

RED II Draft Delegated Acts

The missing pieces of the EU's hydrogen puzzle

Next level of discussions regarding clean hydrogen in the EU
and how it compares to the emerging regime in the UK

Introduction

The Renewable Energy Directive 2018/2001/EU (**RED II**) came into force in December 2018 as part of the “Clean energy for all Europeans” package, establishing ambitious collective targets for the production and use of renewable energy in the EU¹.

RED II led Member States to search for alternative and effective solutions to achieve such ambitious goals, with renewable liquid and gaseous transport fuels of non-biological origin (**RTFNBOs**) taking on a pivotal role. Under RED II, RTFNBOs are fuels made from renewable sources (other than biomass and nuclear) which, with current technology, generally translates to hydrogen-based fuels.

But RTFNBO's are of wider relevance than their name may suggest. Under the amendments to RED II proposed as part of the Fit for 55 package, RTFNBO's will become RFNBOs, dropping the “transport” label and being of wider relevance to even more ambitious decarbonisation targets for the use of renewable energy in the industrial and buildings sectors.

Attention on the role of RTFNBOs (or RFNBOs) in the future European energy mix has become even more acute in the context of the European energy crisis triggered by Russia's military invasion of Ukraine. The European Commission's commitment under the RepowerEU Communication to reduce its dependency on fossil fuel imports will almost certainly accelerate the development of clean hydrogen and hydrogen-based fuels for European markets. Furthermore, the race for RTFNBOs is even more relevant given the current grains crisis caused by the conflict in Ukraine and the suspension of exports by India due to an alarming heatwave – events that will undoubtedly have an impact on the production of biodiesel.

RED II delegated the establishment of the methodology, through delegated acts, for determining: (i) the criteria that the renewable electricity used in the production of RTFNBOs needs to meet so that these fuels can be counted as fully renewable; and (ii) how the greenhouse gas (**GHG**) emissions associated with such fuels are calculated so as to determine whether such fuels would give rise to the 70% GHG emissions savings required under the terms of RED II.

After much delay and speculation, on 23 May 2022, the European Commission finally published drafts of the long awaited RED II delegated acts:

- a) the draft RED II Art 27(3) delegated act establishing the criteria for RTFNBOs classification (the **Green Hydrogen Rules**); and
- b) the draft RED II Art 25(2) and 28(5) delegated act setting a minimum threshold for GHG emissions savings of recycled carbon fuels and the methodology by which to assess the GHG emissions savings from RTFNBOs and recycled carbon fuels (the **Greenhouse Gas Emissions Rules**).

The draft delegated acts are open for public consultation until 17 June 2022 on the [European Commission website](#). After the consultations are concluded, the European Commission will propose a final text to the European Parliament and the Council, who will exercise a two-month scrutiny period over the documents; if no objections are raised, the two delegated acts can enter into force.

For a more detailed overview on RED II targets and the current status of the EU clean hydrogen projects, please consult [a separate piece](#) we have prepared in anticipation of the publication of the delegated acts.

¹ Under the recently published REPowerEU Plan, the European Commission proposed to increase further the overall 2030 target for the share of renewables in final energy consumption from 40% to 45%.

Green Hydrogen Rules

As a principle, RTFNBOs are considered renewable when the energy content thereof (ie the hydrogen component) is produced in an electrolyser that uses renewable electricity. Article 27 of RED II sets out the main ways to establish the share of renewable energy used in the production of fuels to determine whether they qualify as RTFNBOs.

It sets out three options:

- (a) the share of renewable energy used in the production of RTFNBOs can be determined by the average share of electricity from renewable sources in the country of production, as measured two years before the year of production (the **Average Share Option**);
- (b) electricity obtained from a renewable generation installation directly connected to, or within the same installation as, the fuel production facility will be treated as renewable (and thus the fuel potentially an RTNFBO) provided that the installation generating renewable electricity:
 - (i) comes into operation after, or at the same time as, the installation producing the RTFNBOs; and
 - (ii) is not connected to the grid or is connected to the grid but evidence can be provided that the electricity concerned has been supplied without taking electricity from the grid, (the **Direct Line Option**);
- (c) even when electricity is taken from the grid, such electricity may still be treated as renewable provided that such electricity is produced exclusively from renewable sources and the renewable properties and other appropriate criteria have been demonstrated, ensuring that the renewable properties of that electricity are claimed only once and only in one end-use sector (the **Grid Delivery Option**).

