

POLICY UPDATE

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Alternative transport fuels elements of the European Union's “Fit for 55” package

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In July, 2021, the European Commission released a number of policy proposals in its “Fit for 55” package, aimed at achieving the European Union’s (EU) goal of reducing greenhouse gas (GHG) emissions by 55% in 2030 compared to 1990 levels. This policy update focuses on the elements of this package related to the promotion of alternative fuels. Specifically, it covers the transport fuel elements of the following European Commission proposals:

- » The amendment to the Renewable Energy Directive (RED II)¹
- » ReFuel EU Aviation regulation²
- » FuelEU Maritime regulation³
- » Revision of the Directive on deployment of the alternative fuels infrastructure⁴

All of these legislative pieces may be amended by the European Parliament and Council and must be approved by those two bodies before they come into force.

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- 1 Proposal for a Directive of the European Parliament and of the Council amending Directive (EU) 2018/2001 of the European Parliament and of the Council, Regulation (EU) 2018/1999 of the European Parliament and of the Council and Directive 98/70/EC of the European Parliament and of the Council as regards the promotion of energy from renewable sources, and repealing Council Directive (EU) 2015/652, European Commission, COM(2021) 557 final, July 14, 2021, https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal/delivering-european-green-deal_en
 - 2 Proposal for a Regulation of the European Parliament and of the Council on ensuring a level playing field for sustainable air transport, European Commission, COM(2021) 561 final, July 14, 2021, https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal/delivering-european-green-deal_en
 - 3 Proposal for a Regulation of the European Parliament and of the Council on the use of renewable and low-carbon fuels in maritime transport and amending Directive 2009/16/EC, European Commission, COM(2021) 562 final, July 14, 2021, https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal/delivering-european-green-deal_en
 - 4 Proposal for a Regulation of the European Parliament and of the Council on the deployment of alternative fuels infrastructure, and repealing Directive 2014/94/EU of the European Parliament and of the Council, European Commission, COM(2021) 559 final, July 14, 2021, https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal/delivering-european-green-deal_en

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AMENDMENT TO THE RENEWABLE ENERGY DIRECTIVE

OVERVIEW OF THE 2018 RED II

To better understand the changes that the proposed amendment to the RED II makes, we first provide an overview of the transport fuels elements in the RED II, as passed by the European Parliament and Council in 2018.⁵ The 2018 RED II includes a 14% target for the blending of renewable fuels in road and rail fuels, as well as a 3.5% sub-target for advanced biofuels (defined as biofuels in Annex IX, part A in the directive) in 2030, with both targets calculated on an energy basis. The advanced biofuels feedstock list includes many types of lignocellulosic material, animal manure, sewage sludge, and algae, as well as select other wastes and residues.

In the RED II, the contribution of food- and feed-based biofuels towards the renewable energy in transport target, as well as the 32% overall renewable energy target, is limited to either 7% of road and rail energy or the 2020 consumption level in a Member State plus 1%, whichever is lower. The contribution of biofuels produced from the feedstocks defined in Annex IX, part B, including used cooking oil and category 1 and 2 animal fats, is limited to 1.7%, with an option for Member States to request higher caps depending on national feedstock availability.

Besides biofuels, other eligible categories for the 14% energy target include renewable fuels of non-biological origin (RFNBOs), which includes renewable hydrogen and renewable e-fuels, and renewable electricity used in vehicles. Member States may also opt to count recycled carbon fuels (RCFs), which include fuels produced from industrial flue gas as well as waste plastics fuel. The RED II includes a number of multipliers: a 2x multiplier for all Annex IX fuels (including both parts A and B) towards the 14% energy target as well as the 3.5% advanced biofuel target, a 4x multiplier for renewable electricity used in vehicles, and a 1.2x multiplier for renewable fuels used in aviation and maritime, except for food- and feed-based biofuels.

The RED II is a directive and must be transposed by Member States into national legislation in order to take effect.

PROPOSED CHANGES TO THE RED II

The main changes that the European Commission has proposed to transport fuels policy in the RED II are to raise the ambition of the targets, convert the energy target to a GHG intensity target, and introduce a new target for RFNBOs.

