



MINISTÉRIO DAS RELAÇÕES EXTERIORES

Ofício nº 09057.000307/2023-24

Brasília, 14 de agosto de 2023

De: DER (Divisão de Energias Renováveis)

Para: Câmara dos Deputados

Destinatário: Ao Senhor

Deputado Federal Arnaldo Jardim

Presidente da Comissão de Transição Energética e Produção de Hidrogênio Verde (CEENERGIA)

Senhor Deputado,

Transmito, para conhecimento, comunicação recebida da Missão do Brasil junto à União Europeia em Bruxelas sobre certificação para produtores de hidrogênio renovável.

ABRE ASPAS

A Direção-Geral de Energia da Comissão Europeia realizou, de modo virtual, no dia 27 de julho, sessão informativa acerca dos dois atos delegados que estabelecem as regras europeias de sustentabilidade para a produção de hidrogênio renovável e outros Combustíveis Renováveis de Origem Não Biológica.

2. Na ocasião, os representantes da DG - Energia realizaram apresentação sobre os dois atos delegados e responderam a perguntas de representantes de terceiros países. Enfatizaram que os critérios aplicados para a certificação serão os mesmos para o hidrogênio produzido na Europa e para o importado e que todos os estados-membros da UE aceitarão o hidrogênio renovável aprovado pelas companhias credenciadas nos esquemas voluntários de certificação.

3. Como mencionado, a Comissão apresentou os atos em fevereiro e eles entraram em vigor 5

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meses depois, em julho último, após processo de consulta pública. Não obstante, a comissão não estabeleceu ainda a data em que dará início ao reconhecimento de esquemas voluntários de certificação, aos quais os produtores de hidrogênio renovável de terceiros países deverão aderir para solicitar reconhecimento pela Comissão Europeia e ter acesso ao mercado dos estados-membros. A representante da DG - Energia limitou-se a indicar informalmente que a Comissão pretende iniciar o reconhecimento neste segundo semestre de 2023.

4. Tampouco foram apresentados esclarecimentos adicionais sobre a forma pela qual se dará a certificação no caso do hidrogênio, para além da informação anteriormente disponibilizada de que os esquemas de certificação seguirão as mesmas normas dos demais biocombustíveis.

5. Após a reunião, foram disponibilizados o arquivo da apresentação e documento com perguntas e respostas sobre o funcionamento das normas. Ambos seguem em anexo.

Eduardo Pereira e Ferreira, encarregado de negócios, a.i.

FECHA ASPAS

Cordiais saudações,

Laís de Souza Garcia
Chefe da Divisão de Energia Renovável
Ministério das Relações Exteriores

Documento assinado eletronicamente por **Mariana Maciel Fonseca**, em 14/08/2023, às 11:01

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Information Session

Renewable hydrogen delegated acts

26/27 July 2023

Certification of renewable and low-carbon hydrogen

Renewable Energy Directive:

- Definition of renewable fuels of non-biological origin (RFNBOs)
- Robust certification system
- Delegated Act on additionality
- Delegated Act to set out methodology to assess greenhouse gas emissions saving – at least 70%

Hydrogen & Gas market package (proposed):

- Definition of low-carbon hydrogen:
 - Greenhouse gas emission savings of at least 70%
- Robust certification system using the tools of the Renewable Energy Directive
 - Life-cycle emission approach, methodology to be set out in a delegated act

Harmonised certification for renewable hydrogen

Criteria for renewable hydrogen (RFNBOs) – Renewable Energy Directive 2018/2001

Case 1

Partial renewable hydrogen

- Renewables share in electricity mix

Case 2

100% renewable hydrogen

- Direct connection between electrolyser and renewable power installation

Case 3

100% renewable hydrogen

- Electricity from the grid:
 - Additionality
 - Temporal correlation
 - Geographical correlation

Key principles

Additionality

- Hydrogen production should add to the deployment of renewable energy

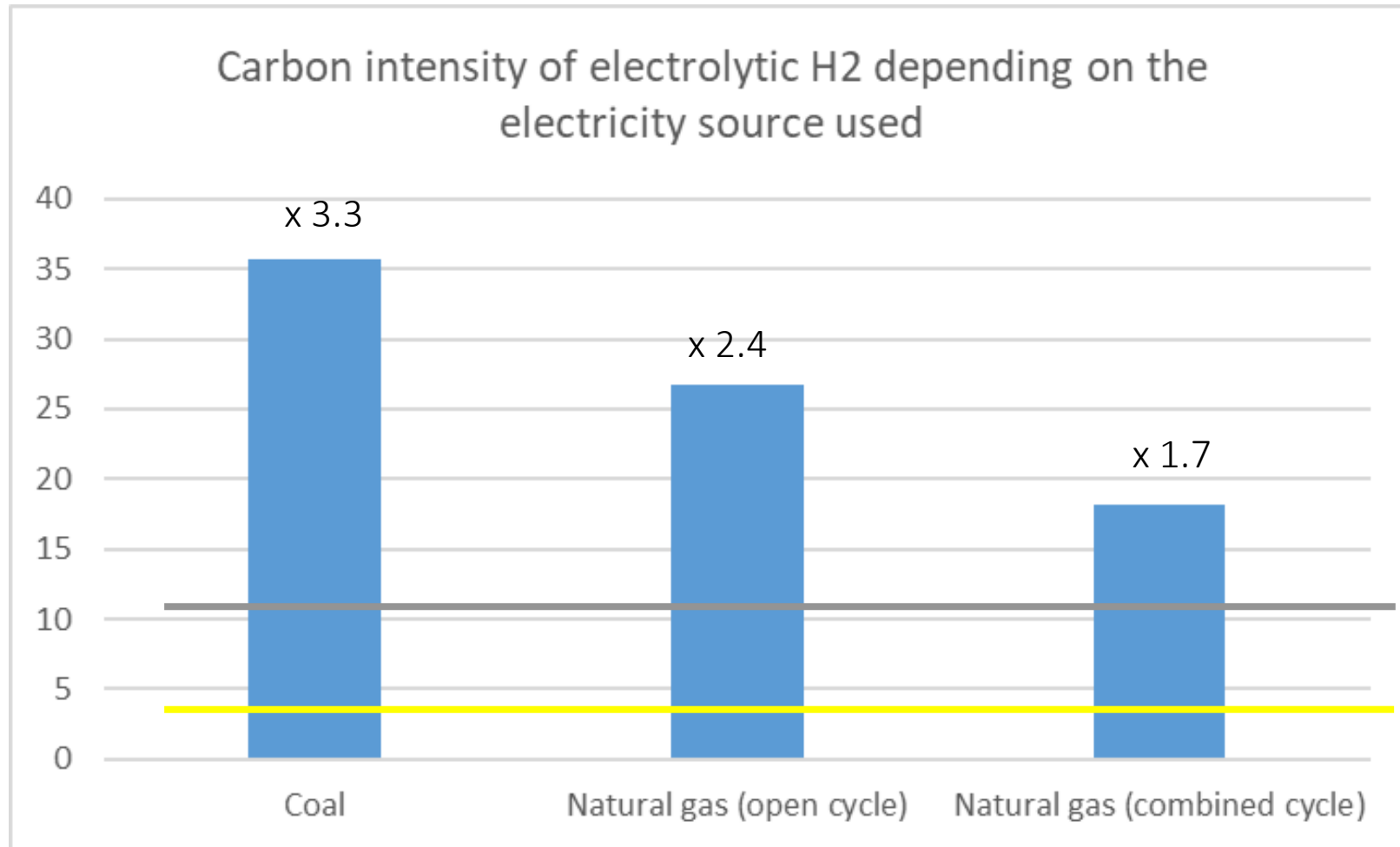
Temporal correlation

- Renewable hydrogen should be produced when renewable electricity is available

Geographic correlation

- There should be no grid congestion between the place where the renewable electricity is produced and where the renewable hydrogen is produced

