

Implications of the “Fit for 55” package for the market development of powerfuels

Insights from the Powerfuels Brief on 2 August, 2021



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Introduction

Powerfuels – green hydrogen and gaseous and liquid fuels from power-to-X processes using renewable electricity – will play an indispensable role in achieving the European Climate Law’s 2030 climate target of **reducing emissions by 55%** and, ultimately, the goal of climate neutrality by 2050.

To put the European Union on track in reaching its 2030 goal and deliver on the targets of the European Green Deal, the European Commission released its long-awaited **“Fit for 55” package** mid-July 2021. The package includes 13 legislative proposals that will substantially shape the regulatory framework on climate and energy across the EU over the coming decade. As such, the package will also have a considerable impact on the development of powerfuels in all EU member states and beyond.

In order to discuss the content of the package, its implications for powerfuels project development, and identify critical points to be addressed in the policy-making processes of the upcoming years, the Global Alliance Powerfuels gathered policy and industry experts in a digital event as part of its “Powerfuels Brief” series on August 2, 2021.

In the event, the Alliance’s in-house experts and three guest speakers presented their preliminary analysis of the package. The presentations were followed by a moderated discussion with several policy experts from renewable hydrogen initiatives and industry, as well as a Q&A session with contributions from the audience.

The following speakers presented their insights and joined the panel discussion:

- **Johanna Friese**, Expert International Energy Policy, Global Alliance Powerfuels
- **Friederike Altgelt**, Expert Sustainable Mobility and PtX Technologies, Global Alliance Powerfuels
- **Christian Pho Duc**, CTO & Managing Director H2 Projects, Smartenergy
- **Joana Santos Vaz**, EU Public Affairs & Business Development Manager, Smartenergy
- **Stefan Gielis**, EU Public Affairs Manager, Air Liquide
- **François Paquet**, Impact Director, Renewable Hydrogen Coalition

Kilian Crone, Team Lead of the Global Alliance Powerfuels, moderated the event.

1 Guaranteeing demand and enabling development at scale

Regulatory proposals are headed in the right direction, but not sufficiently ambitious to unlock investments in the required dimensions.

Overall, renewable hydrogen and other powerfuels have an important role in the “Fit for 55” package across a number of updated and newly introduced directives and regulations, even though none of the legislative proposals exclusively targets the market development of these energy carriers.

Guaranteeing a **stable and predictable demand** for powerfuels constitutes one of the central requirements for accelerating their market integration. Recognising the need for such a secured market ramp-up, both the suggested revisions to the recast of the Renewable Energy Directive (REDII) and the proposal for a regulation under the ReFuelEU Aviation initiative set **sub-targets for Renewable Fuels of Non-Biological Origin** (RFNBOs). In the Commission’s proposal for the revision of the REDII, a target for RFNBOs of 2.6% of the energy supplied to the transport sector in 2030 is established. In addition, the Commission also proposes to introduce a sub-quota for RFNBOs used in industry of 50% of the hydrogen used in the sector in 2030, excluding for the production of conventional fuels. The ReFuelEU Aviation proposal, on the other hand, introduces a blending mandate for PtL-kerosene of 0.7% of the total volume of aviation fuel made available to aircraft operators at Union airports.

The speakers universally endorsed the use of dedicated RFNBO sub-targets, even though the Global Alliance Powerfuels remarked that it should be assessed whether the **level of ambition could be increased further** to support a faster market ramp-up. In a poll open to all participants of the event, 42% stated that they considered the RFNBO sub-quotas proposed by the Commission in the “Fit for 55” package to be too unambitious.

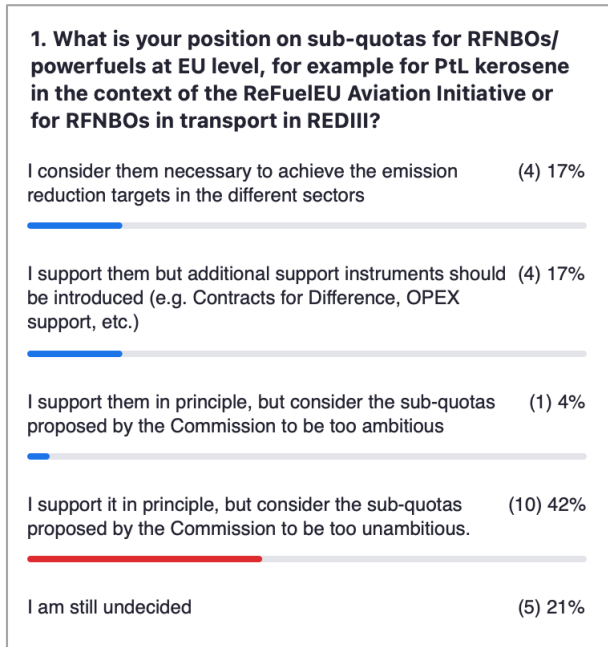


Figure 1 Results of the poll during the Powerfuels Brief on the sub-quotas for RFNBOs in the “Fit for 55” package