The Green Hydrogen Rules build on these options, establishing more detailed criteria under the above options in areas well trailed ahead of the delegated acts' publication: additionality; temporal correlation and spatial correlation.



1. Direct line option

1.1 Additionality

The additionality principle set out in the Green Hydrogen Rules is that the production of renewable hydrogen should incentivise the deployment of new renewable electricity generation capacity and not deplete or divert existing renewable capacity that is being used for other purposes.

In order to comply with these requirements, fuel producers adopting the Direct Line Option, must ensure that the installation generating renewable electricity (i) has started operating not earlier than 36 months before the RTFNBO production installation (or no later than 24 months after the initial installation came into operation in case of an addition of capacity), and (ii) is not connected to the grid, or is connected to the grid but a smart metering system that measures all electricity flows from the grid shows that no electricity has been taken from the grid to produce RTFNBOs.

Previous released versions of the proposed Green Hydrogen Rules had reportedly envisaged an additionality requirement with shorter time periods. A three year window between the start of commercial operations of the renewable generation asset and the fuel production facility therefore provides a potentially significant margin for the respective developers to manage project on project risks.

However, the inclusion of an additionality requirement under the Direct Line Option still means that there is limited ability (or incentive) for hydrogen developers to locate their facilities near to existing renewable generation.

For all of the options, the additionality requirement also means that there needs to be a significant increase in renewable generation capacity in order to supply all of the expected green hydrogen projects. Whilst the additionality principle has philosophical and environmental merit, the commercial and practical reality is that this creates a “chicken and egg” challenge for the growth of the European hydrogen economy and a risk to achieving the pace of growth required.

1.2 Spatial correlation and temporal correlation

The Green Hydrogen Rules requires a spatial correlation between the renewable electricity installation and the RTFNBOs installation. This principle aims to avoid the inability to source renewable electricity due to grid congestion and increase the likelihood that the electrons used to produce the hydrogen were the electrons that were generated at the relevant solar or wind farm.

For similar reasons, the Green Hydrogen Rules set out a principle of temporal correlation between the production of renewable electricity and the production of RTFNBOs, intending that the generation and consumption take place at the same time.

For the Direct Line Option, spatial and temporal correlation is inherent: achieved through the production of renewable electricity and RTFNBOs in the same installation or in different installations connected through a direct line. However, the plant will still need to show that the renewable electricity generated could not be sent to the grid, or if it could, prove (using smart metering technology) that no power from the grid was used to produce the hydrogen.

2. Grid delivery option

2.1 Additionality

Fuel producers that adopt the Grid Delivery Option will be required to source an (at least) equivalent amount of renewable electricity through power purchase agreements (**PPAs**) with generators that produce renewable electricity at installations that:

- (a) have entered into operation no more than 36 months before the RTFNBO production installation (or no later than 36 months after the initial installation came into operation in case of an addition of capacity); and
- (b) have not received support in the form of state aid (investment/CAPEX and operating/OPEX) (with some exceptions).

The existence of the ability to demonstrate the renewable nature of electricity supplies via a power purchase agreement is a welcome feature of the European regime in the absence of a sufficiently green power system. Without it, the growth in hydrogen production capacity in regions where large scale directly connected renewables is not physically or economically feasible would have been severely constrained.

However, in addition to the challenges described above, in the context of the Grid Delivery Option the additionality principle narrows the market of renewable generators that can participate in a PPA, causing increased competition between fuel producers and other potential corporate and industrial off-takers who are also under pressure to procure “additional” green power. This is likely to drive up prices, and so hydrogen production costs.

The Green Hydrogen Rules are not specific on the type of PPA that needs to be entered into or the evidence that needs to be provided as to the ownership of the power and associated renewable attributes. Further consideration will need to be given to whether physical/sleeved, synthetic/virtual or wholesale power purchase arrangements would be sufficient (although this may depend on whether the arrangement meets temporal and spatial correlation requirements – see below). Double-counting of guarantees of origin should also be avoided by ensuring that the guarantees of origin issued to the producer of renewable electricity are cancelled before the producer of RTFNBOs can receive guarantees of origin.

