The Impact of EU Road Transport Decarbonization on Biofuels, G&O, and Sugar

An Outlook Toward 2050

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Executive Summary

The path toward decarbonization in road transportation in the EU[1] will require a multifaceted approach that, besides traditional biofuels, will also include the use of renewable electricity, green hydrogen, and other advanced biofuels. The adoption of these newer technologies, along with regulations that seemingly will ban the sale of internal combustion engine (ICE) cars by 2035, will slowly replace the vehicle fleet and negatively impact the demand for fossil fuel and biofuel as early as 2025, with a bigger impact after 2030.

In the years until 2025, biodiesel demand is expected to decline by 4% from 2020 levels, given the higher replacement rate of diesel vehicles. On the other hand, bioethanol demand is forecast to grow 5% to 2025, as the trend of total car fleet growth will compensate for the declining share of petrol cars in total new car sales, which will still be higher than 50% of total new car sales.

The impact on biofuel feedstocks like grains, oilseeds, and sugar, as well as on the industry, will be twofold through 2030. On the one hand, the declining demand for biodiesel will not be enough to offset the phasing out of palm oil in EU biofuel production through 2030, which will increase the demand for the other feedstocks to fill the gap, spurring a competition between rapeseed oil and used cooking and waste oils (UCO). Although processing capacity of hydrogenated vegetable oil (HVO), also called renewable diesel, in the EU is expected to almost double by 2025, securing UCO supplies is likely to be constrained by competition from US biofuel makers and from producers of sustainable air fuels in the EU and other regions of the world (e.g. the US), which means that the demand gap for EU road transport biofuels is likely to be filled by rapeseed oil. On the other hand, the growth in ethanol demand by 2025 should benefit most ethanol players, especially since production has been well below capacity due to crop failures, but also due to proximity to countries with higher blending potential.

Beyond 2030, the EU fleet's replacement with electric and hydrogen vehicles will cause a greater impact to fossil fuel and biofuels, to a point that it will become unfeasible to keep plants operating. Although demand for most feedstocks is expected to grow until 2025, the path toward net-zero emissions by 2050 means that the future of traditional biofuels and its feedstocks is discouraging, unless policies change to allow these biofuels to be used directly as fuel. Otherwise, renewable electricity, hydrogen, and other advanced biofuels are renewable sources capable of providing energy with zero GHG emissions.

There is, however, great uncertainty as to whether and at what speed these renewable technologies will take off at large scale. It is possible that unforeseen events in the future could affect the projected development and uptake of new vehicle technologies and advanced biofuels. Under these circumstances, conventional biofuels could potentially play a more significant role in achieving the EU´s emissions reductions targets.

[1] In this report, EU refers to both EU-27 and the UK.

EU Biofuels Policy

Climate and Energy Targets: Where It All Started

In line with global efforts to cap global warming at 1.5°C to 2°C, the EU aims to become climate neutral while achieving net-zero GHG emissions by 2050. In the path toward decarbonization, the European Commission (EC) proposed a package plan on July 14, 'Fit for 55,' to reduce gas emissions to at least 55% by 2030 when compared to 1990. The reduction target for the transport sector is 13%.

Renewable sources of energy in transport contribute to reducing greenhouse gas emissions and fossil fuel dependence. EU legislation to promote renewables has evolved in the last 15 years with the implementation of various climate packages (*see Table 1*).

Table 1: Renewable Energy Directives (RED) for the transport sector

	RED I (2009, 2015)	*RED II (2018)*	*RED II revised (latest proposal, July 2021)*
Cut in GHG emissions from 1990 levels	20% by 2020	55% by 2030	55% by 2030
Share of renewable energy	20% by 2020	32% by 2030	40% by 2030
Renewable energy in transport sector	10% by 2020	14% by 2030	Replaced by 13% reduction in GHG
Crop-based biofuels maximum limit in transport sector (within the renewable target)		7%	7%
Part A: Advanced biofuels minimum target	0.5% by 2020	0.2% by 2022 1% by 2025 3.5% by 2030	0.2% by 2022 0.5% by 2025 2.2% by 2030
Part B: UCO + animal fat maximum limit		1.7%	1.7%

Source: European Commission (EC), Foreign Agricultural Service (FAS), RED II Directive Amendment 2021

RED I (No Longer in Effect)

In 2009, the EU adopted the Renewable Energy Directive (RED) and Fuel Quality Directive (FQD) as part of the 2020 climate and energy package. The packages set a target of a 20% share of EU energy consumption coming from renewable energy sources by 2020, and a 20% cut in GHG emissions from 1990 levels. The directive set the target for the share of renewable energy in transport to 10% by 2020. In 2015, the EU adopted the Indirect Land Use Change (or ILUC) Directive, which amended the RED and FQD to include a 7% cap on the share of food/crop-based biofuels, a non-binding national target of 0.5% for advanced biofuels such as cellulosic ethanol, and a predefined list of feedstocks for biofuels (*see Table 2*). The amendment allowed double counting of advanced biofuels against the biofuels target, in order to further incentivize advanced biofuel use.

Table 2: Pre-defined list of feedstocks for biofuels

Annex IX	
Part A (advanced)	
Algae	*Bagasse*
Biomass fraction of municipal waste	Grape marcs and wine lees
Bio-waste from private households	Nut shells
Biomass fraction of industrial waste not fit for use in food and feed chain	Husks
Straw	Cobs cleaned of kernels of corn
Animal manure and sewage sludge	Biomass fraction of wastes and residues from forestry and forest-based industries
Palm oil mill effluent and empty palm fruit bunches	Other non-food cellulosic material
Crude glycerin	Other lingo-cellulosic material except saw logs and veneer logs
Part B (not as 'advanced')	
Used cooking oil (UCO)	Some categories of animal fats

Source: EC, RED II 2021

RED II (In Effect, but Will Be Revised)

In 2018, the EU adopted the Renewable Energy Directive II (RED II), which increased the target for the share of renewable energy sources in EU energy consumption to 32% by 2030 and set the target for the renewable share in transport to 14% by 2030. It also capped the share of crop-based biofuels to 1% above each member state's (MS) consumption level in 2020, with a max of 7% of final consumption of total fuel in the road and rail transport sectors. The target for advanced biofuels, from Part A of Annex IX, was increased to 0.2% by 2022 and 3.5% by 2030, with the possibility to use multipliers, whereas the share of biofuels produced from feedstocks listed in Part B of Annex IX is capped at 1.7% of the energy content of fuels and electricity supplied to the transport sector.

