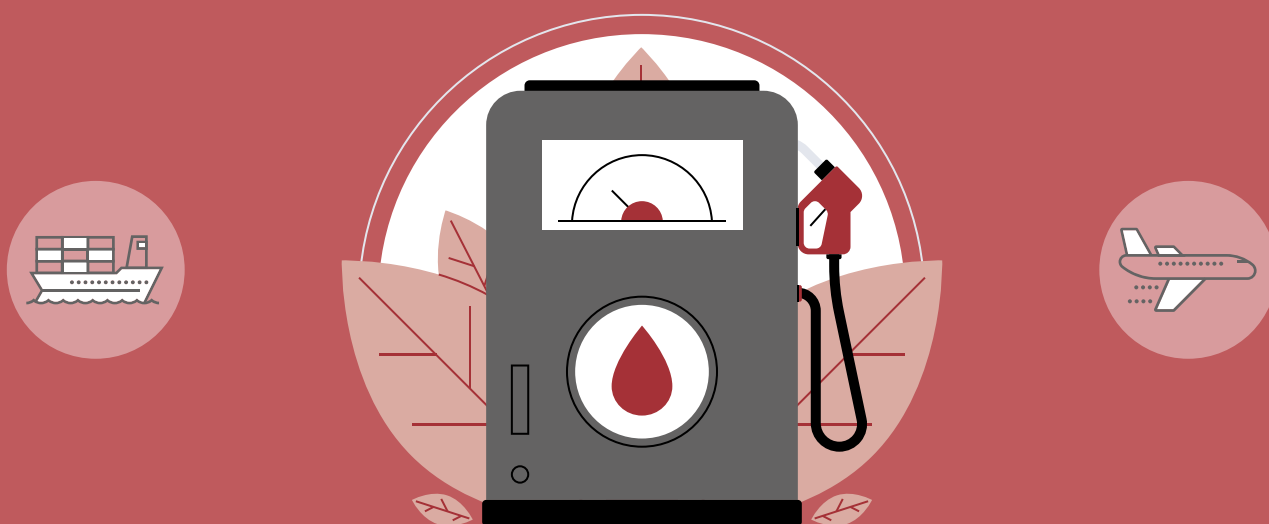




BIOFUELS IN SPAIN

Real solution
or hidden issues?

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Biofuels in Spain

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Executive summary

Biofuels are promoted by the European Union's Renewable Energy Directive as a tool for the decarbonization of transport, and Spain is currently in the process of transposing this regulatory framework, with a growing commitment to their deployment. The aim of this report is to provide an updated overview of the state of biofuels in Spain and to identify the main risks, limitations, and needs associated with their development, in order to assess whether their expansion effectively contributes to climate and energy security objectives or, conversely, may generate adverse social, environmental, and strategic impacts.

The most recent data show uneven market developments. Although total biofuel sales slightly declined in 2024, sales of HEFA (Hydroprocessed Esters and Fatty Acids), a biofuel used in aviation and produced from used cooking oil (UCO), increased by 17,531%, reflecting strong pressure on this feedstock. UCO, classified as a waste and prioritized under European legislation, already accounts for 28% of all feedstocks used to produce biofuels, despite being a limited resource and subject to growing suspicions of fraud in international markets. At the same time, the ban on the use of palm oil from 2025 is leading to an increase in the use of soybean oil, a feedstock associated with high risks of indirect land-use change (ILUC).

The report also highlights a dependence on imported feedstocks. In 2024, only **15% of the feedstocks used to produce biofuels originated in Spain**, calling into question the argument that these fuels contribute to strengthening the country's independence and energy security. This reliance on third countries not only exposes the system to supply and fraud risks, but also weakens domestic production and shifts environmental and social impacts outside the European Union.

These findings indicate that the current model for expanding biofuels in Spain presents significant contradictions. Increasing pressure on scarce feedstocks, the substitution of banned oils with others associated with high impacts, and structural dependence on imports jeopardize both the climate benefits and the environmental credibility of this policy. In the absence of robust controls and alignment between demand and the real availability of resources, biofuel development may generate effects contrary to its intended goals.