2.2 Spatial correlation

The Green Hydrogen Rules require that the renewable energy production unit is located (at the time when it came into operation) (i) in the same bidding zone² as the electrolyser, or (ii) in a neighbouring bidding zone, provided that electricity prices in the relevant time period on the day-ahead market in the neighbouring bidding zone is equal or higher than in the bidding zone where the RTFNBOs are produced, or (iii) in an offshore bidding zone adjacent to the bidding zone where the electrolyser is located.

We note that the specific accommodation of renewable electricity from offshore wind is expected to be welcomed by some of the stakeholders and some Member States are already looking into facilitating the production of offshore wind energy and creation of hydrogen hubs in coastal locations.

The proposed draft also allows Member States to introduce additional criteria concerning the location of electrolysers and the installation producing renewable electricity. This discretionary power is causing some uncertainty between producers and investors since it is not possible to foresee at this stage which further criteria may be applied by Member States.

2.3 Temporal Correlation

RTFNBOs produced via the Grid Delivery Option must also comply with temporal correlation requirements, which, in accordance with the Green Hydrogen Rules, means that they must be produced:

- (a) during the same one-hour period as the renewable electricity purchased under the relevant renewables PPA was produced; or
- (b) from renewable electricity from a storage asset that is located behind the same network connection point as the electrolyser and that has been charged during the same one-hour period in which the electricity purchased under the renewables PPA was produced; or
- (c) during a one-hour period where the clearing price of electricity resulting from single day-ahead market coupling in the bidding zone where the fuel production plant is located is lower or equal to EUR20 per MWh or lower than 0,36 times the price of the price of an European Trade System emission allowance.

The last option was not included in the previously disclosed drafts, but it may bring some flexibility to the producers.

Nevertheless, this strict temporal criteria may create operational difficulties for the producers and increase the production costs. For example, a hydrogen producer looking to optimise the economics of its project by operating the electrolysers when power prices are low will only be able to do so if it can secure a PPA with a renewable generator with variable pricing linked to the market price. Such market price based PPAs have been less common in the European corporate PPA market as renewable generators usually look for fixed price offtakes to provide the revenue stability needed to finance their projects. These were challenges that stakeholders had already pointed out, but have not been addressed by the European Commission in the proposed draft.

2.4 Curtailment

The European Commission has also provided for an exception to the above mentioned additionality and temporal correlation requirements when electricity is consumed during periods of downward redispatch ie, when renewables are curtailed. According to the Green Hydrogen Rules, an equivalent amount of electricity will count as fully renewable in that event, yet it is not clear how this will be operationalised.

² 'bidding zone' means bidding zone as defined in Article 2, point (65), of Regulation (EU) 2019/943 of the European Parliament and of the Council 4 for Member States, or an equivalent concept for third countries, ie the largest geographical area within which market participants are able to exchange energy without capacity allocation.

3. Average share option

Although the emphasis of the Green Hydrogen Rules is on the Direct Line Option and Grid Delivery Option, it also sets out the criteria for the determination of RTFNBOs produced pursuant to the Average Share Option. It provides that (i) the installation producing the RTFNBOs must be located in a bidding zone where the average proportion of renewable electricity exceeded 90% in the previous calendar year, and (ii) the production of RTFNBOs does not exceed a maximum number of hours set by reference to the proportion of renewable electricity generated in the bidding zone during a year.

The Average Share Option had been left out of the previous drafts of the delegated act but the European Commission does not provide further context on the decision to include it in the Green Hydrogen Rules. By establishing that something less than 100% renewable grid power would be sufficient does introduce some room for manoeuvre but it is still a very high bar in the context of European grids, with some stakeholders pointing out that this would only favour hydro intensive Member States. Its introduction in the document published for consultation may also be beneficial to producers since establishing these rules contributes to the certainty of applicable legislation and its interpretation, allowing the definition of the projects in accordance.