RED II Revised (Proposed, but Not Implemented Yet)

On July 14, 2021, the EC released the 'Fit for 55' package, which is a set of proposals that will support Europe's climate policy framework and bring to fruition the path toward decarbonization as suggested by the European Green Deal. This set of proposals is not yet legislation, as it still needs to be approved by the European Parliament and the Council of the European Union, and could therefore still see further changes. The Green Deal was first announced in December 2019, and the European Climate Law was enacted in March 2020, giving legal binding power to the Green Deal. Part of the 'Fit for 55' package was a revision of the 2018 RED II. Back in April 2021, policymakers had already agreed to increase the 2030 GHG reduction target from a 40% to a 55% cut from 1990 levels. Building on this, the proposal suggests to increase the share of renewable sources in the overall energy mix to 40% from 32%.

The renewable energy target for the transport sector of 14% was replaced by a GHG reduction target of 13%. The biggest news for the road transport sector was a ban on the sale of new cars with internal combustion engines (ICE) after 2035 in order to accelerate the sales of zero-emission vehicles. The revised RED II also proposes to remove multipliers associated with advanced biofuels for road transport, for which electric and hydrogen fuel cell vehicles are already becoming popular. With that, the new target for advanced biofuels from Part A is now 0.2% by 2022 and 2.2% by 2030. A 2.6% sub-target was also introduced for renewable fuels of non-biological origin (RFNBO), meaning liquid and gaseous fuels, the energy content of which is derived from renewable sources other than biomass.

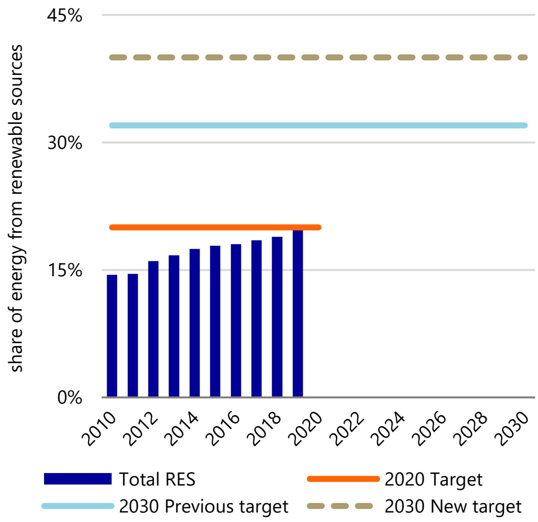
EU Member State Initiatives

Under all of the above RED policies, each EU MS should transpose the provisions outlined in the RED into national legislation, leaving room for each country to implement slightly different rules, as long as the policy outcomes meet EU RED targets. In the past, several MS measures did not fully comply. For instance, in 2016, the EU sent a warning to Portugal as an 'urge to comply,' and sent Poland to the Court of Justice of the EU for imposing restrictions on certain raw materials for biofuels.

Where Does the EU Stand on Renewable Energy Source Targets?

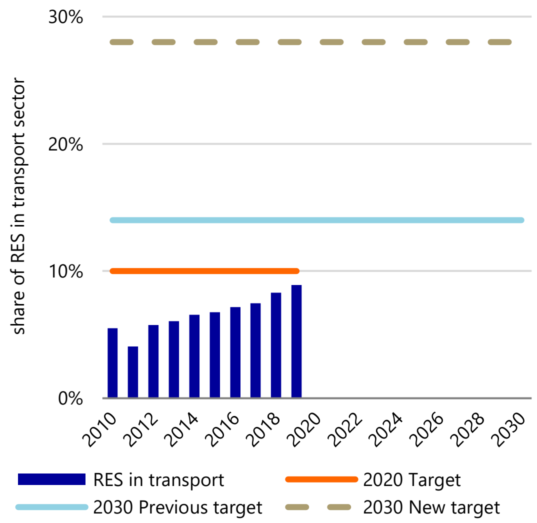
In terms of renewable energy source (RES) targets, the total energy industry is faring better than the transport sector. In 2019, the share of RES was 19.7%, very close to the previous 2020 target of 20%, but still far behind the new proposed target of 40%. In the same year, the share of renewable energy in the transport sector was 8.9%, well below the previous 2030 target of 14%. Some studies suggest that, in order to reduce GHG emissions by 13% in the transport sector, the share of renewable energy sources would have to increase to as much as 28% from the previous target of 14%. (*See Figures 1 and 2.*)

Figure 1: Progress toward renewable energy source targets for the energy sector, 2010-2030



Source: Eurostat, European Environment Agency (EEA) 2021

Figure 2: Progress toward renewable energy source targets for the transport sector, 2010-2030

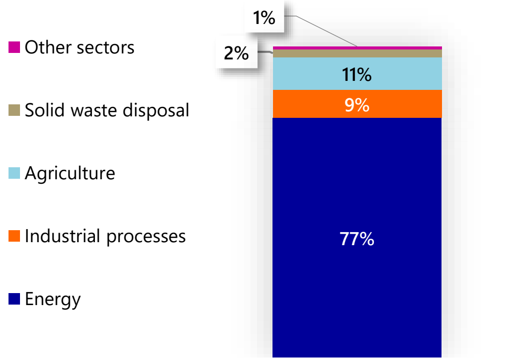


Source: Eurostat, EEA 2021

GHG Emissions and Its Contributors

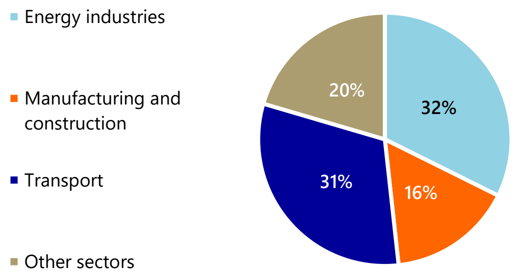
The road transport sector is by far the biggest contributor of GHG emissions, representing 22% of the total share of emissions of the entire industry in the EU. To put into perspective, the agricultural sector, including livestock, contributes 11% of the total share of emissions (*see Figure 3*). This explains the need for tighter policies in the road transport sector, especially for passenger cars, which account for 61% of road transport emissions (*see Figure 6*).

