

FREQUENTLY ASKED QUESTIONS ON EU REQUIREMENTS FOR RENEWABLE HYDROGEN AND ITS DERIVATIVES

FAQs on the delegated acts CDR 2023/1184 &
CDR 2023/1185 supplementing the
Renewable Energy Directive

IMPRINT

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PREFACE

This document answers a selection of questions raised by participants of a series of nine workshops organized by PtX Hub in collaboration with Ecologic Institute, Öko-Institut and adelphi between March and September 2023. It complements our previous briefing ‘EU requirements for renewable hydrogen and its derivatives’¹, which provides an in-depth systematic analysis of the contents of these two delegated acts.

Thus, this document has not the ambition to answer all questions that could potentially be asked on the contents of these two legal acts. It simply reflects the discussions that happened in these meetings with their specific sample of participants. However, these questions and answers have also a broader relevance for understanding the implications of the two Delegated Acts especially in non-EU countries.

Besides the experts from PtX Hub and experts from the three mentioned research institutes, the participants were mainly from the public sector, but partly also from private sector, academia and civil society, from the following countries: Algeria, Chile, Colombia, India, Jordan, Kenya, Namibia, South Africa, Uruguay and Vietnam.

We structure the questions in the following chapters:

1. General questions and basic concepts
2. Issues specific to CDR 2023/1184 (...setting out detailed rules for the production of RFNBO)
3. Issues specific to CDR 2023/1185 (... setting out a methodology for assessing GHG emissions from RFNBO and RCF)
4. Questions concerning certification



These two Commission Delegated Regulations (CDR) are also known as delegated acts. During the long process of drafting them, they were often referred to as delegated acts pursuant to certain articles of the EU Renewable Energy Directive in its version adopted in 2018 (RED II). Thus, it can be useful to clarify

- CDR 2023/1184 is the delegate act pursuant to Art. 27(3) of the RED II,
- CDR 2023/1185 is the delegate act pursuant to Art. 28(5) and 25(2) of the RED II.

¹ See: <https://ptx-hub.org/publication/policy-brief-on-eu-requirements-for-renewable-hydrogen-and-its-derivatives/>

ABBREVIATIONS

CDR	(European) Commission Delegated Regulation
GHG	Greenhouse Gases
RCF	Recycled Carbon Fuel
RED	EU Renewable Energy Directive
RED II	EU Renewable Energy Directive (2 nd version, adopted in 2018)
RED III	EU Renewable Energy Directive (3 rd version, in advanced state of negotiation, likely to be approved in 2023)
RFNBO	Renewable (Transport) Fuels of Non-Biological Origin

General questions and basic concepts

How does the EU define green hydrogen? What is the difference between green hydrogen and renewable hydrogen?

‘Green hydrogen’ has often been colloquially used in policy debates, including within the EU. However, the concept has never been defined and it is in general not used in EU legal acts.

Instead, EU law defines in a detailed manner under which conditions hydrogen can be considered of renewable origin or, in other words, ‘renewable hydrogen’.

The currently valid definition of renewable hydrogen in EU law is based on two sources:

The definition of renewable energy sources that can be used to produce renewable hydrogen, as contained in Art. 2 (1) of the Renewable Energy Directive (RED). Its second version (RED II), which was adopted in 2018, defines ‘renewable energy’ as following: ‘(...) energy from renewable non-fossil sources, namely wind, solar (solar thermal and solar photovoltaic) and geothermal energy, ambient energy, tide, wave and other ocean energy, hydropower, biomass, landfill gas, sewage treatment plant gas, and biogas’. The third version of the Renewable Energy Directive (RED III, likely to be adopted in 2023, see more on this in the next question) adds ‘osmotic energy’ to this list.

RED II also defines ‘renewable liquid and gaseous transport fuels of non-biological origin’ (RFNBO) as following: ‘liquid or gaseous fuels which are used in the transport sector other than biofuels or biogas, the energy content of which is derived from renewable sources other than biomass.’ On the relevance of the presence of the word ‘transport’ in this definition, please refer to the following question.

The detailed provisions contained in the CDR 2023/1184 supplementing RED II, which are described in detail in our policy brief ‘[EU Requirements for Renewable Hydrogen and its Derivatives](#)’².

The relevance of this definition of renewable hydrogen beyond the specific realm of the EU Renewable Energy Directive is proven by the fact that this definition has been adopted also in two recent EU documents related to other policies and produced under the coordination of another Directorate of the European Commission. One of these documents are the Terms and Conditions for the pilot Innovation Fund Auction³ dedicated to support renewable hydrogen projects: it defines the auctioned good on the basis of the above-mentioned definition. Moreover, also the Regulation defining the reporting rules for the transitional period in the implementation of the EU Carbon Border Adjustment Mechanism (CBAM) refers to the definition of the CDR 2023/1184.