According to preliminary estimates of the Global Alliance Powerfuels, the 2.6% sub-quota for RFNBOs in transport could lead to the market integration of approximately 340PJ/94 TWh of RFNBOs in 2030 across the EU. Approximately 62.4 PJ of these, equivalent to 520,000 tonnes, could be e-kerosene supplied to meet the 0.7% target set out in the ReFuelEU Aviation Regulation.

As Joana Santos Vaz, EU Public Affairs & Business Development Manager, and Christian Pho Duc, CTO & Managing Director H2 Projects, at Smartenergy pointed out, projects with corresponding production capacities will have to be built up in order to supply the powerfuels volumes the quotas mandate. Currently, the annual **capacity of operating and planned projects** in Europe is only a fraction of what would be needed to meet the 2030 RFNBO targets in transport, including the specific quota for aviation, and industry.

However, regulatory proposals that remain outstanding, in particular the delegated acts of the Renewable Energy Directive specifying criteria for electricity and carbon sources for the production of powerfuels, cause **investment uncertainty**. As the speakers pointed out, this in turn hinders project developers from accessing the funding needed to move their project pipeline into execution. As both questions regarding permissible ways of sourcing renewable electricity for electrolysers and on the methodology for accounting carbon as an input factor for powerfuels production remain open, this affects both hydrogen and carbon capture projects.

Another fundamental bottleneck to reach scale is the expansion of additional renewable electricity generation capacity. François Paquet highlighted today's permitting processes for renewable electricity generation projects across the EU to be too slow and complex to allow for such an expansion, putting the emergence of a green hydrogen economy in jeopardy if these are not accelerated and simplified.

The "Fit for 55" package expands funding options for renewable hydrogen and other powerfuels projects, e.g., by endowing the **EU Innovation Fund** with additional revenues from auctions of carbon certificates under the newly established separate Emissions Trading System (ETS) for road transport and buildings, which is proposed to come into operation in 2026. According to estimates of the environmental non-profit think tank Sandbag, the **endowment** of the Innovation Fund could **reach over €50bn until 2030** at a carbon price of €55/t.¹

Along with the inclusion of maritime transport in the existing EU ETS by 2026 (after a three-year phase-in period), the scope of the Innovation Fund is also extended to **support projects to decarbonize the maritime sector**, including investments in RFNBOs. Here, the proposal explicitly mentions hydrogen and ammonia. In addition, the range of funding instruments that the Innovation Fund can support is extended to **carbon contracts for difference** (CCDs).

The speakers welcomed these changes, particularly the extension to support instruments like CCDs in ad-

dition to more traditional measures like loans and direct subsidies. According to Smartenergy, CCDs can provide additional security for investors in innovative climate-friendly powerfuels technologies by guaranteeing a fixed price above the current EU ETS price. However, they also stated a **need for additional clarity on the potential funding instruments and the specific eligibility criteria for projects**. Similarly, François Paquet from the Renewable Hydrogen Coalition expressed the concern that the lack of specification of the types of projects or technologies that could be supported via instruments such as CCDs leaves open which "decarbonisation projects" would benefit. In specific, the RCH argued, such CCfDs could subsidize the uptake of low-carbon instead of renewable hydrogen, bearing the **risk of undesirable lock-in effects** in fossil-based technologies.

The Global Alliance Powerfuels shared the support for price-competitive tendering mechanisms. Regarding the Innovation Fund and its potential role in supporting powerfuels projects, Friederike Altgelt from the Alliance's project team added that the Commission's proposal for the revision of the ETS Directive restricts technologies that are eligible for support under the fund to those that are "innovative" in addition to not being commercially viable at scale yet. It hence remains unclear whether certain powerfuels technologies, e.g. for the production of green hydrogen, which are no longer new or disruptive but are not yet economical, will qualify for funding.

