



RFNBOs: Getting sustainability right from the start.

T&E submission to Commission consultation on Renewable Fuels of Non-Biological Origin (RFNBOs)

June 2022

Summary

T&E welcomes the technical work undertaken by the Commission in the preparation of these two delegated acts (DA), one on defining additionality and geographic and temporal correlation and the other one on a methodology to calculate the greenhouse gas savings of RFNBOs (and Recycled Carbon Fuels). However, the major effort done to ensure that RFNBOs are produced with additional renewable energy is undermined by the insertion of a grandfathering clause in the DA setting out detailed rules for the production of RFNBOs. The exemption for electrolyzers that come into operation before 2027 - especially in combination with the high RFNBO targets in the RED proposal and the further increase following RePowerEU - will cause a 500+ TWh of additional demand to produce around 10 million tonnes of green hydrogen in the EU. This is more than the electricity generated by all installed wind power in the EU27+UK in 2021. We regret that the Commission did not conduct an impact assessment on how adding such a significant load to European grids will increase emissions and impact electricity prices for electricity-intensive industries and all businesses and households more generally. As was the case for biofuels and its indirect land use impacts, ignoring the side-effects of non-additionality will undermine the credibility of RFNBOs as zero-emission fuels.

According to legal advice commissioned by T&E, Article 27 of the RED does not delegate the authority to the Commission to simply exempt entire parts of industry from having to prove additionality. The Commission may have exceeded its power to 'supplement' the RED, because the grandfathering clause goes beyond the development in detail of non-essential elements of the legislation. **The grandfathering clause must be removed.**

T&E appreciates the need for a transition phase for the emerging hydrogen industry. However, the root cause for the difficulties faced by developers of large renewable projects should be addressed directly (e.g. by shortening permitting procedures, while respecting the environmental acquis). Delaying additionality for RFNBO simply sidesteps the issue. If grandfathering were to remain in the RFNBO framework, this exemption needs to be well circumscribed. The exemption for pre-2027

electrolysers should be restricted in time: For example, pre-2027 electrolysers could be allowed to operate only a couple of years without PPAs for additional renewables. At the very least, Member States that authorise RFNBO projects must factor the additional demand for renewables from pre-2027 electrolysers into their NECPs and demonstrate how additional renewables will be included in their indicative trajectory for the increase of renewable energy. Lastly, **it is crucial that grandfathering is not applied to temporal and geographic correlation.**

In Article 6, The Commission counts on certification schemes to certify that RFNBO producers comply with the requirements in the DAs. In particular for RFNBO imported from outside the EU, the Commission should establish clear guidelines and mandates for auditing information from PPAs and correlation data. Both DAs refer to a number of broad concepts, such as Power Purchase Agreements, effective carbon pricing, operating aid or investment aid, which remain undefined. Similarly, guidance is needed on how to assess data from smart metering systems or establish the > 90% average share of renewable electricity in the previous calendar year in a given bidding zone.

In the DA on the methodology for assessing GHG emissions from RFNBOs, 2036 is the cut-off date for using fossil carbon that is covered by a carbon pricing mechanism. T&E prefers a more gradual growth path for non-fossil carbon and in particular for “CO2 captured from the air”. A slower ramping up rate will be more suitable to scale the Direct Air Capture technology and bring down costs.

1. Delegated Act establishing a Union methodology setting out detailed rules for the production of renewable liquid and gaseous transport fuels of non-biological origin (RFNBOs)

Compared to previous drafts of this delegated act, T&E notes that the stringency of sustainability criteria has been significantly weakened, in particular by the introduction of a grandfathering clause for additionality (see section 1.1 below). As the Commission set high RFNBO targets for transport and industry in its ‘fit-for-55’-proposal for a review of the Renewable Energy Directive and further increased them in its RePowerEU Plan, an emphasis of ‘quantity over quality’ started to emerge in negotiations of this proposal, at the expense of the environmental integrity of the RFNBOs.

For T&E, the higher level of ambition should have been more closely linked to the use of RFNBO targets in the hard-to-decarbonise transport modes like aviation and shipping. We regret that increased RFNBO targets in the RED were not associated with a dedicated sub-target for shipping under the FuelEU Maritime and increased e-kerosene target under the ReFuelEU Aviation proposals.

T&E’s comments focus mainly on the proposed rules for grid-connected electrolysers and how they can source additional renewable electricity via the grid.