Since the two delegated acts CDR 2023 1184/1185 (on what can be considered as ‘renewable fuel of non-biological origin’ (RFNBO) and on their GHG accounting) are based on RED II, they formally refer to transport fuels only. However, RED III widens the scope to other sectors. Do the CDRs maintain their more limited scope?

The background of this question is that the two delegated acts⁴ have entered in force in 2023, pursuant to and supplementing the second version of the EU Renewable Energy Directive (RED II) adopted in 2018. However, in the meanwhile, the next version of the EU Renewable Energy Directive (RED III) has been adopted by both legislators, although at the time of the last change to this text (22 September 2023) its legal adoption was not yet complete.

Both delegated acts refer to ‘renewable transport fuels of non-biological origin’ (RFNBO). The RFNBO concept was introduced in the RED II to make clear that, unlike in RED I, the specific target for renewables in the transport sector can also be fulfilled by fuels consisting of hydrogen or hydrogen derivatives (also known as PtX products), which is in practice the meaning of RFNBO. The word ‘transport’ was part of the RFNBO definition only because, in the frame of RED II, RFNBO could be

² See: <https://ptx-hub.org/eu-requirements-for-green-hydrogen-and-its-derivatives/>

³ This pilot auction is limited to projects located within the territory of the European Economic Area. A financing scheme for projects located outside the EEA is being prepared.

⁴ Their formal denominations are ‘Commission Delegated Regulations’ (CDR) 2023/1184 and CDR 2023/1185.

used only to achieve the specific transport sector targets.

However, RED III introduces specific renewable energy targets also for the industrial sector. RFNBO can be used to fulfil these targets. Therefore, in RED III RFNBO count regardless of the sector in which they are consumed. Accordingly, Article 2 of RED III establishes a new definition of the RFNBO concept, without the word transport: “*renewable fuels of non-biological origin*” means liquid and gaseous fuels the energy content of which is derived from renewable sources other than biomass’.

RED III⁵ also clearly states that the rules established in the two delegated acts adopted in 2023 are also applicable to RFNBO used in other sectors than transport.

However, RED III (Recital 34a and Article 27 of the text adopted by the European parliament on 12 September 2023) gives the European Commission the task to submit a report by 1 July 2028 assessing ‘the impact of the methodology defining when electricity used for producing renewable fuels of non-biological origin can be considered fully renewable’ (in other words the impact of CDR 2023/1184) and, where appropriate, to subsequently adopt a delegated act to modify such methodology.

How does the methodology to calculate GHG emissions (savings) as of 2023/1185 relate to CBAM? Will the same methodology be used to calculate the emission intensity of hydrogen or PtX imports for the purpose of CBAM?

In August 2023, the European Commission adopted the Implementing Regulation (EU) 2023/1773 laying down rules for the purpose of the carbon border adjustment mechanism (CBAM) during the transitional period. Companies importing into the EU products covered by the CBAM will have to follow these rules to fulfil their reporting obligations.

As a general principle, this CBAM Implementing Regulation stipulates that all emissions from fuel use directly or indirectly linked to the hydrogen production process and from flue gas cleaning must be counted. However, ‘where the produced hydrogen has been

certified to comply with Commission Delegated Regulation (EU) 2023/1184, an emission factor of zero for the electricity may be used.’ In all other cases, an own methodology must be followed for the purposes of CBAM. PtX Hub plans to publish by October a briefing looking more in detail at how the GHG accounting of hydrogen must be done for the purpose of CBAM.

Can these rules be applied to industrial feedstock, green ammonia, hydrogen used for green steel production, etc.? Or will there be other regulations for industrial use?

As discussed more in detail above, RED II foresees that RFNBO only count for reaching the EU renewable energy target in the transport sector. However, RED III entails provisions for the use of RFNBO to meet the renewable energy target also in the industrial sector. Moreover, RED III stipulates that the rules established in the two delegated acts adopted in 2023 (CDR 2023/1184 and CDR 2023/1185) will also be applicable to RFNBO used in other sectors than transport.

It must be noted that the EU’s renewable energy target refers to renewables shares in ‘gross final consumption of energy’. The latter includes energy losses and energy commodities delivered for energy purposes, but not fossil energy sources used as feedstock. For example, the energy used to produce hydrogen subsequently used in ammonia or steel production does count for the purpose of calculating the renewable share. Therefore, there is an incentive to use hydrogen considered of renewable origin for these purposes. However, methane or oil that are directly used as feedstock do not count in terms of the EU renewable energy target.