Under current conditions, the expansion of biofuels in Spain risks undermining climate

and energy security goals, as it relies on limited, increasingly imported feedstocks with significant environmental and social impacts. This also affects the decarbonization of key sectors such as transport, by opening the door to widespread use when it should instead be targeted to specific systems and not others. For example, this is the case for road transport, where battery electric technology is already available and represents the most efficient and sustainable solution.

The use of biofuels should be prioritized exclusively in sectors that are difficult to electrify, such as aviation and maritime transport, and should be accompanied by strict criteria regarding the origin and traceability of feedstocks. At the same time, it is crucial to limit their role in road transport and strengthen the push for electrification, a more effective pathway to reduce emissions and enhance Spain's energy autonomy.

Introduction

What are biofuels?

Biofuels are liquid or gaseous fuels produced from organic matter of plant or animal origin (such as crops, plant residues, or organic waste) through physical or chemical processes.¹

They are classified according to the type of organic matter used as feedstock:

First-generation biofuels²:

These are produced from crops that can also be used for human or animal consumption, such as maize, sugarcane, soybeans, palm oil, or rapeseed.

Second-generation biofuels³:

These are produced from various types of waste and by-products, including agricultural, forestry, industrial, or municipal waste, as well as from non-food crops such as camelina and carinata, including intermediate crops or those grown on degraded land.

Third-generation biofuels⁴:

These are produced from algae, sewage sludge, and municipal solid waste.

Fourth-generation biofuels⁵:

These aim to use genetically optimized feedstocks designed to enhance carbon dioxide capture.

Currently, only first and second-generation biofuels are commercially available. Their production in Europe is increasing, and the European Union's Renewable Energy Directive (RED) counts them as renewable energy toward its targets.⁶

¹ Diccionario de lengua española, Biocombustible, 2025

² European Parliament, Briefing on Advanced Biofuels, 2017

³ European Parliament, Briefing on Advanced Biofuels, 2017

⁴ European Parliament, Briefing on Advanced Biofuels, 2017

⁵ European Parliament, Briefing on Advanced Biofuels, 2017

⁶ Ver [Análisis de la normativa sobre los biocombustibles](#)

In addition to these, there are renewable fuels of non-biological origin (RFNBOs), which constitute a separate category within renewable fuels,⁷ RFNBOs are produced through chemical or electrochemical processes using renewable energy sources (such as electricity from solar, wind, or hydropower) to generate liquid or gaseous fuels, including renewable hydrogen or synthetic fuels.

These fuels are playing an increasingly important role in the energy transition, particularly in sectors that are difficult to electrify, such as aviation and maritime transport. The Renewable Energy Directive recognizes them as renewable energy within EU targets and even establishes specific sub-targets for their production and use.⁸

What biofuels are used in Spain?

Different types of biofuels can be produced from these feedstocks, depending on the transformation process used and the final characteristics of the fuel.

The most widely sold biofuels in Spain are biodiesel, co-processed hydrotreated vegetable oil (HVO) (blended with fossil fuels), hydrotreated vegetable oil (HVO), bioethanol, and HEFA.⁹ They are categorized and defined according to how they are processed.

The case of HVO is particular because a new category was created to distinguish between HVO used on its own and HVO blended with diesel (co-processed HVO), as well as a category for HVO used in maritime transport. Taking this into account, total sales of HVO decreased by only 3.31%.

⁷ European Commission (JRC), [Renewable fuels of non-biological origin in the European Union, 2023](#)

⁸ Ver [Análisis de la normativa sobre los biocombustibles](#)

⁹ Ministerio para la Transición Ecológica y el Reto Demográfico, [Estadísticas de biocarburantes, 2025](#)

Biodiesel

	It is produced through a chemical process called transesterification, which transforms oils or fats into methyl esters
	1.216.346 m ³ sold in 2024 (-16%)
	Mainly made from waste
	Feedstock primarily sourced from Indonesia, China, and Malaysia
	Used in road transport to replace diesel
	Up to 20% blend with fossil diesel, or used pure in adapted engines

Hydrobiodiesel (HVO), Co-Processed HVO, and Maritime HVO¹⁰

	It is produced through hydrogen hydroprocessing, which removes oxygen and generates paraffinic hydrocarbons. Co-processed HVO is obtained by processing renewable and fossil feedstocks together in refinery units, resulting in a final product that is molecularly blended
	830.699 m ³ sold in 2024 (-3%)
	Mainly made from waste for HVO, and crops used for co-processed HVO
	Feedstock primarily sourced from Malaysia, Indonesia, and Spain
	Used in road transport to replace diesel
	HVO can be used directly in conventional engines without blending with fossil fuels. The blend percentage of co-processed HVO with fossil fuels varies, but is usually 25–30% HVO.