	Direct Line Option	Grid Delivery Option	Average Share Option
Additionality	<ul style="list-style-type: none"> – New renewable installations or significantly retrofitted required. – Renewables to come into operation no earlier than 3y prior to electrolyser installation (or 2y after installation for additional capacity). 	<ul style="list-style-type: none"> – New renewable installations or significantly retrofitted required. – Additionality not applicable to the initial production capacity of RTFNBOs installations that come into operation before 1 January 2027. – From 1 January 2027: <ul style="list-style-type: none"> – renewables operation to come into operation no earlier than 3y prior to electrolyser installation (or 3y after installation for additional capacity). – renewable plant must not have received operating aid or investment aid (with some exceptions) 	N/A
Spatial correlation	<ul style="list-style-type: none"> – Physically linked renewable electricity generation. – Production of renewable electricity and RTFNBOs in same installation or in different installations connected through a direct line. 	<ul style="list-style-type: none"> – Grid connected with power purchased under a PPA with an economic operator producing renewable power. – Renewable energy production unit is located: <ul style="list-style-type: none"> – in the same bidding zone as the electrolyser; or – in a neighbouring bidding zone with aligned or higher prices; or – in an offshore bidding zone adjacent the RTFNBOs installation zone. 	N/A
Temporal correlation	N/A	<ul style="list-style-type: none"> – Until 31 December 2026: <ul style="list-style-type: none"> – temporal correlation requirement is one calendar month (except for projects that receive state aid support that is not CAPEX based, which remains one hour). – From 1 January 2027: <ul style="list-style-type: none"> – hydrogen to be produced in the same hour as renewable electricity is generated. – if hydrogen produced from power from behind the meter storage, renewable electricity to have been charged into storage within the same hour as renewable electricity produced. – during a one-hour period where the clearing price of electricity resulting from single day-ahead market coupling in the bidding zone is lower or equal to EUR20 per MWh or lower than 0,36x the price of an ETS emission allowance. 	N/A
Other Criteria	N/A	N/A	<ul style="list-style-type: none"> – Electrolyser to be in bidding zone with more than 90% renewables. – Cap on full-load hours depending on share or renewables.

4. Global application

The Green Hydrogen Rules are not only relevant to projects in the EU. They expressly provide that the rules will apply regardless of whether the RFTNBO was produced inside or outside the EU. The arrangements prescribed under the Green Hydrogen Rules will therefore be of relevance to any hydrogen producers or distributors looking to European downstream markets. In any event, many actors in the nascent hydrogen value chain are looking to the EU as the benchmark for sustainability requirements in respect of green hydrogen.

It is not clear how some of the concepts in the Green Hydrogen Rules will be applied to production projects outside of the EU. For example, the concept of a “bidding zone” or the exclusion of renewable installations that have received “operating aid” or “investment aid” – does this exclude renewable tax credits so widely utilised in the USA for example?

5. Grace periods and grandfathering

In order to allow the development of the necessary technology and the ramp up of the hydrogen economy, the European Commission recognizes the need to gradually phase-in the additionality and temporal correlation criteria. It has therefore established a transitional period until 31 December 2026. During this period, the additionality criteria for the Grid Delivery Option (i.e., the term for the entry into operation of the renewable energy production installation and the absence of operating or investment aid) shall not apply, and the temporal correlation requirement is increased from one calendar hour to one calendar month (except for projects that receive state aid support that is OPEX based such as Contracts for Difference and Feed in Tariffs, for instance, in which case the temporal correlation remains one hour).

Moreover, the above mentioned additionality criteria for Grid Delivery Option will not apply at all to the initial production capacity of installations producing RTFNBOs that come into operation before 1 January 2027.

The establishment of a transitional phase was highly anticipated by stakeholders and will favour the development of the hydrogen European Market. The approval and publication of the Green Hydrogen Rules in accordance with the current proposal may likely cause an acceleration in the timetables of ongoing and upcoming projects in the next 5 years as producers seek to take advantage of the grandfathering of projects that are operational before 2027.



Greenhouse Gas Emissions Rules

Article 25 (2) Red II stipulates that the greenhouse gas emissions savings from the use of RTFNBOs shall be at least 70% (compared to fossil fuel). However, the directive itself does not contain the details on how to calculate this 70% greenhouse gas emissions savings requirement. Instead, Article 28 (5) RED II foresees that the European Commission shall adopt a delegated act that specifies the methodology necessary in this regard. Against this background the European Commission has published the Greenhouse Gas Emissions Rules.

The Greenhouse Gas Emissions Rules propose to set the fossil fuel comparator for RTFNBOs at 94 gCO₂eq/MJ. In light of the 70% reduction requirements, this fossil fuel comparator translates to a threshold of 28.2 gCO₂eq/MJ that the fuel has to meet in order to be considered a RTFNBO.