Are criteria such as social impact, environmental impact, water, and land use, etc. defined in these delegated acts? Does RED II have any requirements around community benefits for green hydrogen projects and programs?

Such criteria are not defined in the Renewable Energy Directive nor in the delegated acts that supplement it. This document is limited to answering questions related to the contents of the delegated acts (CDR 2023/1184 and 2023/1185) supplementing the EU Renewable Energy Directive (RED). The latter contains extensive provisions on the sustainability, GHG

⁵ Recital 34: ‘Since renewable fuels of non-biological origin are to be counted as renewable energy regardless of the sector in which they are consumed, the rules to determine their renewable nature when produced from electricity, which were applicable only to those fuels when consumed in the transport sector, should be extended to all renewable fuels of non-biological origin, regardless of the sector in which they are consumed.’

emissions savings and competition with food crops concerning biofuels, bioliquids and biomass fuels. However, since these provisions are relevant for renewable fuels of biological origin, they are by the definition not relevant for these delegated acts that focus on RFNBO, i.e., on renewable fuels of non-biological origin. Issues such as water and land use, other environmental impacts, and social impact are regulated by other legal sources in the EU and its Member States, which are not covered in this document. In any case, neither the qualification of the 'renewable origin' nor the calculation of the GHG intensity of RFNBO that might be potentially imported into the EU are affected by other regulations than those of the delegated acts discussed in this document, and to a certain extent by CBAM (see above on the latter).

Moreover, RED II and RED III provisions on renewable energy communities and community benefits refer to projects inside the EU and have no impact on the definition of 'renewable hydrogen' and more in general of RFNBO, nor on the methodology to calculate their GHG emission intensity.

Issues specific to the delegated act CDR 2023/1184

Bidding zones and geographical correlation

How can the concept of 'bidding zone' be applied to third countries?

This could be especially relevant in larger countries where there is one interconnected system, or several separate systems, that is/are close to the 90 % threshold defined in Article 4 (1) and to the requirement stated in Article 4 (2d). In the EU, 'bidding zone' is defined as 'the largest geographical area within which power market participants are able to exchange energy

without capacity allocation'. In simpler words, a bidding zone corresponds to a price zone in a wholesale electricity market. In the EU, some countries have only one bidding zone (e.g. Germany), while others have several ones (e.g. Italy). The delegated act CDR 2023/1184 explicitly states that equivalent concepts in other countries can be accepted.

To define a bidding zone or equivalent concept, the European Commission suggests the following approach⁶:

- *'[...] at the location of the electrolyser, market regulations applied are similar to the rules set out for bidding zones in Regulation (EU) 2019/943. In this context 'similar' means that there are rules requiring establishing hourly prices for electricity in a geographical area. If such rules are in place, the geographical area for which the prices are established should be considered as a bidding zone [...].'*
- *'If such rules are not in place, certifiers should assess whether the electricity network in the country of production is integrated or whether there are several separated networks.*
 - *If there are several networks, each network should be considered as a bidding zone [...].*
 - *If the electricity network of the country is integrated and there are no geographically differentiated electricity prices, the whole country may be considered as one bidding zone [...].'*

We deduce from the Commission's Q&A document⁷ that recognized certification schemes will decide whether the declarations from third countries concerning the bidding zone will be deemed as valid.

How can imported electricity be accounted for? Some developers might be interested in developing RES-E in one country and export it to a second country where hydrogen production takes place.

The delegated act CDR 2023/1184 allows for the contracted RES-E plant to be in a neighboring bidding-zone (or equivalent concept) to the one where the RFNBO plant is located. In the EU, for example, the DA

⁶ Information taken from Q&A (Version of the 26/07/2023) concerning the implementation of hydrogen delegated acts: https://energy.ec.europa.eu/system/files/2023-07/2023_07_26_Document_Certification_questions.pdf

⁷ Information taken from Q&A (Version of the 26/07/2023) concerning the implementation of hydrogen delegated acts: https://energy.ec.europa.eu/system/files/2023-07/2023_07_26_Document_Certification_questions.pdf

allows the ‘import’ of electricity from a bidding zone located in EU country A to a neighboring bidding zone in EU country B, where the RFNBO plant is located. Yet, this ‘import’ is only accepted under certain conditions, which aim to ensure that this import is not prevented by physical grid bottlenecks between the two bidding zones. Details on this matter can be found in Article 7(1)b of the CDR 2023/1184.

ADDITIONALITY

What is the rationale for the requirement that the RES-E plant must be new? Is renewable electricity from a preexisting plant not as good as renewable electricity from a plant built in the last 36 months?