Bioethanol



Renewable alcohol used as fuel, produced through the fermentation of sugars that converts organic matter into ethanol



304.260 m³ sold in 2024 (-1%)



Produced from crops, mainly corn and sugarcane



Feedstock primarily sourced from Ukraine, Spain, and Brazil



Used in road transport to replace petrol



Up to 85% blend with fossil fuels

HEFA



Produced through a hydrogen hydroprocessing method, which transforms esters and fatty acids into hydrocarbons similar to fossil fuels



58.990 m³ sold in 2024 (+17531%)



Made from used cooking oil (UCO)



Feedstock primarily sourced from China, Malaysia, and Spain



Used in aviation to replace part of kerosene



Up to 50% blend with fossil fuels

Why are they being promoted?

In Spain, the transport sector is responsible for 32.5% of greenhouse gas emissions.¹¹ Through the European Green Deal,¹² the European Union committed to reducing its greenhouse gas emissions by 55% compared to 1990 levels by 2030 and achieving climate neutrality by 2050. Consequently, greenhouse gas emissions from the transport sector must be reduced.

Two main solutions are currently being considered: prioritizing the electrification of transport modes¹³ and replacing fossil fuels with biofuels in systems that are difficult to decarbonize.

However, several environmental and socioeconomic risks associated with biofuels have been documented, calling into question the suitability of this pathway for transport decarbonization.

¹¹ [Ministerio para la Transición Ecológica y el Reto Demográfico, Inventario nacional de emisiones a la atmósfera - Emisiones de gases de efecto invernadero, Informe Resumen, 2024](#)

¹² [Consejo Europeo, Consejo de la UE, Pacto Verde Europeo, 2025](#)

¹³ [ECODES, Electricidad renovable como combustible para el transporte, 2020](#)

Analysis of Biofuel Regulations



European Regulations Renewable Energy Directive

The Renewable Energy Directive (RED) is the main framework establishing binding renewable energy targets and limits, including for biofuels, in the transport sector.

In its latest revision, Directive (EU) 2023/2413 of the European Parliament and of the Council,¹⁴ approved in 2023 (RED III), the renewable energy target was increased to 42.5%. This new regulation sets sector-specific targets, including for transport, with a renewable share of 29% or a 14.5% reduction in carbon intensity by 2030.

Targets and limits are calculated over the total fuel mix (including biofuels but also fossil fuels) and are expressed in terms of energy content rather than volume.

Under RED, biofuels are classified according to their feedstock, and Annex IX is divided into Part A and Part B. Part A contains 22 types of feedstock, and Part B contains 6.¹⁵ The most recent additions were made in 2024 during the Directive's revision, including, among others, intermediate crops and crops grown on severely degraded land.¹⁶

Specific rules apply to these feedstocks, different from those applied to feedstocks not listed in the annex. Feedstocks in Annex IX benefit from double counting, meaning their energy content is counted twice for the purposes of meeting renewable energy targets in transport. However, in the Spanish transposition, it is currently planned to remove all multipliers.

¹⁴ [Boletín Oficial de Estado, Directiva \(UE\) 2023/2413 del Parlamento Europeo y del Consejo, 2023](#)

¹⁵ [Boletín Oficial de Estado, Directiva \(UE\) 2018/2001 del Parlamento Europeo y del Consejo, 2018](#)

¹⁶ [Boletín Oficial de Estado, Directiva Delegada \(UE\) 2024/1405 de la Comisión, 2024](#)

Feedstocks in Part A receive the highest incentives, with a target of 5.5% for 2030, of which at least 1% must come from renewable fuels of non-biological origin (RFNBOs). Advanced biofuels and biogas produced from Part A feedstocks of Annex IX, when supplied to aviation and maritime transport, are counted as 1.2 times their energy content to meet the targets for these transport modes. Meanwhile, RFNBOs supplied to these same sectors are considered equivalent to 1.5 times their energy content.

