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Report Highlights:

With the gradual lifting of the lockdowns, and recovering economies, consumption of bioethanol and biobased diesel (BBD) are estimated to have increased by respectively 6.1 percent and 0.6 percent in 2022. For both biofuels, the achieved level in 2022 is above the pre-COVID level of 2019, and a new record. Reinforced by the policy support measures of the second Renewable Energy Directive (REDII), both bioethanol and BBD consumption are forecast to increase by about two percent in 2023. Despite expanding demand, EU bioethanol production is anticipated to decline this year due to falling sugar beet supplies. EU BBD production is forecast to increase only marginally with lower biodiesel (fatty acid methyl esters (FAME)) production compensated by further expanding production of hydrogenation derived renewable diesels (HDRD). Based on expanding consumption and stagnating domestic production, EU imports of both bioethanol and BBD are forecast to increase more than ten percent this year.

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I. Summary

The 2021 EU Biofuels Annual Report contained a biomass chapter, which now is a standalone report *EU Wood Pellets Annual*. It is available at: https://gain.fas.usda.gov/#/

Policy and Programs

In 2018, the European Union adopted the Renewable Energy Directive II (REDII). Most of the provisions of the REDII entered into force on January 1, 2021. It set an overall renewable energy target of 32 percent by 2030 and a 14 percent target for the transport sector. The EU capped the REDII share of conventional/crop-based biofuels to one percent above Member State 2020 consumption levels, up to the overall cap of seven percent of final consumption of road and rail transport for each Member State. First generation biofuels were already capped at seven percent in the EU after the adoption in 2014 of the Indirect Land Use Change (ILUC) Directive. The REDII also set ambitious binding targets for the use of advanced biofuels to 3.5 percent by 2030. In the REDII, the EU also expanded sustainability criteria for biofuels.

In 2019, the EC presented its Communication on the European Green Deal which aims to make the European Union carbon neutral by 2050. As part of the Green Deal, the EC published several legislative proposals that will affect the biofuels market in the medium to long term such as the review of the Renewable Energy Directive, the Deforestation-free Supply Chain Regulation or the ban on combustion engines by 2035.

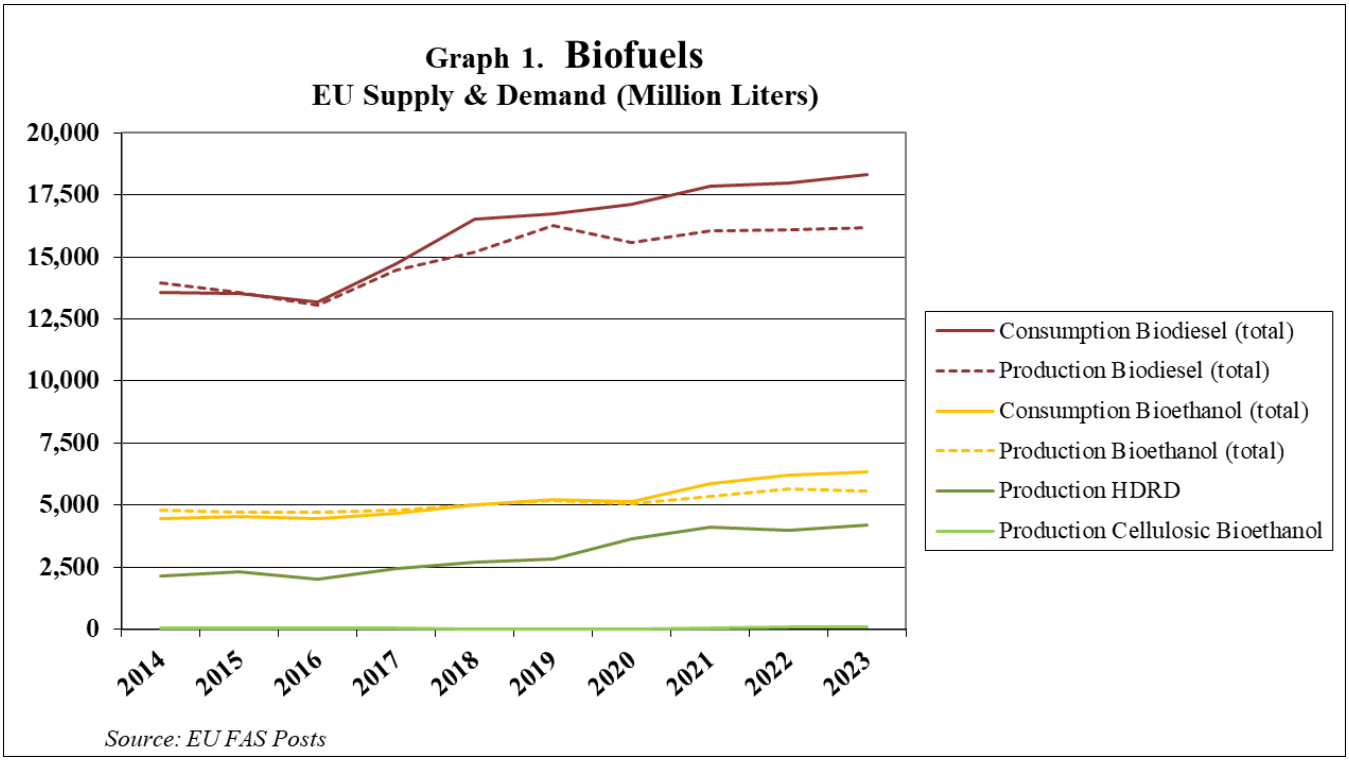
Conventional and Advanced Biofuels

With the gradual lifting of the lockdowns and recovering economies, consumption of bioethanol and biomass-based diesel (fatty acid methyl esters (FAME) and hydrogenation-derived renewable diesel (HDRD)) are estimated to have increased by respectively 6.1 percent and 0.6 percent in 2022. For both biofuels, the achieved level in 2022 is above the pre-COVID level of 2019, and a new record. The expansion is mainly due to higher average blending and less so gasoline fuel pool growth for ethanol, and in fact growth for biomass-based diesel (BBD) is entirely due to increased blending which is offsetting some expected decline in the diesel pool. Biofuel consumption was further reinforced by post-2020 second Renewable Energy Directive (REDII) policy support measures. To achieve the REDII's goals, each Member State (MS) has implemented individual national use trajectories and measures.

Both bioethanol and biomass-based diesel (BBD) consumption are forecast to increase by about two percent in 2023. A further expected increase in average blending and growth in the gasoline pool drives ethanol consumption, while it appears that further BBD growth is driven by blending increases alone with continued decline in the diesel pool. The skyrocketing gasoline prices have increased the competitiveness of bioethanol. In addition, bioethanol sales are supported by the further market introduction of mid-level blends (E10) as well as the higher blends (E85). Most of the market expansion is anticipated in the French market. It should be noted that the final consumption in all EU MS will depend on the effect of government actions to relax biofuel blending obligations. Despite expanding demand in 2023 (6.3 billion liters), EU bioethanol production is anticipated to decline to 5.6 billion liters. This production drop is mainly due to lower use of capacity in France as a result of the falling beet

supplies. With the increased demand, and falling production, EU bioethanol imports are forecast to increase to a new record of 1.39 billion liters.

EU bio-based diesel (BBD) consumption (fatty acid methyl esters (FAME, aka biodiesel) and hydrogenation derived renewable diesels (HDRD)) is expected to increase by 1.9 percent to 18.3 billion liters in 2023. The projected higher consumption is driven by increased mandates for biofuel use and/or greenhouse gas (GHG) reduction in various MS. However, an increased use of biodiesels with higher GHG reduction values reduces the physical volumes needed to fulfill the mandates. The gradual recovery of biodiesel production in 2021 and 2022, is anticipated to continue in 2023 but with 16.2 billion liters production is forecast to remain below 2019 levels, as anticipated higher imports leave less room for domestic production. The higher production of BBD masks different developments for FAME and HDRD. HDRD production is expected to grow by 6.3 percent as it has an advantage based on its higher GHG reduction values. In contrast, FAME production is forecast to further decline by 1.3 percent. In 2023, palm oil-based biodiesel production is anticipated to significantly drop by 15 percent and be replaced by biodiesel made from rapeseed oil, used cooking oil (UCO) and animal fat.



Based on the minimum blending rates for “advanced” biofuels produced with agricultural and forestry byproducts listed in Part A of Annex IX of the REDII, the consumption of these “advanced” biofuels must increase significantly towards 2030. Currently, EU production of such “advanced” biofuels is limited to roughly 5 percent of BBD and 11 percent of bioethanol. Most of these biofuels are renewable diesel (HDRD) produced from tall and pine oil from pulp mills, bioethanol produced from food waste streams, and to a lesser extent cellulosic ethanol. A significant production expansion of “advanced” biofuels produced with feedstocks listed in Part A of the REDII is forecast to take place in Sweden and Finland, which is anticipated to be based on the refining of tall oil.

A larger portion of biofuels is produced using waste oils and fats listed in Part B of Annex IX of the REDII. Nearly a third of the BBD (including HDRD) are produced from used cooking oil and animal fats. The REDII sets a consumption limit of 1.7 percent of all transport fuels for biofuels produced with these waste oils and fats, but MS can modify this limit, if justified, considering the limited availability of the feedstock. Sourcing feedstocks from third countries could support a production expansion to keep these renewable transport fuels competitive.

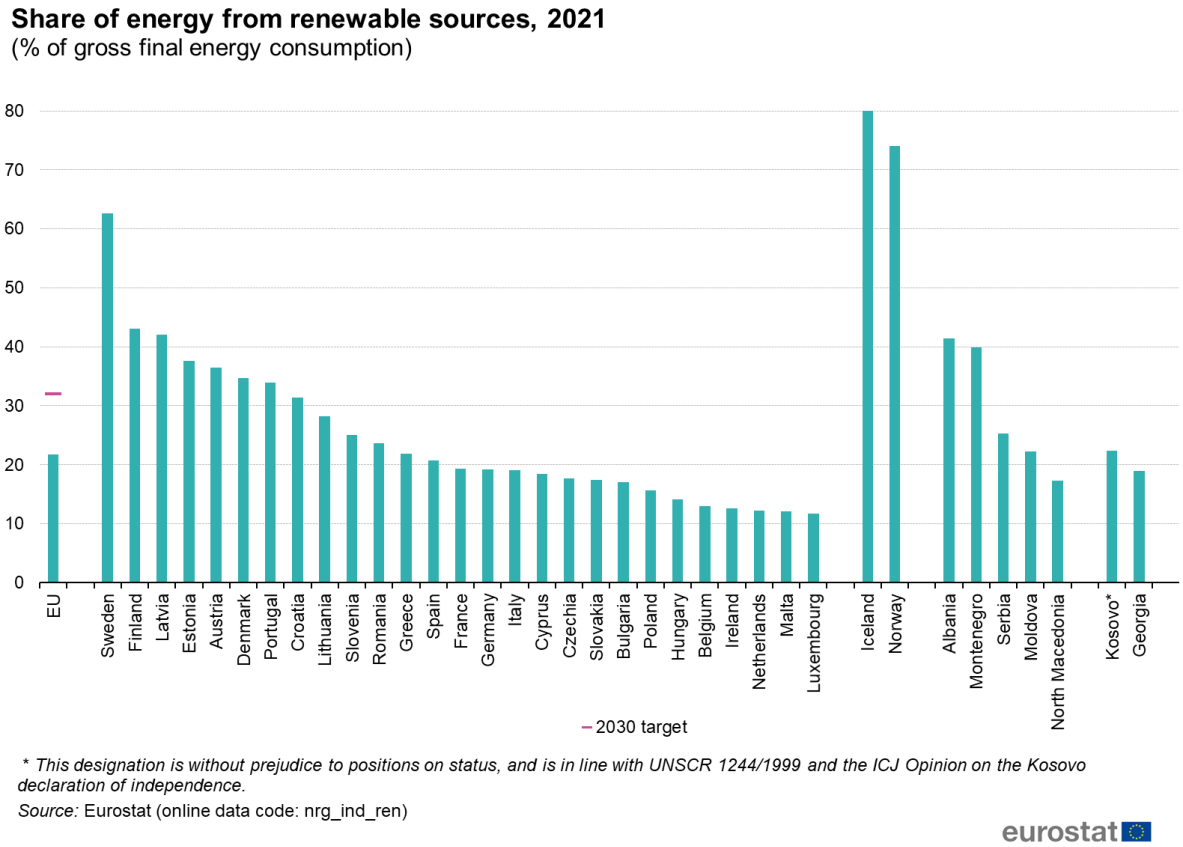
II. Policy and Programs

The EU's Renewable Energy Directive (RED)

The EU Energy and Climate Change Package (CCP) ran from 2010-2020. The RED, which was part of the CCP package, entered into force on June 25, 2009 and expired on December 31, 2020. The CCP required the EU to achieve a binding target whereby 20 percent of its overall energy use would be powered from renewable sources and 10 percent energy use in transportation for each Member State would come from renewables by 2020. For more information about RED, please see the 2020 Biofuels Annual Report.

The Renewable Energy Directive II (the REDII)

Graph 2



** This designation is without prejudice to positions on status, and is in line with UNSCR 1244/1999 and the ICJ Opinion on the Kosovo declaration of independence.*

Source: Eurostat (online data code: nrg_ind_ren)

eurostat

The European Union (EU) adopted the new REDII for the period 2021-2030 in 2018. Most of the provisions of Directive 2018/2001 entered into force on January 1, 2021. The EU Member States (MS) were required to transpose the REDII by June 30, 2021, into national legislation.

Uptake of Renewables in the EU

In October 2023, the European Commission (EC) published a report on the State of the Energy Union 2022. In 2021, the EU reached a 21.8 percent share of its gross final energy consumption from renewable sources, around 0.3 percentage points lower than in 2020 (see the graph above published by Eurostat). The EC explains that this is likely due to the lifting of the restrictions linked to the COVID-19 pandemic. The average share of energy from renewable sources in transport was of 9.1 percent in 2021 (this include the double counting of advanced biofuels).

The REDII Renewables Targets

The REDII sets an overall binding renewable energy target of at least 32 percent by 2030 with a 14 percent target for the transport sector, with a clause for a possible upwards revision by 2023. Within the 14 percent transport sector target, food-based biofuels are capped at EU MS 2020 levels up to one percent higher, but with a maximum cap of seven percent for each MS. If the cap on first generation biofuels in a MS is less than seven percent, the country may reduce the transport target by the same amount (for example, a country with a food and feed crop cap of 6 percent could set a transport target at 13 percent). MS can also set a lower limit for conventional biofuels than prescribed in the REDII.

For advanced biofuels, the REDII introduces two different sets of targets for feedstocks listed in Part A of Annex IX and feedstock listed in Part B. Feedstocks listed in Part A must be supplied at a minimum of 0.2 percent of transport energy in 2022, 1 percent in 2025 and increasing to at least 3.5 percent by 2030. Biofuels produced from feedstock listed in Part B will be capped at 1.7 percent in 2030. Advanced biofuels can be double counted towards both the 3.5 percent target and towards the 14 percent target.

Table 1. Advanced Biofuel sources, Part A and Part B of Annex IX in the REDII

Part A	Part B
• Algae if cultivated on land in ponds or photobioreactors • Biomass fraction of mixed municipal waste • Biowaste from private households subject to separate collection • Biomass fraction of industrial waste not fit for use in the food or feed chain • Straw • Animal manure and sewage sludge • Palm oil mill effluent and empty palm fruit bunches • Crude glycerin • Bagasse • Grape marcs and wine lees	• Used cooking oil • Some categories of animal fats

• Nut shells • Husks • Cobs cleaned of kernels of corn • Biomass fraction of wastes and residues from forestry and forest-based industries • Other non-food cellulosic material • Other ligno-cellulosic material except saw logs and veneer logs	

The European Commission has proposed to add new feedstocks to Annex IX. The draft delegated act is still going through the legislative approval process but is expected to be adopted soon.