1.1. Additionality - grandfathering clause must be removed

Key asks

- Remove the grandfathering clause in Article 8
- Keep the transition period short, during an initial ramp-up phase for the renewable hydrogen industry

The Commission proposal inserted a grandfathering clause for all installations producing RFNBOs that came into operation before 2027, exempting them *forever* from the additionality requirement required in the RED to be “adding to the renewable deployment or to the financing of renewable energy” (recital 90). T&E opposes this element of the proposal, which undermines the regulatory framework elaborated in both DAs.

The recitals 2 and 3 of the Commission explain the rationale for additionality well:

- *The use of renewable hydrogen will therefore only lead to greenhouse gas emission savings if incentives for an increase of fossil electricity generation are prevented by an increase in the production of renewable electricity. Given the enormous amount of additional renewable electricity generation needed to progress in the decarbonisation of current fossil electricity production, this can only be ensured by including strict criteria for additionality in this methodology.*

- *Renewable hydrogen will contribute towards reducing greenhouse gas emissions in the Union only if it is avoided that incentives for the production of more fossil electricity are provided, which would lead to an increased level of emissions. In order to account hydrogen as fully renewable, the production of renewable hydrogen should therefore incentivise the deployment of new renewable electricity generation capacity (principle of additionality) or take place at times where the electrolyzers support the integration of renewable power generation into the electricity system or in bidding zones where renewable electricity already represents the dominant share and adding additional renewable electricity generation capacity would not be necessary or possible.*

The increased ambition in the RePowerEU plan to use 20 million tonnes of renewable hydrogen in the EU by 2030 and to install around 120 GW of electrolyser capacity in the EU by 2030 (to produce 10 million tonnes of renewable hydrogen in the EU) significantly raises the stakes to get this regulatory framework right from the start. These RePowerEU objectives are double the RFNBO objectives set in the ‘Fit for 55’-package and the 2021 Commission proposal for a review of the 2018 RED. The target for RFNBOs in transport increased from 2,6% to 5,7% and the target for the replacement of grey hydrogen consumed in industry with renewable hydrogen increased from 50% to 75%. It will require about 500 TWhs of renewable electricity in the EU to produce 10 million tonnes of green hydrogen in the EU. This amount of electricity is equivalent to more than the electricity generated by all installed wind power - both onshore and offshore - in the EU27+UK in 2021, or the total annual electricity demand of France.

We deplore that the Commission did not conduct a thorough impact assessment on the implications of adding such a significant demand for renewable electricity to the grid, which will lead to more fossil fuel electricity generation and more emissions. Together with the consumers’ organization BEUC, we have repeatedly warned the Commission that setting ambitious RFNBO targets without a strong commitment to additionality will put a huge strain on European energy markets and probably lead to consumers electricity bills skyrocketing, at a time when many consumers see their electricity bills increase as a result of record-high gas-fire power plants setting the marginal price on wholesale electricity markets.¹

To avoid such impacts, **the grandfathering clause must be removed. T&E prefers the use of a transition phase during an initial ramp-up phase for the industry**, as suggested in Article 7, whereby the need for additional renewables is delayed for some years. In other words, our preferred option for a short transition phase will also enable the EU, Member States and regional authorities to find a balanced way forward to reduce the time needed for permitting large renewables projects, while respecting the environmental acquis.² Discussions to facilitate permitting are ongoing in negotiations on RED and as a follow-up of the RePowerEU Plan.³ We do not see the added value of the grandfathering clause,

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<https://www.transportenvironment.org/discover/consumers-electricity-bills-should-not-be-used-to-finance-the-production-of-hydrogen-say-consumer-and-green-groups/>

² For more details on what such a balanced approach to permitting, see the letter by the Green10:

<https://green10.org/wp-content/uploads/2022/05/20220516-G10-letter-to-EVP-Timmermans-on-REPowerEU.pdf>

³ See Commission Recommendation on speeding up permit-granting procedures for renewable energy projects and facilitating Power Purchase Agreements

permanently exempting electrolyser capacity installed before 2027 from additionality. Grandfathering as proposed creates two different classes of electrolysers that will operate under very different regulatory frameworks, which will undermine a level playing field. Pre-2027 electrolysers are exempted from additionality, whereas grid-connected electrolysers coming into operation after 2027 will have to comply with all the rules for the production of RFNBOs. In arguably the most challenging case of directly connected electrolysers, there is no grandfathering at all. This is why we do not see a technological or economic justification for such a permanent exemption. A transition phase delaying additionality during the initial ramp-up of the renewable hydrogen industry is a better tool to incentivize early movers in the renewable hydrogen industry, while avoiding the above-mentioned negative side effects in terms of more emissions and the upward pressure on already high electricity prices.