Feedstocks in Part B are limited to 1.7%, to ensure that the majority of double counting is allocated to feedstocks with lower environmental impact, such as those in Part A of Annex IX.

Feeds- tock	Mode of transport	REDIII clasificación	REDIII
Annex IX - Part A feedstock ^{17,18}	All	Annex IX - Part A feedstock	Objective 4,5% (5,5% with at least 1% RFNBO)
			Double counting
Annex IX - Part B feedstock ^{19,20}	All	Annex IX - Part B feedstock	Limited to 1,7%
			Double counting
Intermediate crops	Aviation	Annex IX - Part A	Objective 4,5% (5,5% with at least 1% RFNBO) (all feedstock from part A)
			Double counting
Crops in degraded land	Aviation	Annex IX - Part A	Objective 4,5% (5,5% with at least 1% RFNBO) (all feedstock from part A)
			Double counting

¹⁷ Boletín Oficial de Estado, Directiva (UE) 2018/2001 del Parlamento Europeo y del Consejo, 2018

¹⁸ Boletín Oficial de Estado, Directiva Delegada (UE) 2024/1405 de la Comisión, 2024

¹⁹ Boletín Oficial de Estado, Directiva (UE) 2018/2001 del Parlamento Europeo y del Consejo, 2018

²⁰ Boletín Oficial de Estado, Directiva Delegada (UE) 2024/1405 de la Comisión, 2024

Feeds- tock	Mode of transport	REDIII clasification	REDIII
UCO	All	Annex IX - Part B	Limited to 1,7% (all feedstock from part B)
			Double counting
Animal fats (categories 1&2)	All	Annex IX - Part B	Limited to 1,7% (all feedstock from part B)
			Double counting
Intermediate crops	Road transport, Maritime	Annex IX - Part B	Limited to 1,7% (all feedstock from part B)
			Double counting
Crops in degraded land	Road transport, Maritime	Annex IX - Part B	Limited to 1,7% (all feedstock from part B)
			Double counting
Damaged crops	All	Annex IX - Part B	Limited to 1,7% (all feedstock from part B)
			Double counting
Food and feed crops	All	Not included in Annex IX	Limited to 7%
		Limited to 2,6% in Spain by Orden TED/1342/2022	
Palm oil	All	Not included in Annex IX	Not mentioned
		Prohibited since 2025 by Delegated Regulation (EU) 2019/807	
PFADs	All	Not included in Annex IX	Not mentioned
		Prohibited since 2025 by Delegated Regulation (EU) 2019/807	
FFFBs	All	Not included in Annex IX	No mencionado
		Prohibited since 2025 by Delegated Regulation (EU) 2019/807	

Feeds-tock	Mode of transport	REDIII clasification	REDIII
POME	All	Not included in Annex IX	Not mentioned
EFB	All	Not included in Annex IX	Not mentioned
Soy	All	Not included in Annex IX	Not mentioned
		Prohibited or discouraged in France, Belgium, the Netherlands and Denmark. The pending revision of Delegated Regulation (EU) 2019/807 could ban its use for biofuels.	

Table 1. Key biofuels' feedstocks and European regulatory framework.

Key biofuels' feedstocks and European regulatory framework

Regulation	What does it establish?	Key points
<u>Directive (UE) 2015/1513</u>	It introduces limits on the use of biofuels from food crops for transport, in order to reduce the risks of indirect land use change (ILUC) and food insecurity.	It sets a limit of 7% on final energy consumption in transport for this type of biofuel.
		Promotes the development of advanced biofuels by establishing a favourable framework for waste feedstock.