Implementation of the REDII and Advanced Biofuels

Some EU MS plan to achieve higher blending rates of advanced biofuels than required by the REDII. In February 2019, Finnish Parliament approved a law that mandates an advanced biofuel share of two percent in 2023, increasing to ten percent in 2030, with the note that feedstocks in Annex IX–B are not capped. The Netherlands imposed a mandate of 2.4 percent blending of advanced biofuels in 2023 and seven percent in 2030 (with a cap of ten percent for Annex IX-B biofuels). In Italy, the targets for advanced biofuels are set at 3.4 percent in 2023 increasing to 8.0 percent in 2030. In Portugal, the targets for advanced biofuels are set at 0.7 percent in 2023 increasing to 7.0 percent in 2030. In the two main fuel markets in the EU (Germany and France), the mandates for advanced biofuels are more conservative. In Germany, the advanced biofuels target is 0.3 percent in 2023 and gradually increasing to 2.6 percent in 2030. But it should be noted that in Germany HDRD and waste-based biodiesel enjoy competitive advantages based only on their higher greenhouse gas (GHG) reduction characteristics compared to first generation biofuels. In France, the blending objective of advanced biofuels is 1.2 percent in gasoline and 0.4 percent in diesel in 2023 – 2027 and are set at respectively 3.8 percent and 2.8 percent by 2028 and. For more information about the mandates see our FAS GAIN report: Biofuel Mandates in the EU by Member State – 2023, published July 6, 2023.

Research on Supporting Bio-based Industries and the Bioeconomy

The bioeconomy is one of the key research areas of the EU. The Bioeconomy Strategy and the Bioeconomy Action Plan, both published in October 2018, contribute to the European Green Deal. For more information see the Bioeconomy research and innovation website of the European Commission (EC), and the EU Biorefinery Outlook to 2030, which presents scenarios on how demand and supply for bio-based chemicals and materials could grow to 2030.

In July 2014, the Bio-Based Industries Joint Undertaking (BBI-JU) was launched. The goal of the program was to convert biomass into common consumer products through innovative technologies by biorefineries. On February 23, 2021, the EC has agreed on the successor of BBI JU: the Circular Bio-based Europe Joint Undertaking (CBE JU). The CBE JU is a €2 billion partnership between the EU and the Bio-based Industries Consortium (BIC) that funds projects advancing competitive circular bio-based industries under Horizon Europe. The objective of the initiative is to produce major contributions to the climate targets by 2030 and pave the way for climate neutrality by 2050. It aims to develop and expand the sustainable sourcing and conversion of biomass into bio-based products focusing on multiscale biorefinery processing. On April 26, 2023, the CBE JU published its second call for project proposals. A

total of €215.5 million will be dedicated to advance competitive circular bio-based industries in Europe across 18 topics, of which optimizing and integrating wood-based value chains and retro-fitting biorefineries towards higher-value bio-based products.

The REDII Sustainability Criteria

To qualify for counting towards the REDII targets, biofuels, bioliquids, and biomass consumed in the EU must comply with strict sustainability criteria provided in article 29 of the REDII. This article sets requirements on the minimum level of GHG savings, safeguarding against the conversion of high-carbon content lands and protection of biodiversity.

High-Risk Indirect Land Use Change (ILUC) Biofuels

The REDII introduces specific criteria for high-risk ILUC biofuels. One of the more heated debates of the REDII surrounded the use of biofuels produced from high-carbon content lands that have undergone recent deforestation or conversion from native grasslands to croplands. These areas are referred to ILUC areas. The REDII required that the EC come up with a definition of high-risk ILUC biofuels.
In May 2019, the EU published in the Official Journal Delegated Act 2019/807 determining high-risk ILUC biofuels. The EC defines high ILUC-risk feedstock as feedstock for which the share of expansion of the production into land with high-carbon stock is higher than ten percent since 2008 with an annual expansion of more than one percent. Given the calculations of the EC, only palm oil falls under this definition. The use of high-risk ILUC biofuels will be capped at the 2019 level until 2023 and then phased out by 2030. The Delegated Act also sets out criteria for certifying low-risk ILUC biofuels, which were already defined in article 2 of the REDII. The delegated act provides the possibility for producers to certify their feedstock as low-risk ILUC. Palm oil producers are able to certify their feedstock as low-risk if they comply with the general sustainability criteria of the REDII and produce through additional "measures" such as cultivation on unused or abandoned land or if they fruit bunches are collected only from small holders (less than 2 hectares).

The REDII Greenhouse Gas (GHG) Savings

The REDII introduces new compliance measures for GHG emission criteria for biofuels used in transport and counted towards the overall 14 percent target. The EC is allowed to revise and update the default values of GHG emissions when technological developments make it necessary. Economic operators have the option to either use default GHG intensity values provided in the REDII or to calculate actual values for their pathway.

Table 2. Greenhouse gas savings thresholds in the REDII

Plant operation start date	Transport biofuels	Transport renewable fuels of non-biological origin	Electricity, heating, and cooling
Before October 2015	50%	-	-
After October 2015	60%	-	-
After January 2021	65%	70%	70%
After January 2026	65%	70%	80%

The sustainability criteria apply to plants with a total rated thermal input above 20 megawatts (MW) for

installations producing power, heating, cooling, or fuels from solid biomass fuels and to plants with total rated thermal input capacity equal to or exceeding 2 MW for installations using gaseous biomass fuels.

Compliance With Sustainability and GHG Emission Saving Criteria - Voluntary schemes
Voluntary schemes and national certification schemes of EU MS help to ensure that biofuels, bioliquids and biomass fuels are sustainably produced by verifying that they comply with the EU sustainability criteria. Following the entry into force of the REDII, voluntary schemes recognized under the RED must adjust the certification approaches to meet the new requirements. Those additional rules are enshrined in Implementing Regulation 2022/996 which lays down the rules to verify sustainability and GHG emissions saving criteria and low ILUC change-risk criteria. This Regulation lays down implementing rules to ensure economic operators comply with the sustainability criteria and provide accurate data on GHG emission savings of the REDII. The Regulation also lays down the rules comply with the criteria for certification of low ILUC-risk biofuels as foreseen by Delegated Regulation 2019/807. More information about the recognition process can be found on the EC website. The updated assessment protocol can be found here.

The recognition by the EC is not a pre-requisite for certification. EU MS may accept evidence from voluntary schemes or national certifications schemes set up by EU MS not recognized by the EC if the competent authorities in those countries are confident about the quality of the certification services provided by these schemes.

Additional National Sustainability Requirements
The REDII allows MS to establish additional sustainability criteria for biomass fuels. Before December 31, 2026, the Commission will assess the impact of such additional criteria on the internal market, accompanied, if necessary, by a proposal to ensure harmonization at EU-level.
The REDII also allows MS to set a limit lower than the seven percent allowed for biofuels, bioliquids and biomass fuels produced from food and feed crops. MS can also distinguish between different biofuels, bioliquids and biomass fuels produced from food and feed crops, considering the best available evidence on indirect land-use change impact. EU MS may, for example, set a lower limit for the share of biofuels, bioliquids and biomass fuels produced from oil crops.

The Fuel Quality Directive (FQD) and the REDII

As noted above, the REDII addresses the issue of the decarbonization of transport fuels after 2020. This was previously addressed in the FQD which requires that all fuel suppliers must meet a six percent reduction (from 2010) in GHG emissions by 2020 across all fuel categories supplied to the market. In addition, the FQD limits ethanol blends to ten percent or less when ethanol is used as an oxygenate standard gasoline burning internal combustion engines (not applicable for flex-fuel engines), and places limits on palm oil and soy oil content of biodiesel.

The European Green Deal

On December 11, 2019, the EC presented its Communication on the European Green Deal. On July 9, 2021, Regulation 2021/1119, also known as the EU Climate Law, was published in the EU Official Journal. The Climate Law enshrines a legally binding target of net zero GHG emissions by 2050. EU Institutions and MS are bound to take the necessary measures at EU and national level to meet the target. The Climate Law includes measures to keep track of progress and adjust the EU's actions

accordingly. The text also includes a reduction of net GHG emissions by at least 55 percent compared to 1990 levels by 2030. The Law also includes a process for setting a 2040 climate target.

The Fit for 55 Package

To achieve the Green Deal objective of climate neutrality by 2050 and a 55 percent reduction of net GHG emissions compared to 1990 levels by 2030, the EC released its 'Fit for 55' legislative package.

Updated RED

As part of this package, the EC proposed to amend the RED. On March 29, 2023, the EU institutions agreed on the review of the RED (REDIII). The text still needs to be formally adopted. It is expected that it will enter into force in late 2023 or early 2024. The new Directive increases the EU target for the share of renewable sources and changes the targets for the transport sector as listed in the table below:

Table 3. Targets in the REDIII

Type of Target	Current 2030 Target (REDII)	Proposed 2030 Target (REDIII)
Overall renewable energy target	32%	42.5%
Transport sector	14%	29% or a GHG intensity reduction of at least 14.5%
Crop-based biofuels in transport	7%	Limited to 7%
Advanced biofuels in transport	3.5%	- Combined share of advanced biofuels from the feedstock listed in Part A of Annex IX and of renewable fuels of non-biological origin of at least 1% in 2025 and 5.5% in 2030, of which a share of at least 1% is renewable fuels of non-biological origin in 2030 - Limited to 1.7% of advanced biofuels from the feedstock listed in Part A of Annex IX

Advanced biofuels from the feedstock listed in Annex IX and renewable fuels of non-biological origin can still be double counted towards the targets thus lowering actual volumes needed to meet targets.

New CO_2 emissions standards for vehicles

In April 2023, the EU adopted Regulation 2023/851 which requires a 100 percent reduction target for CO_2 emissions from new passenger cars and new light commercial vehicles by 2035, This Regulation effectively bans the sale of new internal combustion engine passenger cars and vans by 2035. The agreed text sets intermediate 2030 targets of a 55 percent fleet-wide CO_2 emissions reduction (compared to 2021 levels) for new cars and a 50 percent reduction for vans.

In February 2023, the European Commission published a proposal revising CO_2 emission standards for heavy-duty vehicles. Under the proposal, CO2 emissions would reduce on average compared to 2019 levels by 45 percent from 2030, 65 percent from 2035 and 90 percent from 2040 onwards. This proposal continues through the legislative process and is not yet adopted.

It remains unclear to which extent these new rules on internal combustion engines will impact the biofuels market in the EU.

Revision of the Energy Tax Directive
As part of the package, the EC also announced a revision of the Energy Tax Directive (ETD). The EC noted that biodiesel, and especially ethanol, are disadvantaged by the volume-based taxation (rates expressed per liter), because one liter of these fuels has a lower energy content than one liter of the fossil fuels they replace while the same tax rate applies. Therefore, the EC proposes to set different minimum levels of taxation applicable to fossil fuels and biofuels on an energy basis (euros/gigajoule). This is accompanied by a transition period for food and feed crop biofuels and low-carbon fuels. The proposal continues through the legislative process and is not yet adopted.

Table 4. Proposed minimum level of taxation applicable to motor fuels (in EUR/gigajoule)

	Start of transitional period (01/01/2023)	Final rate after completion of transitional period (01/01/2033)
Petrol	10.75	10.75
Gasoil	10.75	10.75
Sustainable food and feed crop biofuels	5.38	10.75
Sustainable biofuels	5.38	5.38
Low-carbon fuels	0.15	5.38
Advanced sustainable biofuels and biogas	0.15	0.15
Renewable fuels of non-biological origin	0.15	0.15

Sustainable Aviation Fuels (SAF)
As part of the package, the EC also forwarded a proposal for a regulation that would require aviation fuel suppliers to ensure all aviation fuel made available to aircraft operators at each EU airport contains a minimum share of SAF, including a minimum share of synthetic aviation fuel, in accordance with the values and dates of application set below:

Table 5. Targets in the proposed SAF Regulation

Date of application	Minimum share of SAF	Minimum share of synthetic fuels
January 1, 2025	2%	N/A
January 1, 2030	5%	0.7%
January 1, 2035	20%	5%
January 1, 2040	32%	8%
January 1, 2045	38%	11%
January 1, 2050	63%	28%

The EC defines SAF as drop-in aviation fuels that are either synthetic aviation fuels, advanced biofuels as listed from feedstock listed in part A of Annex IX or biofuels produced from the feedstock listed in Part B of Annex IX to the REDII, which comply with the sustainability and GHG emissions criteria. The

EC defines synthetic aviation fuels as renewable fuels of non-biological origin, as defined in Article 2 of REDII used in aviation. The EC decided not to include first generation biofuels such as crop-based biofuels such as feed and food and crop-based biofuels for sustainability reasons. The EC states that they have limited scalability potential and raise sustainability concerns and therefore they should not be supported. This proposal is still being discussed between EU institutions.

Deforestation-Free Supply Chain Initiative

As part of the Green Deal, the EC adopted Regulation 2023/1115 aimed to prevent products causing deforestation entering the EU market. The proposal targets products which are identified by the EC as the main drivers of deforestation including soy and palm oil. To sell any of the covered products in the EU or export them from the EU, business operators will be required to provide extensive information about the product's origins, including the precise location(s) and general time of production. The requirements for economic operators will start on December 30, 2024.

The Regulation establishes a country benchmarking system through which the EU Commission will assess the risk that countries, or parts thereof, produce relevant commodities and products that contribute to deforestation. Products sourced from standard- or high-risk origins must comply with additional risk assessment and mitigation procedures. It is likely that this new Regulation will divert global trade flows of many products including soybeans, palm oil and derived products. It will also likely have an impact on commodity prices in the EU. For more information, please see GAIN Report: European Institutions Finalize Deforestation-Free Supply Chain Regulation.

The EU Taxonomy for Sustainable Activities

In order to meet the EU's climate targets for 2030 and reach the objectives of the European Green Deal, the EC adopted the Taxonomy Regulation in June 2020. This Regulation establishes the framework for an EU taxonomy for sustainable activities by setting out four overarching conditions that an economic activity must meet in order to qualify as 'environmentally sustainable'. The Taxonomy Regulation aims to act as a screening mechanism to define sustainable activities to steer private investment to activities the EC deems sustainable. It creates three different categories: "sustainable activities", "transitional activities and "enabling activities." The EC classifies crop-based biofuels as sustainable activities. More information can be found in GAIN Report: Commission Adopts Taxonomy for Green Investments.

EU Policy Response to the War in Ukraine

In February 2022, Russia launched a full-scale invasion in Ukraine. The war is putting pressure on global food security because both countries are large producers of animal feed, grains, and oilseeds and trade flows are being intentionally disrupted by the ongoing war and Russia's withdrawal from the Black Sea Grains Initiative (BSGI). Energy, fertilizer, and pesticides prices as impacted as well. For more information about the EU's policy response to the situation, please see the European Union: Oilseeds and Products 2023 Annual Report.

Market Access

Duties

Regulation 2017/2321 lays down the EU's anti-dumping and anti-subsidy rule. Duty rates for fuels are listed below; for a historical discussion of how EU harmonized system (HS) customs codes have changed and influenced trade please see the EU Biofuels Annual 2017.