If Article 8 and grandfathering were to remain in the RFNBO framework, this exemption needs to be well circumscribed, under strict conditions:

- The exemption for pre-2027 electrolysers should be restricted in time: For example, pre-2027 electrolysers could be allowed to operate only a couple of years without PPAs for additional renewables.⁴ The grandfathering clause should enable these RFNBO producers to start working on their own PPAs for large-scale renewables projects, while the EU finds a balanced approach to accelerate permitting for renewables.
- For those RFNBO producers that did not manage to sign PPAs by 2027 for additional renewables for their pre-2027 electrolysers, they should be required to make a financial contribution after 2027 to the EU renewable energy financing mechanism where they contracted additional renewables.⁵ This financial contribution to the EU renewable energy financing mechanism should be equivalent to the corresponding amount of renewable electricity that is claimed as fully renewable, based on the results of a call for proposals for renewables projects by the mechanism.
- Member States that authorise RFNBO projects must be required by the DA to factor the additional demand for renewables from pre-2027 electrolysers into their NECPs and demonstrate how additional renewables (excluding biomass) will be included in their indicative trajectory for the increase of renewable electricity.

Lastly, **it is crucial that grandfathering is not applied to temporal and geographic correlation.** If the requirements on **temporal correlation** would be grandfathered, RFNBO producers would have no incentive for “developing technologies allowing for a quick adjustment of hydrogen production and the synchronisation of electricity generation and hydrogen production” (as mentioned in recital 15). The hourly temporal correlation from 2027 recognizes that role that the Commission had already identified for electrolysers in its 2020 Energy System Integration Strategy, namely that they “can play a particularly important “nodal” role in an integrated energy system, where it can help integrate large shares of variable

⁴ Suggested wording for amending article 8: *Article 4(2), points (a) and (b) do not apply for x years from their coming into operation to installations producing renewable liquid and gaseous transport fuel of non-biological origin that come into operation before 1. January 2027.*

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https://ec.europa.eu/info/news/eu-renewable-energy-financing-mechanism-opening-way-private-investment-2021-jan-11_en

renewable generation, by offloading grids in times of abundant supply, and providing long term storage to the energy system”⁶

1.2. No legal basis in the RED for grandfathering

Key asks

- The grandfathering clause in Article 8 exceeds the legal powers delegated to the EC and must be removed.
- Further widening the scope of grandfathering will increase the risk of a legal challenge and undermine the legal certainty offered by a stable set of rules for the renewable hydrogen industry.

According to legal advice commissioned by T&E, **Article 27 of the RED does not delegate the authority to the Commission to simply exempt entire parts of industry from having to prove additionality.**⁷ The Commission may have exceeded its power to ‘supplement’ the RED, because the grandfathering clause goes beyond the development in detail of non-essential elements of the legislation. The grandfathering clause must be removed.

Article 290 TFEU stipulates that delegated acts can only ‘supplement or amend certain non-essential elements’ of the basic act and are based on an explicit delegation of power (contained in a legislative act) that lays down the objectives, content, and scope of the delegated act, and is of specific duration; and may not be concerned with ‘essential elements of an area’ regulated by the basic act.

The delegated power set out in Article 27(3) of RED is designed to ensure that the rules ensure that the energy actually *is* additional.

In the comparable *Case C-286/14, EP, supported by Council v Commission*, the Court of Justice clearly distinguished between the power to ‘amend’ and the power to ‘supplement’:

“Where the Commission exercises that power [to supplement], its authority is limited, in compliance with the entirety of the legislative act, adopted by the legislature, to development in detail of non-essential elements of the legislation in question that the legislature has not specified. [...] In that regard, it is important to note, first, that, for reasons of regulatory clarity and transparency of the legislative process, the Commission may not, in the context of the exercise of a power to ‘supplement’ a legislative act, add an element to the actual text of that act. Such an incorporation would be liable to create confusion as to the legal basis of that element, given that the actual text of a legislative act

⁶ https://ec.europa.eu/energy/sites/ener/files/energy_system_integration_strategy.pdf

⁷ Opportunity Green (2022, June) *Additionality under Article 27(3) of RED Legal Analysis*, June 2022

*contains an element arising from the exercise, by the Commission, of a delegated power which does not entitle it to amend or repeal that act.*⁸

In this case, it can certainly be argued that the Commission did not just supplement additional elements but rather wholesale exempted a certain portion of electricity provision from the essential element of the act: to ensure the additionality of electricity used for hydrogen production. Nowhere in the designation of delegated authority was the Commission given the ability to simply exempt entire parts of industry from having to prove additionality. Therefore, the legal advice commissioned by T&E concludes that, on balance, it would seem that the Commission exceeded their authority in this case.

