the Delegated Act, Eurogas recommends providing default values in case certified values are not available.

In addition, the Commission should clarify how CO_2 emissions in injection/storage should be allocated to individual LCF production sites.

Link with CO_2 sources in the EU ETS

(-) As highlighted in discussions around the RFNBO/RCF GHG Methodology DA, Eurogas regrets the choice made by the EC to replicate the same problematic sunset date for CO_2 from ETS sources (Annex A.10/11).

While this mirrors the RFNBO/RCF GHG Methodology DA, Eurogas considers that if a revision was to come, the LCF DA should be amended accordingly.

Link with the RED/Union Database: third country grid transport recognition

It should be noted that the current UDB design to be used for biomethane and gaseous RFNBO (hence their derivatives as well) **(-)** excludes the possibility of relying on third country grid for transport.

Eurogas encourages the EC to resolve this issue as soon as possible, which would solve also the problem to come for low carbon gases to be transported through non-dedicated third-country grids.

[3] Question 51 of the EC Q&A implementation of hydrogen delegated acts, 14 March 2024 version

What should be clarified (?)

Recognition of CCS in third countries

(+) Eurogas welcomes the EC intention to recognise permanent geological storage sites in third countries where legal obligations on MRV and remediation for leakages are in line with EU legislation (Annex A.17).

(+) Eurogas equally supports that the '*potential future recognition of the storage of EU ETS emissions in storage sites in third countries without a linked ETS would depend on there being equivalent conditions to ensure permanently secure and environmentally safe geological storage of captured CO_2 storage*' (Recital 6).

(?) Nonetheless, the conditions and timeline for third countries to reach equivalence with the EU legislative framework should be clarified in both situations described above.

Eurogas considers that further clarification on the following aspects is needed:

- when and how the equivalence between third countries and EU law would be established on MRV and remediation for leakages in permanent geological storage sites.
- the '*equivalent conditions*' that shall be met by third countries to ensure permanently secure and environmentally safe geological storage of CO_2.

Net emissions savings under e_{CCU}

Annex A.18 explicitly states that e_{ccu} shall include CO_2 emissions that fall under the scope of permanent CCU (as detailed under Article 12(3b), second subparagraph of Directive 2003/87/EC).

However, **(?)** the definition of the e_{ccu} factor covers all '*net emission savings from carbon captured and permanently chemically bound in long-lasting products*' (Annex A.1).

Eurogas considers that the text would benefit from further clarification: is it the intention of the European Commission to expand the scope of e_{ccu} to long-lasting products (Annex A.1, as defined in the CRCF) or should it only include permanent CCU (Annex A.18)?

Low-carbon fuels certification

In order to fully implement this Delegated Act, a significant piece of the framework will have to be developed: the establishment of certification schemes. The timeline of this process for RFNBO remains an ongoing challenge despite the efforts undertaken by the European Commission.

Eurogas would encourage the European Commission to establish a swift accreditation of low-carbon certification schemes in order to boost the necessary development of LCF projects.

Hydrogen leakages

Eurogas acknowledges the intention of the European Commission to consider hydrogen leakages in the future.

Eurogas underscores the importance of considering the market availability of hydrogen leakage detection and monitoring technologies before their inclusion into the Delegated Act.

Eurogas considers that, as a basic principle, the definition of any default values: should be tied to the possibility of demonstrating better performance through actual values.

Similarly, considering the ambition of the European Commission to also consider hydrogen leakages for the GHG emissions calculation of RFNBO, Eurogas underlines the need to ensure alignment between the requirements for RFNBO and low carbon fuels.

CO_2 sources

(?) Eurogas notes that the LCF DA replicates most of the provisions of the RFNBO/RCF GHG Methodology DA, with the notable exception of removing the requirement for CO_2 from production or combustion of biofuels/bioliquids/biomass fuels to not have received credits for emission savings from CO_2 capture and replacement under the RED.

Eurogas would welcome further clarification about this change.

When considering emissions from the inputs' existing use or fate ($e_{ex\text{-}use}$), Eurogas welcomes the addition of the carbon stemming from inputs qualifying as a carbon source for the production of recycled carbon fuels (Annex A.10 (f)). This represents a positive change and could also be extended to the methodology for calculating emissions of RFNBOs (Delegated Regulation 2023/1185).

Link DA/Natural Gas/Union Database:

The recital (4) of the LCF DA indicates:

> *"[…] Accordingly, raw materials used for the production of low-carbon fuels as well as the low-carbon fuels themselves should be traced via the Union database in the same way as raw materials used for the production of renewable fuels. Therefore, as regards the value for the upstream methane emissions, it is appropriate to distinguish between individual batches of fuels and raw material based on the methane performance profile of the supplier supplying the fuel used to produce the low-carbon fuel."*

Eurogas would welcome clarifications on the implementation of such intention under the UDB and the link with the methane emissions import requirements currently being discussed.

CCUS for process emissions

The current draft does not bring details about the implication of using BECCUS on the energy used by the production process to lower the carbon intensity of the low carbon fuels. For example, if biomethane is being combusted and the resulting emissions captured, will negative emissions be accounted for?

Eurogas would welcome additional guidance on this possibility to further lower the GHG footprint of the LCF produced.

Link with the ReFuelEU – Synthetic low-carbon aviation fuels

The ReFuelEU introduces the concept of synthetic low-carbon aviation fuels (Art. 2 (13)) defined as:

> "*'synthetic low-carbon aviation fuels' means aviation fuels that are of non-biological origin, the energy content of which is derived from non-fossil low-carbon hydrogen, which meet lifecycle emissions savings threshold of 70 % and the methodologies for assessing such lifecycle emissions savings pursuant to relevant Union law*"

It should be noted that the LCF DA relies on the definition of the Gas Directive which defines low carbon as being non-renewable.
Against this backdrop, Eurogas underlines that the LCF DA does not bring more clarity to the ReFuelEU definition.

Eurogas recommends to the EC to clarify the interlinkages and gaps between the two legislations to support the decarbonisation efforts of the aviation industry and its fuels suppliers.