Figure 3: Total GHG emissions per sector, 2019 (4bn metric tons CO2-eq)



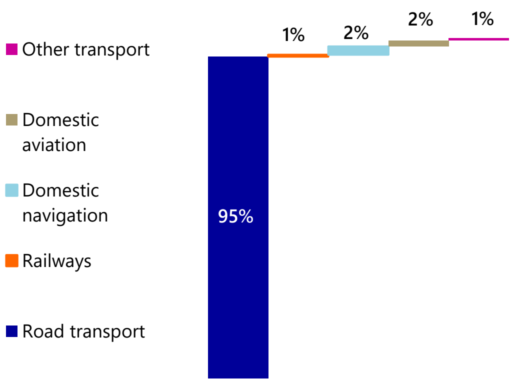
Source: Eurostat 2021

Figure 4: Transport, second largest contributor of GHG emissions from energy, 2019



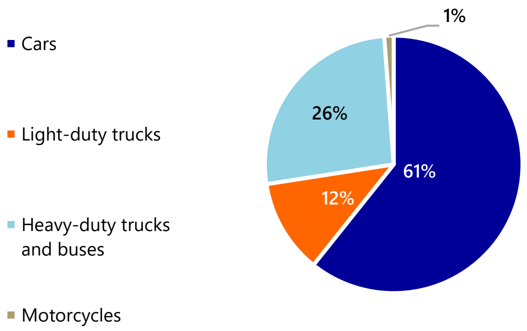
Source: Eurostat 2021

Figure 5: GHG emissions in transport, 2019



Source: Eurostat 2021

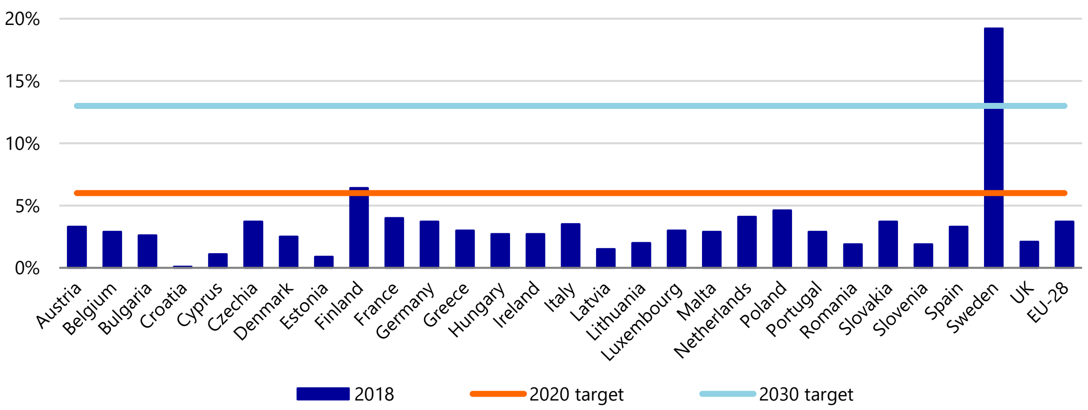
Figure 6: Cars, biggest contributor to GHG emissions in road transport, 2019



Source: Eurostat 2021

The FQD requires MS to report the type of fuels, and fuel suppliers to reduce the GHG intensity of their fuels. The target was 6% by 2020, and now stands at 13% by 2030, when compared with the fuel baseline standard for 2010. The ILUC emissions result from the conversion of non-agricultural land, such as forests, into agricultural land to grow biofuels or to displace food production resulting from biofuel production. It is important to note that ILUC GHG emissions are not taken into account when assessing compliance with the minimum GHG reduction target. The average GHG intensity of the fuels supplied in 2018 was only 3.7% lower than the 2010 baseline (*see Figure 7*).

Figure 7: The average GHG intensity of the fuels and energy supplied in the EU, 2018

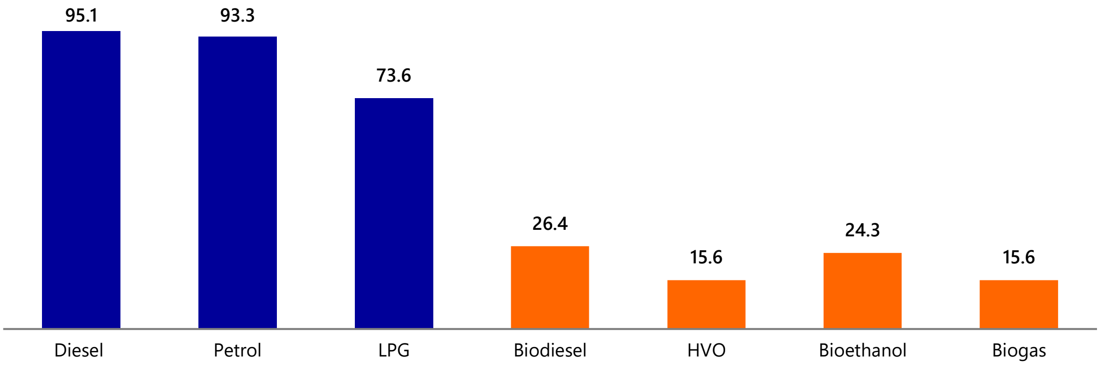


Source: Renewable Energy Progress Report 2020

The average GHG intensity depends on the share and type of fossil fuels and biofuels in the total fuel mix. For this reason, assessing the GHG reduction potential of biofuels becomes of great importance when selecting which feedstocks to use, especially when including the ILUC effect. In the last Renewable Energy Progress Report, with results for 2018, biodiesel from oil crops, when considering ILUC, had a high GHG intensity that is only marginally better when compared to regular diesel (*see Figures 8 and 9*).