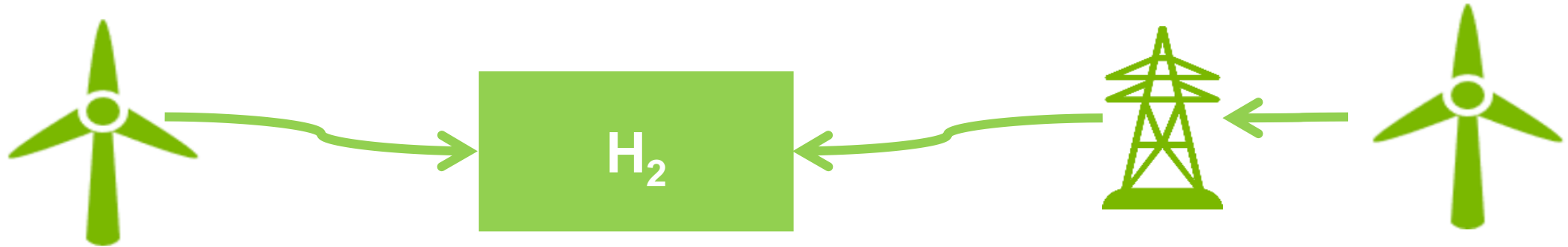
Reason for criteria for renewable hydrogen production



Grey hydrogen = 10.9t

70% threshold

How is the matter addressed in the DA?



Direct connection:

- Renewable power asset should be **less than 36 months old**
- Electricity is consumed **at the hours** that the renewable power asset is producing
- Renewable power asset is located **at the site** of the hydrogen production

Sourcing via the grid:

- **Power purchase agreement** with **unsubsidised** renewable power asset
- Renewable power asset should be **less than 36 months old**
- **Hourly correlation** between hydrogen production and renewable power generation
- Located in the same **bidding zone**

How is industrial uptake ensured?

No additionality

Jan '28: phase-in of additionality

Jan '38: end of grandfathering

Monthly correlation

Jan '30: mandatory phase-in of hourly correlation (optional from 07/27)

Rules for highly decarbonised electricity mix

- Additionality no longer required if electricity mix is already largely decarbonised
 - Threshold to be achieved (bidding zone): **emission intensity < 18g CO₂/MJ**
 - Reason: Hydrogen produced from such electricity achieves 70% emission savings
- Need to demonstrate that electricity is renewable:
 - Renewables PPA
 - Criteria of temporal and geographic correlation

Sunset clause

- Additionality no longer required if electricity mix is already largely based on renewable energy
 - Threshold to be achieved: RES- E share > 90%
 - Hydrogen produced from electricity that is 90% renewable achieves 70% emission savings
- Full-load hours should not exceed the RES-E share in order not to run at peak times

Source of CO₂

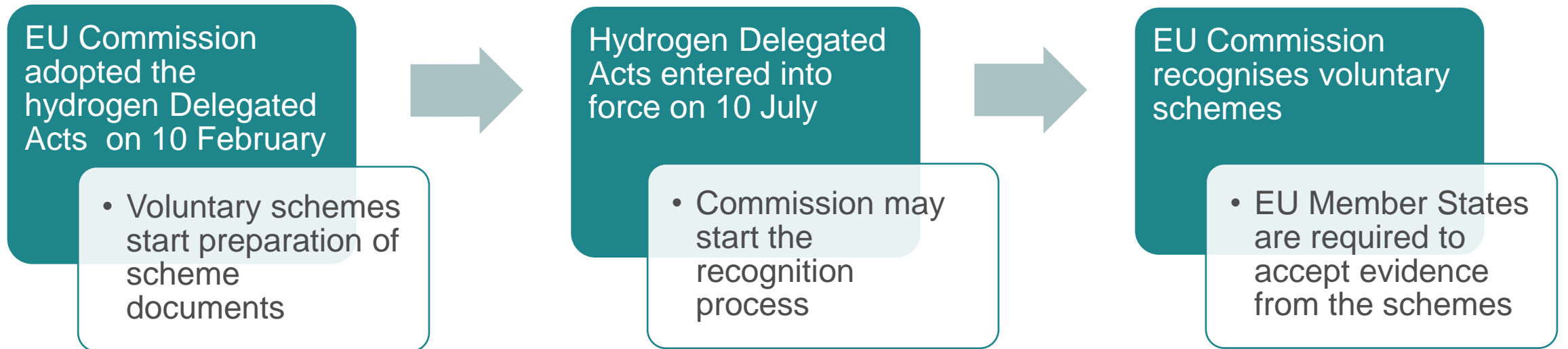
- In the long term (after 2035/2040) it is necessary to shift to a sustainable source of carbon i.e. carbon captured from the air or biogenic carbon, and
- Emissions must be subject to an effective carbon pricing system to provide the right incentive for the transition;

How will this be implemented and certified?

- Criteria apply for both for domestically produced hydrogen as well as for imports
- Certification to be conducted by voluntary schemes (international companies)
- Voluntary schemes already recognised for certification of bioenergy
- EU Member States are required to accept evidence from recognised schemes. Certification allows access to all markets