In order to determine this threshold, the European Commission highlights that the full life-cycle emissions must be taken into account. Details on the relevant segments of inputs for such life-cycle analysis are set out in the Annex of the Greenhouse Gas Emissions Rules. These include the emissions from the supply of inputs; processing; storage, transport and distribution and combusting the fuel in its end use.

An important part of that life-cycle if of course the electricity used to produce the RTFNBO. Electricity qualified as fully renewable in accordance with Article 27 RED II shall be attributed zero greenhouse gas emissions.

Another important point to mention is that the life-cycle may include carbon capture technologies. However, only specific segments of carbon capture technologies are recognised by the Greenhouse Gas Emissions Rules. A prominent role has carbon capture technology with permanent geological storage in accordance with Directive 2009/31/EC. Furthermore, the Greenhouse Gas Emissions Rule points out that capturing of emissions from non-sustainable sources should only be considered as avoiding emissions until 2035. Many details remain open in this regard. Nevertheless, the wording of the Greenhouse Gas Emissions Rules suggests that carbon capture technology may very well play an important role in the future of RTFNBOs in the EU.

On-going Discussions and Public Consultation

The publication of the delegated acts is a crucial step for setting the European green hydrogen landscape and is set to affect not only the structuring of upcoming hydrogen projects, but also the national legislation to be adopted by each Member State. Additionally, non-EU producers are also invested in understanding this regulation and how it may have an impact on their business and future investments.

Although the drafts seem to bring some sound solutions, there is still a degree of uncertainty and dissatisfaction in some of the matters addressed therein, particularly whether Member States will adopt further criteria, the operationalisation of the curtailing exception and the application of the regulations to RTFNBOs produced outside the EU, which hopefully will be clarified soon.

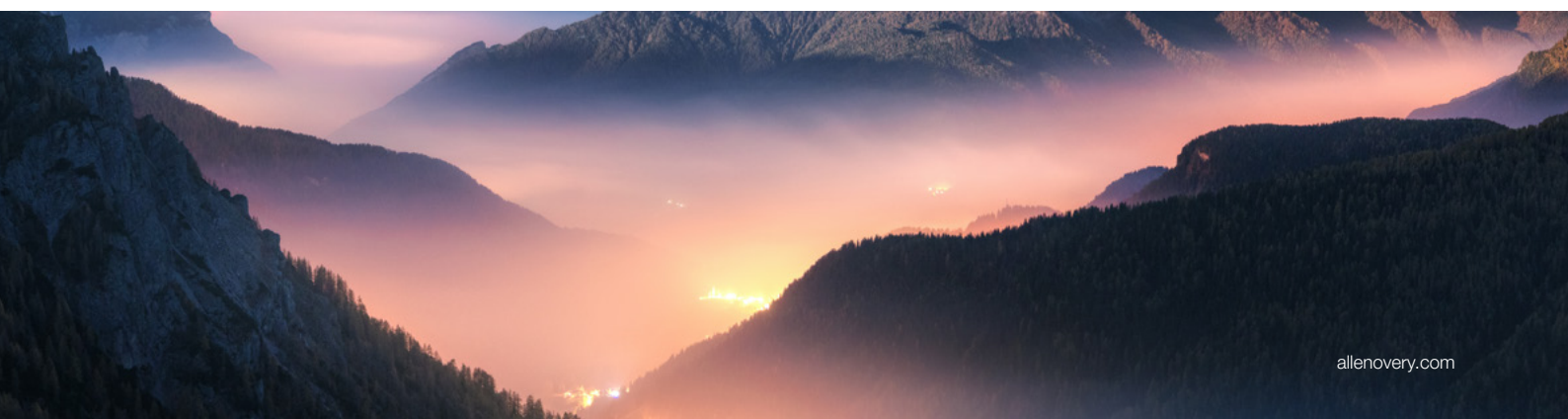
As we have seen from the reactions to different drafts of the delegated acts that have been released to the public in the past, the consultation period is expected to bring to the table

lively discussions and some opposition from stakeholders to the strictness of some of the criteria and the implications that the rules could have on the price of production of renewable hydrogen as a direct consequence.

A good example is the criticism already brought to light by leading organizations such as Hydrogen Europe, on the temporal correlation for the Grid Delivery Option as from 2027 where in their view “an hourly correlation as currently suggested will strongly limit the ability of hydrogen producers to produce above 40% of the time for most parts of Europe (3,500 hours) unless the projects are extremely oversized (eg 1,200 MW of renewables for 200MW of electrolysers) and incorporate large batteries, leading to significantly higher costs for hydrogen³”.