1.3. Transition phase until 2027 for temporal correlation

Key asks

- A monthly temporal correlation is too long to incentivise a flexible operation of electrolyzers.
- Until 2027, temporal correlation should be intra-day and hourly afterwards, to ensure matching with high shares of renewables.

In the recital 15 cited earlier, the Commission makes clear that a strict temporal correlation can drive innovation. For example, instead of oversizing the renewable generation asset in order to achieve sufficient operating hours for the electrolyzer, RFNBO producers could innovate by exploring a hybrid set-up, combining solar, wind and other renewable sources as well as integrate some storage, to ensure temporal correlation, as we already flagged in a T&E briefing published in 2021.⁹ A strict temporal correlation is therefore not an administrative burden. Rather, it is a clever operational decision that makes sense both from an environmental and economic perspective, producing hydrogen when renewables are available (and electricity prices are low), without ramping up fossil fuel generation. This is why the proposed transition from a monthly temporal correlation to an hourly temporal correlation after 2027 is a big jump and will not sufficiently incentivize RFNBO operators to operate their electrolyzers flexibly, failing to drive the much-needed innovation to synchronize electricity generation and hydrogen production. This is the case, because the monthly time interval is much longer than the typical fluctuations in e.g. wind and solar generation, thus not ensuring that the electrolysis runs in hours with a high share of renewables.

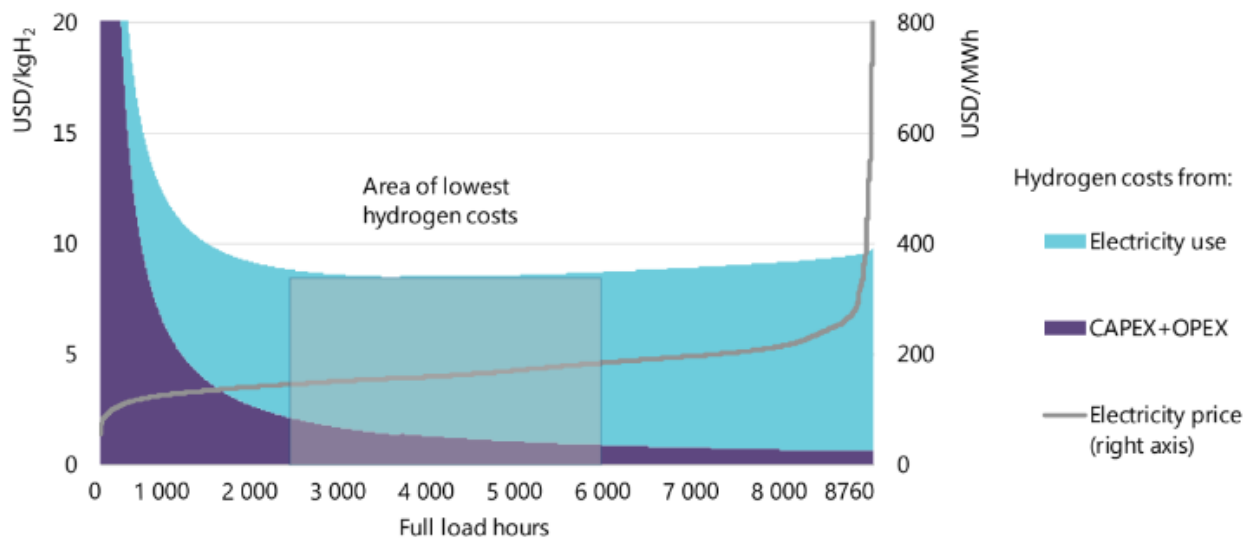
In absence of strict temporal correlation, electrolyzers drawing electricity from the grid would be de facto running on expensive and most likely gas-fired turbines whenever electrolyser demand is not met with additional supply. Moreover, without temporal correlation, PPAs will only be established with the cheapest renewable generation asset available on the market (i.e. solar), instead of a hybrid solar + wind combination that enables higher operating hours. Recent analysis by Aurora Energy shows that - given

⁸ Case C-286/14, European Parliament, supported by Council v Commission (Connecting Europe Facility, Judgment of the Court of 17 March 2016.