Table 6. MFN Duty Rates for Biofuels

HS Code	Description	Duty Rate
38260010	FAME above 96.5 and up to 100% by volume	6.5%
38260090	FAME below greater than 30% and up to 96.5% by volume	6.5%
271020	Petroleum oils containing FAME up to 30% by volume	3.7%
220710	Undenatured ethanol	€19.2/hl
220720	Denatured ethanol	€10.2/hl

Anti-Dumping Duties (AD) Against U.S. Bioethanol

In February 2018, the EC initiated a 15-month review of the current AD duties of 9.5 percent for U.S. bioethanol, which were set to expire that month. The EU had originally put in place these definitive measures in February 23, 2013 (Regulation 157/2013). The EU General Court ruled against the duties in 2016, which the EC appealed. For background information on this case development, see: EU Biofuels Annual 2017. On May 15, 2019, the EU concluded the 15-month review and repealed the AD duty on bioethanol imports from the United States (Regulation 2019/765).

AD and Countervailing (CV) Duties Against U.S. Biomass-Based Diesel

In 2009, the EU initiated AD and CV duties of up to €409.2 (around $495) per MT on imports of U.S. biomass-based diesel (both biodiesel and renewable diesel) mainly targeting the U.S. federal blenders tax credit of $1/gallon (Council Regulation 598/2009 and Council Regulation 599/2009). On September 15, 2015, the EU extended the duties against both fuels an additional five years to September of 2020 with Commission Regulation 2015/1519. On September 14, 2020, two days before the expiration of the duties, the EC launched an investigation to extend the anti-dumping measures against both fuels. On August 3, 2021, the EU extended for an additional five years the anti-dumping and countervailing duties levied on both fuels. Implementing Regulation (EU) 2021/1266 imposes an anti-dumping duty rate of up to EUR 198 per ton net both fuels. For more information, please see GAIN Report: EU Extends Its Anti-Dumping Duty and Countervailing Duties on Imports of US Biodiesel.

Biodiesel AD and CV Duty Actions Against Argentina and Indonesia

On September 19, 2017, the EC removed AD duties on Argentine and Indonesia's biodiesel exports, in response to losing a five-year dispute with said countries in the WTO in October 2016. (For more information about the history of the case, please see EU Biofuels Annual 2019.) However, days after lifting the AD duties on biodiesel, in January 2018, the EC announced a Notice of Initiation of anti-subsidy proceedings for Argentina. In February 2019, the EU imposed CV duties on Argentinean biodiesel between 25.0 and 33.4 percent depending on the company (Implementing Regulation 2019/244). Duties are linked to an undertaking offer by the Argentine industry which aims to prevent prices from falling below a certain floor price. Implementing Decision 2019/245 establishes price and

volume limits – not disclosed publicly - for Argentinean biodiesel. It spares producers who agree to a minimum price from the imposition of CV duties and if volume limits are not exceeded. This is in line with article 18 of the WTO Agreement on subsidies and countervailing measures. Nevertheless, the EU biodiesel industry is concerned with this managed trade agreement and calls on the EC to be vigilant in monitoring prices. In December 2019, the EU imposed countervailing duty on imports of biodiesel from Indonesia with Implementing Regulation 2019/2092. The CV duty ranges from 8 to 18 percent depending on the company.

III. Ethanol

Bioethanol (ethyl alcohol), or simply ethanol, is produced by fermenting the carbohydrate components of plant materials. The most used feedstocks are grains (e.g., corn, other coarse grains, and wheat kernels) and sugarcane. 'Synthetic' ethanol made from petroleum fuels is restricted to a very small market and is not included in this report. Ethanol used as transport fuel is referred to as bioethanol in this report.

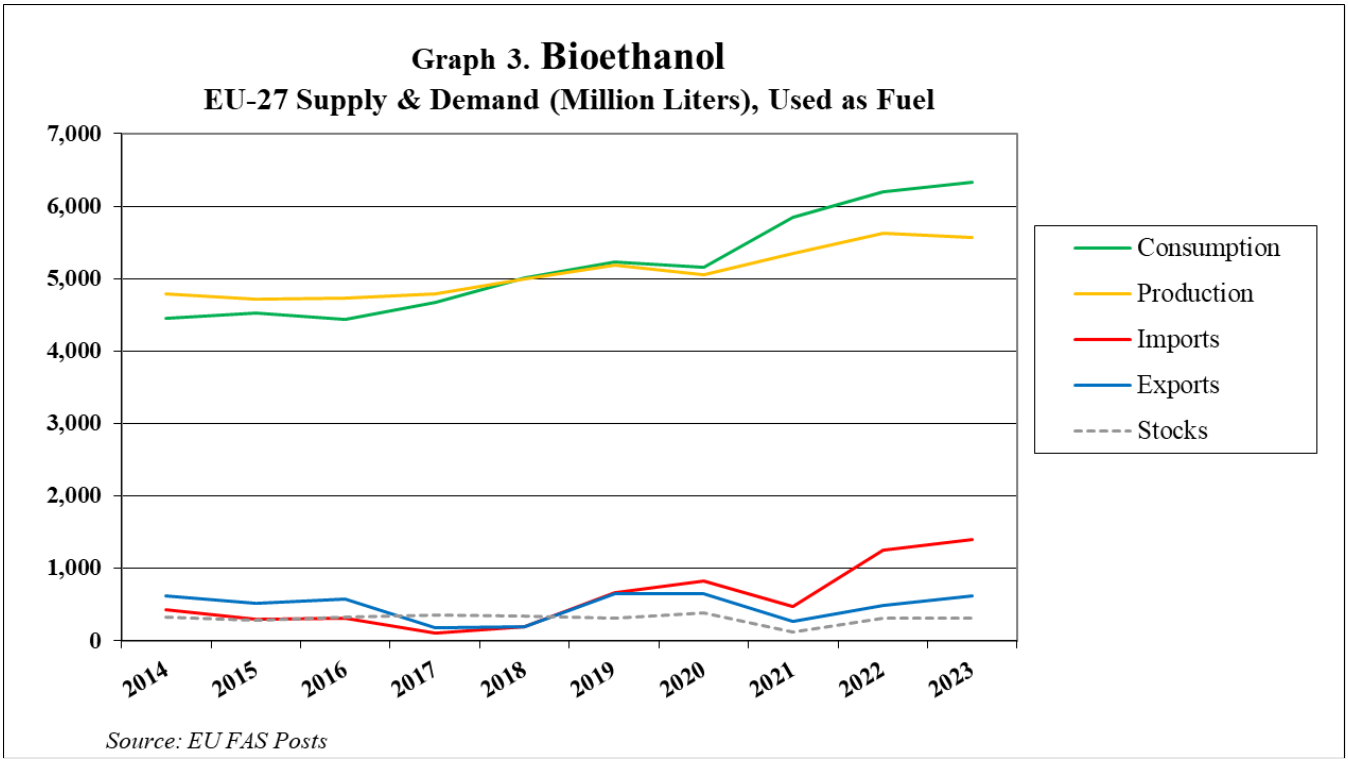
EU Production, Supply and Demand Table

Table 7. Ethanol Used as Fuel and Other Industrial Chemicals
(Million Liters)

Calendar Year	2014	2015	2016	2017	2018	2019	2020	2021[e]	2022[e]	2023[f]
Beginning Stocks	355	393	359	389	418	393	369	471	177	371
Fuel Begin Stocks	219	358	317	356	388	366	341	423	147	341
Production	5,489	5,558	5,395	5,376	5,542	5,750	6,022	5,949	6,229	6,159
Fuel Production	4,789	4,722	4,728	4,785	4,994	5,181	5,061	5,352	5,633	5,570
>of which is cellulosic (a)	40	40	40	40	5	5	20	50	70	80
Imports	814	742	856	881	800	1,100	1,490	1,125	1,987	2,050
Fuel Imports	424	292	315	110	189	666	832	478	1,257	1,392
>of which is ETBE (b)	110	109	24	9	9	14	26	19	18	81
Exports	673	574	622	236	244	698	704	312	544	677
Fuel Exports	623	524	572	186	194	648	654	262	494	627
Consumption	5,593	5,760	5,598	5,992	6,122	6,176	6,706	7,057	7,479	7,527
Fuel Consumption	4,451	4,530	4,432	4,677	5,010	5,224	5,156	5,844	6,203	6,329
Ending Stocks	393	359	389	418	393	369	471	177	371	376
Fuel Ending Stocks	358	317	356	388	366	341	423	147	341	347
Refineries Producing First Generation Fuel Ethanol (Million Liters)										
Number of Refineries	66	59	55	57	56	52	54	58	58	59
Nameplate Capacity	8,089	7,949	7,620	7,418	7,278	7,266	7,456	8,051	8,392	8,519
Capacity Use	59%	59%	62%	64%	69%	71%	68%	66%	66%	64%

Refineries Producing Cellulosic Fuel Ethanol (Million Liters)										
Number of Refineries	1	1	1	1	2	2	2	4	4	5
Nameplate Capacity	50	50	50	50	10	10	40	120	140	200
Capacity Use	80%	80%	80%	80%	50%	50%	50%	42%	50%	40%
Co-product Production (1,000 MT)										
DDGs	3,122	3,158	3,219	3,293	3,504	3,510	3,699	3,745	4,034	4,129
Corn Oil	147	144	142	144	185	201	193	197	202	197
Feedstock Use for Fuel Ethanol (1,000 MT)										
Wheat Kernels	3,011	3,334	3,570	3,926	3,107	2,855	3,123	2,709	3,579	3,602
Corn Kernels	5,084	4,956	4,884	4,962	6,392	6,929	6,647	6,798	6,970	6,804
Barley Kernels	414	421	394	388	483	364	462	521	482	573
Rye Kernels	805	724	662	514	484	231	441	585	421	507
Triticale Kernels	661	691	779	735	700	850	1,050	800	675	450
Sugar Beets	10,478	9,198	8,370	7,720	6,982	8,216	5,112	7,933	6,750	5,233
Cellulosic Biomass	160	160	160	160	20	20	80	200	280	320
Market Penetration (Million Liters)										
Fuel Ethanol Use	4,451	4,530	4,432	4,677	5,010	5,224	5,156	5,844	6,203	6,329
Gasoline/Ethanol Pool 1/	91,144	89,789	90,186	91,127	96,142	98,272	86,025	93,503	98,409	98,854
Blend Rate	4.9%	5.0%	4.9%	5.1%	5.2%	5.3%	6.0%	6.3%	6.3%	6.4%

Sources/Notes: r = revised / e = estimate / f = forecast of EU FAS Posts.
Footnote :1/ Fuel pool defined as gasoline plus all biocomponents (ethanol, ETBE, methanol). Source: IEA, Oil Market Report, June 2023. Production capacity as of December 31 of year stated. Ethanol use: Eurostat statistics and FAS Posts projections. Trade data: See Notes section. The EU bioethanol stocks are estimated between 2 and 5 percent of consumption.
Footnotes: (a) For more information see section Advanced Biofuels. (b) ETBE HS code 29091910, ETBE contains 45 percent ethanol which is the volume reported. (c) Calculated co-product production (theoretical maximum) based on estimated feedstock use in fuel ethanol production.



Consumption

Table 8. EU27 Fuel Ethanol Consumption
Main Consumers (million liters)

Calendar Year	2016[r]	2017[r]	2018[r]	2019[e]	2020[e]	2021[e]	2022[e]	2023[f]
Germany	1,485	1,465	1,491	1,435	1,378	1,467	1,505	1,520
France	823	842	777	795	1,039	1,218	1,485	1,515
Netherlands	237	253	335	366	430	444	456	462
Poland	329	329	299	372	359	409	430	430
Belgium/Luxembourg	63	208	228	228	215	234	241	241
Spain	253	277	319	257	195	248	196	190
Sweden	215	172	224	178	187	229	253	266
Hungary	129	133	138	189	167	180	190	180
Total	4,432	4,677	5,010	5,224	5,156	5,844	6,203	6,329

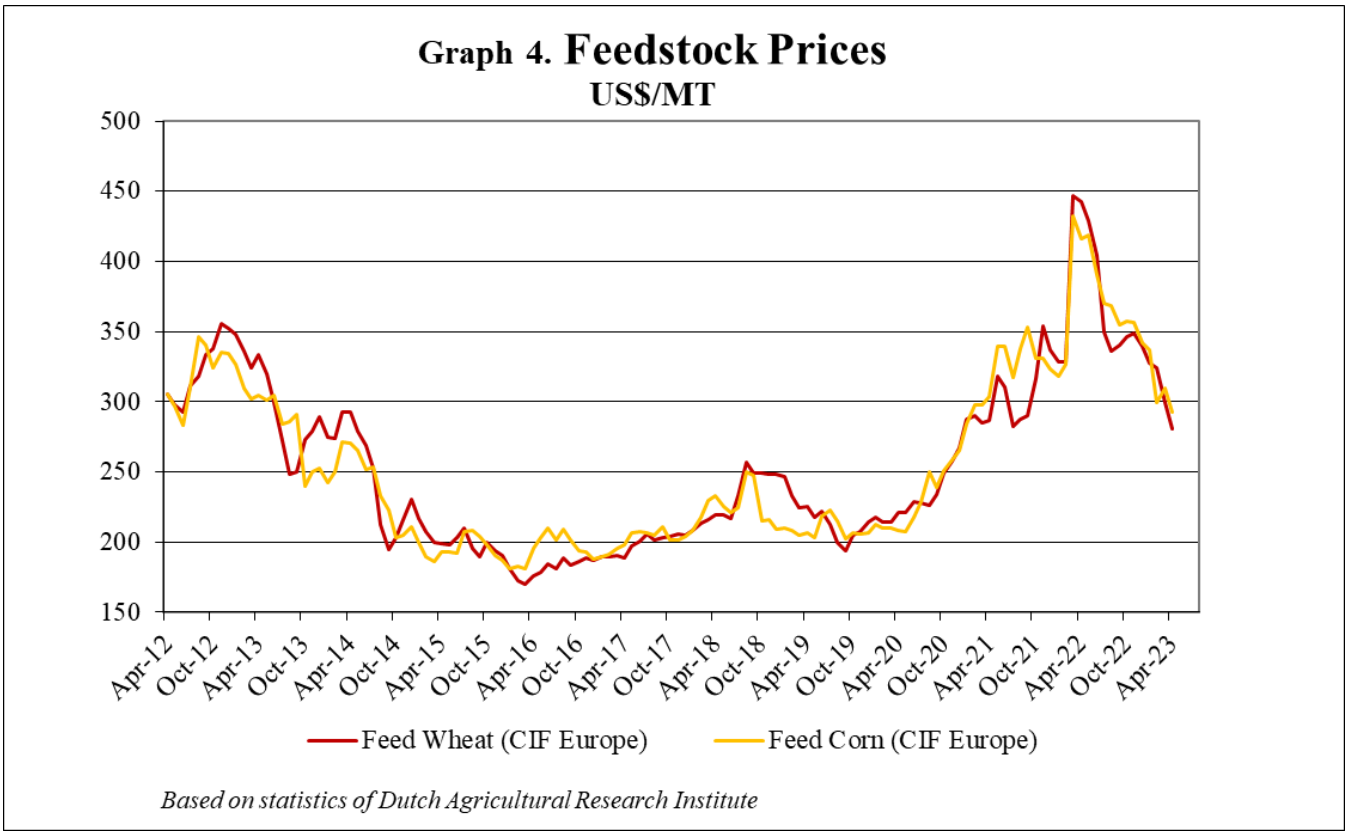
r = revised / e = estimate / f = forecast EU FAS Posts. Source: EU FAS Posts and Eurostat