This requirement intends to provide an incentive to deploy additional renewable electricity generation capacity that can cover the additional electricity demand caused by the electrolysers. If hydrogen is produced with electricity from older renewable power plants, the additional electricity demand is not matched by additional renewable electricity generation. Rather, it is met by renewable electricity withdrawn from the existing electricity market. In this case, even if RES-E is purchased via a power purchase agreement or certificates, but no additional RES-E generation is stimulated, RES-E generation for green hydrogen will just be virtually shifted from existing consumers to hydrogen production. As a result, while no emissions will on paper be associated with the hydrogen production itself, GHG emissions of the whole electricity system will likely increase, since the additional electricity demand must be met by a fossil power plant.

The planning and construction of installations generating renewable electricity are often subject to significant delays in the permitting processes, while installing an electrolyser can be quicker. The EU legislator therefore considers an installation generating renewable electricity as new if it has come into operation not earlier than 36 months before the installation producing renewable liquid and gaseous transport fuel of non-biological origin.

GRID CONNECTION

Storage location: Why should the storage be located behind the meter of the electrolyser, why not at the RES-E generation plant?

Both options are possible: At the location of the contracted RES-E plant or at the RFNBO plant (see Article 6 of the CDR 2023/1184).

Can a sourcing concept that uses the direct connection and the grid option (including PPA) be applied?

The delegated act CDR 2023/1184 (Article 3b) allow for combining both, provided that a smart metering system is installed. So, in some time intervals (called a ‘batch’ in the Delegated Act), the electricity from the directly connected RES-E plant can be accounted for (as fully renewable); in other time intervals, the ‘grid option’ can be used, either via a PPA with a renewable energy producer or counting the emission factors for the grid electricity.

In the direct connection case, is it possible to use the transmission/distribution grid as a means of transport without taking power from the grid?

We think that the answer is no: a “‘direct line’ means either an electricity line linking an isolated generation site with an isolated customer or an electricity line linking a producer and an electricity supply undertaking to supply directly their own premises, subsidiaries and customers’ as defined in Article 2, point (41), of Directive 2019/944 of the European Parliament and of the Council. To our understanding, this definition does not include the option to define a line of the public transmission or distribution grid as a ‘direct line’.

If direct lines are only built via concession contracts (with the transmission system operator), would this pose a problem for European requirements?

This is not further discussed within the delegated act CDR 2023/1184. The rationale for its provisions concerning direct lines is to have proof that the RFNBO production is based only on renewable electricity. For this purpose, who owns or operates the direct electricity line is irrelevant. However, to our understanding a ‘direct line’ cannot be part of the public transmission or distribution grid (see question above). Hence, the provision sets our rules in terms of physical connection rather than legal ownership.

Where direct connections are established, potential connections to the grid could be imposed as synergies (e.g. serve local communities, selling excess RES-E and use grid as back-up for voltage drops). Why is there a distinction between direct line and the case where electrolysers are part of the public grid?

Direct line means a direct electricity line between the contracted RES-E plant and the RFNBO plant. A direct line is not a necessary condition, but just one of several options that allow to consider the electricity used to produce hydrogen as of renewable origin. Connecting

to the grid and selling excess renewable electricity could be an option. However, if there is a connection to the public grid, a smart metering system must prove that no electricity from the public grid is used to produce RFNBO. If grid electricity is used for backup means, this amount of electricity cannot be counted as fully renewable input for RFNBO production. If renewable electricity is provided to local communities by connecting them to the direct line between the RES-E plant and the RFNBO plant, and no non-renewable generation occurs in this closed system, the electricity delivered to the electrolyser could be considered as renewable according to the rationale of the Delegated Act. However, this case is not specifically mentioned in the delegated act CDR 2023/1184 and certification schemes would have to integrate this option into their criteria set.

TEMPORAL CORRELATION

In many countries where green hydrogen projects are being developed, the RES-E penetration levels are low: at times additional RES-E capacity injects into the grid, it will displace fossil electricity generation. During non-RES-E-generation hours, electricity can be taken back from the grid: from a GHG point of view, this is net sum. Would the described scenario under Article 3 exclude any set-up where surplus renewable energy is fed to the grid and taken back out again during hours where the installation is not producing renewable electricity?