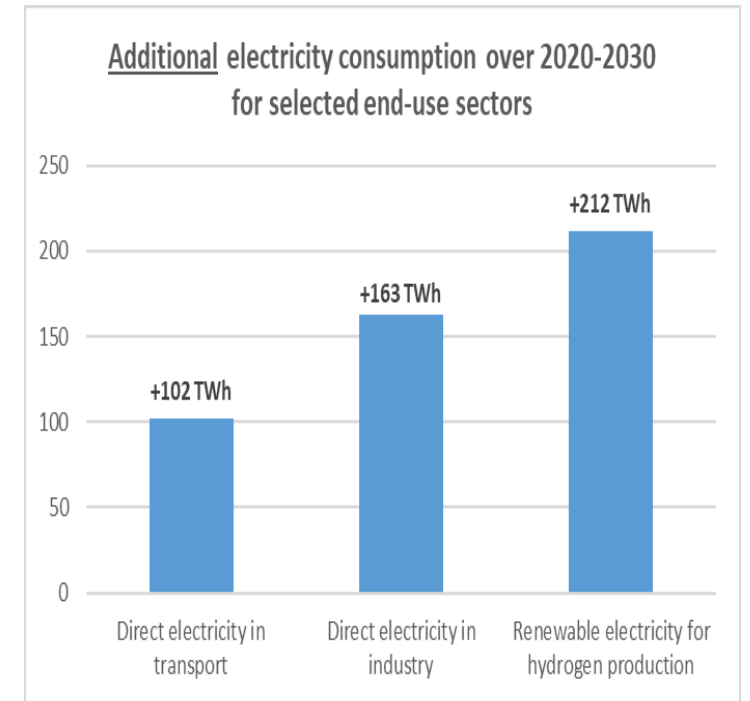
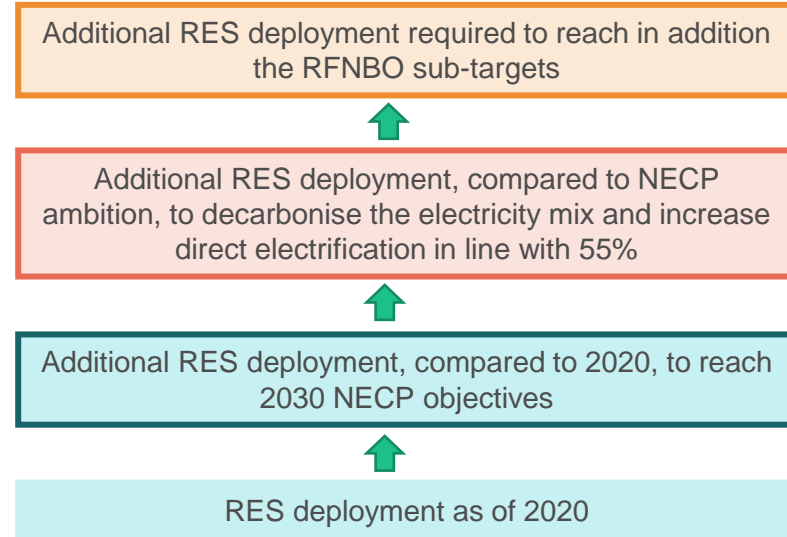
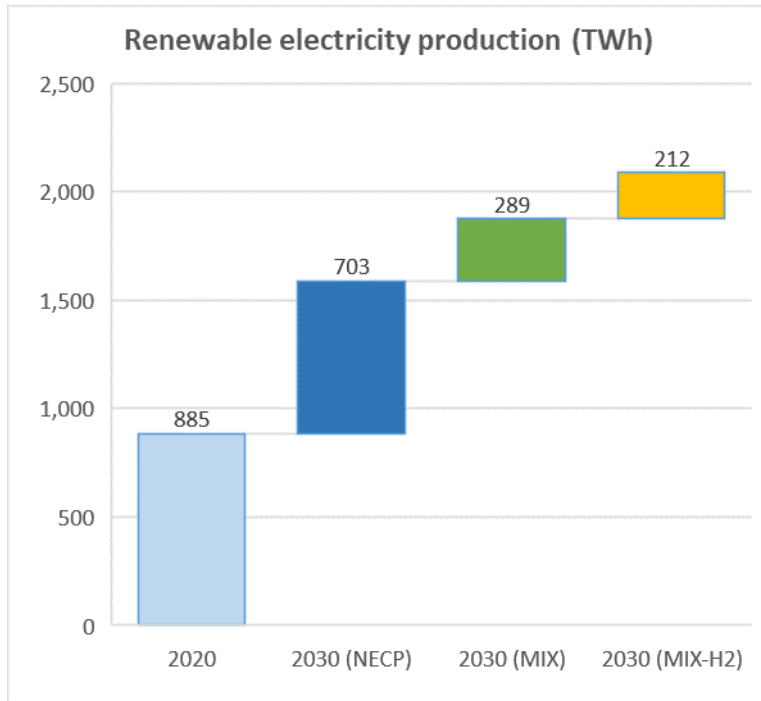
More info: [Voluntary schemes \(europa.eu\)](https://europa.eu)

Timeline



Thank you

Increased need of renewable electricity



Q&A implementation of hydrogen delegated acts

Version of 26/07/2023

In meetings with certifiers and voluntary schemes, the Commission has discussed how hydrogen producers and voluntary schemes could implement the requirements set out in the “RFNBO delegated act”¹ and the delegated act setting out the GHG calculation methodology for renewable fuels of non-biological origin and recycled carbon fuels (“GHG methodology”)². This document sets out questions that have been raised by fuel producers and certifiers in the aftermath of the adoption of the delegated acts. The replies do not address any of the additional requirements in relation to the agreed revision of the renewable energy directive (“RED”)³.

This report summarises the outcome of those meetings and does not create any enforceable right or expectation. The binding interpretation of EU legislation is the exclusive competence of the Court of Justice of the European Union. The views expressed in this document are without prejudice to the position that the Commission might take before the Court of Justice.

Neither the European Commission nor any person acting on behalf of the European Commission is responsible for the use which might be made of the following information.

As this report reflects the state of the art at the time of its drafting, it should be regarded as a 'living tool' open for improvement and its content may be subject to modifications without notice.

¹ [Commission Delegated Regulation \(EU\) 2023/1184](#)

² [Commission Delegated Regulation \(EU\) 2023/1185](#)

³ https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CONSIL:ST_10794_2023_INIT

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General questions

1. What evidence would be required to demonstrate that hydrogen qualifies as renewable?

Reply: The RED does not include a definition of renewable hydrogen. Instead, the RED includes a definition of renewable fuels of non-biological origin (RFNBO), which covers hydrogen produced via electrolysis from renewable electricity as well as its derivatives. The term renewable hydrogen is often used as a simplification for hydrogen that qualifies as a RFNBO under the RED⁴. To count as an RFNBO, hydrogen is required to 1) fulfil the definition of an RFNBO as set out in Article 2(36) of RED, 2) comply with the rules set out in Article 27(3) of the RED for the sourcing of renewable electricity 3) achieve 70% emissions savings and (4) be traced through the supply chain in line with the rules set out in Article 30(1) and (2) RED. In this context the hydrogen delegated acts, adopted pursuant to Articles 27(3) and 28(5) of RED set out detailed rules for sourcing of renewable electricity that is used for the production of RFNBOs and for determining the GHG emission intensity (GHG methodology)⁵.

2. For what purposes do the rules on renewable hydrogen set out in RED apply?

Reply: The rules have to be met to count renewable hydrogen towards the targets set out in the RED. Complying with the rules is not a prerequisite for importing hydrogen or for placing hydrogen on the EU market but may be a prerequisite for receiving public support. The rules apply currently only for fuels consumed in transport. However, according to the provisional agreement achieved on the revised RED, the scope of the rules for the production of RFNBOs will be extended to all sectors, including industry.