Regulation	What does it establish?	Key points
<u>Regulation (UE) 2023/2405</u> (ReFuel EU Aviation)	The ReFuel EU Aviation Regulation imposes obligations on aviation fuel suppliers to incorporate a percentage of SAF (sustainable aviation fuel) and synthetic aviation fuel from 2025 to 2050.	The target is 2% sustainable aviation fuel by 2025 and 70% by 2050, with a gradual increase in targets between these two points.
		From 2030 onwards, the target includes a specific sub-target for synthetic aviation fuels that increases over time.
<u>Regulation (UE) 2023/1805</u> (FuelEU Maritime)	The FuelEU Maritime Regulation sets progressive limits on the greenhouse gas (GHG) intensity of energy used on board for maritime operators from 2025 onwards.	Emissions must be reduced by 2% in 2025 compared to 2019 levels and reach 80% by 2050, with a progressive path to reach this point.
<u>Delegated Regulation (UE) 2019/807</u>	Establishes high-risk feedstock for land use change (ILUC).	Palm oil and some of its co-products (FFBs, PFAD, oil extracted from the kernel or shell of the palm fruit) are considered high ILUC risk.
		Soybeans are not considered high ILUC risk in terms of ILUC at European level, but some countries have banned them (France, Belgium, Denmark, the Netherlands). The revision of the Delegated Regulation could include soy as high ILUC risk.

Table 2. Main European regulations on biofuels.



Spanish Regulations on biofuels

Spain is currently transposing the Renewable Energy Directive (RED), which involves modifying and updating various national legislative texts that regulate, among other aspects, the use of biofuels. This process, led by the Ministry for the Ecological Transition and the Demographic Challenge, is being implemented through new regulatory instruments designed to adapt the Spanish legal framework to European requirements on renewable energy and renewable fuels. In this context, the following section outlines the currently applicable regulatory framework and analyzes how biofuels are integrated and considered within the National Integrated Energy and Climate Plan (PNIEC).

Spain's National Energy and Climate Plan 2023-2030

The NECP 2023–2030 is Spain's national strategic energy and climate plan that guides the country's decarbonization efforts through 2030, aligning with European targets for emissions reduction and increased renewable energy.

In the transport sector, the plan incorporates specific quotas for renewable fuels, including advanced biofuels, biogas, and renewable fuels of non-biological origin (RFNBOs), with quantified targets for their share in the energy supplied to transport by 2030.

This is part of the implementation of the RED, as the PNIEC translates EU-level targets into concrete national goals, planning deployment, indicators, and measures that must accompany regulatory development (such as royal decrees and ministerial orders) to meet renewable energy targets in the transport sector.

2030 targets	Fitfor55 (UE)	PNIEC 2023 (SP)
GHG reduction compared to 1990	55%	32%
Share of renewables in final energy consumption.	42,5% (+2,5% indicative)	48%
Energy efficiency.	38%*	39,5%(PEC)/ 43% (FEC)
Reduction in ETS emissions compared to 2005	62%	70%
Share of renewable energy in final energy consumption. Transport sector.	≥ 23,5%**	28%
Reduction in GHG intensity. Transport sector	≥ 11,8%***	16,3%
Combined share of advanced biofuels and biogas produced from the feedstock listed in Annex IX, Part A, and from RFNBOs in the energy supplied. Transport sector.	5,5%	17,26%
Share of RFNBOs in energy supplied. Transport sector.	1%	11,61%
Biofuels, bioliquids and biomass fuels from food and feed crops.	<2020 share +1%**** (Maximum 7%)	1,5%
Biofuels from feedstock listed in Annex IX.B.	<1,7%	1,1%
Advanced biofuels and biogas from feedstock listed in Annex IX, Part A.	≥ 2,2%	6,9%
Average annual increase in renewable energy. Heating and cooling sector.	0,8% (2021-2025) 1,1% (2026-2030)	1,42% (2021-2025) 2,36% (2026-2030)
RFNBOs on hydrogen used (final energy and non-energy uses). Industry sector.	42%	74%
Average annual increase in the share of renewable energy. Industry sector.	1,6% (2021-2025) 1,6% (2026-2030)	2,14% (2021-2025) 2,97% (2026-2030)
Renewable energies in final consumption. Building sector.	49% (Indicative target)	67,59%

Table 3. Comparison of Fitfor55 reduction targets with reductions anticipated with the implementation of the PNIEC. Source: Ministry for Ecological Transition and Demographic Challenge, 2024

* With regard to the 2030 projections of the PRIMES Model (2007)

** The share of renewable energy in final energy consumption in the transport sector, according to Article 25.1.a.i of the DER III, corresponds to 29%. In application of Article 26.1.ii, the target for Spain is reduced to 23.5%.