Feeding surplus electricity into the grid does not interfere with the rationale of the delegated act CDR 2023/1184. However, a smart metering system needs to be installed to prove that no electricity is taken from the grid to produce hydrogen. Taking an equivalent amount of electricity back from the grid is possible but it does not count as fully renewable.⁸ While the net sum of electricity will remain constant, the specific GHG emissions of electricity from the grid will likely be higher in times of sourcing electricity from the grid than in times when there is surplus renewable electricity being fed into the grid. The rationale behind the temporal correlation between the RES-E plant and the RFNBO-plant is to ensure that RFNBOs are being produced when RES-E sources are actually producing electricity. In combination with the given requirements of geographical correlation (same bidding zone) this

should in any case safeguard that the additional installation and operation of electrolysers does not increase stress and also emissions in a given electricity system.

How will an hourly match be managed for projects connected to the grid?

You will need proof of hourly production of your contracted RES-E plant and hourly electricity consumption of your RFNBO-plant. The latter needs to be equal or lower than the former, as one of the prerequisites to declare the electricity input as 100% renewable.

DATA AVAILABILITY

Data availability: What data sources are allowed if a country does not publish official grid carbon intensity or renewable share data?

Answers to this question can be found in the Q&A Paper of the EU Commission: ⁹*Where bidding zones are identical to countries, the latest data on the RES-E that has been published by Eurostat are to be used for EU Member States and the latest data on the share of renewable electricity that has been published by the IEA for third countries. When IEA data is not available, data from the nation statistical institutes may be used. Where bidding zones are not identical to countries, data from official national statistics have to be used that have been derived in line with the methodology applied for determining the RES-E share in the SHARES tool.*

RES-E SHARE ABOVE 90%

What is the rationale for the 90% renewable electricity share criterion? Since it can only be evaluated ex-post, this criterion leads to uncertainties and risks for off-take agreements, for instance if in hindsight the threshold was undercut by a small margin. Why does the EU create such uncertainties and risks?

The rationale of the delegated act 2023/1184 is to describe options in which the electricity input for RFNBO production is 'fully renewable'. From this point of view, the 90% criterion already is a compromise. Of course, the fulfilment of such a criterion in a given year is no guarantee that it will always be fulfilled in the

⁸ The only exception here: Electricity from the grid is considered renewable if the share of renewables in the bidding zone was above 90% in the previous year and the hours of RFNBO production do not exceed the RES-E share multiplied by 8760 hours, which is the total number of hours in a year with 365 days.

⁹ Information taken from Q&A (Version of the 26/07/2023) concerning the implementation of hydrogen delegated acts, question 12: https://energy.ec.europa.eu/system/files/2023-07/2023_07_26_Document_Certification_questions.pdf

future. If for example the electricity demand rises quickly and the uptake of RES-E generation does not keep up, the renewable share can fall below 90%, and the specific GHG emissions of electricity within the grid will increase. To mitigate risks for off-take agreements the Delegated Act foresees a five year ‘safe-guard’ period in which the grid electricity is still considered as ‘fully renewable’ once the 90% threshold has been reached in one year.

In the case of sourcing renewable electricity according to Article 4(1): what would happen if the electrolyser operates more than the max 90% hours permitted? Can in this case the production within the 90% limit be counted as renewable, while the additional production (e.g. the hydrogen produced in the hours beyond 90%) is counted as non-renewable? Or would the entire output of the facility be considered as non-renewable if the 90% limit is exceeded?

There is a clear answer in the Commission’s Q&A on this topic: ¹⁰*In the case described, the hydrogen produced during the maximum number of hours set in relation to the proportion of RES-E (8760 hours x RES-E share) would count as renewable (RFNBO) and hydrogen produced outside of these hours would count as non-renewable.*

During the day, one could produce green hydrogen with solar power for the export market, at night grey hydrogen for the local market. Is this approach compliant with the delegated act?

Yes, it is. One approach to do this in a way that is compliant with the RED II and the delegated acts CDR 2023/1184 and CDR 2023/1185 would be to completely separate the two batches of hydrogen you are producing (leading to very short batches, i.e. a couple of hours). The other would be to produce both green and grey hydrogen within the same batch (with a longer time interval, e.g. a couple of days or a full month). According to the rules for co-processing in the CDR 2023/1185, the fraction of the product (hydrogen) which is considered RFNBO is equal to the fraction of the total energy inputs that is provided by the renewable electricity.

However, it must be considered that this approach means increasing the GHG emission intensity of the hydrogen consumed in the local market.

EXPANDING RFNBO PRODUCTION AND RES-E REPOWERING

The 36-month-requirement for additional RFNBO production capacity (Article 5(a)) may be difficult to comply with, as capacity expansions usually take longer than 36 months. Hence, a period of 36 month would require starting the planning for expansion even before the original RFNBO plant would start operation. Why is the EU creating such hurdles?