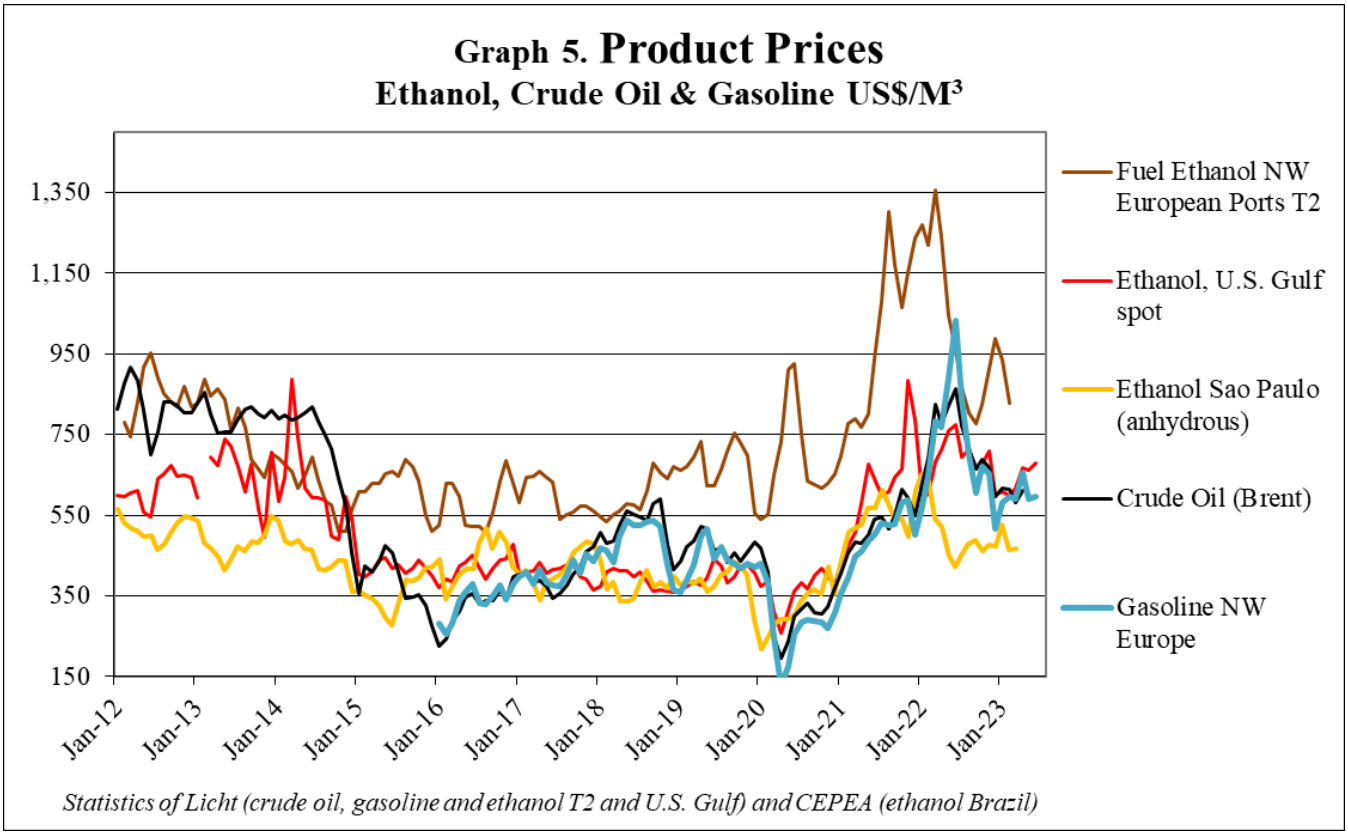
With the absence of the United Kingdom, the EU27 (referred further as EU) was a net producer of bioethanol from 2014 to 2018. As from 2019, the EU became a net bioethanol importer as consumption outpaced production (see graph 3).

The Impact of the COVID-19 Outbreak and Recovery

According to the International Energy Agency (IEA), EU gasoline consumption declined 12.5 percent in 2020, recovered by 8.8 percent in 2021 and 5.2 percent in 2022 and is forecast to increase slightly by 0.4

percent in 2023. The COVID-19 outbreak, and the resulting lockdowns and reduced transport activity had only a limited effect on the EU's bioethanol use, namely only a 1.3 percent decline in 2020 and raising the averaged calculated blend rate to 6 percent. Bioethanol consumption did not decline equally with motor gas due to MS support measures to reach the national blending mandate of ten percent (for more information see the Policy and Programs chapter). Another factor which supported bioethanol consumption in some MS was that the blending rate achieved in 2020 determined the maximum level for food-based biofuels blending thru 2030. With the gradual lifting of the COVID-19-related lockdowns in 2021, EU bioethanol consumption picked up with increased gasoline consumption and even somewhat higher blending to well above the pre-COVID-19 year of 2019. In addition to a recovery in the fuel pool, bioethanol consumption was reinforced by post-2020 policy support measures. For more information about the mandates see our FAS GAIN report: Biofuel Mandates in the EU by Member State – 2023, published July 6, 2023.





The Effect of Russia's War in Ukraine in 2022.

During the first quarter of 2022, when Russia invaded Ukraine, fossil fuel and feedstock prices as well as associated biofuel prices continued to surge (see graphs 4 and 5). Cereal and ethanol prices fell during the spring of 2022, while crude oil and gasoline prices peaked during the summer of 2022. This created a competitive advantage for bioethanol mid-2022 boosting demand in key markets such as France and Germany. As a result, EU bioethanol consumption increased by more than six percent to 6.2 billion liters in 2022. This expanding bioethanol use was also driven by the introduction and/or higher sales of high blends such as E10 and E85.

Most of the market expansion was reported in the French market. In France, consumption of E85 is supported by an increase in the number of flex-fuel cars. Superethanol-E85 is a fuel composed of 65 to 85 percent of bioethanol. In 2022, vehicle conversions to bioethanol have tripled compared to 2021, while sales of original flex-E85 vehicles increased sixfold in 2022. Another MS in which a significant growth of consumption was reported is Sweden. In August 2021, E10 was introduced in Sweden, which boosted demand during 2022. Significant sales increases of E10 were also reported in other MS, such as Germany and France. Currently, E10 is available in the following fourteen EU MS: Austria, Belgium, Bulgaria, Denmark, Estonia, Finland, France, Germany, Hungary, Ireland, Latvia, Lithuania, Luxembourg, the Netherlands, Romania, Slovakia, and Sweden (source ePURE). Austria and Ireland introduced E10 in April 2022. In June 2023, the Polish Parliament approved the introduction of E10 in 2024. EU MS which have not introduced E10 are mainly located in the Mediterranean region (Spain, Portugal, Italy, Croatia, and Greece). In Spain, petrol stations have the possibility to market non-labeled

blends of up to ten percent of bioethanol content since January 1, 2020. However, the standard gasoline distributed in Spain's petrol stations continues to be E5.

The Forecast for 2023

Based on the further market introductions of E10, FAS EU posts forecast an increase of bioethanol use of 2.0 percent. Like previous year, increased sales of the higher blends in France are the main driver for total EU bioethanol consumption. In 2023, France is anticipated to catch up to Germany as the two largest bioethanol markets in the EU. In Germany, bioethanol consumption in transport is expected to increase only marginally. The increase in the GHG reduction mandate from seven to eight percent is partly countered by a higher share of passenger cars with alternative engines, namely electrical vehicles (EVs) or compressed and liquid natural gas (CNG and LNG).

Like in Germany, in most other MS, a stagnation or only a slight increase of bioethanol consumption is forecast for this year. EU gasoline and thus bioethanol consumption is negatively affected by the introduction of cars with alternative engines. In addition, price inflation is eroding consumer purchasing power and affecting transport activity. The IEA forecast EU gasoline consumption to decline slightly by 0.4 percent in 2023. Inflation is also affecting policy incentives for blending. For instance, Sweden is reportedly planning to lower the GHG emission mandates for total as well as advanced biofuels to lower fuel prices. The European Commission (EC) also allowed lower blending mandates in the Czech Republic (voluntary blending as of July 1, 2022), Croatia (removing penalties), Finland (reduction of blending mandates), and Latvia (temporary blending waiver from July 1, 2022, until end-2023). In the Czech Republic, the obligation to reduce GHG emissions however remained in place, so the producers and sellers continue to add biofuels to reach the GHG emission reduction mandate. In Hungary, the gasoline consumption was supported by a fuel price cap until December 2022. But due to the phasing out of the price control, Hungarian bioethanol consumption is anticipated to fall in 2023. In Poland, Bulgaria, and Romania, however, bioethanol consumption is supported by increasing gasoline sales (source: IEA) and a further expansion of domestic bioethanol production.

The robust expansion of bioethanol use in 2022 and 2023 is the result of one-time events as described unlikely to be repeated. Peak consumption is inevitable, but the timing remains uncertain. The cap on conventional biofuels and increasing minimum use level of advanced biofuels (anticipated to favor the blending of renewable diesels) are at play. More importantly in the longer term is increasing e-mobility and the displacement of the internal combustion engine (ICE).

Production and Capacity

Table 9. EU27 Fuel Ethanol Production
Main Producers (million liters)

Calendar Year	2016[r]	2017[r]	2018[r]	2019[e]	2020[e]	2021[e]	2022[e]	2023[f]
France	987	1,000	1,138	1,299	1,099	1,201	1,399	1,260
Germany	882	810	799	676	700	738	759	759
Hungary	633	633	646	689	695	704	722	704
Netherlands	443	519	519	519	481	519	513	520
Spain	328	377	522	547	501	553	497	544

Belgium	570	620	646	620	620	633	633	633
Poland	241	258	259	286	276	338	404	405
Austria	224	235	251	254	222	246	247	247
Total	4,728	4,785	4,994	5,181	5,061	5,352	5,633	5,570

r = revised / e = estimate / f = forecast EU FAS Posts. Source: EU FAS Posts and Eurostat

From 2016 to 2019, EU bioethanol production increased steadily from 4.73 billion liters to 5.18 billion liters but fell in 2020 as a result of the COVID-19 crisis. The lockdowns resulted in a lower bioethanol demand as gasoline sales declined, and some producers opted to produce ethanol used as a disinfectant instead. The elevated production of technical ethanol, at the expense of bioethanol production, is estimated near 400 million liters in 2020.

In 2021 and 2022, EU bioethanol production recovered to 5.35 and 5.63 billion liters, with the most significant increases reported in France, Germany, Poland, Bulgaria, and Romania. In France, the largest bioethanol producer in the EU, the increase was supported by the recovering domestic consumption. However, based on falling beet supplies French bioethanol production is anticipated to be significantly cut in 2023 (for more information see the section of Feedstock Use and Production of Co-products). In 2021 and 2022, German bioethanol production recovered, but not back to the record level achieved in 2016. In Poland, Bulgaria and Romania, production increased as a result of new capacity, of which in Bulgaria and Romania a part will be destined for cellulosic ethanol (for more information see the Advanced Biofuels Chapter).

Spain is the only main producer in the EU to reduce bioethanol production during the 2021-2022 period. While Spain's bioethanol production peaked in 2021, in 2022, it declined due to eroding profit margins as a result of high energy prices. Production it is forecast to recover in 2023. In most other main producing MS, bioethanol production was not affected by grain prices during 2022. Local elevated supplies of Ukrainian corn even supported bioethanol production in Central Europe, such as Poland (for more information see the FAS GAIN EU Grain and Feed Annual, published on April 19, 2023). While the Netherlands increased its corn imports from Brazil, the United States, and Canada to counter the lower imports from the Ukraine.

In 2023, EU producers benefit from reduced feedstock and energy prices and expanding bioethanol demand in the EU. Despite expanding demand in 2023, EU bioethanol production is anticipated to decline to 5.57 billion liters mainly due to the falling bioethanol production in France, as discussed in the second paragraph of this section. On the longer term, further expansion of first-generation bioethanol is expected to be limited as EU demand for crop-based bioethanol is forecast to level off. Expansion of cellulosic bioethanol production remains constrained due to high investment and production costs and a lack of certainty in the EU policy making process (see Policy and Programs and Advanced Biofuels Chapter).

Feedstock Use and Production of Co-products

In the EU, bioethanol is mainly produced from grains and sugar beet derivatives. Wheat is predominantly used in Belgium, Germany, and France. Additionally, an abundance of corn in Central Europe, particularly in Hungary and Poland, supports corn-based ethanol production in that region. Corn is also the preferred grain in the Netherlands and Spain, where most ethanol plants are located at

seaports, and corn is sourced from third countries. Due to the widespread use of genetically engineered (GE) corn varieties in Argentina and the United States, these sources are not preferred, and corn is mainly imported from the Ukraine and Brazil. There is an incentive to use non-genetically engineered (non-GE) corn as ethanol producers in northwestern Europe prefer to market their distillers dried grains (DDG) as non-GE for the domestic feed market.

In 2022, the use of grains as feedstock for bioethanol production increased significantly based on the expanding bioethanol production and changing feedstock mix. The EU grain harvest dropped in 2022, but elevated imports from the Ukraine, in particular wheat, supported the use of grains as feedstock for bioethanol production. The use of grains is anticipated to further increase this year, based on the forecast increased domestic supply as well as reduced domestic availability of sugar beets. In France, Germany, the Czech Republic, Belgium, and Austria, sugar beets and their derivatives are used to produce bioethanol. In France, sugar beets are only processed for bioethanol in sugar beet processing plants that have on-site ethanol distillation capacity. In some other MS, like Austria and Belgium, beet pulp or concentrated juice may serve as a feedstock for ethanol production. However, the ban on neonicotinoids, to combat aphid attacks that damage yields, is likely to negatively affect beet production in 2023. In France the planted acreage for beets decreased by approximately seven percent and the French sector has reportedly announced possible closures of production sites and distilleries. The high sugar price also negatively affects the use of beets for bioethanol production. For more information see the FAS GAIN EU Grain and Feed Annual, published on April 19, 2023, the FAS GAIN Sugar Annual, published April 21, 2023, and the latest World Agricultural Supply and Demand Estimates (WASDE) reporting.

In the EU, to reach the estimated 2023 production of 5.57 billion liters of bioethanol, the required cereals volume that will be needed is estimated at 13.2 MMT, an increase of about 300,000 MT compared to 2022. This is roughly 4.6 percent of total EU cereal production. Co-products from the bioethanol production process are DDG, wheat gluten, and yeast concentrates. In 2023, the maximum theoretical production level (calculated, using the conversion factors listed at the end of this report) of co-products is forecast to reach 4.1 MMT, an increase of roughly 100,000 MT from 2022. This accounts for 2.6 percent of total EU feed grain consumption. As stated above, the higher grain use is counterbalanced with a lower volume of sugar beet use to produce bioethanol, estimated at 6.8 MMT in 2022, and 5.2 MMT in 2023. This is roughly 5.1 percent of total EU sugar beet production.

Trade

On February 23, 2013, the EC imposed an anti-dumping (AD) duty on ethanol imports from the United States. With the lifting of this duty on May 14, 2019, the remaining factors limiting the export of U.S. bioethanol to the EU are the Most Favored Nation (MFN) import tariffs (€102 per 1,000 liters for denatured ethanol, and €192 per 1,000 liters for undenatured ethanol) and the sustainability requirements when fuel ethanol is shipped — most importantly the required minimum 50 or 60 percent greenhouse gas (GHG) emission savings over fossil fuels (depending on when the plant was built). For more information see the Policy and Programs Chapter of this report and the EU Biofuels Annual of 2020.

In November 2020, the EU started a surveillance program for fuel ethanol after complaints by the industry that arrivals had been rising disproportionately. According to the EC trade data, EU bioethanol imports totaled 550 million liters during the last ten months of 2020 and totaled 478 million liters in 2021. In February 2022, the EC stopped reporting the bioethanol imports under the HS 2207 code.