The proposed RED II revision replaces the 14% target for renewable energy in transport with a 13% GHG intensity reduction target for transport for 2030, compared to a liquid fossil fuel baseline GHG intensity. The change to a GHG target represents a significant structural modification to the directive. With the energy target in the 2018 RED II, all fuels are required to pass a GHG reduction threshold to be considered eligible. These requirements are 50%–65% for biofuels, depending on date of facility construction, 70% for RFNBOs, and not yet defined for RCFs. Once eligible, all fuels make the same contribution towards the 14% energy target on an energy basis, except for when multipliers are applicable. For example, 1 liter of wheat ethanol would count the same towards the target as 1 liter of wheat ethanol produced with carbon capture and storage (CCS), even though the CCS wheat ethanol delivers much higher GHG reductions. In the proposed RED II revision, fuels instead count towards the 13% GHG target on the basis of GHG savings. Now, that same liter of CCS wheat ethanol would

⁵ Directive (EU) 2018/2001 of the European Parliament and of the Council of 11 December 2018 on the promotion of the use of energy from renewable sources, Official Journal of the European Union, L 328/82, December 11, 2018, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2018.328.01.0082.01.ENG&toc=OJ:L:2018:328:TOC

generate greater GHG reductions per liter towards the target than the conventional wheat ethanol. The GHG reduction eligibility thresholds still apply and are unchanged for biofuels and RFNBOs in the proposed RED II revision; a new 70% GHG reduction threshold has been proposed for RCFs.

There is also a 6% GHG target in 2020 in a separate piece of legislation, the Fuels Quality Directive (FQD).⁶ This GHG target has not been implemented by all Member States. The proposed 2021 RED II revision deletes this target and all related articles in the FQD, as well as the corresponding Council Directive on related calculation methods and reporting requirements.⁷

The proposed RED II revision changes the advanced biofuels target from 3.5% to 2.2% in 2030 and introduces interim targets of 0.2% in 2022, and 0.5% in 2025. However, although these targets and the overall transport target in the proposed RED II revision are nominally lower than in the 2018 RED II, the proposal would actually be more ambitious in its effect. The proposed RED II revision eliminates most of the multipliers in the 2018 RED II and only the 1.2x multiplier for aviation and maritime fuels remains. This 1.2x multiplier now only covers advanced biofuels and RFNBOs and does not apply to waste oil biofuels and RCFs. Because of the multipliers in the 2018 RED II, the 14% energy target could be met with much less than 14% actual energy. This effect is muted with fewer multipliers in the proposed RED II revision. The removal of multipliers also makes the 2.2% advanced biofuel target in the proposed RED II revision more ambitious than in the 2018 RED II, in which the 3.5% advanced biofuel target includes a 2x multiplier so it only represents 1.75% fuel in physical terms. Additionally, because most renewable fuels deliver less than 100% GHG savings per unit fuel compared to fossil fuels, it takes a greater amount of fuel to deliver 1% GHG savings for the total transport fuel supply than 1% energy. Lastly, the size of the fuel pool to which the target applies has also increased: in the 2018 RED II, the 14% energy target applies to road and rail transport. In the proposed RED II revision, the target is for 13% GHG savings for all “energy supplied to the transport sector,” including for use in aviation and maritime.

The 2.6% RFNBO target in the proposed RED II revision is a new addition. Apart from the direct use of renewable hydrogen and renewable e-fuels in transport, this target includes renewable hydrogen used in petroleum refining. Another change is in the accounting: in the 2018 RED II, RFNBOs are counted towards the 32% overall renewable energy target on the basis of the input renewable electricity used, and in the proposed RED II revision, this is changed to counting the energy used in the sector where the RFNBOs are consumed. Because of high conversion losses in RFNBO production, the renewable electricity consumed is substantially higher than the amount of energy in the final fuel used in transport; this had a similar effect as a multiplier towards the 32% overall renewable energy target. This effective multiplier is removed in the proposed revisions. The new accounting scheme also makes it possible for RFNBOs produced outside the EU to contribute to the 32% overall renewable energy target; this was not previously possible because for renewable electricity, only EU generation is eligible.