The main rationale of this rule is to make sure that additional electrolyser capacity and hence additional electricity demand will be covered by additional RES-E plants. Let’s think of an example where a new wind plant provides 50% of its electricity to a RFNBO plant and 50% to other users connected to the electricity grid. After an upgrade of the RFNBO plant a few years later, the RFNBO plant might use all the electricity produced by the wind park, which stops serving other consumers in the grid. All other factors being equal, the share of renewable electricity in the grid would decline. The rule set out in the CDR 2023/1184 tries to make sure that after a certain time (36 month) additional RES-E deployment is being triggered in case of capacity upgrades of the RFNBO plant.

The capacity expansion of the RFNBO plant can also take place after the specified 36 months. However, in this case, the same commissioning date of the existing plant is not transferred to the new capacities. To cover the electricity demand of the new production capacity as well, equivalent (new) renewable electricity sources must be contracted. This is a way to ensure the additionality of the overall electricity supply of the plant.

There may be cases where existing RES-E plants may be repowered, and it is currently understood that this scenario would be count under this Article 3. Is this correct?

Repowering is defined in Article 2, point (10) of Directive (EU) 2018/2001 “repowering” means renewing power plants that produce renewable energy, including the full or partial replacement of installations or operation systems and equipment for the purposes of replacing capacity or increasing the efficiency or capacity of the installation’. The Delegated Act states that repowered RES-E power plants will classify as new installations if ‘...investments exceeding 30% of the

¹⁰ Information taken from Q&A (Version of the 26/07/2023) concerning the implementation of hydrogen delegated acts, question 14: https://energy.ec.europa.eu/system/files/2023-07/2023_07_26_Document_Certification_questions.pdf

investment that would be needed to build a similar new installation' (see Article 2(5) of the CDR 2023/1184).

SYSTEM BOUNDARIES

Since our transport system is currently using fossil fuels, do you foresee the industry being required to use renewable energy sources to transport the green hydrogen?

The delegated Act CDR 2023/1184 only states under which conditions electricity input for RFNBO production can be considered as fully renewable. However, the CDR 2023/1185 defines a threshold of 28.2 gCO_{2eq}/MJ that may not be exceeded if the produced fuel is to be considered 'renewable' (i.e. RFNBO). GHG emissions from transport (well to gate system boundary) count for the purpose of calculating this threshold. If in the specific case it seems difficult to achieve this threshold, using low-carbon electricity or fuels to transport the fuel would be advantageous.

How are requirements on the environmental attributes of electricity (renewable and low carbon to determine 'renewability' vs. low carbon) for units downstream of the electrolyser defined in the Delegated Acts? This is especially relevant for hydrogen derivatives with long supply chains (including intermediary carriers like NH₃).

Whereas the RED II and the delegated act CDR 2023/1184 require that the inputs, including electricity, are considered renewable for the produced fuel to qualify as RFNBO, there is no such requirement for the energy used in the processing and transport and distribution steps. However, the delegated act supplementing article 28 of the RED II requires accounting for the emissions resulting from these steps. This puts fossil energy sources at a disadvantage vis-à-vis renewable energy sources.

As such, long and complex supply chains do not represent an issue (except that accounting for the GHG emissions generally requires more effort). The approach to calculating the GHG emissions is iterative, i.e. to calculate the emissions of a product in step N requires knowing the emissions of its inputs, i.e. the products of the step N-1. Accounting for specific GHG emissions of ammonia therefore requires (among other things) accounting for specific GHG emissions of electrolytic hydrogen, which in turn requires

accounting for specific GHG emissions of electricity used as input.

POWER PURCHASE AGREEMENTS

Power Purchase Agreements: While in some countries PPAs are 'new' (e.g., in Egypt: first PPA signed only in 2020), in other countries PPAs would require a market reform (e.g. Oman). Could PPAs be an entry barrier for green hydrogen projects?

Power Purchase Agreements are not defined in detail in the delegated act CDR 2023/1184. However, the structure of a typical PPA is aligned with the general requirements on the contractual relationships between the parties laid out by the CDR 2023/1184: it demands a contract for the purchase of an equivalent amount of electricity as being used in the RFNBO producing plant. This contract is to be established between a natural or legal person who agrees to purchase RES-E directly from an electricity producer. This means that the role of intermediaries, if applicable, is limited to the role of a facilitator of such contracts, i.e. not acting as a contracting party. Also, the electricity and certificates for the 'green' property of the contracted amount of electricity should not be sold otherwise. If these requirements are met, the electricity supply is proven in the way a PPA would work, and the electricity is thus counted as fully renewable.

OPERATING AND INVESTMENT AID

What exactly falls under 'support in the form of operating aid or investment aid' as different and multiple support mechanisms in non-EU countries exist?