*** The reduction in greenhouse gas intensity in the transport sector, according to Article 25.1.a.ii of DER III, corresponds to 14.5%. In application of Article 26.1.ii, the target for Spain is reduced to 11.8%.

**** The share in 2020 + 1% corresponds to 4%.

It is clear that the ambition for biofuel deployment is significantly higher in the Spanish NECP than in European legislation. The share of advanced biofuels produced from Annex IX Part A feedstocks and biogas is anticipated to reach 17.26%, whereas the RED sets a target of 5.5%. This target can be questioned given that there is still no independent analysis of the availability of sustainable and local feedstocks.

A total of 10 measures included in the NECP mention biofuels, with some specifically aimed at promoting this technology:

Measure 1.12. Advanced biofuels and other renewable fuels in transport

Measure 1.13. Decarbonization of maritime transport

Measure 1.14. Decarbonization of aviation

Measure 1.15. Development of biogas and biomethane

Measure 1.27. Training of professionals in the renewable energy sector

Measure 1.33. Reduction of GHG emissions in waste management

Measure 2.5. Promotion of electric vehicles

Measure 3.4. Charging points and infrastructure for alternative fuels

Measure 5.1. Strategic action on climate, energy, and mobility

Measure 5.3. Complementary plans in the energy and climate sectors

In the transport sector, the NECP highlights that the main pillars of decarbonization are modal shift, the deployment of electric mobility, and the use of advanced biofuels. Although the plan indicates that the goal is to develop advanced biofuels “produced sustainably,” there are currently insufficient safeguards in both European and Spanish regulations to ensure this is actually the case.

Spanish regulations related to biofuels

Regulation	What does it establish?	Key points
<u>Law 34/1998, the Hydrocarbons Sector</u>	Basic legal framework that enables the government to establish biofuel sales or consumption targets and promotion mechanisms, and contributes to regulatory development.	It enables the Government to set mandatory targets for the sale or consumption of biofuels and other renewable fuels in transport.
		It enables the development of mechanisms for promotion, control and monitoring, which are subsequently implemented through royal decrees and ministerial orders.
		It serves as the legal basis for the transposition and implementation of European regulations on biofuels.
<u>Order TED/728/2024</u>	Develops the new mechanism for promoting biofuels and other renewable fuels for transport purposes, in line with the DER and the NEPC.	Defines the obligations of regulated entities, calculation formulas, computation rules, and accreditation procedures.
		It incorporates the ILUC limits and criteria established in Royal Legislative Decree 376/2022.

Regulation	What does it establish?	Key points
<u>Royal legislative decree 376/2022</u>	It regulates the sustainability and GHG emission reduction criteria applicable to biofuels, bioliquids and biomass fuels used in transport..	Requires minimum emission savings compared to the fossil fuel benchmark: at least 65% for new biofuel production facilities.
		Incorporates the framework of guarantees of origin for renewable gases.
		Refers to the targets of the RED: 5.5% in 2030 for advanced biofuels (Annex IX part A) and RFNBOs at EU level, with a minimum of 1% RFNBOs within that 5.5%.
		Strengthen controls on feedstock and supply chains.
<u>Royal legislative decree 1085/2015</u>	Sets targets for the sale or consumption of biofuels for transport purposes (until 2026) with calculation rules, limits and ILUC raw materials linked to European regulations.	Sets mandatory targets for biofuel sales or consumption until 2026. The target for biofuels and biogas for transport purposes in 2026 is 12%.
		Introduce calculation rules, such as double counting for feedstocks in Annex IX.
		Phasing out of raw materials considered to be high ILUC risk, establishing a reduction path starting on 31st December 2023, until reaching a value of 0% on 31st December 2030.