The treatment of renewable electricity used in vehicles changes with the proposed RED II revision, but the effect may largely be the same as for the 2018 RED II. The 4x multiplier is removed, but the fossil fuel comparator for electric charging has also changed from 94 gCO_{2e}/MJ to 183 gCO_{2e}/MJ. The comparator of 94 gCO_{2e}/MJ for

6 Directive 2009/30/EC of the European Parliament and of the Council of 23 April 2009 amending Directive 98/70/EC as regards the specification of petrol, diesel and gas-oil and introducing a mechanism to monitor and reduce greenhouse gas emissions and amending Council Directive 1999/32/EC as regards the specification of fuel used by inland waterway vessels and repealing Directive 93/12/EEC, Official Journal of the European Union, L 140/88, April 23, 2009. <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32009L0030>

7 Council Directive (EU) 2015/652 of 20 April 2015 laying down calculation methods and reporting requirements pursuant to Directive 98/70/EC of the European Parliament and of the Council relating to the quality of petrol and diesel fuels, Official Journal of the European Union, L 107/26, April 25, 2015. <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32015L0652&from=EN>

all other transport fuels represents the GHG intensity of the average liquid fossil fuel mix in the EU, whereas 183 gCO₂e/MJ represents the GHG intensity of fossil-derived electricity. In the proposed RED II revision, renewable electricity used in vehicles is assumed to be zero carbon, and the GHG savings is calculated as 183 gCO₂e/MJ–0 gCO₂e/MJ. Compared to a food-based biofuel with 50% GHG savings (half if 94 gCO₂e/MJ, i.e. 47 gCO₂e/MJ), each unit of energy of renewable electricity makes a contribution towards the 13% GHG target about four times as large as for one unit of food-based biofuel. The proposed REDII revision requires Member States to establish a mechanism for public recharging stations to receive exchangeable credits for renewable electricity supplied to electric vehicles.

All liquid and gaseous fossil fuels used in transport have the same GHG intensity of 94 gCO₂e/MJ for the purposes of calculating compliance towards the GHG target. Any shift in consumption between gasoline, diesel, and natural gas, for instance, will not change GHG target compliance.

The sustainability criteria related to transport fuels remains largely untouched in the proposed RED II revision. The cap on food- and feed-based biofuels is slightly increased; while it remains the lower of 7% or 2020 consumption levels in each Member State plus 1%, in the proposed RED II revision it is calculated as a share of “final consumption of energy in the transport sector in that Member State,” including aviation and maritime; in the 2018 RED II the share was calculated out of road and rail transport fuels, only. As in the 2018 RED II, Member States may choose to reduce the transport target if they adopt a food- and feed-based biofuel cap lower than 7%. In the proposed RED II revision, Member States shall consider food- and feed-based biofuels to have 50% GHG savings in making this adjustment, and thus may reduce their applicable GHG target accordingly. In the 2018 RED II, the food- and feed-based biofuel cap did not apply to cover crops; this exemption remains in the proposed RED II revision. The 1.7% cap on waste oil biofuels is calculated as a share of total energy supplied to transport in both the 2018 RED II and the proposed RED II revision. The major change to the treatment of waste oil biofuels in the proposed RED II revision is the removal of double counting. The GHG reduction thresholds for biofuels and RFNBOs are unchanged in the proposed revision but defines a 70% GHG savings threshold for RCFs.

The proposed RED II revision delays two delegated acts related to transport fuels. The deadline for the delegated act on co-processing, where biofuels are processed as a mix with fossil fuels in conventional refineries, is postponed from December 31, 2021 in the 2018 RED II to December 31, 2024 in the revision. In the 2018 RED II, the Commission is required to adopt a delegated act on a GHG calculation methodology for RFNBOs and RCFs by December 31, 2021; in the proposed RED II revision, this delegated act is now made optional for the Commission, with no due date.

Table 1 summarizes the major changes to transport fuels policy in the proposed RED II revision, compared to the 2018 RED II. The deadline for Member State transposition of the proposed RED II revision is December 31, 2024.