3. Are the RFNBO delegated act and the GHG methodology interlinked?

Reply: The RFNBO delegated act complements the RED by setting out detailed rules on how fuel producers can source electricity that counts as fully renewable. The RED itself already includes a rule that allows sourcing electricity that counts as partially renewable (average share of renewable electricity in the country in the year n-2). The GHG methodology includes a life-cycle approach to determine the greenhouse gas emission intensity of RFNBOs (and recycled carbon fuels “RCF”). This approach distinguishes between electricity that counts as fully renewable and electricity that counts as partially renewable. In addition, the methodology includes a formula that allows deriving the amount of RFNBOs and RCF that is produced as this is required to derive the emission intensity. The delegated acts are therefore closely interlinked.

4. What is the geographic scope of the hydrogen delegated acts?

Reply: The hydrogen delegated acts apply to hydrogen consumed in the EU, regardless of whether the hydrogen is produced inside or outside the territory of the Union. However, the application of the rules is limited to the purposes described under question 2. Accordingly, they do not set out binding rules for hydrogen production in third countries.

⁴ Hydrogen produced from biomass, although produced from renewable energy sources, is not eligible for counting towards the targets set out for RFNBOs.

⁵ Sourcing of electricity that is partially renewable is also possible in line with Article 27(3).

5. *What means do fuel producers have to demonstrate that they comply with the criteria?*

Reply: For certification of renewable hydrogen, producers can rely on a well-established system of certification by third parties, so-called voluntary schemes⁶. These are international companies with experience of more than a decade in certifying biofuels, biomass and other products worldwide. The Commission has been empowered to recognise voluntary and national schemes for certifying renewable hydrogen. The Member States are required to accept evidence from schemes that have been recognised by the Commission.

6. *How does the recognition process for voluntary certification schemes work?*

Reply: Voluntary schemes may submit applications for recognition to the Commission⁷. Before recognition, the schemes undergo a thorough assessment. Schemes meeting all criteria are recognised by the Commission via Commission Implementing Decisions. More details can be found on a dedicated [website](#).

7. *How can hydrogen producers get certified?*

Reply: Hydrogen producers have the option to either contact a voluntary scheme or to approach a national scheme set up by the EU Member States to get certified.

8. *May voluntary schemes apply further sustainability criteria (e.g. water input, resource efficiency etc.) than those set out under the RED and the delegated acts?*

Reply: Voluntary schemes are required to apply the criteria and certification rules set out in EU legislation. They may, however, go beyond these criteria on a voluntary basis provided compliance with the mandatory rules is still ensured.

⁶ https://energy.ec.europa.eu/topics/renewable-energy/bioenergy/voluntary-schemes_en

⁷ Applications may be sent to the following address: ENER-VOLUNTARY-SCHEMES@ec.europa.eu

Detailed questions: RFNBO delegated act

Direct connection

9. Does the exclusion of operating aid or investment aid also apply for directly connected installations generating renewable electricity?

Reply: No, the exclusion of public support does not apply for directly connected installations.

10. Is it required to conclude power purchase agreements “PPAs” if the electricity is sourced via a direct connection?

Reply: No, this is not required.

11. Can directly connected installations generating renewable electricity be also connected to the grid?

Reply: Yes, this is possible. Indeed, both the installations generating renewable electricity as well as the installation producing RFNBOs can be connected to the grid. In this case the provisions set out in Article 3 of the RFNBO delegated act apply for the electricity sourced via the direct connection and the provisions set out in Article 4 apply to the electricity sourced from the grid.

Sunset clause

12. How should the RES-E share in bidding zones be calculated (Article 4(1) of the RFNBO delegated act)?

Reply: The average share of renewable electricity shall be determined by dividing the gross final consumption of electricity from renewable sources in the bidding zone, calculated by analogy to the rules set out in Article 7(2) of Directive (EU) 2018/2001, by the gross electricity production from all energy sources as defined in Annex B to Regulation (EC) 1099/2008, except from water previously pumped uphill (excluded from both the numerator and the denominator), plus imports minus exports of electricity to the bidding zone. Imports and exports are not considered in the numerator. 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 tool⁸.

⁸ [https://ec.europa.eu/eurostat/web/energy/database/additional-data#Short%20assessment%20of%20renewable%20energy%20sources%20\(SHARES\)](https://ec.europa.eu/eurostat/web/energy/database/additional-data#Short%20assessment%20of%20renewable%20energy%20sources%20(SHARES))

13. Under which scenario is a bidding zone for which it has been established that the share of renewable electricity is 90% or more no longer considered as having this status?

Reply: A bidding zone is no longer considered under Article 4(1) of the RFNBO delegated act to have a share of renewable electricity higher than 90% if the actual share drops below 90% for more than 5 consecutive years. The same principle applies to the calculation of the emission intensity of electricity in the bidding zone in the context of the application of Article 4(2).

14. We understand that even in bidding zones where the share of renewable electricity is 90% or higher, full load hours of hydrogen production may not exceed the maximum number of hours set in relation to the proportion of renewable electricity. What happens if this rule is not correctly implemented?

Reply: In the case described, the hydrogen produced during the maximum number of hours set in relation to the proportion of renewable electricity (8760 hours x RES-E share) would count as renewable (RFNBO) and hydrogen produced outside of these hours would count as non-renewable.

Curtailment

15. Is the cause of redispatch relevant when implementing Article 4(3) of the RFNBO delegated act?

Reply: The delegated act does not set conditions for the reason of the redispatch.

Renewable PPAs

16. What are the minimum requirements for “renewable PPA”?

Reply: The requirements for renewable PPAs stem from the definition set out in the RED itself and the RFNBO delegated act. In the RED, a renewables PPA is defined as a contract under which a natural or legal person agrees to purchase renewable electricity directly from an electricity producer. The role of the intermediaries referred to in the RFNBO delegated act is therefore limited to the role of a facilitator of such contracts but not as a contracting party. In addition, the requirements on cancelling Guarantees of Origin “GOs” as described under question 17, the requirements set out in Article 5 of the RFNBO delegated act, and the requirements set out in Article 19 RED (referred to in recital 15 of the RFNBO DA), have to be met.

17. Several provisions in the RFNBO delegated act require concluding renewables PPAs with economic operators producing renewable electricity. What requirements would apply for GOs in this context?

Reply: The GOs for the PPA need to comply with the general requirements in Article 19 of RED and furthermore carry the same attributes as the physical installation producing the electricity. This includes e.g. the location of the installation, the age of the installation, and the time of the production. The

associated GOs need to be cancelled before the expiry of the validity period and the volume cancelled shall correspond to that claimed under the PPA. The requirements on GOs also apply in cases where the RFNBO DA does not require the conclusion of a renewables PPA.