Since December 2021, EU bioethanol imports surged and remained at a high level until the publication of this report. During the first ten months of 2022, the United States was the main supplier, but this position was taken over by Brazil since November 2022. In 2022, 490 million liters of U.S. non-beverage ethanol, classified under Chapter 22, was shipped to the EU, an increase of 56 percent compared to 2021. Based on the methodology described in Chapter VIII – Notes on Statistical Data, 2022 EU bioethanol imports are estimated at 1.26 billion liters.

In 2022, the EU imported roughly 81 million liters of bioethanol as ethyl-tert-butylether (ETBE), a significant increase compared with the 19 million liters in 2021. Note that any "light oils" that may contain ethanol are not included in the balance or trade estimates, but volumes arriving in Europe in this form already blended with gasoline are expected to be small (and would not appreciably affect the balance).

During the first quarter of 2023, EU ethanol (total imports of both undenatured and denatured ethanol) imports increased further to a level of more than 40 percent higher than reported during the first quarter of 2022. This import surge is based on elevated imports from Brazil. EU ethanol imports from Brazil are forecast to remain at a high level based on a high Brazilian production, and the weak Real to the Euro and the US$. Increased volumes will possibly also be sourced from countries exporting under the zero-duty regime. In 2023, EU imports from the United States are forecast to stagnate due to the tight ethanol supplies in the United States. FAS Posts projects EU bioethanol imports to increase slightly to 1.39 billion liters in 2023. This forecast is based on a further expansion of bioethanol consumption and a declining domestic production.

IV. Biobased Diesel

In the report the term biobased diesel (BBD) covers traditional biodiesel (fatty acid methyl ester (FAME)) and hydrogenation-derived renewable diesel (HDRD). Additionally, some HDRD plants also produce sustainable aviation fuel (SAF). We currently have limited information about the extent of this but assume that the HDRD production stated in this report includes small volumes of SAF.

The EU is home to the world's largest BBD market and combining the markets of all 27 countries makes the EU the world's largest BBD producer. It is also an early adopter of HDRD, this drop-in, fully replaceable alternative to fossil diesel, with Finland's *Neste* pioneering the modern commercialization opening its first plants in 2007 and 2009. FAME plus HDRD represent, on a volume basis, roughly three-quarters of the total transport biofuels market. FAME was the first biofuel developed and used in the EU, adopted by the transportation sector in the 1990s. At the time, rapid expansion was driven by increasing crude oil prices, the *Blair House Agreement*, resulting provisions on the production of oilseeds under Common Agricultural Policy (CAP) set-aside programs, and generous tax incentives, mainly in Germany and France. EU biofuels goals set out in former Renewable Energy Directive (RED) Directive 2003/30/EC (indicative goals) and in the REDII 2009/28/EC (mandatory goals) further pushed the use of FAME and later commercialization of HDRD.

COVID-19 Impact

In 2020, COVID-19 related lockdown measures and increased teleworking resulted in reduced personal vehicle transport. Reduced economic activity initially slowed demand for heavy-duty trucking. The consequence was temporarily reduced demand for diesel and BBD. The overall diesel pool (diesel plus all biocomponents), both transport use and total use, shrank 10.8 and 7.3 percent, respectively. The decline was less severe than the light fuels market because commercial transport was less impacted. In contrast, total annual BBD consumption actually increased in 2020 and 2021. This was because of higher blending mandates across several EU Member States (MS) combined with - unlike in other years – an excess mandate fulfilment certificates from the previous year which were not counted against mandates in 2020. In addition, as just noted, fuel use declines in heavy-duty commercial vehicles were less severe, offsetting declines in light-duty passenger use of diesel and providing relative stability to the distillate market as compared to the light-duty fuels market which was fully impacted by lockdown measures.

In 2021, BBD demand further increased. Higher vaccination and falling infection rates supported a significant recovery in road transport in the second half of the year which more than compensated for reductions in the first half of 2021. During that period, second and third waves of COVID-19 infections prompted MS to re-install lockdowns, albeit at varying degrees in terms of length and severity of restrictions.

In early 2022, remaining COVID-19 related physical distancing measures and masking requirements were lifted. This resulted in a further 0.4 percent rebound in personal diesel car use as teleworking further declined. Additionally, people resumed social activities, such as eating out and visiting cultural events. The impact of the public's return to restaurants is more important for the collection of used cooking oil (UCO) from the HRI sector than for diesel use. This is because a significant share of diesel is used in the commercial sector, which already rebounded in 2021.

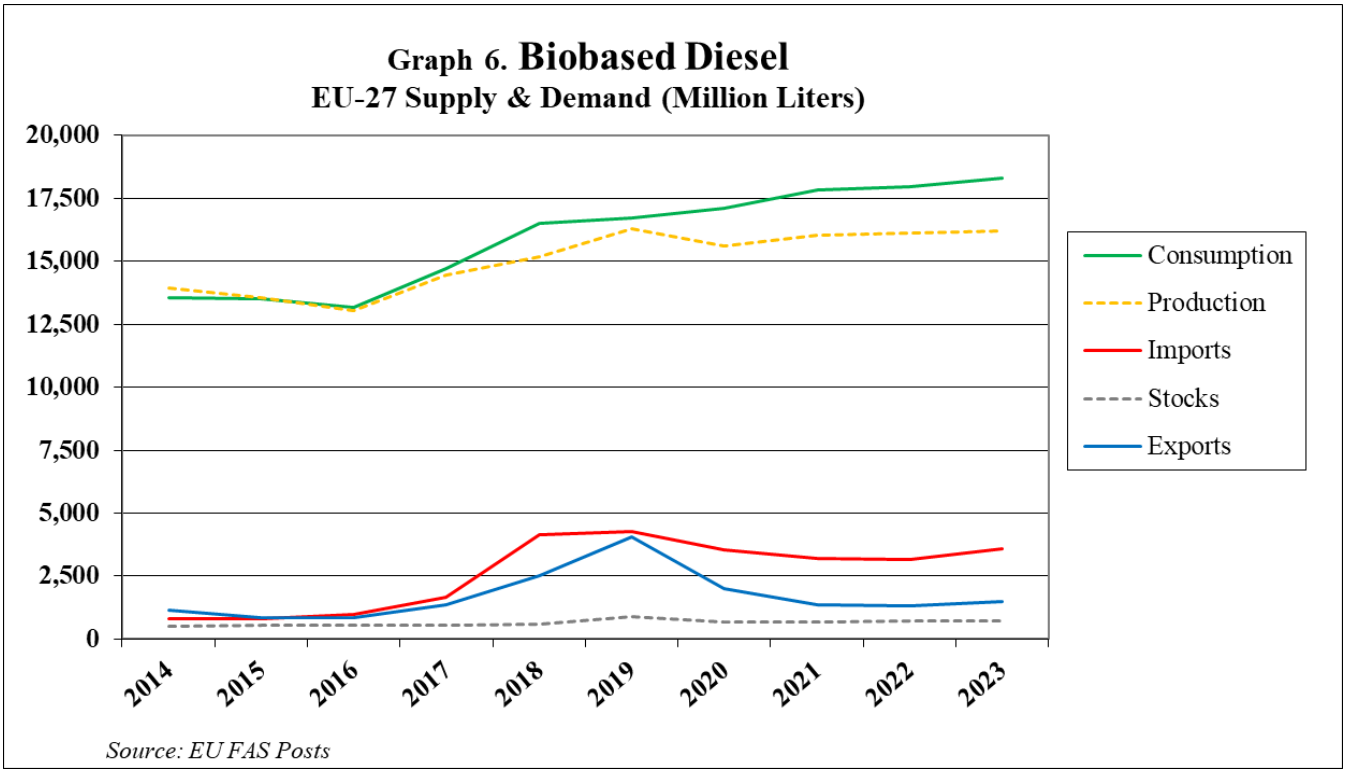
EU Production, Supply and Demand Table

Table 10. Biodiesel (FAME) & Renewable Diesel (HDRD+SAF)
(Million Liters)

Calendar Year	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023[f]**
Beginning Stocks	500	550	540	530	590	900	670	680	715	720
Production	13,944	13,555	13,058	14,464	15,200	16,280	15,600	16,044	16,110	16,200
>HDRD Production	2,151	2,310	2,029	2,421	2,702	2,842	3,629	4,120	3,960	4,200
Imports	820	817	958	1,669	4,148	4,286	3,539	3,217	3,159	3,600
Exports	1,139	863	841	1,364	2,530	4,062	2,007	1,371	1,304	1,490
Consumption	13,575	13,519	13,185	14,709	16,508	16,734	17,122	17,855	17,960	18,300
Ending Stocks	550	540	530	590	900	670	680	715	720	730
Production Capacity, Biodiesel (Million Liters)										
No Biorefineries	212	193	186	179	180	174	175	172	171	171
Nameplate Capacity	21,860	21,160	20,700	20,050	20,450	19,830	19,790	19,910	20,080	20,115

Capacity Use (%)	53.9%	53.1%	53.3%	60.1%	61.1%	67.8%	60.5%	59.9%	60.5%	59.7%
Production Capacity, Renewable Diesel (HDRD+SAF) (Million Liters)										
No of Biorefineries	10	11	11	13	14	15	15	16	16	17
Nameplate Capacity	2,830	3,395	3,395	3,600	3,600	5,450	5,450	6,060	6,240	6,265
Capacity Use (%)	76.0%	68.0%	59.8%	67.3%	75.1%	52.1%	66.6%	68.0%	63.5%	67.0%
Feedstock Use for Biodiesel + Renewable Diesel (HDRD+SAF) (1,000 MT)										
Rapeseed oil	6,300	6,300	5,850	6,300	6,000	5,950	5,800	6,075	6,200	6,375
UCO	1,570	1,950	2,200	2,600	2,700	3,375	3,500	4,000	4,300	4,350
Palm oil	2,060	2,000	2,020	2,300	2,250	2,600	2,500	2,000	1,500	1,400
Soybean oil	860	500	550	700	1,200	1,070	900	780	750	740
Animal fats	950	1,200	1,000	860	1,050	1,190	1,200	1,150	950	1,000
Sunflower oil	320	210	250	230	1,000	260	225	210	290	265
Other	310	415	304	280	510	580	450	820	900	950
Biodiesel + Renewable Diesel (HDRD+SAF) Use Compared to Fuel Pool Demand 1/ (Million Liters)										
Biodiesel + HDRD, On-road	12,858	12,782	12,531	13,456	15,044	15,596	15,810	16,267	16,400	16,700
Biodiesel + HDRD+SAF, Total	13,575	13,519	13,185	14,709	16,508	16,734	17,122	17,855	17,960	18,300
Diesel Pool, On/Off-road /2	210,852	215,207	220,274	237,560	245,122	246,250	219,783	235,778	236,771	229,059
Diesel Pool, Total 3/	290,807	301,874	305,870	311,038	309,514	311,459	288,712	299,998	300,140	291,373
Jet Fuels/Other Kerosene 4/	49,855	51,432	53,844	57,383	60,187	61,356	28,404	34,565	50,428	56,343

Sources/Notes: r = revised / e = estimate / f = forecast EU FAS Posts. 1/ Fuel pools are defined as fossil fuels plus all "bio-components" (biofuels). 2/ All on/off-road transport incl. construction & agriculture; excludes rail, heavy marine diesels & stationary power 3/ Covers all on/off-road uses as defined above plus rail & heavy marine diesels and stationary power. 4/ Covers all private-commercial-military kerosene-type jet fuels (fossil and bio-based, both Jet A-1 and naphtha-kerosene blend Jet B) + other fuel applications. Sources: see chapter VII. Production capacity as of December 31 of year stated. HDRD trade is assumed to be happening under a variety of customs codes as no separate trade code for HDRD exists and may be underreported. The feedstock category “other” includes but is not limited to pine oil, tall oil, tall oil pitch, palm fatty acids, and free fatty acids. Beginning/ending stocks: In the absence of reliable data and except for 2017 and 2018, data assumes that average stocks amount to the equivalent of two weeks’ supply of consumption.



Consumption

BBD consumption[1] is driven almost exclusively by EU and MS mandates and, to a lesser extent, by tax incentives. In 2020, a six percent GHG reduction mandate became applicable for all fuel suppliers in the EU (see Policy and Programs chapter). This favors the use of FAME with high GHG reduction values and HDRD, and especially the latter in countries already close to the seven percent volumetric blending limit for FAME (stipulated in the FQD[2]). This, and the use of double counting feedstocks/biofuels, limits the effect of increasing mandates on physical blending volumes as less biofuel is needed to fulfill the mandate. As a result, actual physical blend rates remain quite a bit lower than the nominal mandates stipulated in EU and MS legislation.

In 2023, higher mandates compared to 2022 are applicable in Belgium, Finland, Germany, Ireland, Lithuania, Netherlands, Poland, Portugal, Slovakia, Slovenia, and Spain. In all other countries the mandates remain the same as in 2022. However, the EU has granted MS some flexibility in temporarily reducing biofuel mandated in response to the impacts from Russia's invasion of Ukraine. The following MS have announced measures that affect 2022 and/or 2023 consumption: Croatia, Czech Republic, Finland, Latvia, Poland, and Sweden. For more information about the mandates see our FAS GAIN report: Biofuel Mandates in the EU by Member State – 2023, published July 6, 2023.

In 2023, EU BBD consumption is expected to increase by 1.9 percent to 18.3 billion liters. Positive effects from increased blending mandates are countered by strong competition from high imports. Effects vary by country. Increased BBD consumption is expected in Finland, Germany, the Netherlands, Sweden, Austria, Ireland, and Romania (in decreasing order of magnitude). However, double counting

of certain feedstocks limits the increase that higher mandates could otherwise generate. In contrast, Hungary, Lithuania, Spain, Portugal, and the Czech Republic expect small reductions in consumption.

In 2022, EU BBD consumption is estimated to have increased by 0.6 percent because of economic recovery after COVID-19 and the lifting of movement restrictions, and/or higher mandates. The top six consumers of biodiesel in the EU in 2022 were France, Germany, Spain, Sweden, Italy, and Poland. Together they accounted for 64 percent of the total EU BBD consumption (see table above). Romania's increased consumption in 2022 is a direct result of a 10-percent higher fuel consumption related to Romania's geographical proximity to Ukraine. After Russia's invasion in Ukraine traffic picked up substantially as food and non-food commodities to and from Ukraine were moved through Romania.

Table 11. EU27 BBD[1] Consumption
Main Consumers (million Liters)

Calendar Year	2016[r]	2017[r]	2018[r]	2019[r]	2020[r]	2021[e]	2022[e]	2023[f]
France	3,191	3,276	3,208	3,286	3,042	3,193	3,277	3,280
Germany	2,498	2,522	2,669	2,621	3,583	2,974	2,931	3,040
Sweden	1,613	1,922	2,342	1,744	1,596	1,691	1,729	1,750
Spain	1,293	1,546	1,979	2,009	1,813	1,752	1,546	1,520
Italy	1,362	1,388	1,322	1,257	1,366	1,450	1,395	1,400
Poland	367	551	951	1,025	1,076	1,076	1,102	1,100
Finland	135	385	354	424	381	692	808	940
Belgium	452	487	625	625	454	650	650	650
Netherlands	175	261	426	526	375	453	514	550
Austria	641	572	529	578	444	505	515	540
Romania	268	278	254	386	384	453	496	500
Portugal	337	358	387	379	350	500	401	380
Czech Republic	308	345	315	272	394	401	377	360
Others	545	817	1,147	1,602	1,863	2,065	2,217	2,290
Total	**13,185**	**14,709**	**16,508**	**16,734**	**17,122**	**17,855**	**17,960**	**18,300**

1) Contains small amounts of SAF in most recent years.
r = revised / e = estimate / f = forecast EU FAS Posts.
Source: FAS EU Posts based on information collected in MT.