¹ Sandbag, 2021: ETS reform: under the hype, a sense of déjà-vu. Retrieved from: <https://sandbag.be/index.php/2021/07/15/ets-reform-under-the-hype-a-sense-of-deja-vu/>

2 Closing the cost gap to fossil fuels

Determining the impact of the “Fit for 55” package on the costs of green hydrogen is challenging and will remain a major focal point in further analysis of the package’s implications.

On the one hand, **the targets and quotas** for the use of RFNBOs found in several proposals (see previous chapter) could contribute to bringing down electrolyser costs, as they will help to **create a stable and considerable demand** and therefore enable the cost-decreasing benefits of **economies of scale**. The speakers at the event agreed that the targets included for RFNBOs constitute a step into the right direction. However, these targets only partially address the challenge of bridging the cost gap between renewable energy carriers such as powerfuels and their fossil equivalents.

Robust carbon pricing is a key instrument to create a level-playing-field for renewable energy carriers. In this respect, the **revision of the EU ETS**, containing a significant proposed reduction of allowances and a higher level of ambition overall, is expected to result in an **increase of the CO₂ price** to potentially 80-100€ by 2030, making green hydrogen more cost competitive vis-à-vis grey hydrogen. The proposed new separate ETS for road transport and buildings is also likely to incentivise the use of renewable fuels such as RFNBOs in these sectors.

The speakers pointed out that expanding the scope of the ETS and **increasing ambition on carbon pricing will make grey hydrogen more expensive** but will likely **not be sufficient to fully close the cost gap** and make green hydrogen cost-competitive. This is why, in the opinion of all speakers, **multiple support schemes and policies are needed on top of a robust CO₂ price**. As for the structure and design of these funding mechanisms, industry players remarked the need for subsidies covering both capital expenditures (CAPEX) and operating expenses (OPEX). This would facilitate the

market entry of smaller projects and eliminate a disadvantage for smaller investors and first-movers. In this context, Francois Paquet (RHC) also pointed to the importance of clearly defining the rules for compatibility of state support for RFNBOs with EU law in the state aid guidelines for climate, environmental and energy measures expected to be adopted at the end of 2021.

Notably, the production of hydrogen via water electrolyzers is to be included in Annex I of the EU ETS, making **renewable and low carbon facilities eligible for free allowances** from 2026. The Global Alliance Powerfuels as well as most of the external speakers generally welcomed this inclusion, pointing out, however, that the proposed minimum production capacity of 25 tonnes per day would **exclude electrolyzers with a capacity of less than app. 76 MW²**. This would hence inhibit the development of small-to-mid scale electrolyzers.

Through the proposed introduction of a Carbon Border Adjustment Mechanism (CBAM), **imports of powerfuels into the EU would become relatively more attractive compared to their fossil equivalents**, as importers of certain industrial products would have to buy carbon certificates for embedded emissions in the respective products from a separate pool of certificates with prices aligned to EU ETS. With fertilisers being included in the list of sectors covered by the CBAM, the production and import of renewable hydrogen-based ammonia could benefit in particular. According to estimates of the Global Alliance Powerfuels, a CBAM price of €55/tCO₂ would add costs to the import of so-called grey hydrogen from steam methane reforming of approximately €0.49-0.72€/kg

² Assuming 4,000 full-load hours

hydrogen³, hence incentivising the switch to low-carbon or renewable alternatives.

As far as the changes to the Energy Taxation Directive (ETD) are concerned, **RFNBOs are consistently put into the lowest taxed category** and would benefit from a long-term minimum tax rate of 0.15€ from 2023 onwards. This would have a **direct impact on the costs of RFNBOs**. With electricity always taxed at the lowest rate, indirect costs through use of renewable electricity in electrolyzers would also be reduced. RFNBOs would also benefit from being exempt of any taxes over a ten-year transitional period in the aviation and shipping sector (intra-EU).

In their presentations, the Renewable Hydrogen Coalition and Smartenergy particularly welcomed the preferential tax rates for the use of renewable hydrogen for end consumers. **Preferential tax rates for the use of low carbon hydrogen**, on the other hand, **were discussed controversially**. According to the European Commission's proposal, low-carbon fuels will benefit from a fixed minimum tax rate over a transitional period from 2023-2033. However, low-carbon fuels are inherently advantaged being the cheaper option. Both the Renewable Hydrogen Coalition and Smartenergy agreed that the proposal to extend minimum tax rates to low-carbon fuels over a ten-year transitional phase is problematic, as **this could cause undesired lock-in effects on fossil fuels and sends unclear signals to investors**.