18. *Could concluding a renewables power purchasing agreement between an RFNBO producer and a retailer supplying physical electricity and associated GOs comply with the requirement set out in Article 4 (2)(a)?*

Reply: No. Fuel producers are required to have concluded directly, or via intermediaries, one or more renewables PPAs with economic operators producing renewable electricity. While electricity suppliers could act as intermediaries (i.e. facilitators of the contracting), the fuel producer would need to conclude renewables PPAs with economic operators producing renewable electricity. The associated GOs are an additional element necessary to ensure that the same unit of energy from renewable sources is taken into account only once.

Additionality

19. *What could be considered as operating aid or investment aid referred to in Article 5(b) of the RFNBO delegated act?*

Reply: Operating aid or investment aid referred to in Article 5(b) could be considered to include 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, including 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 energy obligations. Article 5(b) 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. For the ex-ante assessment, fuel producers should demonstrate based on the terms of the contract for difference that the contract is unlikely to result in net support for the contracted installation generating renewable electricity. In the ex-post verification, fuel producers should demonstrate that the contracted installations generating renewable electricity did not receive net support.

20. *How could the definition of ‘come into operation’ set out in Article 2(5) be understood? First day of commercial delivery of even an incomplete installation?*

Reply: The RFNBO delegated act defines ‘come into operation’ as starting production of renewable liquid and gaseous transport fuels of non-biological origin or renewable electricity for the first time. Starting production should be considered to include any form of commercial production of hydrogen that is intended to be used or sold. If the installation is taken into operation step by step (part of the capacity at date 1 and other part(s) of the capacity at (a) later date(s)), then the definition of coming into operation would refer to the first date. This applies to installations producing renewable electricity as well as to

installations producing RFNBOs. For installations producing RFNBOs, the conditions for adding additional capacity in Articles 3(b) and 5(a), 3rd subparagraph, of the RFNBO delegated act shall be complied with in order to consider the different capacity parts as one installation.

Geographic correlation

21. Do interconnected bidding zones need to be adjacent?

Reply: No. While interconnected bidding zones are usually adjacent, there may be exceptions e.g., if the bidding zones are connected via a direct line such as a sub-sea cable but otherwise not adjacent.

22. How could the concept of the "offshore bidding zone" be implemented?

Reply: Offshore bidding zones should be considered as bidding zones that comprise only offshore areas i.e. no land. No such bidding zone has been created, so far.

23. Is it required to monitor physical electricity flows when sourcing renewable electricity from an interconnected bidding zone? Is it required to book capacity?

Reply: No, there are no such requirements under the delegated acts.

Combination of options

24. May fuel producers source renewable electricity via different options (counting as partially renewable and counting as fully renewable)?

Reply: The RED sets out two main pathways to produce RFNBOs: The first approach, set out in the fourth subparagraph of Article 27(3), determines the share of renewable hydrogen based on the share of renewable electricity in the country of production in the year n-2. The second approach set out in the fifth and sixth subparagraphs of Article 27(3), which is further detailed in the RFNBO delegated act, allows the production of fully renewable hydrogen via several sub-options. Fuel producers may combine those options to source renewable electricity provided the way the electricity is sourced is fully documented in line with the requirements set out in Article 8 of the RFNBO delegated act. This applies also for electricity sourced during the same time interval. For each way of sourcing electricity, the dedicated rules apply. If for instance an electrolyser is fed with 50% electricity that counts as fully renewable and 50% electricity that is only 40% renewable, 70% of the total hydrogen produced will be renewable. The remaining 30% cannot be made renewable by applying the rules of the RFNBO delegated act. The hydrogen produced from the remaining 30% electricity may count as low carbon hydrogen under the forthcoming framework under the Hydrogen and Gas Market Decarbonisation Package.

Documentation

25. Article 8 of the RFNBO delegated act sets out reporting requirements for fuel producers. In this context it implies that information for each hour must be recorded where relevant. How could RFNBO producers do it practically?

Reply: Some of the requirements can only be verified if information is available on an hourly basis. This will be the case in particular when hourly temporal correlation is applied. Given that the requirement for hourly correlation applies only as from 2030, monthly correlation may be sufficient in many cases unless compliance options, which require checking hourly data, are applied (e.g. sourcing of electricity from an interconnected bidding zone, curtailment). It is recommended however, to gradually introduce systems that automatically record information on an hourly basis e.g. via smart metering systems.

26. Which requirements on electricity GOs would apply when the RFNBO delegated act does not require the conclusion of a renewables PPA (e.g. areas with more than 90% RES in the electricity mix)

Reply: According to recital 15 of the RFNBO delegated act, Article 19 of RED obliges Member States to ensure that the same unit of energy from renewable sources is taken into account only once. Therefore, if RES GOs have been issued for the electricity used to produce the hydrogen, then these GOs need to be cancelled. The cancellation of the respective GOs can be done e.g. by the competent body designated by the Member States or by the producer of the hydrogen. It is up to the certifier of the installation to ensure that the amount cancelled corresponds to the volume of electricity used.

27. What is the role of GOs for the implementation of the RFNBO delegated act?

Reply: The RFNBO delegated act does not set out rules for the use of GOs and the use of GOs is not required to implement the requirements of the hydrogen delegated acts. The requirements for GOs stem entirely from Article 19 RED and therefore apply only where GOs have been issued or are used.

GOs and systems characterised by a comparable degree of robustness may still be used as a tool for demonstrating compliance with the criteria of the RFNBO delegated act. For instance, it would be possible for the fuel producer to demonstrate via cancelling the required number of GOs that at least an equivalent amount of electricity that is claimed as fully renewable has been produced by the installations producing renewable electricity under the renewable PPA (only electricity produced by the contracted installations themselves is eligible).

Application of equivalent rules in third countries

28. How should the concept of bidding zone and curtailment be implemented in third countries?

Reply: See Annex.

Detailed questions: GHG methodology

Source of carbon

29. What can be considered as biogenic CO₂ under the GHG methodology and how is it treated?

Reply: Biogenic CO₂ comprises CO₂ that stems from the production or the combustion of biofuels, bioliquids or biomass fuels. CO₂ from the treatment of biogenic wastes is also eligible. In order to be eligible to count as emissions from existing use or fate e ex-use, biogenic CO₂ must comply with the sustainability and greenhouse gas saving criteria and must not have received credits for emission savings from CO₂ capture and replacement, set out in Annex V and VI to Directive (EU) 2018/2001. Biogenic CO₂ stemming from processes which are out of the scope of the sustainability and greenhouse gas saving criteria are also eligible.

30. Can CO₂ for incineration of municipal waste in the EU be considered as avoided under the GHG methodology?

Reply: According to Point 10(a) of the GHG methodology, one of the carbon sources that can be considered as avoided is CO₂ that (i) has been captured from an activity listed under Annex I to Directive 2003/87/EC and (ii) has been taken into account upstream in an effective carbon pricing system and (iii) is incorporated in the chemical composition of the fuel before the deadline set out.