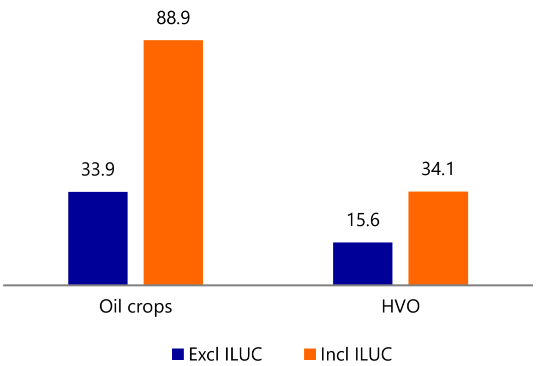
The RED II does not include ILUC in the GHG calculation of different fuel pathways, and food-based biofuels are among the lowest cost alternative fuels available.

Figure 8: GHG intensity (in g CO2-eq/MJ) excluding ILUC, 2018



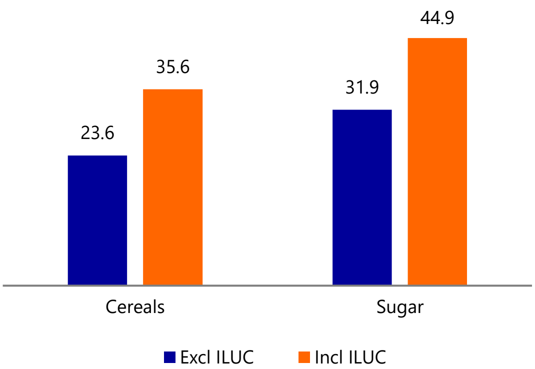
Source: EEA, RED II 2021

Figure 9: GHG intensity in biodiesel (in g CO2-eq/MJ), 2018



Source: EEA, RED II 2020

Figure 10: GHG intensity in bioethanol (in g CO2-eq/MJ), 2018



Source: EEA, RED II 2020

MS can choose whether or not to count biofuels from food crops toward the transport target. If they do not, they may reduce the GHG intensity reduction target, assuming that food crop-based biofuels save 50% GHG emissions. Renewable electricity should be considered to have zero emissions, meaning it saves 100% emissions compared to energy produced from fossil fuels. Operators can either use the default GHG savings threshold provided in the RED II (*see Table 3*) or calculate the actual values for their pathway. Additionally, the way biofuels processing plants operate affects the GHG emission reduction. The percentage range in some feedstocks refers to that. The processing plants with better emission reduction use natural gas or forest residues as process fuel in cogeneration plants, while the processing plants with the worst emission reduction use lignite as process fuel in cogeneration plants or natural gas as process fuel in conventional boilers.

Table 3: GHG savings threshold (default value excluding ILUC), 2021

Biofuels	50%
Sugar beet ethanol	47-68%
Corn ethanol	40-48%
Other cereal ethanol	24-67%
Sugar cane ethanol	70%
Rapeseed biodiesel or HVO	47%
Soybean biodiesel or HVO	50%-51%
Palm oil biodiesel or HVO	19%-22%
Palm oil biodiesel (process with methane)	45%-49%
Waste cooking oil biodiesel	84%
Animal fats rendering biodiesel	78%
Renewable fuels of non-biological origin (RFNBO)	70%
Renewable electricity	100%

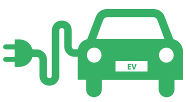
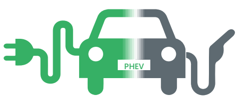
Source: Annex V, RED II 2021

Energy Transition: The Pathway to Full Decarbonization in Transport

The pathway to decarbonization in the EU is geared toward the electrification of the car fleet (with renewable sources), including light trucks, and the use of renewable or green hydrogen in heavy and commercial vehicles such as heavy trucks, buses, and trains.

There are different types of electric vehicles (EV) (*see Table 4*), and the only type of EV that is free of GHG emissions are the battery electric vehicles (BEVs), provided that the energy source to charge them is also renewable energy. Some advantages to electrification are that some full-cell EVs do not generate NOx, a type of gas that has been considered damaging to health, nor do they emit CO_2. Large investments have already been made, and businesses are gearing up to support electrification. The challenges consist of lack of raw materials to produce batteries, as they are made of rare earth metals such as copper, cobalt, and manganese. Metal prices have recently risen sharply due to the boom of electrification. Besides batteries, electrification also requires software to align batteries with motor and data. Less experienced carmakers seem to be struggling to combine disparate electronic systems from different suppliers to create the seamless experience offered by Tesla. Another constraint, at least in the short term, is the lack of charging stations, making it difficult to travel long distances, and the overall refueling infrastructure as the path toward complete decarbonization requires a different way of distributing energy or meaningful upgrades to power grids.

Table 4: Types of electric vehicles

		
Battery electric vehicles (BEVs):	**Plug-in hybrid electric vehicles (PHEVs):**	**Hybrid electric vehicles (HEVs):**
Powered solely by an electric battery, with no gas engine parts. Capable of fast charging. Zero emissions if car is charged with renewable energy source.	Similar to a hybrid, but with a larger battery and electric motor. Has a gas tank and a charging port.	Low-emission vehicles that use an electric motor to assist gas-powered engines. All energy comes from gasoline. Cannot plug into the grid to recharge.

Source: Financial Times, Rabobank 2021

The other promising renewable energy source is hydrogen, more specifically, renewable or green hydrogen. There are different types of hydrogen (*see Table 5*). However, the only type of hydrogen that is considered emissions-free is green hydrogen, as it is made with electricity from renewable sources. Currently, green hydrogen makes up only 1% of the global hydrogen supply, and is very expensive to produce. According to the Hydrogen Council, the EU is planning to offer subsidies to help reduce production costs. It is estimated that about USD 300bn will be invested globally in the next decade, with USD 80bn already committed. There are some benefits to hydrogen, such as infrastructure at scale when compared to fast charging, as it is faster to refuel and requires less space. Moreover, hydrogen provides power for long ranges due to its superior energy density. The major concern is cost, and there are arguments that producing green hydrogen via electrolysis is an inefficient way of using renewable electricity.