The clarification on the term 'operating and investment aid' can be found in the Q&A (Version of 26/07/2023) answered by the European Commission regarding the implementation of the delegated acts CDR 2023/1184 and CDR 2023/1185¹¹: 'Operating aid or investment aid referred to in Article 5(b) includes any payments received from public authorities for the construction of the installations generating renewable electricity and any benefits received from public authorities for the production of renewable electricity. This includes feed-in tariffs, feed-in premiums, reductions applying for the production, contracts for difference or any direct payments linked to the production of renewable electricity. Operating aid or investment aid does not include obligations or restrictions placed on energy consumers, producers, or suppliers such as renewable

¹¹ Information taken from Q&A (Version of the 26/07/2023) concerning the implementation of hydrogen delegated acts, question 14: https://energy.ec.europa.eu/system/files/2023-07/2023_07_26_Document_Certification_questions.pdf

energy obligations. Article 5(b) of the delegated act also sets out that support received by installations before their repowering, financial support for land or for grid connections, support that does not constitute net support and incentives provided via the renewables PPA are not considered. Whether e.g., a contract for difference constitutes net support should be assessed ex-ante and verified ex-post.’

Issues specific to the delegated act CDR 2023/1185

Could you provide one concrete example for RFNBO and one example for RCF, one type of product for each?

- RFNBO: Electrolytic hydrogen produced from renewable electricity and its downstream products such as ammonia, methanol, methane etc.
- RCF: Diesel fuel made from waste plastic (e.g., from HDPE via pyrolysis)

Do these delegated acts establish the emissions associated with the transport of renewable H₂ and PtX?

Yes, they do. The CDR 2023/1185 states that the ‘emissions from transport and distribution shall include emissions from the storage and distribution of the finished fuels’ (in the ‘ e_{td} ’ term of the GHG emissions calculation equation) as well as the emissions associated with transport and distribution of the inputs (in the ‘ e_i ’ term of the equation). In contrast to the energy used as inputs for the RFNBO/RCF production process (‘ e_i ’ term of the equation), the E_F product (the finished fuel) can be considered as RFNBO, regardless of whether the energy used for transport and distribution is of renewable origin or not. However, using fossil energy will typically result in higher GHG emissions, potentially making it more challenging to achieve the 70% reduction as compared to the fossil comparator.

How do processes like SMR (Steam Methane Reforming), WGS (Water Gas Shift) and HB (Haber-Bosch) for the production of ammonia fit into RED II regarding their energy consumption?

Both RED II and the two delegated acts CDR 2023/1184 and CDR 2023/1185 establish general principles to determine whether a fuel can be considered RFNBO, and how to calculate its GHG emission intensity. These principles must be applied to any process aiming to produce an RFNBO and RCF. For the produced fuel to qualify as RFNBO, all the energy input required for its production must qualify as renewable energy other than bioenergy (see above). If, for example, the methane used in a SMR process, the syngas used in a WGS reaction or the hydrogen used in a Haber Bosch Process are completely or partly of fossil origin, then the resulting fuel cannot be fully considered as of renewable origin (see the rules on co-production for more details). As of their GHG emission intensity, the formula included in the CDR 2023/1185 must be applied to any process which aims to produce an RFNBO or an RCF.

Can the production of hydrogen from waste (solid, liquid) be considered RFNBO?

The RED definition of an RFNBO (where ‘NBO means of non-biological origin’) explicitly excludes fuels the energy content of which is derived from biomass. If a fuel is produced exclusively from the biodegradable fraction of waste, which is considered biomass according to RED, the fuel is considered a renewable fuel of biological origin (and therefore, by definition, not a RFNBO). If a fuel is produced from the non-biodegradable fraction of waste, it is not considered as renewable, but it can be, under certain conditions, considered as a recycled carbon fuel (RCF).

In case of Waste to Hydrogen (landfill, for example), the final balance of GHG is negative (final GHG emissions are lower than the landfill emissions). May the accounting for this in the ‘ e_i ’ parameter apply as based in a current use? Or should it rather be based on the ‘ e_{ccs} ’ parameter?

As explained in the previous answer, a waste-to-hydrogen route including the non-biodegradable fraction of waste does not meet the definition of RFNBO. It might however meet the definition of RCF, for which the delegated act CDR 2023/1185 stipulates the GHG accounting rules. CDR 2023/1185 does not provide the option to subtract the emissions potentially avoided in the specific case of waste-to-fuel production. However, this subtraction is possible in

other cases, e.g., when CO₂ is avoided by capturing it from processes covered by the EU-ETS.