Production and Production Capacity

Preliminary data for 2022 suggests that EU BBD production marginally increased by 0.4 percent compared to 2021, largely due to lower domestic consumption in some MS, lower exports, and increasing imports from China in the last quarter of the year. Projected production decreases in France, Spain, Italy, Greece, Czech Republic, Portugal, and Belgium were too high to be fully compensated by small increases in Poland, Germany, Sweden, Finland, Hungary, the Netherlands, Slovak Republic, Bulgaria, Austria, and Romania. The decrease affected both FAME and HDRD. The latter is due to the beginning phase-out of palm oil as feedstock in France and a standstill at the Gela HDRD biorefinery in Italy.

For 2023, BBD production is forecast to increase by only 0.6 percent to 16.2 billion liters, as projected high imports particularly from China that are competitively priced and/or eligible for double counting leave less room for domestic production. However, this masks different developments for FAME and HDRD. HDRD production is expected to grow by 6.3 percent as it has an advantage based on its higher GHG reduction values and requires no separate dedicated supply chain. In contrast, FAME production is forecast to decline by 1.2 percent, most notably in Germany, Hungary, and Spain. Increases of FAME production in Greece, Poland, and Italy are too small to compensate the decline elsewhere. However, much will depend on the development of imports throughout the year. EU domestic BBD production could be higher or lower, if imports turn out to be smaller or larger than forecast.

Table 12. EU27 FAME Production
Main Producers (Million Liters)

Calendar Year	2016[r]	2017[r]	2018[r]	2019[r]	2020[r]	2021[e]	2022[e]	2023[f]
Germany	3,543	3,644	3,799	4,070	3,875	3,837	4,010	3,860
Spain	1,319	1,721	2,008	1,835	1,681	1,391	1,350	1,320
France	2,291	2,211	2,726	2,174	1,821	1,179	1,144	1,136
Netherlands	638	1,112	1,010	1,136	1,136	1,136	1,136	1,136
Poland	985	1,019	1,001	1,091	1,081	1,138	1,110	1,136
Belgium	521	511	511	568	568	568	568	570
Italy	386	353	508	616	618	560	557	570
Portugal	385	404	413	448	381	363	411	415
Others	960	1,067	522	1,501	810	1,751	1,874	1,845
Total	11,029	12,043	12,498	13,438	11,971	11,924	12,160	12,000

Ranked by production in 2023, r = revised / e = estimate / f = forecast.
Source: FAS EU Posts based on information in MT.

Table 13. EU27 HDRD[1] Production
(Million Liters)

Calendar Year	2016	2017[r]	2018[r]	2019[r]	2020[r]	2021[e]	2022[e]	2023[f]
Netherlands	1,154	1,218	1,218	1,156	1,203	1,247	1,280	1,280
Finland	135	383	354	424	381	753	830	960
France	-	-	128	150	476	641	640	640
Italy	323	323	323	328	797	750	550	615
Sweden	-	-	160	208	208	312	350	370
Spain	418	465	482	545	535	409	300	300
Austria	-	-	-	-	-	-	-	30
Portugal	-	32	37	30	30	9	5	5
Total	**2,029**	**2,421**	**2,702**	**2,842**	**3,629**	**4,120**	**3,960**	**4,200**

1) Contains small amounts of SAF in more recent years. Ranked by production in 2023; e = estimate / f = forecast.
Source: FAS EU Posts based on information in MT, converted to liters.

The structure of the EU biodiesel sector is quite diverse. Plant sizes range from an annual capacity of 2.3 million liters owned by a group of farmers to 680 million liters owned by a large multi-national company. FAME production facilities exist in every EU MS, except for Finland, Luxembourg, Croatia, and Malta. In contrast, HDRD production occurs in only eight countries (see table above). The majority of HDRD capacity consists of dedicated HDRD plants, of which the main producers are Finland's *Neste* (which production is mainly located in the Netherlands) and *UPM*, *Eni* of Italy, *Total Energies* of France, and *Preem* of Sweden. Additionally, co-processing of HDRD with conventional fuel at their oil refineries occurs in Spain (11 plants) and Portugal (*GALP*) and started in Hungary in 2022 (*MOL* at its Szazhalombatta refinery).

EU FAME production capacity marginally increased by 0.8 percent in 2022 as the closure of two plants (one in Austria and one in Poland) was more than compensated by a new plant in Hungary and capacity increases of existing plants in Poland, Bulgaria, and Austria. In 2023, small capacity increases are projected for Bulgaria and Hungary. If realized, this would push up EU FAME production capacity by 0.2 percent. However, reportedly, numerous plants throughout the EU are operating below capacity or are temporarily shut down because of the competition from competitively priced imports. EU HDRD+SAF production capacity increased by three percent in 2022, as a result of capacity expansions in Sweden, the Netherlands, and Italy. Austria's *OMV* has announced to modify one of its plants and start producing HDRD in the second half of 2023 with further increases in future years. If realized, this would increase 2023 EU HDRD+SAF capacity by 0.4 percent.

Feedstock Use and Co-products Production

In most MS, official data on biodiesel, HDRD and SAF feedstock use is not available. The figures and analysis presented below are based on FAS EU Post estimates. Russia's invasion of Ukraine has further increased prices for vegetable oils that had already become increasingly challenging for biofuel producers in recent years. This is partly because of high fuel and energy costs and partly because Ukraine historically is a major supplier of rapeseed, soybeans, and sunflower seeds and oils. For details on the vegetable oil market, please see the latest FAS GAIN report Oilseeds and Products Annual_Vienna_European Union_E42023-0015.

Rapeseed oil is still the dominant biodiesel feedstock in the EU, accounting for 42 percent of total BBD feedstock use in 2022. This is a small increase from the 40 percent in 2021 and can be attributed to the higher availability due to the higher EU rapeseed harvest in 2022. For 2023, a further small increase of three percent is anticipated because of the abundant EU rapeseed harvest in 2022 in combination with the phase-out of palm oil in some MS. The popularity of rapeseed oil is grounded in its domestic availability, as well as in the higher winter stability of the resulting rapeseed methyl ester (RME) compared to other feedstocks. This is more important in the northern MS than for those situated in Mediterranean region with warmer winters. However, rapeseed oil's share in the feedstock mix has continuously decreased since its peak in 2008, when it accounted for 72 percent. This is partly due to a higher use of used cooking oil (UCO), animal fats, and in previous years of palm oil.

Used Cooking Oil was the second most important feedstock in 2022, accounting for 29 percent of the total feedstock. The increased use of this feedstock is mainly driven by double counting eligibility for UCO-Methyl Ester (UCOME) in the majority of MS. A growing share of UCO is imported. In 2020 and 2021, this was due to restaurant closures during COVID-19. During the lockdowns, many MS ordered restaurants to temporarily close down or restrict their services to take-away and delivery, which

impacted the availability and collection of locally sourced used cooking oil. While this phenomenon also occurred in other parts of the world, it did so at different times of the year, which made imports possible during times of low domestic supply. In 2022, domestic EU UCO collection rebounded as restaurant dining and public events with high potential for UCO collection (e.g., festivals, soccer games) pick up after the last COVID-19 physical distancing were lifted. However, the increase was not enough to satisfy demand and UCO imports also increased, particularly from China. There are widespread concerns about product fraud with product classified as UCO coming from China.

According to TDM, LLC, the EU imported 2 MMT of UCO in 2022, an increase of 24 percent compared to 2021 (1.6 MMT). China alone supplied 47 percent of EU UCE imports. Other major suppliers included United Kingdom, Malaysia, Indonesia, Saudi Arabia, and Russia. Together the top six suppliers accounted for 82 percent of EU UCO imports. In 2022, the largest EU producers of UCOME were the Netherlands, Germany, Finland, Italy, Spain, Portugal, Austria, France, and Poland. Together they accounted for 96 percent of this feedstock use. Smaller amounts of UCOME were produced in Ireland, the Czech Republic, Bulgaria, Slovakia, and Hungary. In 2023, the use of UCO is forecast to stagnate as imports from China seem to switch from UCO to UCOME.

Palm oil was third in terms of feedstock use in 2022, accounting for 8.5 percent. Its use declined by 25 percent compared to 2021. Exceptionally high palm oil prices along with phase-out of palm oil-based biofuel resulted in lower use in Spain. Additionally, the phaseout of this feedstock in some MS reduces the market size for the resulting palm oil-based BBD. Palm oil was mainly used in Spain, Italy, France, Belgium, and the Netherlands, and to a much lesser extent in Germany, and Romania. Negligible amounts are also used in Hungary, Greece, and Bulgaria. In 2023, palm oil use is forecast to further decline by 15 percent, as more MS are starting to phase-out of biofuels deriving from high-risk ILUC crops (see the Policy and Programs chapter of this report). Several MS have announced earlier phase-outs. France spearheaded this movement having excluded palm oil-based biofuels effectively since January 2020. Austria followed effective July 2021. Germany banned palm oil in January 2023 but introduced a 0.9 percent cap on high-ILUC feedstocks for the year of 2022. However, the bans only affect the eligibility for counting against mandates (i.e., consumption) and not production. Therefore, palm oil-based BBD can still be produced in MS with a ban but will have to be exported either to another MS market or outside the EU. As a result, the full effect on the EU feedstock mix will only be felt when more countries apply such bans.

Animal fats accounted for 6.7 percent of total BBD feedstocks. It benefits less from double-counting than UCO, as fewer MS allow double-counting for use of tallow methyl ester (TME) (Denmark, Finland, France, the Netherlands, and the United Kingdom) than for UCOME. In addition, in Germany, TME use does not count against the biofuel mandate, and its production is exported to other MS. Increased animal fat use is the result of new plants (or capacity increases at existing plants) rather than a function of feedstock prices, as using animal fat requires changes to the technical equipment. In 2022, Italy is estimated to have been by far the largest user of animal fat for BBD production, followed by the Netherlands and France. Germany, the Czech Republic, Denmark, Spain, Austria, Finland, Ireland, Hungary, and Poland also used animal fats but to a much lesser extent. Tallow is imported to produce TME and Australia is a known source although exact import volumes used in TME are unknow as there are multiple uses for tallow.

The use of ***soybean oil*** and palm oil in FAME is limited by the EU biodiesel standard DIN EN 14214 and colder weather conditions. However, the standard can be met by using a feedstock mix of rapeseed oil, soybean oil, and palm oil. On its own, SME does not comply with the iodine value prescribed by this standard (the iodine value functions as a measure for oxidation stability). Additionally, PME has a higher cloud point than RME and SME and thus does not provide enough winter stability in northern Europe. However, the incentive persists to maximize the use of SME and PME due to their lower feedstock cost. Most of the soybean oil is used in Germany, and Spain. Smaller amounts are being used in Belgium, Portugal, Romania, Bulgaria, Austria, the Netherlands, Greece, and Poland.

Sunflower oil accounted for only 1.9 percent of the total biodiesel feedstock, and is mainly used in Greece, France, Bulgaria, and Hungary - collectively accounting for 59 percent of EU sunflower oil-based biodiesel production. Small amounts of sunflower oil are also used in Romania, Lithuania, and Poland. In 2022, the use of sunflower oil for biodiesel production increased substantially in Poland and Hungary, as cheap sunflower oil from neighboring Ukraine was readily available.in those countries after Russia invaded Ukraine.

The category "**other**" includes pine oil and wood (Sweden), free fatty acids (Germany and Finland), tall oil (Finland), palm fatty acids (Finland), and cottonseed oil (Greece.)

Origin of feedstocks and volume of generated byproducts

A large share of EU soybean oil is crushed from imported soybeans. In contrast, most of the rapeseed oil is of domestic origin. The 2023 projection of 6.4 MMT of rapeseed oil used in RME is equivalent to about 15.9 MMT of rapeseed. This also generates roughly 9.6 MMT of rapeseed meal as a byproduct, most of which is used for animal feed. Similarly, 3.7 MMT of soybeans will have to be crushed to generate the 740,000 MT of soybean oil with about 3 MMT soybean meal as a byproduct (see also Oilseeds and Products Annual_Vienna_European Union_E42023-0015)

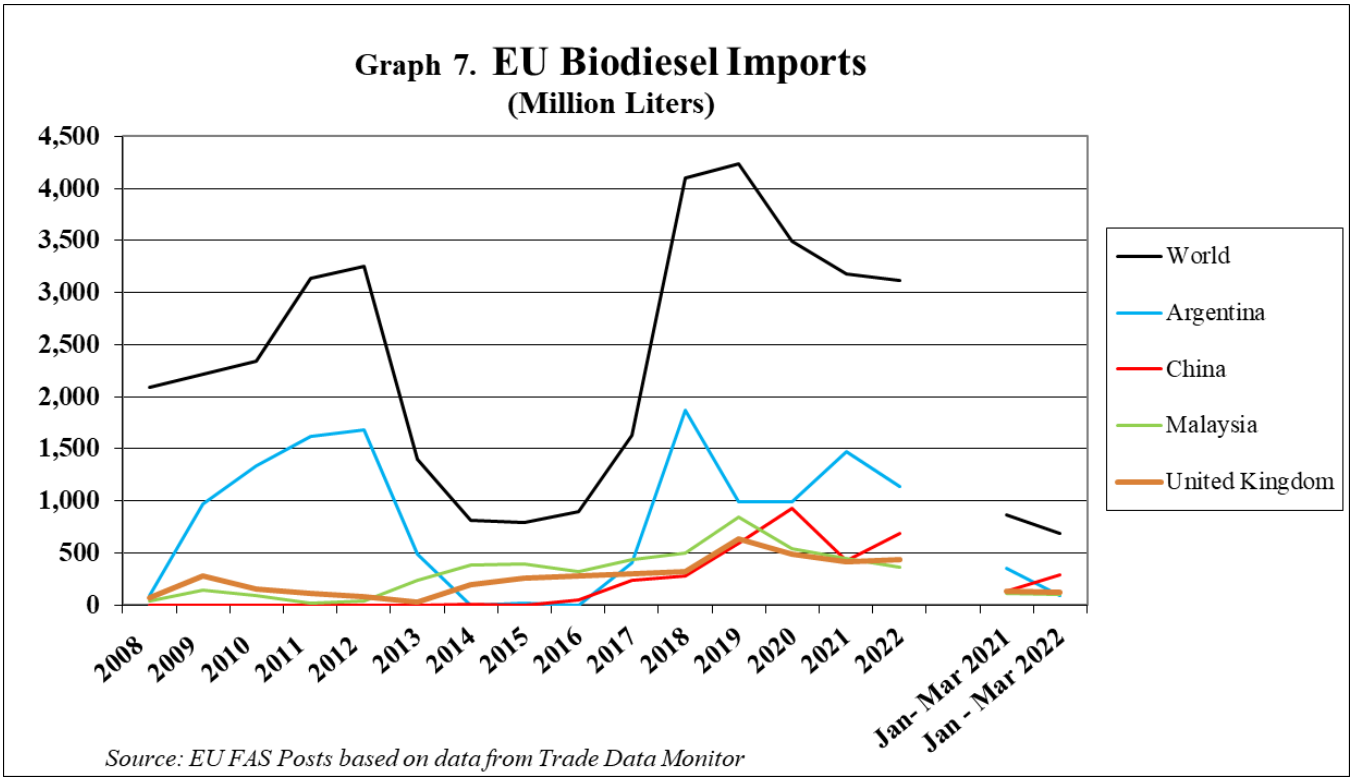
Trade

The trade flow discussed below is limited to biodiesel and petroleum oil containing biodiesel codes CN 38.26.00 and CN 27.10.20 converted to a B100 equivalent and should not include HDRD which should be classified elsewhere because it is chemically different from biodiesel. Currently, EU Customs combines HDRD with other products under a single 10-digit code that falls under 2710.19, and therefore exact HDRD trade (import and export) volumes remain difficult to determine. It is confirmed by the industry that HDRD is traded under CN 27.10.19, but it is not clear which 10-digit code is used. China's HDRD industry, mainly using UCO feedstock apparently, reportedly first shipped product to the EU in 2017 and continues to ship, albeit not consistently. Although targeting mostly North American markets, Neste's Singapore's HDRD plant, currently expanding its sustainable aviation fuel (SAF) production capacity, has reportedly also shipped limited volumes of HDRD to Europe.