Installations that incinerate municipal waste are currently not covered under the ETS and fossil-based CO₂ from the incineration of municipal waste can therefore not automatically be considered as avoided in the EU. However, CO₂ from these installations can be considered as avoided where a Member State, in its application of the ETS Directive, covers such emissions under the ETS. Further, biogenic CO₂ including the biogenic share of CO₂ arising due to the incineration of municipal waste constitutes an eligible carbon source provided the sustainability and greenhouse gas saving criteria are met. Compliance with the criteria could be assumed if the installation producing the CO₂ is exempt from demonstrating compliance with the sustainability criteria.

31. If only part of the CO₂ released from a plant co-processing biogenic and non-biogenic input is captured, and if this part represents a share of all the CO₂ otherwise released smaller than the share of biogenic CO₂, can the captured CO₂ be considered 100% biogenic?

Reply: In case of a CO₂ stream including both fossil-based and biogenic CO₂ the rules of the mass balance system should be applied. Accordingly, it is possible to consider all CO₂ taken from the stream biogenic, provided the amount of biogenic CO₂ taken from the stream does not exceed the amount of biogenic CO₂ that is included in the mixture.

32. In the case of production of RFNBO/RCF from CO₂ of fossil origin, is there a limitation for use of this carbon source, besides not being possible to consider savings under e_{ex-use} ?

Reply: No, it is not forbidden to use fossil-based CO₂, but it would make it more challenging to achieve the 70% threshold. Additionally, fossil CO₂ is only allowed until 2040.

33. Are the combustion emissions of biogenic carbon considered? Which values should be used?

Reply: The emissions of fuel in use (e_u) of the produced RFNBO are always considered. The source of the carbon is not relevant. However, use of CO₂ would allow claiming a credit under e_{ex-use} , which may fully compensate the emissions due to fuel in use. The rules set out under point 10 of the methodology apply for this purpose. To determine the emissions of fuel in use (e_u), the values for the combustion emissions set out in Annex B shall be used.

Other questions on e_{ex-use}

34. What are the criteria (biogenic vs. non-biogenic) to be applied for other gaseous inputs other than CO₂ (e.g. CO, N₂)?

Reply: The phase-out dates (2035, 2040) apply only to CO₂. Some fossil inputs may indeed qualify as input for the production of recycled carbon fuels. The carbon intensity of other (fossil) inputs would need to be considered as set out in the methodology e.g. by distinguishing between rigid and elastic inputs and by considering the rules for co-processing (see Annex I).

35. How shall the emissions from existing use or fate be calculated for waste which would be sent to a landfill?

Reply: Emissions from existing use or fate are calculated in line with Point 10 of the GHG methodology. In the case of waste which would otherwise be sent to landfill, all emissions that occur in the landfill including non- CO₂ emissions due to methane leakage could be considered. The fossil carbon incorporated in the composition of the fuel cannot be considered, however, as landfilled waste is not combusted.

36. What is meant by “captured CO₂ stemming from a fuel that is deliberately combusted for the specific purpose of producing the CO₂”? Would that include biomass that is burned for electricity production and the CO₂ is captured for fuel processing?

Reply: No, as in the case described the biomass is combusted to produce electricity. The CO₂ would not be eligible if the biomass was combusted with the sole purpose of producing CO₂ or no economically meaningful use of the energy stemming from the combustion would take place.

Rigid vs elastic inputs

37. What are examples for elastic and rigid inputs?

Reply: For determining whether an input has to be considered as elastic or rigid the rules are set out under point 4 of the GHG methodology. Rigid inputs include all inputs qualifying as a carbon source for the production of recycled carbon fuels, as well as outputs produced in fixed ratio by an incorporated process,

which represent less than 10% of the economic value of the output. All other inputs are to be considered as elastic. Hence, the categorisation of an input may depend on the circumstances. Rigid inputs would therefore comprise liquid or solid waste streams of non-renewable origin which are not suitable for material recovery or waste processing gas and exhaust gas of non-renewable origin which are produced as an unavoidable and unintentional consequence of the production process in industrial installations (taken from the definition of RCF). Waste heat from processes might also fall into that category. Elastic inputs comprise for instance petroleum products, electricity, natural gas and CO₂. In case of doubt an input should be considered as elastic.

38. Assuming a process using municipal waste as feedstock that includes a mixture of biogenic feedstock and feedstock that can be used for the production of RCF, would the emissions from e_i including e rigid and e ex-use need to be allocated to all products or only to the products from non-biogenic origin?

Reply: As a general rule, in accordance with point 1 of the GHG methodology, all (fuel) types shall be considered to have the same emission intensity. The overall emissions from e_i should thus be divided by the energy in the overall produced fuels.

Allocation of emissions

39. How should emissions from an electrolyser facility be allocated between hydrogen and oxygen, if the oxygen is used in other processes and not released to the atmosphere?

Reply: In this case emissions should be allocated based on economical allocation. The economic value considered shall be the average factory-gate value of the products over the last three years. If the hydrogen is composed of products to which are attributed the same emission intensity (RCF and RFNBOs), an average price (weighted arithmetic average) can be applied.

40. Which rules apply for the allocation of emissions to heat as a co-product?

Reply: It is possible to allocate emissions to heat (if used as a product). The allocation should be based on a carnot efficiency calculation as defined in point 15(e) of the GHG methodology. The same rules apply as set out for biofuels in Annex V to the RED.

41. If all co-products have an energy content but are not fuels, should economic allocation be used?

Reply: All products with an energy content should be considered to be fuels.

42. If the ratio of the products is fixed and some co-products are materials with energy content, can the allocation be done in energy terms, even though the co-products do not all have an energy content?

Reply: No, point 15(f) of the GHG methodology requires in this case to use an economic value.

Calculation of the share of RFNBOs and RCF

43. How is the share of RFNBOs and RCF determined at different stages of the supply chain?

Reply: As set out under point 8 of the GHG methodology, the GHG methodology applies for each processing step. The emission intensity of inputs must be calculated and reported to the next production step or final fuel producer. Accordingly, the share of RFNBO is also calculated at each step of the supply chain.

44. If the output of a process is a hydrogen derivative that does not fully qualify as an RFNBO, is the share of RFNBO calculated considering the share of RFNBO hydrogen in the step where RFNBO hydrogen is co-processed with other inputs, or on the basis of renewable non-biological relevant primary energy input to the upstream processes (e.g. electricity input to H₂ production and biomass input to syngas production)?

Reply: As explained in the reply to question 44, the emission intensity of inputs must be calculated and reported to the next production step or final fuel producer. Accordingly, the share of RFNBO is also calculated considering the share of RFNBO hydrogen input at the step where RFNBO hydrogen is co-processed with other inputs. Such differentiation should also be applied if the processing steps take place in the same facility.

45. Does co-processing of syngas from biomass gasification and hydrogen from renewable electricity result in co-production of biofuel and RFNBO (although the biogenic CO in the syngas contributes to the energy content of all the product)?

Reply: Yes. See the relevant chapter in the Annex for further explanation.

46. Is the processing of mixed biogenic and non-biogenic non-recyclable waste into fuels considered as a form of co-processing?

