

eFuels, a game-changer?

Is the EU Renewable Energy Directive regime too 'rigid' to attract low-carbon fuel investment and supply? Mark Rowley, Shane Wilson and Chad Passlow of Baker Botts consider the EU approach to the more sustainable eFuel sector.

At COP28 in Dubai, world leaders reached an historic agreement, dubbed the “UAE consensus”, to “transition away from fossil fuels..., in a just, orderly and equitable manner...,” and to a “tripling of renewable energy capacity globally...by 2030”. The UAE consensus has announced an accelerated shift away from fossil fuels towards a more sustainable energy future that will hopefully accelerate investment in clean fuel alternatives. In the transition to a clean energy future, investors and traditional energy producers alike will need to evaluate what the transition means for their businesses and how they can participate in the shift towards a clean energy future.

One of the potential near-to-medium term low-carbon fuel alternatives is the “eFuel” sector. Projects for eFuels and other low carbon fuels transform low-carbon hydrogen (generally green hydrogen produced from renewable power and electrolysis) into low-carbon fuels by adding captured carbon (typically from biogenic or CDR sources), resulting in “carbon-neutral” hydrocarbons that will release captured carbon (i.e., be net “neutral” to the balance of carbon in the atmosphere). Although eFuels still emit “recycled” carbon, much of that carbon will be captured for that purpose, including by direct air capture, and those eFuels can (as a “drop-in fuel”) help to decarbonise hard to abate uses in the near term by using existing infrastructure, combustion engines, downstream refueling and storage facilities, distribution facilities, and other end-user infrastructure, without significant additional investment or modification. Thus, eFuels represent a fast transition solution at lower overall investment levels.

As investors and traditional energy providers consider the nascent eFuel market, much of their attention will focus on the end-customer market policies and incentives. Demand for eFuels and other

clean fuel alternatives, as well as any premium or forced-use subsidy, will be driven by the end-use markets (for example the European Union’s Renewable Energy Directive and California’s Low Carbon Fuel Standard (LCFS) requirements). In this context, we take a closer look at how the end-customer market regulatory environment for eFuels (defined as RFNBOs in the EU) will, across different geographies, impact that investment decision (especially at the early-stage project development stage), starting with the European Union¹.

THE EU APPROACH

The Renewable Energy Directive² (RED III) (together with its delegated acts) is the legal framework in the EU for the development of clean energy across all sectors. The Production Delegated Act³ sets out the production requirements for renewable fuels of non-biological origins (“RFNBOs”) (i.e., green hydrogen and derivative eFuels, such as e-methanol, e-gasoline, e-kerosene), and the GHG Delegated Act⁴ sets out the methodology for calculating the GHG savings and emissions. The production and GHG requirements apply equally to projects developed within the EU and export projects being developed outside the EU. As such, the RED III and the Delegated Acts will define the domestic market for eFuels and drive demand for such eFuels domestically within the EU and, to a large extent, internationally.

EU TARGETS

One of the complementary aspects of the EU legislation that will ultimately drive demand for qualifying eFuels (including the import of qualifying eFuels from overseas) are the mandatory targets (quotas) for RFNBO (i.e., green hydrogen and other qualifying eFuel) use in industry and the transportation sector. For industry, Red III requires a 1.6 per cent annual increase in renewable energy usage with at least 42 per cent of hydrogen used for energy

and non-energy purposes in the industry coming from RFNBOs by 2030, and 60 per cent by 2035. The 2030 quotas for use of RFNBOs in the transport sector are also increased (from 2.6 percent to 5.7 percent) with a minimum requirement of 1 per cent RFNBOs in the transportation sector by 2030. In addition:

- (i) FuelEU Maritime sets out targets for the yearly average GHG intensity of energy used on board by a ship during a reporting period and couples this with incentive multipliers to reward ships for the use of qualifying eFuels; and
- (ii) ReFuelEU Aviation supports blending mandates by requiring that aviation fuel made available to aircraft operators at each EU airport to contain minimum shares of Sustainable Aviation Fuels (starting at 2 per cent in 2025, 6 per cent by 2030 (with a minimum share of synthetic aviation fuels) and 70 per cent by 2050 (of which 35 per cent must be synthetic aviation fuels)) and also requiring that the yearly quantity of aviation fuel uplifted by a given aircraft operator at a given EU airport shall be at least 90 per cent of the yearly aviation fuel required.