Table 5: Types of hydrogen

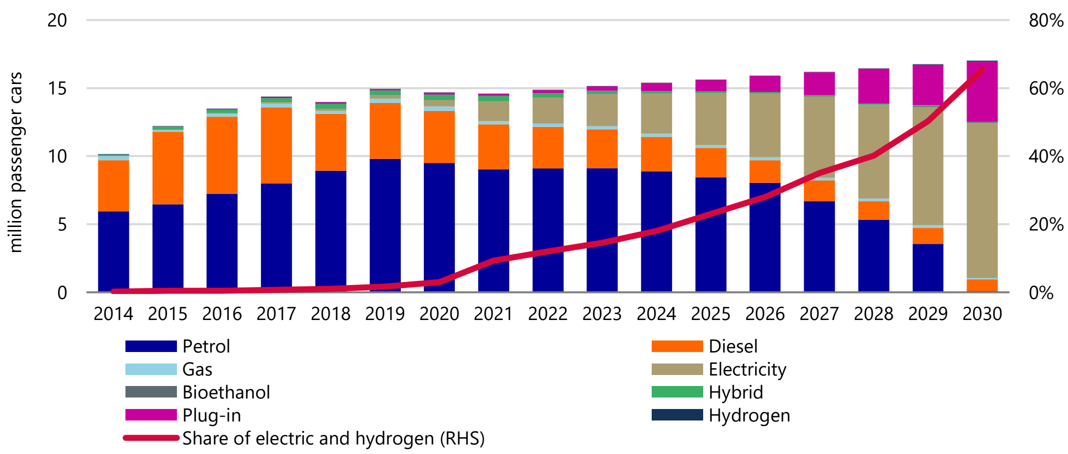
"Green (renewable) hydrogen"	Produced by using clean electricity from renewable energy sources to electrolyze water.
"Blue hydrogen"	Produced using natural gas, but with carbon capture and storage (CCS) or reuse of emissions.
"Grey hydrogen"	Most common type of hydrogen. It comes from natural gas via steam methane reformation, but without CCS.
"Brown hydrogen"	The least expensive way to produce hydrogen, but with the highest GHG intensity as it uses thermal coal in the production process.
"Turquoise hydrogen"	Produced by a process called methane pyrolysis. It has not been proven at scale, and there are concerns over methane leakage.

Source: Financial Times, Hydrogen Council 2021

Impact on Road Transport Fuel Demand

In 2019, the electric share of the total car fleet in the EU was only 0.24%, or 662,000 cars. However, the electric share of new car registrations (new car sales) was 1.6% of total new car registrations, totaling 267,375 new electric cars registered in the EU. In our projections, we assumed the electric share of new registrations will increase to 23% by 2025 and to 65% by 2030.

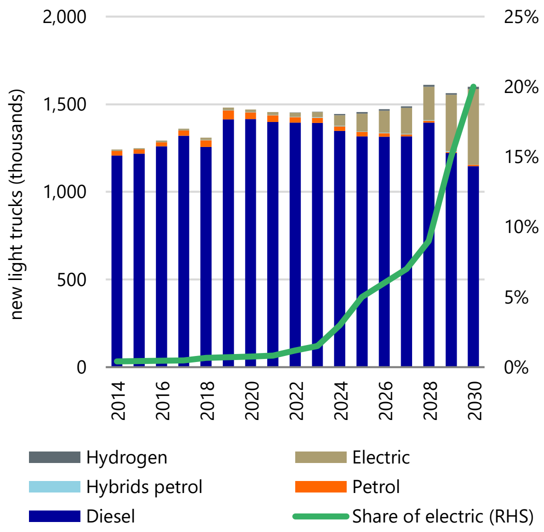
Figure 11: New car registrations, 2014-2030: ICE sales to halt even before 2035



Source: Eurostat, Rabobank 2021

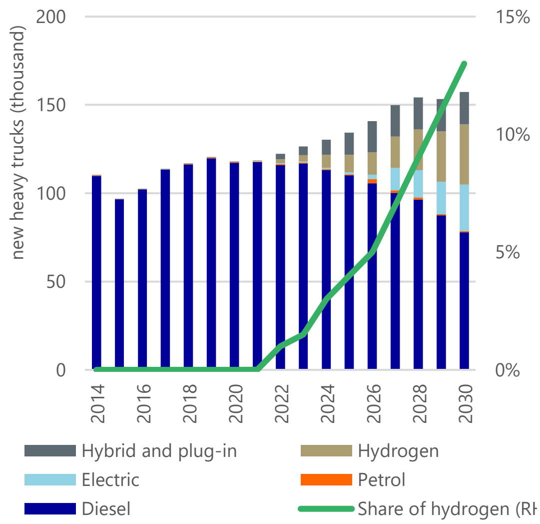
For light trucks (<3.5 metric tons), we estimate a slower adoption rate and a 20% share of electric vehicles in new registrations by 2030. The hydrogen adoption rate would be minimal for cars and light trucks, reaching 13% of new registrations by 2030.

Figure 12: Light-truck new registrations, 2014-2030: electrification main form of renewables