Overall, the presented package boosts the business case for renewable hydrogen and other RFNBOs according to the assessment of the Global Alliance Powerfuels. The package tackles the cost challenge for hydrogen from several angles. However, just as rising CO₂ prices so far have not been enough to get green hydrogen to a competitive level, tax reductions alone will not suffice, either. **It is the combination of improvements of regulatory conditions for RFNBOs seen in the different policy proposals that will have to come together to achieve cost-competitiveness**. However, even the sum of proposals for support instruments and changes in the policy framework will likely not suffice, which is why **additional support from**

the policy framework is crucially needed for industry to invest into and use green hydrogen.

Feelings about the impact of the "Fit for 55" package on hydrogen therefore remain mixed. The fact that the provisions for RFNBOs are spread out across the different proposals complicates reaching a comprehensive understanding of the overall impact. This fragmentation, together with them having been developed by different directorates, bears the **risk of incoherence of the hydrogen policy framework** as a whole. In all further analysis, it should be kept in mind that future changes to one proposal will possibly necessitate changes in other parts of the package as the different parts of the package interact with each other.

³ Assuming life-cycle emissions of 9-13 kg CO₂/kg H₂ in accordance to the literature. See IEA, 2019: Future of Hydrogen; Greenpeace Energy, 2020: Kurzstudie Blauer Wasserstoff; Timmerberg et al., 2020: Hydrogen and hydrogen-derived fuels through methane decomposition of natural gas - GHG emissions and costs; Burmistrz et al., 2016: Carbon footprint of the hydrogen production process utilizing subbituminous coal and lignite gasification.

3 Establishing a methodology for accounting RFNBOs to targets

Regarding the accounting of RFNBOs to (sector-specific and economy-wide) renewable energy and GHG reduction targets, the REDIII proposal establishes that the consumption of RFNBOs is to be **accounted in the sector in which they are consumed**. To avoid double-counting, the renewable electricity used in the production of RFNBOs is not included in the calculation of the gross final consumption of renewable energy in the Member State. Such a provision would allow to count real energy consumed and also enable the accounting of RFNBOs imported into the EU. With regard to **ensuring sustainability of RFNBOs**, the proposal adds that RFNBOs can only be counted towards the renewable targets if the emissions savings are at least 70%. In addition, Member States would have to require economic operators to prove that sustainability criteria are met. Both obligations described above are also extended to renewable fuels that were imported and apply regardless of the end-use sector (whereas currently, they only applies to RFNBOs used in transport).

In addition, the scope of the **union database**, which tracks supply chains, will be expanded to cover RFNBOs beyond transport to enable the tracing of RFNBOs and their life cycle emissions. This makes an important contribution to the **monitoring of production and consumption of RFNBOs**.

The proposal on the revision of the ETS also includes certain provisions on the **accounting of GHG emissions from carbon-based RFNBOs**. First, the proposed directive states that GHG emissions from industrial processes that are not directly released should be considered emissions under the ETS and operators hence have to surrender allowances if the respective are not permanently stored or bound in products. In

the case of RFNBOs that use CO₂ as a feedstock, like synthetic methane and kerosene, the CO₂ is only temporarily bound and eventually released when the RFNBO is used. Therefore, CO₂ from industrial sources covered by the ETS and used in their production would have to be covered by allowances.

For this case, the directive states that **when RFNBOs are produced from captured CO₂ from an industrial installation or activity that is covered by the ETS, the emissions should be accounted under that activity**. On the question of how to account for the eventual release of CO₂ to avoid double-counting or evasion of certificates, the Commission plans to follow up with an implementing act in the future (see Article 16 (1)).

In its paper "Carbon Sources for Powerfuels Production"⁴, the Global Alliance Powerfuels proposed to differentiate between the use cases of powerfuels in ETS and non-ETS sectors. If the carbon is used in a non-ETS sector, but captured from an industrial point source within the ETS, the "original emitter" (industrial plant) requires allowances for captured carbon, but the end user can credit emission reductions to sector-specific mitigation targets. In this way, emissions allowances cannot be bypassed. On the other hand, if the end-use sector is also covered by the ETS, emissions in end-use are accounted for within the EU's carbon pricing scheme, reducing the problem of bypassed emissions. To ensure that certificates for the carbon captured and used for the production of powerfuels only need to be surrendered once, the industrial plant would still require allowances for captured carbon but the end-users of the products containing the carbon would not require or could sell the

⁴ https://www.powerfuels.org/fileadmin/powerfuels.org/Dokumente/GAP_Discussion_Paper_Carbon_Sources_for_Powerfuels_Production.pdf

respective allowances. The former case is what can now be found in the EC's proposal.