Although this article focuses on RFNBOs or qualifying eFuels (given the centrality of these transitional fuels to demand-based quotas and stringent decarbonisation requirements), it should be noted that

non-RFNBOs (i.e. other low carbon fuels that do not qualify as RFNBOs in the EU) can still be imported into the EU and will continue to have value in the EU and other markets in the short to medium term.

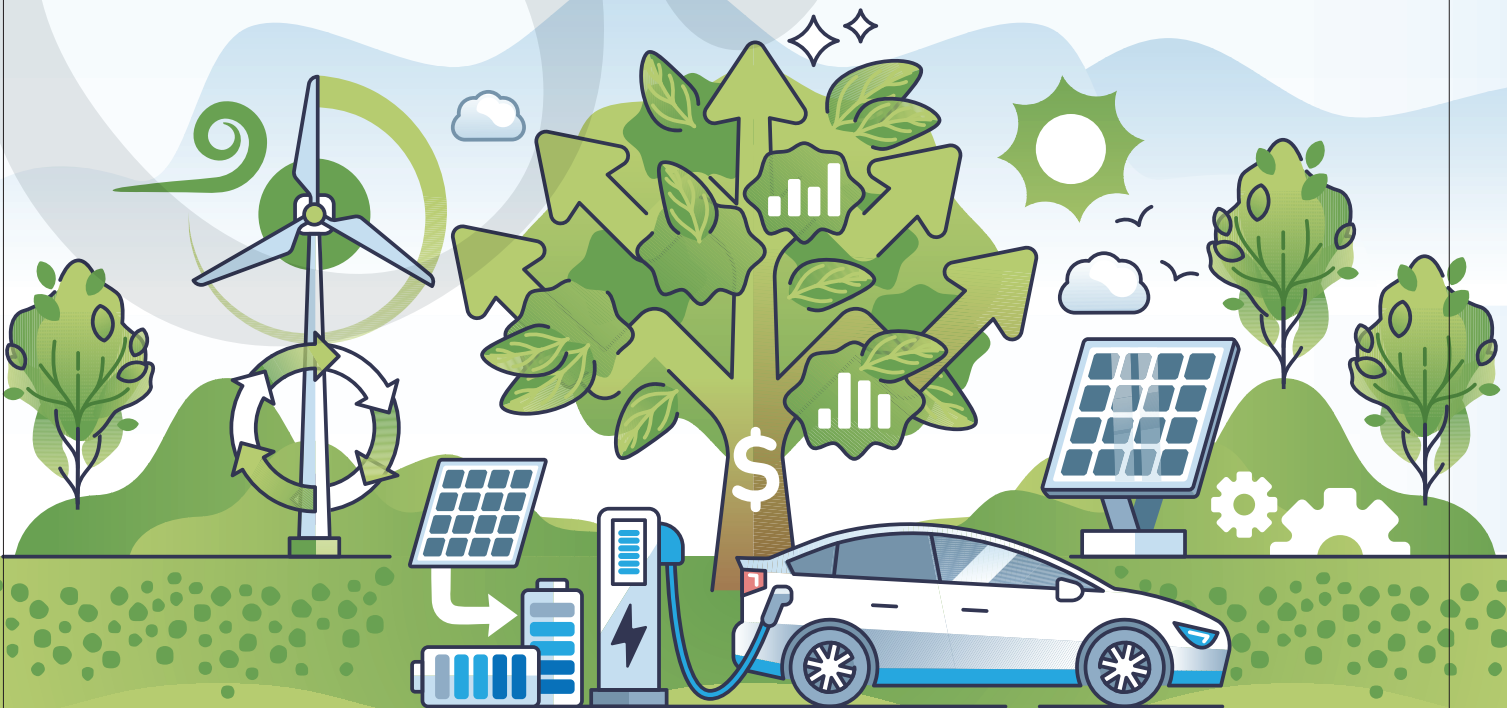
EU RFNBO

If investors wish for their low-carbon fuel to qualify as a “RFNBO” in the EU (either through the development of low-carbon fuel facilities in the EU or through the supply of low-carbon fuels produced outside the EU), investors will need to ensure that their eFuel is produced from “Fully Renewable Energy” and that it meets the “GHG Emission” requirements.