Source: Eurostat, Rabobank 2021

Figure 13: Heavy-truck new registrations, 2014-2030: rely mostly on hydrogen

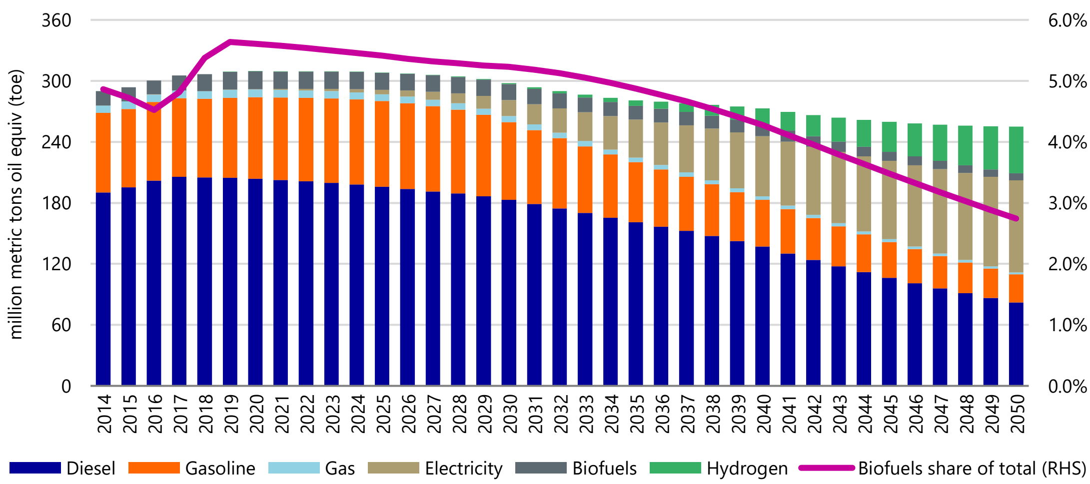


Source: Eurostat, Rabobank 2021

Electrification and hydrogen adoption in road transport will have a negative impact on the demand for oil (gasoline and diesel), especially after 2030. Given the higher replacement rate of diesel vehicles, Rabobank forecasts that diesel demand will decline almost 4% in the next few years until 2025. A steeper decline will show in the years that follow, as those new technologies start to replace the old vehicle fleet. By 2030, we expect diesel demand to be 10% below 2020 levels and by 2050, 40% below 2020 levels. For gasoline demand, Rabobank forecasts a 5% growth until 2025. Total car fleet growth will compensate for the declining share of new gasoline car sales, which will still be higher than 50% of total new car registrations in the next few years, as the adoption of other renewable sources will take longer to increase the share considerably.

However, even with a relatively high adoption rate of these renewable sources, the total vehicle fleet will not be completely fossil fuel-free by 2050. So unless electrification and hydrogen adoption increases at faster rates, or there is an expansion in advanced biofuels from Part A of Annex IX, the target to reach net-zero emissions by 2050 will not materialize.

Figure 14: EU fuel demand forecast, 2014-2050



Source: Eurostat, Rabobank 2021

Impact on Biofuels Industry

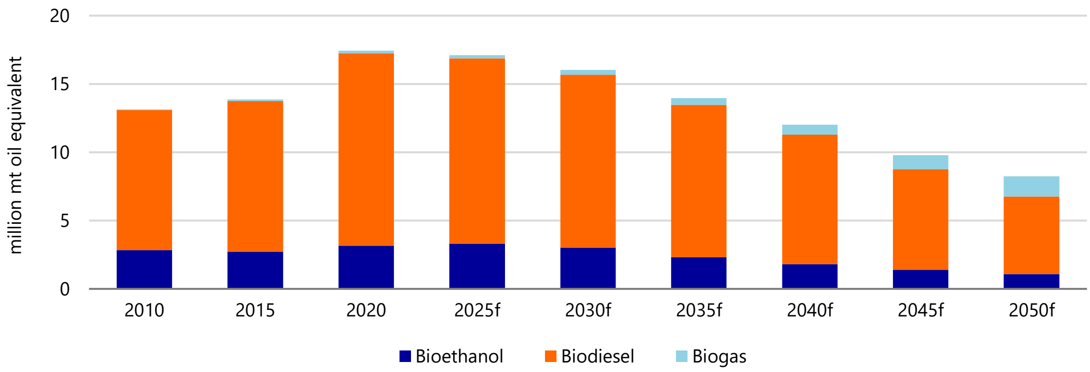
EU Biofuels Demand by 2050

Demand for biofuels will decline at a similar rate to fossil fuels, provided that blending rates remain capped at 7% for crop biofuels and at 1.7% for advanced biofuels Part B, such as UCO and animal fats.

In the years until 2025, Rabobank forecasts biodiesel demand to decline by 4%, assuming blending rates will be similar to what they are now and will thus decline at the same rate as diesel. Similarly, we forecast bioethanol demand to grow at similar rates as gasoline at 5% growth. Although, there is potential for a higher growth rate if other MS increase their blending rates and switch their gasoline motors to ethanol, like France has done since 2018.

Beyond 2030, Rabobank expects the fleet's replacement with electric and hydrogen vehicles will cause a greater impact on biofuels, to a point that it could become unfeasible for certain plants to keep operating (beyond 2040-45). However, we expect an increase in biogas production due to the adoption of other advanced biofuels, such as biomethane.

Figure 15: EU biofuels demand, 2010-2050f

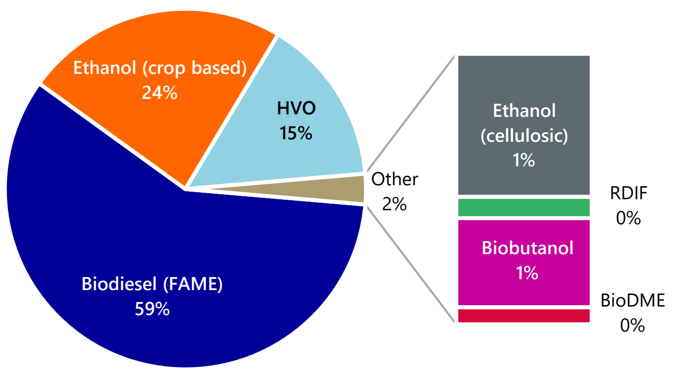


Source: Eurostat, Rabobank 2021

Currently, about 5% of the total fuel supply comes from biofuels. The total processing capacity is estimated to be at 35m metric tons, of which only 2% are advanced biofuels from Part A of Annex IX. The main factors that prevent operators from investing in those types of fuels are high research and production costs and regulatory uncertainty. For instance, cellulosic ethanol has, to date, only appeared viable for highly specialized markets.

The current HVO capacity in the EU is estimated at close to 5m metric tons, and according to company project announcements, it is expected to almost double by 2025-30. The crop biofuels processing facilities have been operating at 58% to 65% of capacity utilization.