Johanna Friese from the Global Alliance Powerfuels project team outlined several **challenges with the accounting of CO₂ used in RFNBO production** that are **not yet addressed in the legislative proposal**.⁵ Firstly, projections indicate that a significant share of carbon-based powerfuels will be produced in regions outside the EU and industry in these markets often does not face emission caps comparable to the ETS. A CBAM can alleviate but does not solve this challenge, as emissions from sectors outside the CBAM would remain unaccounted for. Furthermore, fully counting emissions at the stage of capture, and crediting reductions at the end-use stage, would result in all powerfuels being treated equally at the use stage in terms of their GHG reduction potential.

Smartenergy welcomed the inclusion of RFNBOs in the EU certification system for renewable fuels as part of the revision of the RED II as a positive signal for the production of carbon-neutral fuels but also spotlighted the **need for reporting sustainability characteristics**, including RFNBO's life cycle GHG emissions starting from production to consumption, via a common EU-wide scale. Stefan Gielis emphasised the **importance of the upcoming delegated act on sustainability criteria for sourcing electricity for powerfuels production**, as the definition of these criteria will determine the cost and scalability of hydrogen projects. Francois Paquet from Renewable Hydrogen Coalition highlighted the importance of setting enabling additionality criteria in the upcoming delegated act to support the ramp-up of powerfuel production volumes. He also stressed that authorities should also in parallel remove bottlenecks towards building up additional renewable electricity generation capacity to meet the extra electricity demand for powerfuels. The Global Alliance Powerfuels pointed out to its recently published position paper on the delegated act⁵, which contains concrete suggestions for the elaboration of the criteria of temporal and geographical correlation as well as additionality.

⁵ <https://www.powerfuels.org/newsroom/news/global-alliance-powerfuels-publishes-position-paper/>

4 Providing and adapting infrastructure and refuelling stations

The new “Alternative Fuels Infrastructure Regulation” (AFIR) repeals the current directive on the deployment of alternative fuels infrastructure and establishes binding and directly applicable obligations for Member States. This avoids delay in national transposition processes. The key provision of the regulation regarding the development of powerfuels infrastructure is the **definition of targets to build up a sufficiently extensive network of hydrogen refuelling stations** to make the large-scale deployment of hydrogen-powered vehicles possible. Specifically, the AFIR obliges Member States to deploy one publicly accessible hydrogen refuelling stations with a minimum capacity of 2t/day every 150 km along the Trans-European Transport Network (TEN-T) core network and the TEN-T comprehensive network, as well as in every urban node, by 2030.

While Joana Santos Vaz and Christian Pho Duc, Smartenergy, welcomed these targets as an important measure to advance hydrogen applications in road mobility, they criticised that the use of other powerfuels in road transport is not recognized, e.g., in the revision of the CO₂ standards for new cars and vans. Stefan Gielis endorsed the proposals for the build-up of hydrogen refuelling stations in the AFIR, but pointed out the **lack of specific targets for hydrogen infrastructures at ports and airports**. Finally, the Renewable Hydrogen Coalition equally voiced support for the regulation and the proposed targets to ensure the availability of a certain minimum number of publicly accessible hydrogen stations.

The speakers emphasised that beyond the “Fit for 55” package, central legislative proposals concerning the decarbonisation for hydrogen and gas markets are still outstanding and will be presented as part of the so-called **“gas package” before the end of 2021**. The package includes the review and revision of the Gas Directive 2009/73/EC and Gas Regulation (EC) No 715/2009. It aims to ensure that the gas market framework is in line with the EU’s “Fit for 55” ambition, and will write into legislation the measures outlined in the respective strategies for hydrogen and energy system integration. Specifically, the package targets the emergence of cost-effective hydrogen infrastructure and contestable hydrogen markets as well the access of renewable and low-carbon gases to the infrastructure and the market.



About the Global Alliance Powerfuels

The **Global Alliance Powerfuels** was founded in 2018 and is backed by 16 member organisations and an international network of partner institutions. It is coordinated by the German Energy Agency (dena). All members and partners are united by the common goal of advancing the development of sustainable markets for powerfuels.

Further details about the Alliance and its activities can be found at www.powerfuels.org.