Reply: No. According to the GHG methodology, co-processing covers only cases where RFNBOs and RCF are replacing a conventional input in a process. As no replacement takes place in the example given, the rules for co-processing do not apply and the entire output from the process is considered to have the same emission intensity.

47. When different products are co-produced by coprocessing of renewable and non-renewable input, is it possible to assign renewable input to only e.g. one of the co-products?

Reply: Rules for co-processing are explained in the Annex.

48. For RFNBO H₂ as an intermediate for conventional (transport) fuel production: What fraction from RFNBO H₂ input to the refinery can fulfil RFNBO mandate?

Reply: Article 25(1)(a) RED allows the counting of renewable liquid and gaseous transport fuels of non-biological origin that are used as intermediate products for the production of conventional fuels. This means that all renewable hydrogen that is used for the production of conventional fuels in oil refineries

can be counted towards the objectives of Article 25(1), i.e. before the final fuel is consumed. This implies that the contribution is counted towards the RES-T target in the Member State where the renewable fuel is used in the production of the fuel and not where the final fuel is consumed i.e. conventional fuels produced in the refinery will continue to count as fossil fuel. Under the revised RED which has been provisionally agreed, only renewable hydrogen that is used for the production of conventional transport fuels and biofuels can be counted towards the targets set out in transport. Renewable hydrogen (RFNBOs) that is used in refineries for other purposes is counted towards the industry target.

49. *One way to transport renewable hydrogen over long distance is to ship it in the form of derivatives (e.g. ammonia or methane) and to reconvert it into renewable hydrogen at the place of consumption. Is the energy used for converting hydrogen derivatives considered as relevant energy?*

Reply: As set out under point 3 of the GHG methodology, only electricity and heat that is added to the heating value of the fuel is considered as relevant energy. The use of heat for the reversion of ammonia and methane into hydrogen and by-products does not increase the heating value of the products, so does not influence the RCF and RFNBO shares. The only condition is to document that the energy obtained in the reversion process is not higher than the energy contained in the hydrogen used to create the carrier. The arising emissions from the energy needed to convert from and to hydrogen need to be included in e_{id} .

Other questions

50. *Electricity is used at different stages of the RFNBO production, e.g. for the electrolyser, for fuel synthesis, CO₂ capture from biofuels production. What is the scope of electricity use in the two DAs? More specifically, do the same rules apply for different electricity uses when (i) calculating GHG emissions from electricity use, and (ii) determining if electricity is considered fully renewable?*

Reply: The rules of the RFNBO delegated act are relevant for 1) determining the share of RFNBO that is produced and 2) the GHG emission intensity of the RFNBO. For determining the share of RFNBO in total output, only the relevant energy input matters as set out under point 2 of the GHG methodology. For determining the GHG emission intensity all electricity input is considered. Electricity that is considered as fully renewable is considered as having an emission intensity of 0 gCO₂eq/MJ¹, while partially renewable electricity usually has a higher GHG emission intensity. Hence, it is not required to apply the criteria of the RFNBO delegated act for electricity that does not enhance the heating value of the fuel but applying the rules impacts the emission intensity of the output.

51. *When an electrolyser produces both RFNBOs and low carbon hydrogen, is it possible that the RFNBOs meet the 70% GHG emission saving threshold whereas the low carbon hydrogen does not meet the 70% GHG emission saving?*

Reply: No, this is not possible as according to point 1 of the GHG methodology, the greenhouse gas emissions intensity of RFNBOs and RCF is determined by dividing the total emissions of the process by the total amount of fuel stemming from the process.

52. Does all hydrogen produced by an electrolyser have to meet the requirements to be considered as RFNBO including the threshold of 70% emission saving?

Reply: No, this is not required. Hydrogen producers may produce renewable hydrogen as well as other types of hydrogen in the same installation provided that the production of the different types of hydrogen is well documented.

53. How often does the Commission plan to update the factors provided for Emission intensity of electricity in the European Union, provided in Table A, Annex C to the GHG methodology?

Reply: The objective is to update them annually. Data will be made available on the website of the Commission.

54. Shall H₂ leakages be included under *e p*, even if not listed as a greenhouse gas under the RED?

Reply: H₂ leakages should be considered as an energy loss (leading to proportional increase of the emission intensity). The global warming potential (GWP) of emitted H₂ should be considered as soon as a value for the GWP of H₂ is added in the relevant annex.

55. Does temporal correction affect the calculation of the emission intensity?

Reply: According to the general rule, the emission intensity of RFNBOs and RCF is calculated for a time period of at most one calendar month. However, where electricity qualifying as fully renewable according to the methodology set out in Directive 2018/2001 is used as input that enhances the heating value of the fuel or intermediate products, the time interval shall be in line with the requirements applying for temporal correlation. Accordingly, the emission intensity of renewable hydrogen produced via electrolysis according to Article 6 of the delegate has to be determined on an hourly basis as of January 2030 (or earlier if a Member State decides to apply hourly correlation earlier).

Annex

Implementation of bidding zone concept and curtailment in third countries

The RFNBO delegated act refers to several concepts set out in the EU electricity market design legislation. This concerns in particular the following two matters:

- The concept of the bidding zone
- The rules on curtailment

The methodology requires to implement the rules in third countries based on equivalent concepts.

Implementation of the concept of bidding zone

As regards the implementation of the bidding zone concept the recitals of the GHG methodology provide some guidance:

Recital 3: “[...]Where reference is made to bidding zone and imbalance settlement period, concepts that exist in the Union but not in all other countries, it is appropriate to allow fuel producers in third countries to rely on equivalent concepts provided the objective of this Regulation is maintained and the provision is implemented based on the most similar concept existing in the third country concerned. In case of bidding zones such concept could be similar market regulations, the physical characteristics of the electricity grid, notably the level of interconnection or as a last resort the country”.

Accordingly, the following approach should be applied:

- Certifiers should assess whether 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 for the purpose of the implementation of the methodology.
- 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 for the purpose of the implementation of the methodology.
- 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 for the purpose of the implementation of the RFNBO delegated act.
- Where the methodology requires certain conditions to be met related to the concept of a bidding zone e.g., on the average proportion of renewable electricity (Article 4(1)), the emission intensity of electricity (Article 4(2)) or the price of electricity (Articles 6 and 7(1)), the conditions can only be considered as fulfilled if compliance can be demonstrated based on reliable data from official sources.

Implementation of rules on curtailment

The methodology in Article 4(3) of the RFNBO delegated act sets out that electricity taken from the grid may be counted as fully renewable during an imbalance settlement period during which the fuel producer can demonstrate, based on evidence from the national transmission system operator, that a) power-generating installations using renewable energy sources were redispatched downwards in accordance with Article 13 of Regulation (EU) 2019/943 and b) the electricity consumed for the production of renewable liquid and gaseous transport fuel of non-biological origin reduced the need for redispatching by a corresponding amount. RFNBOs producers will likely rely on these rules only in exceptional cases and a misuse of the provision can only be avoided by following the rules thoroughly. An implementation of this provision in third countries will therefore only be feasible if it set out entities adopting the tasks of national transmission system operators as well as rules for redispatching.