Why are emissions from, for example, CO₂ capture subtracted and not considered neutral, as these will ultimately be re-emitted once the fuel is used?

They are indeed considered neutral over the entire fuel cycle. They have to be counted when emitted in the ‘e₁’ term of the equation but can, under certain conditions, be subtracted in the ‘e₂’ part of the equation. The two parts cancel each other out.

Regarding emissions from existing use or fate: If my project does not comply with the indicated rules, can the project still be classified as RFNBO, even without subtracting these emissions?

Yes, in principle it can. However, you will have to achieve the required emissions reductions in some other way, e.g. by using CCS.

Questions concerning certification

Which voluntary schemes are recognized today (or are well advanced on the way to recognition) by the EU and the criteria set in the DA of the REDII?

The Commission has been empowered to recognize voluntary and national schemes for certifying renewable hydrogen. The Member States are required to accept evidence from schemes that have been recognized by the Commission.

At the time of writing of this document, no voluntary scheme has been recognized by the European Commission with respect to RFNBOs, yet. There are currently two organisations which have handed-in their applications as a voluntary schemes for RFNBO at the European Commission: CertifHy (<https://www.certifhy.eu/>) and ISCC (International

Sustainability & Carbon Certification, <https://www.iscc-system.org/>). Other schemes like RSB, REDcert or Green Hydrogen Organisation have announced interest for application. Latest information on the status of applications and approvals with respect to voluntary schemes can be found on the Commission’s website.¹²

Who decides which (kind) of auditors are eligible?

Minimum requirements have been defined by the European Commission in an Implementing Regulation.¹³ With respect to RFNBOs this includes the following aspects in Article 11 (3):

- Auditors shall be independent of the activity being audited
- Auditors shall be free from conflict of interest.
- Auditors shall have the specific skills necessary for conducting the audit, with respect to for GHG emissions saving criteria for RFNBOs: a minimum of 2 years’ experience in fuel life-cycle assessment, specific experience in auditing GHG emission calculations, and further experience.

Voluntary schemes shall also set up training courses for auditors, covering all aspects relevant to the scope of the scheme. However, details of the verification procedures, including accreditation requirements for certification bodies as auditors, have to be defined by the voluntary schemes which apply for approval at the European Commission. In order to grant the approval, the Commission has to be convinced that the proposed system requirements (including accreditation programs for certification bodies as auditors) are appropriate to ensure robust and comparable verification procedures.

To that end, information on applicable accreditation programs will only be available after the respective approvals of voluntary schemes by the European Commission.

How long will it take for the Commission to approve a voluntary scheme?

The Commission has not published any information on the expected duration of the approval process after having received an application. The first submitted applications of voluntary schemes with respect to

¹² https://energy.ec.europa.eu/topics/renewable-energy/bioenergy/voluntary-schemes_en

¹³ Commission Implementing Regulation (EU) 2022/996 of 14 June 2022 on rules to verify sustainability and greenhouse gas emissions saving criteria and low indirect land-use change-risk criteria; available at: https://eur-lex.europa.eu/eli/reg_impl/2022/996/oj

RFNBOs are already pending for several months. However, we expect that the approval process will become more time-efficient once it has been further developed and established during the first application assessments.

What is meant with avoiding double-counting?

Double-counting refers to the multiple claiming of specific attributes of a produced energy unit by energy consumers.

In any system where specific attributes of a produced unit of energy have to be allocated to and accounted by a specific consumer, it is crucial that the attributes of a produced energy unit are accounted and claimed only once. E.g., one MWh of electricity produced from renewable sources may not be claimed by two different consumers of electricity. Otherwise, the demand for and accounting of renewable consumption would not be directly related to renewable production. As a consequence, the overarching target of increasing

renewable production by specific demand for renewables would be undermined. For this reason, any certification scheme for RFNBOs comprising a 'tracking' scheme for proving the chain of custody has to build on robust verification and accounting mechanisms in order to avoid such double counting.

Are the certifications separate for separate stages/components of the value chain or is it just at the production stage or combined across the complete value chain?

The scope of the voluntary schemes is in principle to verify compliance with all requirements defined by the RED II and the applicable delegated acts, from the production of the RFNBO to the point of consumption.¹⁴ However, individual voluntary schemes can limit their respective scope on individual aspects or on specific application cases of the overall requirements. Therefore, details have to be drawn from the respective documentation of the individual schemes.

¹⁴ Details are regulated by Commission Implementing Regulation (EU) 2022/996 of 14 June 2022 on rules to verify sustainability and greenhouse gas emissions saving criteria and low indirect land-use change-risk criteria; available at: https://eur-lex.europa.eu/eli/reg_impl/2022/996/oj