Figure 16: Biofuels capacity: Part A advanced biofuels only 2%, 2021

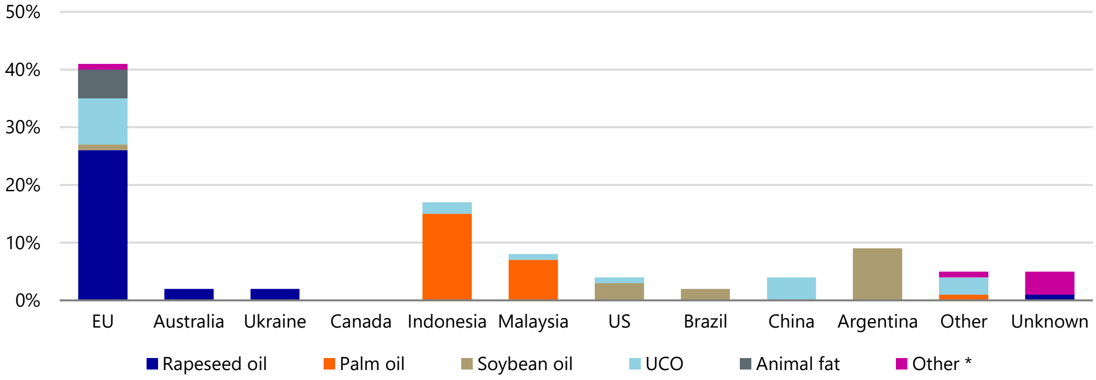


Source: F.O. Licht, GAIN, FAS, Rabobank 2021

Impact on the EU Biodiesel Industry and Its Feedstocks

According to the Renewable Energy Report, the latest data for 2018 shows that rapeseed oil, palm oil, and UCO were the main feedstocks used in EU biodiesel, representing 86% to 87% of all feedstocks. UCO was likely mainly used in HVO production, whereas rapeseed and palm oil were used to produce conventional biodiesel, otherwise known as fatty acid methyl ester (FAME). The report also shows that 59% of feedstocks used to produce biodiesel were imported – mostly palm oil from Indonesia and Malaysia and, to a lesser extent, soybean oil from South America and the US, and UCO from China. The rest (41%) was produced domestically in the EU, with the biggest share going to rapeseed oil.

Figure 17: Feedstocks used for biodiesel consumed in the EU, 2018



Source: Renewable Energy Progress Report (EC), 2020

The rise of the electric and hydrogen vehicles fleet will mostly impact diesel demand in the next few years and, as a consequence, biodiesel and its feedstocks.

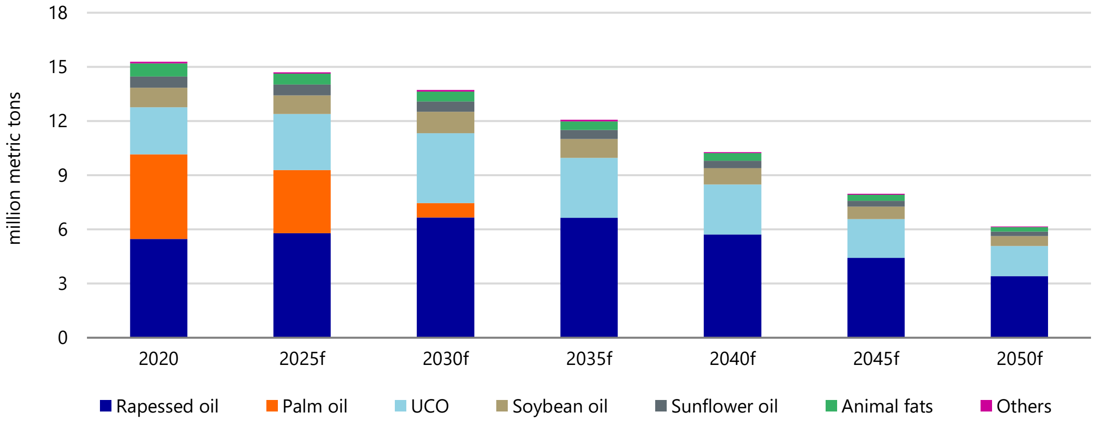
By 2025, with the ban and phasing out of palm oil use for biodiesel, Rabobank forecasts rapeseed oil and UCO will take over the declining share of palm oil, showing a 6% and 18% increase from 2020 levels, respectively, despite the decline in biodiesel production that will result in a 3.8% decrease in feedstock use of total vegetable oils.

Although processing capacity of HVO is expected to almost double by 2025, and UCO is a favored feedstock due to its GHG emissions savings potential, there will be a constraint in securing UCO supplies due to domestic scarcity and fierce competition from the US, which is also expanding its HVO capacity. Therefore, UCO use in road transport will not reach the 1.7% cap of fuel demand by 2025, and HVO capacity might operate below its expected capacity expansion. On the other hand, processing plants in the EU that produce rapeseed oil are likely to increase their capacity utilization, provided sufficient rapeseed is available, as demand for rapeseed oil is expected to increase by 6% from 2020 levels.

By 2030, palm oil use in EU biofuels should be almost phased out, which will spur demand for rapeseed oil and, to a lesser extent, soybean oil. Until then, there will be fierce competition to secure feedstocks, as additional capacity expansion should be limited given there are no incentives to keep operating them beyond 2040. This should trigger vegetable oil trade, especially UCO, in order to meet demand. Rapeseed oil biodiesel plants should expect a boost in demand, especially after 2025, which will also impact global rapeseed markets (see Rabobank's latest report, *Global Canola Opportunities in the Sustainable-Fuel Future: Is Australia Fit and Ready?*)

Beyond 2035, vegetable oil demand for biofuels should decline further, along with fuel demand, which will limit the amount of UCO use, as there is a 1.7% cap based on total fuel demand. Even though there is a promising outlook for rapeseed oil and UCO until 2035, plans for capacity expansion of rapeseed crush and HVO plants in the EU should be limited as the long-term outlook beyond 2045 looks grim. By then, most of the EU fleet will have already been replaced with electric and hydrogen vehicles.

Figure 18: The projected impact of decarbonization on biodiesel feedstocks, 2020-2050f