- 1. Fully Renewable Energy:** requires, either:
 - 1. Direct Connection:** the low-carbon fuel production facility must be directly connected to the renewable power production facility (i.e., no grid power is used); or
 - 2. High Renewable Energy Grid Connection:** the grid that supplies the low-carbon fuel production facility is >90 per cent renewable in its energy mix (currently only Sweden and France in Europe); or
 - 3. Renewable PPA:** one or more power purchase agreements (PPAs) are entered into directly with renewable energy



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producers for 100 per cent of the power used for such fuel production.

If investors are looking to rely on the "Direct Connection" or "Renewable PPA" scenarios, they will need to ensure that from January 1, 2028 the renewable energy used to produce such low-carbon fuel is from "additional renewable energy generation capacity", meaning that the renewable power generation facility cannot have come into operation more than 36 months prior to the fuel production facility (**Additionality – 36 Month Rule**); provided that if the low-carbon fuel production facility started operations before January 1, 2028, the Additionality – 36 Month Rule will only apply from January 1, 2038. In addition, for the Renewable PPA scenario, investors will be required to ensure that: (i) the renewable power generation facilities have not received "operating aid or investment aid", other than permitted aid ("**State Aid Rule**"); and (ii) the "**Temporal Correlation**" and "**Geographical Correlation**" requirements are met (meaning that the renewable electricity and low-carbon fuel must be produced in the same month (from January 1, 2030 there must be an hourly correlation) ("**Temporal Correlation**") and the renewable generation facilities are located in the same electricity market bidding zone as the fuel production facilities (or, be in a neighboring zone where the price is equal or higher) (**Geographical Correlation**). For the High Renewable Energy Grid Connection and Direct Connection scenarios (other than the Additionality – 36 Month Rule for the Direct Connection scenario), these requirements are either assumed or not required.

2. GHG Emission: Greenhouse gas (GHG) savings from use of the low-carbon fuel needs to be at least 70 per cent (in comparison to fossil fuel equivalents) and the carbon intensity of such low-carbon fuels must not be greater than 3.4kg of CO₂e/kg. The GHG savings calculation is set out in the GHG Delegated Act on the basis of the "full life-cycle" GHG emissions (including upstream emissions, input emissions and end-customer use). Emissions associated with electricity production are taken into account but if the electricity is considered to be "Fully Renewable Energy" then the electricity shall be attributed zero GHG emissions.

POTENTIAL HURDLES FOR EXPORT PROJECTS OUTSIDE THE EU

» If export projects are going to rely on the Renewable PPA option to achieve the Fully Renewable Requirement then the fuel producers are required to have concluded directly, or via intermediaries, one or more renewables PPAs with economic operators producing renewable electricity. The EU has made clear in its Q&As that 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 and cannot rely on PPAs with retailers. This will make it exceedingly difficult in jurisdictions where the consumers have no access to the producers and can only procure electricity through monopoly utility companies.

» The Geographical Correlation test is not easily interpreted for export projects as a "bidding zone" is a uniquely European construct and therefore export project investors will need to undertake a detailed analysis of how their grid connected production facilities meet the necessary tests laid out in the Production Delegated Act.

» The "Temporal" Correlation requirement is also problematic as it will (eventually) require an hourly correlation between the generation of renewable energy and the production of the low-carbon fuel, which is challenging given the intermittency of renewable energy production and the further investment in battery storage or some other energy storage methodology to meet this requirement would not currently satisfy the "Fully Renewable" and "Temporal Correlation" tests.