⁹ T&E (2021, January) *How to ensure the sustainability of electrofuels*. Retrieved from <https://www.transportenvironment.org/discover/how-ensure-sustainability-electrofuels/>

the costs of the electricity accounts for > 60% of the cost of hydrogen - RFNBO producers will have an incentive to not only try to achieve high operating hours, but also run the electrolyser when the electricity is cheap or even negative.¹⁰ Their research found that a combination of wind and solar (Hybrid co-location models) to power the electrolyser offers the lowest LCOH compared to individual technologies, reaching 4.1 EUR/kg H₂ by 2025. Such a hybrid set-up (with a Power Purchase Agreement investing in additional wind and solar capacity) makes it possible “to achieve a higher annual load factor (>50%) while minimising energy spillage, leading to lower H₂ production costs”. Focusing on operating hours alone, without factoring in power prices is omitting a very important parameter. Aurora finds that “Flexible electrolysers can avoid producing in high price periods; the lowest LCOH is achieved at lower annual load factors”. Factoring in an hourly granularity of power prices, they find that “the optimal load factor to minimise LCOH is 57%”. The lowest cost of hydrogen is achieved in mid-load operation, around 4500 load hours:¹¹

Figure 13. Hydrogen costs from electrolysis using grid electricity



Notes: CAPEX = USD 800/kW_e; efficiency (LHV) = 64%; discount rate = 8%.

Source: IEA analysis based on Japanese electricity spot prices in 2018, JEPX (2019), *Intraday Market Trading Results 2018*.

In other words, pushing for very high operating hours does not bring down the cost of the green hydrogen any further, if you have to pay a high(er) electricity price.

The claims by industry that a strict temporal correlation will add significant costs to the cost of renewable hydrogen production are not only overblown; they also miss the point that RFNBO producers will not compete with fossil fuels or other low-carbon fuels like blue hydrogen. RFNBO producers will be competing with each other to supply the cheapest hydrogen/RFNBOs to e.g. fuel suppliers in the transport sectors. For the foreseeable future, the demand for RFNBOs will be driven by policy, such as the

¹⁰ Aurora Energy Research (2022, February) *Shades of green (hydrogen) – part 2: in pursuit of 2 EUR/kg*, retrieved from https://auroraer.com/wp-content/uploads/2022/02/Aurora_Jan22_EU_hydrogen_ShadesOfGreen-part2_publicReport.pdf

¹¹ IEA (2019) *The future of Hydrogen*. Retrieved from <https://www.iea.org/reports/the-future-of-hydrogen>

ReFuelEU's ekerosene mandate imposed on fuel suppliers to aviation and an RFNBO target for fuel suppliers. Moreover, Contracts for Difference will be promoted to bridge the cost gap between shipping and aviation RFNBOs and fossil fuels and help the end users of the RFNBOs to bridge the higher fuel costs.

1.4. Temporal correlation

Key asks

- Bring the limit for temporal correlation during low-price hours on the day-ahead electricity market down to 0 EUR/MWh, instead of 20 EUR/MWh.

T&E supports the choice for a one-hour temporal correlation between the renewable electricity produced under the PPA and the electrolyser as well as the possibility for RFNBO producers to count grid electricity as fully renewable, provided that the electrolyser helps to manage grid congestion. However, we ask the Commission to reconsider the option offered by article artikel 4.2c(iii) to consider every one-hour period when the day-ahead price is lower or equal than EUR 20/MWh as meeting the temporal correlation requirement. A maximum of 0 EUR/MWh is the more relevant cut-off value, as only wind and solar can produce at 0 EUR/MWh. With a price of up to 20 EUR/MWh, biomass, nuclear power and some fossil-fueled generation with continued support can also count towards and increase the operating hours of the electrolyser.

1.4. Bring down flexibility for added RFNBO production capacity

Key asks

- Added capacity to grid-connected electrolysers should be installed within 24 months of the initial installation to have the 'coming into operation'-timing, as is the case for direct connections.

Under Article 4.2(a), the flexibility offered to consider expanded RFNBO production capacity added up to 36 months after the initial installation as having come into operation at the same time as the initial installation is overly generous. For direct connections, that flexibility is limited to 24 months. We do not see a reasonable justification to treat grid-connected electrolysers more generously. The 24 months limit should apply to both types of installations.