Table 1. Summary of major changes to transport fuels in the Renewable Energy Directive

	2018 RED II	2021 proposed RED II revision
Renewable energy in transport	14% energy target (out of road and rail fuels)	13% GHG intensity reduction target (out of all energy supplied to transport)
Advanced biofuels (Annex IX part A)	3.5% (out of road and rail fuels, with multiplier)	2.2% (out of all energy supplied to transport, no multiplier)
Renewable fuels of non-biological origin (RFNBOs)	No target	2.6% (out of all energy supplied to transport)
Waste oils (Annex IX part B)	1.7% cap (out of all energy supplied to transport)	1.7% cap (out of all energy supplied to transport)
Food- and feed-based biofuels	Cap at whichever is the lower: 7% or 2020 consumption in each Member State + 1% (out of road and rail fuels)	Cap at whatever is lower: 7% or 2020 consumption in each Member State + 1% (out of all transport energy consumption)
Multipliers	<ul style="list-style-type: none"> • 2x for advanced biofuels and waste oils • 4x for renewable electricity in vehicles • 1.2x for aviation and maritime fuels, except food- and feed-based biofuels 	<ul style="list-style-type: none"> • 1.2x for advanced biofuels and RFNBOs in aviation and maritime

REFUEL EU AVIATION

The proposal for a ReFuel EU Aviation regulation introduces targets for sustainable aviation fuel (SAF) and synthetic aviation fuels from 2025 to 2050 according to the schedule presented in Table 2. Previously, there were no targets specifically for renewable fuels in aviation. Synthetic aviation fuels are defined in the proposal as RFNBOs used in aviation, also known as power-to-liquids. SAF is defined as drop-in aviation fuels that are either synthetic aviation fuels, advanced biofuels (RED II Annex IX, part A) or biofuels produced from feedstocks listed in RED II Annex IX, part B (waste oils and fats). Fuels must receive sustainability certification in accordance with the RED II. Food- and feed-based biofuels and RCFs are not eligible to be counted towards these targets. The shares of SAF and synthetic aviation fuels are calculated on a volume basis; this differs from the accounting in the RED II, which is on an energy basis. Unlike the RED II, there is no cap on waste oils and fats in ReFuel EU.

Table 1. Requirement for volume shares of SAF and synthetic aviation fuels in ReFuel EU

	Sustainable aviation fuel	Synthetic aviation fuels
1 January 2025	2%	--
1 January 2030	5%	0.7%
1 January 2035	20%	5%
1 January 2040	32%	8%
1 January 2045	38%	11%
1 January 2050	63%	28%

Since ReFuel EU is a proposed regulation, not a directive, it is directly binding on obligated parties. Non-compliance will be met with penalties, to be applied by Member States and are required to be “effective, proportionate and dissuasive.” Aviation fuel suppliers are required to supply SAF, but there are also complementary obligations and reporting requirements for aircraft operators and EU airports. Aircraft operators are required to track their total fuel requirement per airport, their non-tanked fuel quantity, and the quantity of SAF purchased at EU airports. Aircraft operators are obligated to uplift at least 90% of their yearly fuel demand at EU airports. This provision prevents “tankering,” where aircraft operators could carry extra fuel from outside the

EU to reduce the amount of SAF and synthetic aviation fuel they must purchase at EU airports. Airports in the EU are required to facilitate the access of aircraft operators to SAF and to provide the necessary infrastructure.

Member States must issue fines and penalties sufficient to ensure that obligated parties comply with the regulation. The fines for aviation fuel suppliers must be at least twice as large as the price difference between SAF (or synthetic aviation fuel) and conventional aviation fuel per unit SAF (or synthetic aviation fuel) not delivered or consumed. The fines for aircraft operators must be at least twice as large as the price of aviation fuel per unit fuel not tanked in the EU. If aviation fuel suppliers fall short of their obligation for one reporting period, they are required make up the shortfall the subsequent reporting period and are still subject to fines. Revenue from fines is directed to the InvestEU Green Transition Fund.

The Refuel EU regulation is expected to come into force January 1, 2023, but the SAF targets do not apply until January 1, 2025. The policy includes a transition period for 2025 to 2029, wherein fuel suppliers may report their SAF blending as a weighted average over all the aviation fuel supplied across EU airports for that reporting period; after that date, EU airports are required to supply the SAF shares illustrated above in Table 2.

FUELEU MARITIME

The proposal for a FueLEU Maritime regulation introduces GHG intensity reduction requirements for 2025 to 2050. The GHG intensity of energy used on-board by ships must be reduced compared to a reference value according to the following schedule:

- » -2% in 2025
- » -6% in 2030
- » -13% in 2035
- » -26% in 2040
- » -59% in 2045
- » -75% in 2050

The reference value refers to the “fleet average greenhouse gas intensity of the energy used on-board by ships in 2020” and it to be calculated “at a later stage of the legislative procedure.”