» There is also concern regarding the Additionality – State Aid Rule as the test is not entirely clear and it leaves open the possibility that export low-carbon fuel facilities that are (i) supplied with renewable electricity from assets that have benefited from renewable subsidies or tax credit schemes in the production jurisdiction; or (ii) the electricity generation assets have benefited from other forms of state support that falls within European "state aid" rules, may not be recognised in the EU as an RFNBO. This may be of particular concern for export projects in the US that benefit from the IRA regime. Without a clear definition of the "Additionality – State Aid Rule" it could be



argued that US producers that benefit from the IRA fall foul of this rule, this will need to be clarified by the EU.

» Investors in export projects must also be mindful that (i) the EU calculation of the GHG Emission requirement is a “full life cycle” calculation and takes into account both “transportation” and “end-customer use”. This is in stark contrast to other jurisdictions (such as the US and some Asian countries) that have or are proposing to carve-out transportation (i.e. a “well to gate” calculation); and (ii) sources of “carbon dioxide” used in the production of low-carbon fuels must be from one of the sources set out in the GHG Delegated Act (such as direct air capture, captured CO2 from production/combustion of biofuels, etc. or from the production/combustion of RFNBOs, or from geological sources) and, where the CO2 is captured from an activity listed under Annex 1 of Directive 2003/87/EC, it must be taken into account upstream in an effective carbon pricing system (similar to the EU ETS). This requirement is likely to increase the costs of low-carbon fuels (as air capture technology is more expensive than other capture technologies) and may exclude some low-carbon fuels as a RFNBO in the EU if produced in a jurisdiction that does not have an established carbon pricing scheme (which include many proposed production jurisdictions).

EU RED III AN “EVOLVING” START

The EU, in setting its legislative framework for eFuels, is in the unenviable position of balancing investor needs for certainty, with the climate imperative to decarbonise industry towards achieving the EU’s net zero target by 2050. If it is to achieve this target, then the EU must ensure that it creates sufficient demand for such eFuels in the EU (attracting “green” dollars and creating EU jobs), not only through compulsory mandates, but analysing what other jurisdictions are doing in this area and adapting accordingly. Some of the technical requirements around the “State Aid Rule”, “Temporal Correlation”, and “Geographical Correlation” will need to be further clarified if export projects are to make a meaningful contribution to the supply of eFuels into the EU. RED III is the current iteration of the EU response and has built on the previous iterations but it is dynamic and will continue to evolve to

support the EU carbon neutral ambitions and to accelerate the EU’s clean energy future. Although some of the legislated aspects have been grandfathered for a period (such as the “Additionality – 36 Month Rule” and “carbon-dioxide sources”), investors should assume that the RED regime will tighten (not relax) as the EU pushes towards its 2050 targets. The next iteration of the RED regime is due in 2028 and we will continue to watch and report on these developments. ➡

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- 1. *This article is focused on eFuels (i.e., green hydrogen derivatives (e-methanol, e-gasoline, e-kerosine)) and does not consider low carbon gases which is proposed to be defined in the upcoming “Decarbonization Package”, yet to be adopted by the EU.*
 - 2. *Directive (EU) 2023/2413 of the European Parliament and of the Council of 18 October 2023 amending Directive (EU) 2018/2001, Regulation (EU) 2018/1999 and Directive 98/70/EC as regards the promotion of energy from renewable sources, and repealing Council Directive (EU) 2015/652*
 - 3. *Supplementing Directive (EU) 2018/2001 of the European Parliament and the Council by establishing a Union methodology setting out detailed rules for the production of renewable liquid and gaseous transport fuels of non-biological origin*
 - 4. *Supplementing Directive (EU) 2018/2001 of the European Parliament and the Council by establishing a minimum threshold for greenhouse gas emissions savings of recycled carbon fuels and by specifying a methodology for assessing greenhouse gas savings from renewable liquid and gaseous transport fuels of non-biological origin and from recycled carbon fuels.*
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