1.5. Detailed guidance will be necessary for certification

Key asks

- Shortly after the entry into force of these rules, the Commission will need to provide detailed guidance to certification schemes on how to interpret key concepts, in particular on how to apply them for RFNBOs imported from outside the EU.

In Article 6, The Commission counts on certification schemes to certify that RFNBO producers comply with the requirements in the DAs. In particular for RFNBO imported from outside the EU, the Commission should establish clear guidelines and mandates for auditing information from PPAs and correlation data. Both DAs refer to a number of broad concepts, such as Power Purchase Agreements, effective carbon pricing, operating aid or investment aid, which remain undefined. Similarly, guidance is needed on how to assess data from smart metering systems or establish the > 90% average share of renewable electricity in the previous calendar year in a given bidding zone.

T&E also suggests providing clear guidance on what processes are included in the “installation producing the RFNBOs” and to also include a basic description of this concept in the list of definitions in Article 2. It is clear that the electricity supplied to the electrolyser is included in the scope of the DA, as electrolysers are referred to throughout the proposal. It is however less clear whether synthesis processes (Haber-Bosch to produce ammonia or Fischer Tropsch to produce synthetic hydrocarbons)

T&E has commissioned a study, entitled “Robust sustainability certification for RFNBO – and what lessons can be learnt from biofuels certification?”, which will be published in July. This study and the forthcoming briefing on the topic of RFNBO certification will provide more information on this topic.

2. Delegated Act establishing a minimum threshold for greenhouse gas emissions savings of recycled carbon fuels and by specifying a methodology for assessing greenhouse gas emissions savings from renewable liquid and gaseous transport fuels of non-biological origin and from recycled carbon fuels

T&E's main comment will focus on point 11 of the Annex to the GHG methodology, which lists the eligible carbon feedstocks that can be used for the production of RFNBOs. We welcome the EC's commitment to move in the longer term beyond fossil carbon and only allow the use of sustainable sources of carbon, in particular to no longer allow fossil sources of carbon for the production of RFNBOs from 2036.

Carbon from the atmosphere via Direct Air Capture (DAC)

As T&E, we have mostly focused on Direct Air Capture as a sustainable source of carbon. In the context of the ReFuelEU initiative, T&E recommends that DAC CO₂ be required from the start to produce e-kerosene for aviation and e-hydrocarbons/e-alcohol for shipping, increasing over time to 100%.¹² DAC technology is at an early stage of development and will require strong policy support to achieve economies of scale and cost reductions.

Instead of the proposed cut-off date of 2036, we have advocated for the ReFuelEU Aviation regulation to gradually scale up demand for carbon supplied via DAC for the production of synthetic aviation fuels from 2030, slowly at first and then more rapidly ramping up afterwards:

- From 2030, 10% of carbon feedstock supplied via DAC
- From 2035, 20% of carbon feedstock supplied via DAC
- From 2040, 40% of carbon feedstock supplied via DAC
- From 2045, 80% of carbon feedstock supplied via DAC
- From 2050, 100% of carbon feedstock supplied via DAC¹³

This ramp-up mandate proposal has been elaborated in co-operation with the Negative Emissions Platform (NEP), which represents the main DAC producers in Europe and beyond. A more realistic growth path, based on the above indications, should be considered in the GHG methodology for RFNBOs.

Biogenic carbon from feedstocks that meet the requirements of the RED

CO₂ from bioenergy industries should not be allowed, because of the negative climate and environmental impacts associated with the use of biomass, especially land-based, for energy purposes. There could be an exception for plants which are already using advanced biomass (waste & residues) feedstocks sourced sustainably. However, we do not recommend the use of biogenic CO₂ from new facilities; given the limited amount of feedstocks available.

¹²

<https://www.transportenvironment.org/discover/why-direct-air-capture-holds-one-of-the-keys-to-sustainable-aviation/>

¹³ <https://www.transportenvironment.org/discover/refueleu-aviation-proposal-and-direct-air-capture/>

To determine the carbon footprint of biogenic CO₂, the GHG methodology should at least account for the added emissions due the effects of Indirect Land Use Changes and indirect displacement effects in other sectors of the economy.

Further information

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Annex

Opportunity Green (2022, June) *Additionality under Article 27(3) of RED Legal Analysis, June 2022*