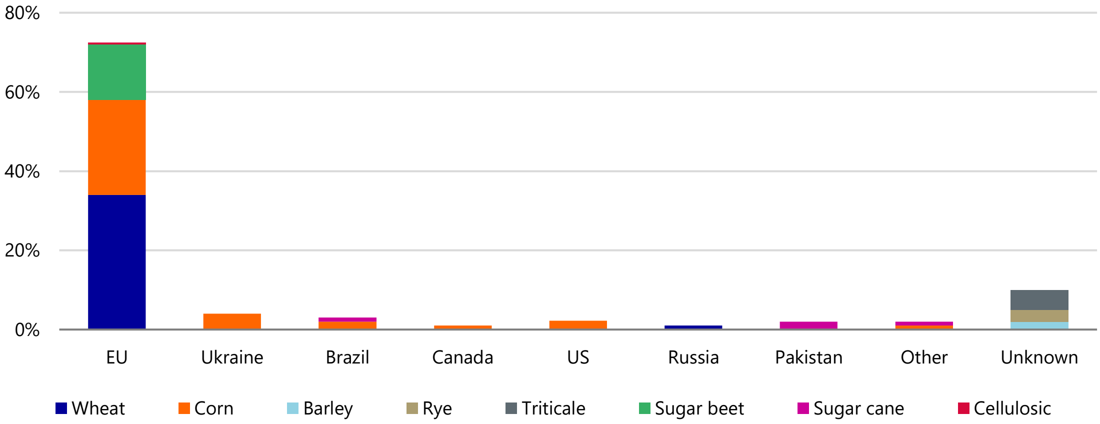


Source: EC, Oil World, Renewable Energy Progress Report, Rabobank 2021

Impact on the EU Bioethanol Industry and Its Feedstocks

The ethanol consumed in the EU is produced mainly from domestic feedstocks (73%), of which wheat, corn, and sugar beet comprise the vast majority. Only a fraction is produced from cellulosic ethanol. About 27% of the EU ethanol market is derived from imported feedstocks, mainly corn from Ukraine, Brazil, the US, and Canada.

Figure 19: Feedstocks used for bioethanol consumed in the EU, 2018



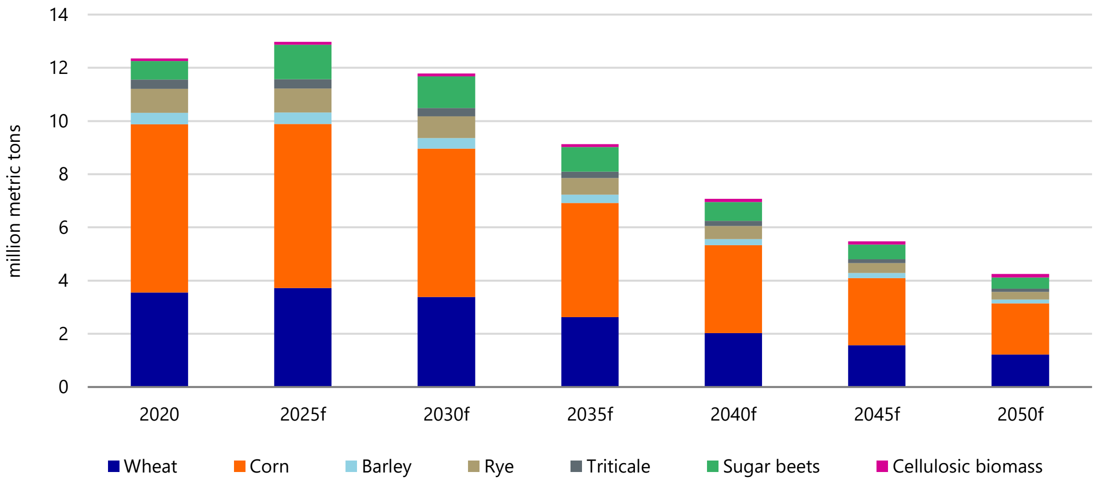
Source: Renewable Energy Progress Report (EC) 2020

For the first few years until 2025, bioethanol demand is expected to increase by around 5%, as the replacement rate of gasoline motor vehicles will be lower than diesel vehicles, delaying the impact until 2027-2030. Another factor that should support ethanol demand is the blending potential in most MS.

It is quite likely that ethanol processors will boost production to meet the demand, especially since production has been well below their capacity due to crop failures, but also due to proximity to countries with higher blending potential (France and Germany). Ethanol imports are likely to remain constrained by tariffs unless the EU grants greater access to ethanol from Mercosur.

From 2035 onward, the rate of decline in ethanol demand will impact feedstocks across the board on a pro rata basis, except for cellulosic ethanol, which should be incentivized to grow, albeit at a slow rate due to its high costs, as it is considered advanced biofuel.

Figure 20: The projected impact of decarbonization on bioethanol (including HVO) feedstocks, 2020-2050f



Source: Eurostat, Rabobank 2021

Concluding Thoughts

Until 2035-2040, the impact on biofuel demand and feedstocks will be twofold. On the one hand, the declining demand for biodiesel will not translate to the same extent into a declining demand for all of its feedstocks, because rapeseed oil and UCO will increase in order to fill the gap from the phasing out and steep decline of palm oil in EU biofuel production through 2030. On the other hand, the growth in ethanol demand until 2025 should benefit most ethanol players and their feedstocks. Its decline thereafter would impact feedstocks at a similar rate, except for cellulosic ethanol, which should be incentivized to grow as it is considered advanced biofuel.

After 2035-40, the expected decline in biofuels demand is likely to encourage biofuel companies to look for alternative uses for their products. Otherwise, the existence of their processing plants could be threatened. The incentives would be greater to invest in zero-emissions renewable sources to decarbonize transport, such as renewable electrification and green hydrogen. Therefore, it is unlikely that there will be additional investments to expand capacity of conventional biofuels, even with the positive short-term outlook, especially as there is existing idle capacity available. This is also true for HVO, which is unlikely to increase capacity beyond what has been announced until 2025, unless the possible demand from aviation and maritime fills the gap of road transportation fuel demand.

It is important to keep in mind that there is still a great level of uncertainty whether and at what speed these renewable technologies will take off at large scale. It is, of course, possible that unforeseen events in the future could affect the projected development and uptake of new vehicle technologies and advanced biofuels. Under these circumstances, conventional biofuels could potentially play a more significant role in achieving the EU´s emissions reductions targets.

List of Acronyms

BEVs	battery electric vehicles
CCS	carbon capture and storage
EC	European Commission
EVs	electric vehicles
FAME	fatty acid methyl ester
FQD	Fuel Quality Directive
GHG	greenhouse gas
HEVs	hybrid electric vehicles
HVO	hydrogenated vegetable oil
ICE	Internal combustion engine
ILUC	indirect land use change
MS	member state
PHEVs	plug-in hybrid electric vehicles
RED	Renewable Energy Directive
RES	renewable energy source
RFNBO	renewable fuels of non-biological origin
toe	tons oil equivalent
UCO	used cooking oil

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