In 2022, the EU imported 3.16 billion liters of biodiesel under CN codes 3826.00 and 2710.20, a decrease of 1.8 percent compared to 2021. Despite the EU imposed countervailing (CV) duties on biodiesel from Argentina in February 2019, Argentina was able to defend its place as the largest supplier of biodiesel to the EU. This was possible as Argentina offered an undertaking (an offer to prevent prices from falling below a certain floor price, see also Policy and Programs chapter), which provided planning

certainty for Argentine exporters and EU importers. However, Argentina's market share dropped significantly from 46 percent to 36 percent as imports from China (reportedly mostly double counting biodiesel from brown grease) surged.

In 2022, the dominant suppliers of biodiesel to the EU were Argentina, China, the United Kingdom, Malaysia, South Korea, and Indonesia, accounting for 36, 22, 14, 12, 4.98 and 4.79 percent of EU biodiesel imports, respectively. Imports from China increased by 61 percent in 2022 (compared to 2021) at the expense of shipments from Argentina and Malaysia. Chinese biodiesel exports benefit twice, 1) from a 70 percent VAT rebate that the Chinese government grants if it produced from waste material and 2) from double counting provisions in the EU.



In 2023, EU biodiesel imports are forecast to increase by about 14 percent. Again, mostly based on growing imports from China. According to TDM, LLC., in the period of January through April 2023, China's exports of biodiesel to the EU increased by 86 percent, with the highest increases going to the Netherlands, Spain, Malta, Bulgaria, and Germany. However, in the EU there is growing concern over potential fraud associated with imports from China as the country does not allow witness audits of their sustainability certification. As a result, some importers may shy away from importing from China if discussions continue and NGOs pick up the topic. In contrast, imports from Argentina are forecast to decline in 2023, as the minimum import price associated with the above-mentioned undertaking is too high to be able to compete with Chinese product.

EU biodiesel exports to destinations outside the bloc remain marginal and normally amount to less than five percent of production and are thus not discussed in this report.

Stocks

In the absence of reliable data, the data for stocks is based on the assumption that average stocks are equivalent of two weeks' supply of consumption. However, after the lifting of anti-dumping (AD) duties on biodiesel from Argentina, and in anticipation of the outcome of EU anti-subsidy proceedings against Argentina, European traders and petroleum companies accumulated large stocks at the end of 2018. These are assumed to have been reduced throughout 2019 and, by the end of the year, returned to the assumed average level.

V. Advanced Biofuels

The EU's Renewable Energy Directive (RED), extended under REDII and with the REDIII in trialogue negotiations, establishes an overall policy for the production and promotion of energy using "advanced" biofuels in the EU. Lower-carbon emission biofuels are replacing higher-carbon emission fossil fuels and biofuels (based on full life-cycle analysis) in the transportation sector, because EU and MS policy is structured to limit further expansion of fossil fuels "conventional" biofuels and incentivize expanded use of "advanced" biofuels. This is because advanced biofuels (as defined) are less likely to result in land use change and may use waste-stream feedstocks or feedstocks that don't require arable land use. Please refer to the Policy and Programs chapter of this report for more information.

Hydrogenation-derived renewable diesel (HDRD, also known originally as hydrogenated vegetable oil (HVO)), is a drop-in fuel that can fully replace fossil diesel, and, with some modification in the production process at the plant, some level of sustainable aviation fuel (SAF) can be substituted for HDRD. All HDRD and SAF are treated as an advanced biofuel in this report but would only be considered "advanced" under EU policy when made with qualifying waste-stream feedstocks.

Renewable hydrogen and renewable ammonia are at the beginning stages of rapid technology development and production capacity buildup. These and so-called e-fuels are certain to become major market disruptors for biomass-based fuels (and eventually even ethanol) used in transport in the medium to longer-term, whereas renewable electricity is already impacting certain markets now.

Commercial Production

EU production of HDRD began with Neste Oil in Finland in 2007, then a large expansion followed in 2011 as its Rotterdam plant came online. Most HDRD is produced from lipids (plant oils and animals fats, both virgin and waste stream products) and all HDRD is fully substitutable for diesel fuel. In 2022, HDRD (including a small volume of sustainable aviation fuel (SAF)) production declined slightly to 3.96 billion liters from 4.12 billion liters in 2021. In 2023, HDRD production is forecast to recover to roughly 4.20 billion liters based on increased use of capacity in Italy and the Netherlands, and production expansion in Finland and Sweden. During 2020-2023, HDRD production expansion has been limited, but by 2025 capacity is forecast to about double. A major share of the capacity will be used to produce sustainable aviation fuels (SAF). This will cause an increase in the demand of feedstocks, in particular the feedstocks listed in Part A and B of Annex IX of the RED. In Finland and Sweden, biorefineries are operational which refine crude tall and pine oil into intermediate feedstocks for the HDRD/SAF plants. The current annual capacity is estimated at about 300 million liters.

The commercialization of cellulosic ethanol is lagging behind the development of HDRD/SAF by a wide margin. The main factors that prevent operators from investing in cellulosic ethanol are high research and production costs, regulatory uncertainty, and increased capacity of dedicated supply chains. The EU capacity for cellulosic ethanol production is estimated at about 125 million liters in 2022. It should be noted that several ethanol plants reprocess byproducts, in many cases from their own process, such as sludge, which can be counted as advanced biofuels. Production of advanced ethanol from non-cellulosic waste materials listed in Part A of Annex IX of the REDII, such as food waste, is estimated at 240 million liters in 2019, 440 million liters in 2020, and about 575 million liters in 2021 by ePURE. The table below outlines the operational or close to operational advanced biofuel plants, at a commercial scale, in the EU.

Table 14. Advanced Biofuels Plants in the EU

Country	Biofuel	Feedstock	*Annual Capacity* (million liters)	Year of opening
Finland	HDRD	Oils and fats	430 (2 lines)	2007
The Netherlands	Methanol	Biogas	75	2010
Spain	HDRD	Palm oil products and UCO	945 (7 plants)	2011
The Netherlands	HDRD	Oils and fats	1,280	2011
Italy	HDRD	Vegetable oils, animal fats, and UCO	513[1]	2014
Finland	HDRD	Tall oil	115	2015
Sweden	HDRD	Tall oil	220	2015
Portugal	HDRD	Palm oil	50	2017
Finland	Ethanol	Saw dust	10	2018
Germany	Bio-CNG	Straw	-	2018
France	HDRD	Oils and fats (90 percent palm oil)	640	2019
Italy	HDRD	Vegetable oils, animal fats, and UCO	962	2019
Sweden	Methanol	Pulp mill side-streams	6	2020
Italy	Ethanol	Biomass	32[S]	2020
Austria	Ethanol	Wood sugar	30	2020
Romania	Ethanol	Wheat Straw	65	2021
Sweden (Preem)	HDRD	Pyrolysis Oil	65[2]	2021
Romania	Ethanol	Wheat Straw	65	2023
Austria	HDRD	Oils and fats	200	2023

Source: EU FAS Posts S=including for sanitary use. 1. Capacity will be increased to 770 million liters in 2024. 2. Capacity will be increased to 950 million liters in 2024.

HDRD, SAF (where applicable), and Pyrolysis Oil

Finland and the Netherlands: In Finland, Neste operates one plant with two lines each producing roughly 200,000 MT of biofuels and intermediate feedstocks per year (of which about 215 million liters

of renewable diesel). In 2011, Neste opened a renewable diesel plant with an annual capacity of roughly 1.0 billion liters in Rotterdam. In addition to renewable diesel, the Neste plant produces renewable feedstock (naphtha, propane, and alkanes) to produce polymers and other chemicals. Current annual production capacity at the plant in Rotterdam is a maximum of 1.4 MMT. In 2022, roughly 95 percent (92 percent in 2021) of the feedstock used by Neste to produce HDRD consisted of waste and residue feedstocks. The waste and residues consist of animal fats, used cooking oil (UCO), palm fatty acid distillate (PFAD), palm effluent sludge, bleaching earth oil, and technical corn oil (co-product of corn ethanol production). Neste is expanding its refinery in Rotterdam increasing capacity to roughly 1.3 MMT of HDRD/SAF. This investment brings the total annual renewable (biofuels and intermediate feedstocks) production capacity in Rotterdam to 2.7 MMT, of which roughly 1.5 billion liters of SAF. The company's target is to start up the new production unit during the first half of 2026. In addition to Neste, also UPM and Shell are planning to build a HDRD/SAF plants in Rotterdam of about 640 million liters and 1 billion liters, respectively. The three prospective plants will partly produce SAF with plans to be fully operational in 2025 or later.

Finland: In 2015, UPM opened a HDRD plant in Lappeenranta. The capacity of the plant is roughly 115 million liters of advanced biofuels per year, and the plant is using tall oil, a residue of pulp production, as a feedstock. Biocrude oil as feedstock for HDRD production is produced by two refineries in Finland. Green Fuel Nordic Oy partnered with a Dutch company, BTG, to produce 25 million liters of pyrolysis oil at its plant in Lieksa. Fintoil is building a crude tall oil refinery with a capacity of 200,000 MT (as feedstock for roughly 100 million liters of renewable diesel), which became operational in the fall of 2022.

Spain: The Spanish HDRD production is mainly from co-processing by petroleum refineries (co-fed with bio-components). Both CEPSA (since July 2011) and REPSOL (since 2013) are producing HDRD. For more information see GAIN Report – Spain's Biodiesel and Renewable Diesel Overview.

Italy: In 2014, a HDRD plant was opened by Eni in Venice, Italy. Since then, the plant has produced approximately 325 million liters per year. In 2024, the capacity will increase from about 510 to 770 million liters per year. Production is forecast to increase to 540 million liters in 2024. Following the model adopted for Venice, Eni converted their petroleum refinery in Gela, Sicily, into a renewable diesel production facility, with an annual capacity of 960 million liters, to produce at least 600 million liters per year. As of October 2022, Eni has stopped importing palm oil for its Gela and Venice refineries ahead of the deadline set by European regulations for 2023. Instead of pam oil, the plant processes waste and residue feedstocks (e.g. used cooking and frying oils, animal fats, and vegetable oil processing waste) and advanced feedstocks (e.g. waste oils as well as bio-oils from lignocellulosic waste). Eni plans to increase its total HDRD/SAF annual capacity to 3 MMT by 2025 and over 5 MMT by 2030. To ensure feedstock supply, Eni reportedly developed a network of agri-hubs in Africa.

Sweden: In Gothenburg, Preem produces nearly 160 million liters of HDRD per year from tall oil. The company recently expanded its production capacity to 220 million liters. Preem sources a variety of raw materials, including raw tall oil diesel from SunPine, and food waste including UCO. The company is reportedly planning to further expand its HDRD/SAF production to 1.3 billion liters in 2023, and 5 million liters in 2030. To achieve this, a plant of 950 million liters is expected to become operational in 2024 in Lysekil. Recently the newly formed Swedish government has announced that it will lower the

greenhouse gas (GHG) reduction target in biofuels, which will significantly affect the domestic demand for fuels.

The Finnish company, St1 plans to produce up to 250 million liters of HDRD/SAF in Gothenburg (Sweden) beginning in 2023. The feedstocks will likely be UCO and tall oil. St1 is also investigating the construction of another plant with a capacity of 500 million liters to begin operations in roughly five years.

One of the raw materials which will be used by Preem and St1 for their expanded production is biocrude oil made from tall oil. To increase the supply of biocrude oil, SunPine increased its capacity from about 100 million liters to 150 million liters in 2021. Pyrocell, owned by Preem and Setra, constructed a plant to produce nearly 30 million liters of biocrude oil from saw dust. In September 2021, production of the non-fossil oil started. The pyrolysis oil is refined into renewable diesel and gasoline at Preem's refinery in Lysekil.

France: Total Energies' HDRD plant located in La Mede (Southern France) began producing HDRD in July 2019. This plant has a maximum capacity of 640 million liters per year. In 2021, production is estimated at 385 million liters. French HDRD is produced almost exclusively with palm oil. As palm oil in biofuel has been banned for use in France by the French administration, the plant is only producing for export purposes. Another project in France is the BioTFuel project, a cooperation of Avril, Axens, CEA, IFPEN, ThyssenKrupp, and Total Energies. This project aims to produce 230 million liters of HDRD/SAF per year from 1 MMT of biomass. The demonstration-scale plant is located at Total Energies' former Flandres petroleum refinery in Dunkerque.

Portugal: Portuguese HDRD production is mainly produced through co-processing of vegetable oils by petroleum refineries. Since 2017, GALP has been producing HDRD in their facilities in Sines. Production capacity is estimated at 35 million liters per year. Galp is considering the installation of a second HDRD unit in Sines which could have an annual production capacity of over 345 million liters. If this project finally materializes, it will be operational in 2025. Since Portugal's production is palm oil based, it faces legislative limits imposed on this type of feedstock. Palm oil producers may certify their feedstock as low-risk ILUC to keep their presence in the EU market beyond 2023.

Austria: OMV has announced to start its HDRD production in the second half of 2023. In the final continuing production, the plant should have a capacity of about 200 million liters per year. It is expected that once the Austrian production starts, more HDRD and less biodiesel (FAME) will be produced.

Czech Republic: Unipetrol RPA produces HDRD at an experimental scale of roughly 3.2 million liters per year.

Cellulosic Ethanol

Italy: On February 16, 2022, Versalis, Eni's chemical subsidiary, restarted the production of bioethanol from lignocellulosic biomass at Crescentino, the former Beta Renewables plant that shut down in 2017. The plant is capable of processing 200,000 MT of biomass per year, with a maximum production

capacity of approximately 32 million liters of bioethanol per year. Following an initial test production, the plant is now fine-tuning its processes and scaling up production.

Finland: St1 has three concepts for advanced bioethanol production. The Cellunolix® biorefining concept processes sawmill side products, such as sawdust and chips from soft wood. The pilot plant in Kajaani has an annual production capacity of 10 million liters and started production in 2017. St1 reportedly plans to build three similar plants, each with a capacity of 50 million liters in Kajaani (Finland), Pietarsaari (Finland) and Follum (Norway). St1's Etanolix® concept refines waste and residues rich in starch and sugar into advanced ethanol. An Etanolix® plant can be set up as stand-alone plant or it can be integrated at a food processing plant such as a bakery or brewery. There are three Etanolix® biorefineries in production in Finland (in Lahti, Vantaa and Hamina). The annual production capacity varies between 1 to 9 million liters. The Bionolix® biorefining concept makes it possible to produce advanced ethanol from municipal and commercial biowaste. The Bionolix® technology is being tested and operated since 2010 in Karanoja waste treatment area in Hämeenlinna, which has annual production capacity of 1 million liters. Other companies which are planning to erect advanced bioethanol plants in Finland are Nordfuel and BioEnergo. Nordfuel is planning to build a biorefinery producing annually 80 million liters ethanol from wood. BioEnergo is planning to build a similar plant with an annual capacity of approximately 60 million liters.

Austria: The company Austrocel, a cellulose producer, started building an advanced bioethanol plant at the beginning of 2020. The feedstock comes from the remainders of its cellulose production. The plant went into operation by the end of 2020 and delivered its first advanced biofuels shipment of 1.3 million liters in January 2021. The Austrocel plant has a capacity of 30 million liters per year. The Austrian sugar, starch, and ethanol producer Agrana, uses residuals of its own starch production as feedstock. Currently, about 30 percent of the feedstock to produce about 250 million liters of bioethanol is starch sludge.