Like ReFuel EU, FueLEU Maritime is a proposed regulation that would be directly binding on ship operators. It applies to all energy used on ships at EU ports of call and on voyages between EU ports of call, as well as half of the energy used on voyages between an EU port and a third country. The proposed regulation applies to all ships with a gross tonnage above 5,000 tonnes, with several small exceptions for warships, fishing ships, wooden ships of a primitive build, ships not propelled by mechanical means, or government ships used for non-commercial purposes.

The FueLEU Maritime proposal provides GHG intensities of various fuels in Annex II. GHG emission factors for biofuels, biogas, RFNBOs and RCFs are calculated following the methodology in the RED II and must also meet the sustainability criteria in the RED II, including GHG emission reduction thresholds. These emissions are broken out into well-to-tank and tank-to-wake emissions. Notably, liquefied natural gas (LNG) fuels have lower well-to-tank and well-to-wake emissions than conventional marine fuels such as heavy fuel oil and can thus generate emissions reductions under the policy. However, LNG fuels also bear additional emission factors depending on which engine technology is used in order to factor in the impact of methane slip from certain engines, which is assessed in terms of grams of CH₄ per g of fuel consumed.

Marine fuels must receive sustainability certification in accordance with the RED II. All food- and feed-based biofuels, as well as biofuels, biogas, RFNBOs and RCFs that do not comply with the RED II sustainability criteria, are considered to have the same emission factors as “the least favourable fossil fuel pathway for this type of fuel.” Thus, food-based biofuels are not eligible to contribute towards the GHG reduction target in FuelEU Maritime. The proposal also includes a reward factor based on the contribution of wind as a substitute source of energy. That reward factor (which ranges from 0.99 to 0.95) is then multiplied by the ship’s fuel emissions intensity.

Surpluses from overcompliance with the GHG intensity targets for one reporting period (i.e. calendar year) may be banked for use in a later reporting period. Ship operators may incur a deficit of up to 2% of the GHG intensity limit in one year, but must make up the deficit, plus 10%, in the subsequent year. This cannot be done in two consecutive years. There is a non-compliance penalty calculated according to the magnitude of the emissions deficit accrued over the year.

The FuelEU Maritime proposal introduces an additional requirement that, starting in 2030, ships must use on-shore power for all energy needs when at berth. The non-compliance penalty for this provision is 250 euros per megawatt of power installed on board and per hour spent at berth.

The FuelEU Maritime regulation is expected to come into force January 1, 2025.

REVISION OF THE DIRECTIVE ON DEPLOYMENT OF THE ALTERNATIVE FUELS INFRASTRUCTURE

This proposal is to convert the Alternative Fuels Infrastructure Directive into a regulation. The main amendments relevant to renewable fuels are the introduction of mandatory deployment targets for electric charging stations and hydrogen refueling stations for Member States.

For light-duty electric vehicle charging stations, there are targets by number of electric vehicles in each Member State as well as targets for the distribution of charging stations along roads. Each Member State must have at least 1 kW of power output at publicly accessible charging stations per battery electric light-duty vehicle and 0.66 kW of power output per plug-in hybrid. In addition, Member States must ensure publicly accessible charging stations are available at least every 60 km along the Trans-European Transport Network (TEN-T)⁸ core network starting in 2025 and the TEN-T comprehensive network starting in 2030, with further requirements on the number of chargers and the power output at each of those stations. The TEN-T network represents connections between key EU cities.

Charging stations for heavy-duty vehicles must also be available at least every 60 km along the TEN-T core network starting in 2025 and the TEN-T comprehensive network starting in 2030, with greater power output requirements than for light duty vehicles. In addition, all parking areas must have at least one charging station dedicated to heavy-duty vehicles by 2030, and there are additional requirements for the aggregated power output of publicly available heavy-duty vehicle chargers in urban nodes.

The proposed revision to the Alternative Fuels Infrastructure Directive also introduces new targets for hydrogen refueling stations. By 2030, publicly available refueling stations offering compressed and liquid hydrogen must be available every 150 km and 450 km, respectively, along the TEN-T core and comprehensive network. One publicly available hydrogen refueling station must also be available in every urban node by 2030.

⁸ European Commission, “Trans-European Transport Network (TEN-T),” (27 August, 2021), https://ec.europa.eu/transport/themes/infrastructure/ten-t_en