If you require any assistance in understanding the implications of the delegated acts for your projects or potential investments, please reach out to one of our experts across A&O's global network.

³ <https://fuelcellsworld.com/news/hydrogen-europe-delegated-acts-to-decide-the-role-of-renewable-hydrogen-in-decreasing-dependency-on-fossil-fuels/#:~:text=On%20Fossil%20Fuels-Hydrogen%20Europe%3A%20Delegated%20Acts%20to%20Decide%20the%20Role%20of%20Renewable,Decreasing%20Dependency%20on%20Fossil%20Fuels&text=The%20European%20Commission%20has%20finally,the%202018%20Renewable%20Energy%20Directive.>



UK low carbon hydrogen standard

At a glance comparison

The UK government has committed to a significant role for hydrogen in the UK's net zero pathway. The British Energy Security Strategy published in April 2022 contained a target of 10GW of low carbon hydrogen production being operational by 2030, doubling the previous target of 5GW set in the UK Hydrogen Strategy in July 2021 and the UK Net Zero Strategy in October 2021. The UK Government expects at least half of this low carbon hydrogen to come in the form of "green" hydrogen.

To support the achievement of these targets, the UK Government is taking a number of steps to support the commercial deployment of low carbon hydrogen projects during the 2020s. One of these steps is the development of a UK Low Carbon Hydrogen Standard (LCHS), which will be used in the first instance to determine "green" eligibility standards and criteria for receiving support from UK Government funding schemes.

The LCHS envisages off-grid generation (via physical direct connection), grid connected supply via contractual link and grid imported and addresses the same themes as are dealt with in the delegated acts, but has reached different landing spots in a number of cases.

– **Evidence of energy attributes and low carbon electricity generation attributes:** Evidence needs to be provided that the hydrogen producer has exclusive ownership of the low carbon attributes of the electricity consumed to cover the amount of electrolytic hydrogen produced and demonstrate that there has been no onward selling or other use of the energy attribute information used in hydrogen production. Evidence is also required to show that low carbon electricity generation has been sourced or purchased and consumed in hydrogen production, to prove the hydrogen producer has a

link to the low carbon source for the settlement periods being claimed (eg via a wholesale purchase agreement or PPA specifying the generator name, PPA in place and location).

- **Additionality:** There are **no mandatory additionality requirements** under the LCHS. However, additionality principles may apply to specific assessment criteria for securing higher levels of government funding.
- **Spatial correlation:** There are **no spatial correlation requirements** under the LCHS.
- **Temporal correlation:** Hydrogen producers are required to provide data to prove that the electrolyser is consuming electricity in the same **30-minute** settlement period as the electricity generation input source.
- **Greenhouse gas emissions threshold:** Hydrogen produced must meet a threshold of **20g CO_{2e}/MJ** or less, taking into account greenhouse gas emissions up to the point of production. This means that emissions associated with hydrogen infrastructure after production and transportation to the consumption location are not included in the assessment under the LCHS (although they may be relevant to GHG emission assessments for other purposes).

The UK also operates the Renewable Transport Fuel Obligation (RTFO) which was introduced to implement the requirements of RED II in respect of renewable transport fuels. As with the European rules, the RTFO rules have also been the subject of recent consultation, particularly in relation to the use of PPAs as evidence of renewable energy supply, temporal correlation and additionality requirements. Updated guidance on these issues in the context of RTFO is still awaited.

	UK – Low Carbon Hydrogen Standard	RTFNBO under RED II (and delegated acts)
Purpose	Access to subsidy/support schemes	Contribution to EU renewable energy use targets
Direct connection/ private wire power permitted	✓ Yes	✓ Yes
Grid connected power (via PPA) permitted	✓ Yes	✓ Yes
Grid import power permitted	✓ Yes	✓ Yes
Additionality requirement	✗ No* <small>*but may be part of subsidy eligibility criteria</small>	✓ Yes
Temporal correlation requirement	30 minutes	1 hour
Geographical correlation requirement	✗ No	✓ Yes
GHG emissions requirement	20g CO _{2e} /MJ LHV at point of production	70% GHG emissions savings (in comparison to fossil fuel) at point of use
Transitional arrangements	✗ No	✓ Yes

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