Romania and Bulgaria: In the fall of 2021, Clariant opened an advanced ethanol plant with a capacity of 65 million liters in Romania. Wheat straw is the major feedstock. An advanced bioethanol plant with the same feedstock is developed by OMV Petrom. The projected capacity is 65 million liters, and the company plans to open the plant in 2023. In Bulgaria, ADM opened an advanced ethanol plant with a capacity of 60 million liters. The plant has the technical ability to produce conventional, advanced, and industrial chemical bioethanol making use of byproducts from starch production. However, the plant is not yet categorized as producing advanced biofuels.

Poland: On March 1, 2022, the Polish oil company, ORLEN Group, announced that they will build an installation to produce advanced bioethanol from non-food products, mainly straw. Its planned annual capacity is 32 million liters. The plant is anticipated to be operational in 2025. The bioethanol plant will be built together with a biomass (mainly lignin as a byproduct of the ethanol production) fueled combined heat and power (CHP) plant. In the next stage of the project, a biogas plant will be built. The biogas facility will process stillage, also a byproduct of bioethanol production.

Biomethanol

Biomethanol can be used as a platform chemical to produce other chemicals such as lactic acid and formaldehyde. It can also be used as a transport fuel and blended with biofuels, diesel, and gasoline, or

used to produce bio-methyl tertiary butyl ether (bio-MTBE) or bio-dimethyl ether (bio-DME). In the Netherlands, the advanced biofuel plant of BioMCN produces biomethanol from biogas. BioMCN produces about 75 million liters of biomethanol annually. In 2020, Södra began production of biomethanol at a pulp mill in southeastern Sweden. The plant has an annual capacity of 6 million liters which is extracted from pulp mill side-streams. As planned, the first deliveries will be shipped to Denmark and used to produce biodiesel.

Biomethane

A wide range of plants are producing biogas and bio-LNG as transport biofuel across much of Europe. In 2020, about a quarter of gaseous fuel used in transport was renewable in the EU. Most of these plants use organic household and industry waste as feedstock. An example is the bio-LNG plant of Renewi in the Netherlands. In Germany, Verbio is producing biomethane from straw at its plant at the Schwedt/Oder site. The plant has capacity to produce approximately 140 GWh of biomethane per year. This is equivalent to 14 million liters of diesel on an energy basis– using approximately 40,000 MT of straw. The biomethane is destined for use in the transport sector as bio-CNG/LNG and will qualify to count against the THG-reduction sub-mandate for advanced biofuels under the national implementation of RED II in Germany.

Sustainable Aviation Fuel (SAF) and Marine Biofuels

On 14 July 2021, the European Commission (EC) presented the 'fit for 55' package. The package includes a proposal to ensure a level playing field for sustainable air transport, also known as the ReFuelEU Aviation Initiative. In the draft regulation, the EC proposes obligations on fuel suppliers to distribute SAF. The EC proposed a SAF mandate of two percent for 2025 and five percent for 2030. For more information see the Policy and Programs section of this report.

A portion of the SAF supplied at European airports including the Rome Fiumicino Airport, Copenhagen Airport, Schiphol Airport (Amsterdam), and Frankfurt Airport is covered by imports from the United States. In 2021, the EU production of SAF totaled 89 million liters (source: Eurostat), with Finland as the sole producer. The current SAF production capacity of Finland's Neste is about 125 million liters, but most of this capacity is reportedly located in Singapore. Neste plans to increase its worldwide SAF production capacity to 1.5 billion liters in 2024, which includes its capacity at its Rotterdam plant. The Swedish company, Preem, also expressed its intention to begin producing SAF in 2023. In Rotterdam also UPM and Shell are planning produce SAF at their plants which will be fully operational in 2025 or later.

Since 2022, Eni has reportedly supplied the Rome Fiumicino Airport with of jet fuel blended with renewable raw material components. The jet fuel is produced through a co-feeding process at the refinery in Taranto with 0.5 percent made up of UCO. In addition, the Livorno refinery produces an aviation fuel containing 100 percent biogenic components which can be used in a blend with conventional jet fuel of up to fifty percent. As from 2024, the Gela (Sicily) and Venice biorefineries will produce an additional 250 million liters of SAF per year, entirely produced from biomass. This will meet the Italian market's potential requirements by 2025. Spain is also anticipated to ramp up SAF

production. Repsol plans to increase its capacity for SAF production to about 300 million liters in 2025, and Cepsa to about 600 million liters in 2026.

SkyNRG is planning to produce SAF for Schiphol Airport in Delfzijl, a seaport in the Northern part of the Netherlands. With the technical expertise of Shell Aviation, the plant will convert waste fats and oils with a SAF production capacity of nearly 125 million liters. The company reportedly has an offtake agreement to deliver the SAF to KLM for ten years and production is scheduled to begin in 2025.

Another potential opportunity for biofuels is the marine fuel market, and at this juncture it seems clear the space will be become crowded with different solutions as time passes. Maersk Mc-Kenney Moller Center for Zero Carbon Shipping, the Global Maritime Forum, and the Global Center for Maritime Decarbonization recently funded a survey shipping companies to ascertain their fueling perceptions about options to reach the industry's net zero goal by 2050. In addition to continued fossil fuel oil and natural gas which diminishes overtime (especially beyond 2030), the key biofuels expected to be adopted in the medium term (by 2030) in descending order of importance are BBD, biomethanol, and blue ammonia. Longer-term (by 2050), the key renewables in descending order of importance are thought to be eAmmonia, BBD, blue ammonia, biomethanol, eMethanol, biomethane, and eMethane. The Dutch biofuel distributor, GoodFuels, has partnered with several ship owners to supply marine biofuels to ships in the Port of Rotterdam and other European ports.

VIII. Notes on Statistical Data

Brexit

Following Brexit, the historic EU27 statistics in this report are updated from previous reports covering the EU28 which included the United Kingdom, as the UK fuels market is no longer included and the source of certain data has been changed from EU MS statistics to predominantly Eurostat data.

Bioethanol

Production
Historical fuel ethanol production capacity, production and consumption figures are based on statistics of Eurostat and the European Renewable Ethanol Association (ePURE). Production of fuel ethanol: Eurostat statistics cover indigenous "bioethanol" production (ethanol produced from biomass and/or the biodegradable fraction of waste, to be used as biofuel). Missing MS production figures of Eurostat are estimated by FAS Posts.

Consumption
Eurostat statistics of final consumption (energy use by transport sector) of blended "biogasoline," which includes biomethanol and ETBE. Ethyl tert-butyl ether (ETBE) is not included in ethanol production but is included in the consumption and trade figures. ETBE is predominantly consumed in France, Spain, the Netherlands, and Poland. Individual MS statistics and EU current and out year forecasts are FAS Post estimates. FAS Posts based their estimates on intel from national industry organizations and government sources.

Trade
Fuel ethanol import figures are based on Trade Data Monitor (TDM) data (sourced from Eurostat) and the U.S. Bureau of Census. As the EU has no Harmonized System (HS) code for ethanol used as fuel, actual trade in ethanol used as fuel vs other industrial chemical applications are difficult to assess. From 2014 to 2019 and for 2022, the estimation of the EU fuel ethanol import figures is based on EU imports through preferential trade under HS 2207 (Bolivia, Costa Rica, Guatemala, and Peru), and the imports from Brazil, Canada, and the United States. The monthly shipments larger than one million liters plus a unit value of less than one $ per liter are counted as fuel ethanol, the remainder is treated as non-beverage, non-fuel ethanol. HS code 29091910 covers ETBE which contains 45 percent ethanol by volume. For 2020 and 2021, EU fuel ethanol import figures are based on the surveillance program for fuel ethanol of the European Commission (EC). EU bioethanol exports are the residual of the production, supply, and demand balance.

Feedstock and Co-products
Official data for feedstock use is scarce and generally unavailable from industry and government sources. The figures in this report represent FAS Posts estimates supported by staff assessments of grain and sugar markets which are published. Feedstock and co-product figures are cross-checked with fuel ethanol production figures as published in the ethanol balance table using known feedstock/BBD yield rates (listed in the Appendix II) to ensure accuracy.

Biodiesel/HDRD

Production and Consumption
Original biodiesel/HDRD data collected in MT, then converted to liters using a conversion rate of 1 MT = 1,136 liters for biodiesel; 1,282 liters for HDRD. 2014-2021 figures are based on Eurostat and MS official statistics and adjusted by EU FAS Posts using additional information obtained from national industry organizations and government sources. 2022 and 2023 figures are FAS post estimates/forecasts.

Trade
Figures are based on Trade Data Monitor (TDM) data (sourced from Eurostat) and the U.S. Bureau of Census and adjusted for U.S. exports of biodiesel blends. A specific customs code for pure biodiesel (B100) and biodiesel blends down to B96.5 (HS 3824.90.91) was first introduced in the EU in January 2008. In January 2012, the code was changed to HS 3826.00.10 for blends containing at least 96.5 percent biodiesel, HS code 3826.00.90 (containing between 30 and 96 percent of biodiesel), and HS 2710.20.11 for blends containing at most 30 percent biodiesel. In this report it is assumed that these codes represent a blend of 99, 95, and 5 percent, respectively. In January 2012, the U.S. Bureau of the Census introduced the export code HTS 3826.00.0000 exclusively for biodiesel blends greater than 30% by volume and up to and including B100, and export code HTS 2710.20.0000 exclusively for petroleum oils containing biodiesel up to 30% by volume. There have been no changes since.

Feedstock
Official data for feedstock use is scarce and generally unavailable from industry and government sources. The figures in this report represent FAS Posts estimates supported by staff assessments of oilseed markets which are published. Feedstock figures are cross-checked with biodiesel/HDRD

production figures as published in the biodiesel/HDRD balance table using known feedstock: biofuel yield rates (listed in the Appendix II) to ensure accuracy.

Fuel Pools
Source for all fuel pools: IEA, Oil Market Report, June 2023.

Appendix I - Abbreviations

BBD = Biobased biodiesels which includes biodiesel (FAME) and hydrogenation derived renewable diesel (HDRD)
Biodiesel = Fatty acid methyl ester (FAME) produced from agricultural feedstock (vegetable oils, animal fat, recycled cooking oils) used as transport fuel to substitute for petroleum diesel
Bioethanol = Ethanol produced from agricultural feedstock used as transport fuel
BtL = Biomass to Liquid
Bxxx = Blend of mineral diesel and biodiesel with the number indicating the percentage of biodiesel in the blend, e.g. B100 equals 100% biodiesel, while B5 equals 5% biodiesel and 95% conventional diesel.
CEN = European Committee for Standardization (Comité Européen de Normalisation)
DDG = distillers dried grains
EBB = European Biodiesel Board
EC = European Commission
EU = European Union. "EU" in this report refers to EU27.
Exxx = Blend of mineral gasoline and bioethanol with the number indicating the percentage of bioethanol in the blend, e.g. E10 equals 10% bioethanol and 90% conventional gasoline.
FAME = fatty acid methyl ester
GHG = greenhouse gas
GJ = Gigajoule = 1,000,000,000 Joule or 1 million KJ
Ha = Hectares, 1 hectare = 2.471 acres
HDRD = hydrogenation derived renewable diesel (also known originally as hydrotreated or hydrogenated vegetable oil or HVO
HS = Harmonized System of tariff codes
KTOE = 1000 MT of oil equivalent = 41,868 GJ = 11.63 GWh
MJ = Megajoule
MMT = Million metric tons
MS = Member State(s) of the EU
MT = Metric ton (1,000 kg)
Mtoe = Million tons of oil equivalent
MW = Mega Watt = 1,000 Kilo Watt (KW)
MWh = Mega Watt hours= 1,000 Kilo Watt hours (KWh)
MY = Marketing Year
Nordics = Denmark, Sweden, Finland, Norway and Iceland
PME = palm oil based methyl ester biodiesel
PVO = Pure vegetable oil used as transport fuel
RED = EU Renewable Energy Directive 2009/28
RME = Rapeseed methyl ester
SAF = Sustainable aviation fuel

SME = Soybean methyl ester
TME = Tallow methyl ester, biodiesel made from animal fat
Toe = Tons of oil equivalent = 41,868 MJ = 11.63 MWh
UCO = Used cooking oil/recycled vegetable oil
UCOME = UCO-based methyl ester biodiesel
US$ = U.S. Dollar

Appendix II - Energy Content and Conversion Rates

1 MT Gasoline = 1,342 Liters = 1.03 toe
1 MT BtL = 1,316 Liters = 0.80 toe
1 MT of HDRD = 1,282 Liters = 1.00 toe
1 MT Ethanol = 1,267 Liters = 0.64 toe
1 MT Diesel = 1,195 Liters = 1.02 toe
1 MT Biodiesel = 1,136 Liters = 0.90 toe
1 MT Pure veg Oil = 1,087 Liters = 0.83 toe

Feedstock: Ethanol Conversion Rates
Corn kernels: 1 MT = 402 to 417 liters (has risen since 2006)
Wheat kernels: 1 MT = 393 liters
Rye/Barley kernels: 1 MT = 241 liters
Sugar beets: 1 MT = 95 liters

Feedstock: Biodiesel Conversion Rates
Soybean oil, crude: 1 MT = 1,113 liters
Soybean oil, 1x refined: 1 MT = 1,128 liters
Crude palm oil (CPO): 1 MT = 1,087 liters
Animal fats/grease: 1 MT = 1,043 liters
Used cooking oil (UCO): 1 MT = 1,043 liters

Ethanol: Co-product Yield Rates (maximum theoretical yield)
Corn kernels: 1 MT = 313 kg of DDG + up to 29 kg of corn oil
Other grain kernels: 1 MT = 313 kg of DDG (negligible vegetable oil)

Appendix III - Related Reports from USEU and MS Posts

Country	Title	Date
EU	Wood Pellet Annual 2023	forthcoming
EU	Grain and Feed Quarterly	08/02/23
EU	Biofuel Mandates in the EU by Member State - 2023	07/06/23
Spain	Spanish Wood Pellet Market Outlook 2023	05/08/23
EU	Oilseeds and Products Annual	05/02/23
EU	Sugar Annual	04/21/23

EU	Grain and Feed Annual	04/19/23
EU	EU Parliament Adopts Negotiating Positions on Deforestation-Free Supply Chains and Renewable Energy	09/30/22
EU	EU Wood Pellet Annual 2022	07/13/22
EU	Biofuels Annual 2022	07/13/22
EU	Biofuel Mandates in the EU by Member State – 2022	07/05/22
Netherlands	Dutch Government Lays Out New Biomass Policy	04/29/22
Germany	Fuel of the Future Congress Concludes Biofuels are Indispensable for	03/02/22
Netherlands	Sustainable Marine and Aviation Fuels in Northern Europe	12/13/21
EU	EU Extends Its Anti-Dumping Duty and Countervailing Duties on	08/23/21
EU	EC Adopts its EU Taxonomy for Green Investments	05/14/21
Netherlands	Dutch Wood Pellet Imports Reach New High	04/26/21
Belgium	Belgium To Ban Palm and Soya Oil for Use in Biofuels from 2022	04/08/21

The GAIN Reports can be downloaded from the following FAS website:
https://gain.fas.usda.gov/#/

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Disclaimer:

This report presents the situation and outlook for biofuels in the EU. This report presents the views of the authors and does not reflect the official views of the U.S. Department of Agriculture (USDA). The data are not official USDA data. Official government statistics on biofuels are not available in many instances. This report is based on analytical assessments, not official data.

Attachments:

No Attachments