Implementation of the rules on co-processing of RFNBOs

RFNBOs may be produced in processes which rely, next to renewable hydrogen, also on other inputs including fossil fuels, recycled carbon fuels and biomass. This annex aims to provide information on how the relevant provisions set out in the RED and the GHG methodology set out in accordance to Article 28(5) of the Directive should be implemented to derive the share of RFNBOs in the output of the process as well as the achieved emission savings. It is assumed that the GHG methodology will enter into force as adopted by the Commission. Articles 25(1)(a) and 30 (2) of RED as well as Point 1 of the Annex to the GHG methodology are in particular relevant for the implementation.

Articles 25(1)(a) RED sets out that renewable liquid and gaseous transport fuels of non-biological origin are counted towards the targets if they are used as intermediate products for the production of conventional fuels. This covers cases where renewable hydrogen is used in refineries e.g., to remove impurities during the hydro treating where the use of the hydrogen is not adding to the heating value of the fuels. Under the revised RED that has been politically agreed only the share of intermediate products that is used for the production of conventional transport fuels will be considered. Given that the hydrogen is already counted, such use of hydrogen is not further considered. This is in line with the rules of the GHG methodology, which considers the energy content of hydrogen used as intermediate product only if it adds to the heating value of the fuel i.e. where at least part of the output is an RFNBO and not a conventional fuel.

The GHG methodology sets out a specific rule for calculating the emission intensity of RFNBOs stemming from a process where co-processing is applied. It allows to distinguish in the calculation of the greenhouse gas emissions intensity on a proportional basis of the energetic value of inputs between: (1) the part of the process that is based on the conventional input and (2) the part of the process that is based on renewable liquid and gaseous transport fuels of non-biological origin and recycled carbon fuels assuming that the process parts are otherwise identical.

If for instance a process uses H₂, CO, CO₂ as well as other energy inputs to produce synthetic fuels and the producer intends to replace 20% of the H₂ with H₂ qualifying as RFNBO, it would be possible to determine the emission intensity of the produced synthetic fuels assuming a virtual process which uses

only 20% of all inputs mentioned above (20% of each input). In this example, all hydrogen qualifying as RFNBO (which is 20% of the total H₂ input) would be used in the virtual process, and the other 80% of the hydrogen (all non-RFNBO) would be used in the other process which uses 80% of all inputs. Such process would also yield only 20% of the output, but only the energy share of RFNBO hydrogen in the input would be considered an RFNBO. It would be possible to replace in this virtual process more than one input. Not only RFNBOs but also RCF, biomass, renewable electricity, renewable heat and CO₂ (including biogenic) could be used for this purpose. While the use of RCF and biomass would not add to the share of RFNBOs in the output, they could reduce the emission intensity of the output as the entire output of the virtual process would have the same emission intensity.

$$S_{RFNBO,out} = \frac{E_{RFNBO,in}}{E_{educts}} \quad (1)$$

Where:

$S_{RFNBO,out}$: energy share of the product that can be counted as RFNBO

$E_{RFNBO,in}$: energy content of the RFNBO input only

E_{educts} : energy content of all “relevant” inputs (as defined in the DA).

For instance, as stated above, if 20% of the energy of the “relevant” inputs comes from hydrogen that qualifies as renewable, 20% of the output can be claimed as RFNBO.

For the share calculated above, it is possible to virtually split the process and determine the emissions for the RFNBO only as follows:

$$Em_{RFNBO} = \sum_n s_n \cdot e_{i,n} + e_p + e_{td} + e_u - e_{ccs} \quad (2)$$

Where:

n: each “relevant” input

s_n : energy share of the input “n”: $s_n = \frac{E_{n,in}}{E_{educts}}$

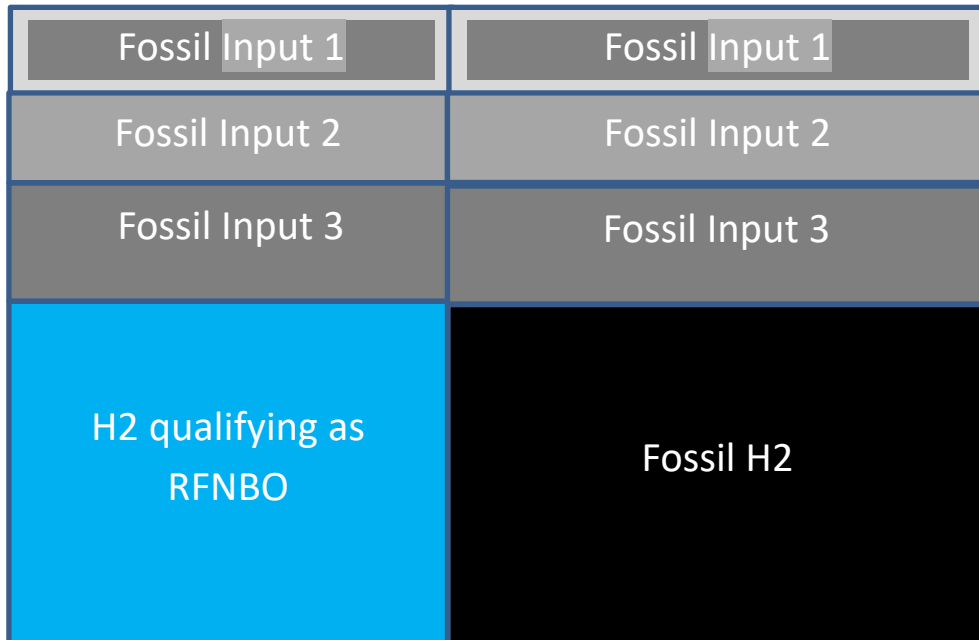
$e_{i,n}$: emissions intensity for the supply of the input “n”.

Inputs qualifying as RFNBO can be attributed to this part of the virtually split process with the upper limit of the energy (or stoichiometric) ratio of the input entering into the output (meaning the energetic share of all inputs has to be respected also for the virtually split part).

CO₂ emissions from fuel combustion have to be counted in the term e_u . If non-fossil carbon enters into the molecule of the output, those emissions might be compensated by the $e_{ex\ use}$ included in e_i for those non-fossil inputs. The share of RFNBOs in the output of the virtual process would be determined as set out under point 3 of the Annex to the GHG methodology. If the process yields more than one output, each type of output would include the same share of RFNBOs, RCF and other fuels in line with Article 30(2) of the RED⁹. The ratio of different outputs of the virtual process should not differ from the share of outputs of the whole process. In accordance with point 1 of the GHG methodology it is possible to determine the emission intensity of the output over a period of at most one calendar month.

⁹ The described approach applies only for the production of RFNBOs and RCF. For determining emission savings and produced amounts of biofuels the relevant provisions Annex V to the Directive and the delegated act in co-processing bio biomass in a common process with fossil fuels apply.

Example of a process with several inputs



Outputs