Regulation	What does it establish?	Key points
<u>Royal legislative decree 235/2018</u>	Establishes calculation methods and reporting requirements for greenhouse gas emissions intensity of fuels and energy in transport, as indicated in the transposition of the RED.	Establishes the method for calculating GHG emission intensity, expressed in gCO ₂ eq/MJ.
		It applies a full life cycle approach ('well-to-wheel').
		It does not impose biofuel quotas, but rather obligations to measure, report and verify emissions.
<u>Order TED/1342/2022</u>	It establishes a specific limit on biofuels produced from food and feed crops.	It sets the limit for biofuels produced from food and feed crops at 2.6% in 2025.
		From 2026 onwards, the limit on biofuels produced from food and feed crops set for 2025 will remain in force, unless new additional limits are set.
		The Ministry for Ecological Transition and Demographic Challenge will be responsible for setting new targets from 2027 onwards.
<u>Resolution of the 29th of September 2021</u>	Determines raw materials with high ILUC risk and their maximum acceptable percentage for the purposes of sales/consumption targets in Spain (development of obligations under Royal legislative Decree 1085/2015 and the Renewable Energy Directive).	It establishes high-risk ILUC feedstock, prohibiting their use in the manufacture of biofuels from 2025 onwards.
		Palm oil and some of its co-products (FFBs, PFAD, oil extracted from the kernel or shell of the palm fruit seed) are classified as high-risk ILUC.
		Does not include soy as a high-risk ILUC feedstock.

Table 4. Spanish regulations on biofuels.

Both at the Spanish and European levels, there is a strong push for biofuels. However, these fuels can pose risks to the environment, energy security, land, and people, and the necessary safeguards are not in place.



Environmental and Socioeconomic Risks Associated with Biofuels

Crop-based biofuels

Biofuels produced from crops have two main negative impacts: land use and risks to food security.

Increased CO₂ Emissions and Impacts on Local Communities

Some specific crops and feedstocks are recognized as high-risk for indirect land-use change (ILUC). This is the case for palm oil, which has been banned since 2025 under Delegated Regulation (EU) 2019/807 and the Resolution of 29 September 2021^{21,22}. The revision of this Delegated Regulation, published in January 2026 and currently under public consultation, includes soy as a high ILUC-risk crop for the first time. If this revision is approved, the use of soybean oil for biofuel production will be prohibited.²³

Some countries, such as France²⁴, Belgium²⁵, Denmark, and the Netherlands, had already prohibited its use. In 2024, more than 100 scientists signed a letter to the European Commission warning about the impacts of soy cultivation on deforestation, biodiversity loss, and food insecurity.²⁶

Large-scale palm and soy plantations cause deforestation and release significant amounts of previously stored carbon, which is very difficult to recapture, exacerbating climate change. A study commissioned by the European Commission showed that biofuels produced from soybean and palm oil generate two and three times more greenhouse gas emissions, respectively, than fossil diesel.

A report by Transport & Environment (T&E) states that global biofuel production emits 16% more CO₂ than the fossil fuels it replaces.²⁸ Analyzing land use for biofuels, the report indicates that today, an area the size of Italy is required just to meet 4% of transport demand.

²¹ [Boletín Oficial de Estado, Reglamento Delegado \(UE\) 2019/807 de la Comisión, 2019](#)

²² [Boletín Oficial de Estado, Resolución del 29 de septiembre de 2021, 2021](#)

²³ [Ver Análisis de la normativa sobre los biocombustibles](#)

²⁴ [European Commission, Review of Indirect Land-Use Change \(ILUC\) delegated act, 2026](#)

²⁵ [Ministères Transition Écologique, Aménagement du territoire, Transports, Ville et Logement, Stratégie nationale de lutte contre la déforestation importée, 2025](#)

²⁶ [RTL info, L'huile de soja à son tour bannie des biocarburants, 2023](#)

²⁷ [ECODES, ECODES se une a la comunidad científica para pedir a la Comisión Europea reconocer los impactos de la soja, 2024](#)

²⁸ [Guidehouse, High ILUC-risk fuels review, 2022](#)

With rising demand, 52 million hectares could be needed by 2030—the size of France. Only 3% of the land currently used for first-generation biofuels could produce the same amount of energy with solar panels.

In Brazil, **the expansion of sugarcane cultivation for bioethanol has significant environmental impacts.**²⁹ Large-scale production has caused the loss of natural vegetation in regions such as the Cerrado and the Atlantic Forest, with both direct effects (sugarcane replacing pastures or agricultural land) and indirect effects (livestock moving into still-forested areas).

Impact of Crop-Based Biofuels on Food Security

Producing **biofuels from food crops directly affects food security**, as highlighted by the FAO as early as 2008 in its report *The State of Food and Agriculture*.³⁰ **Crops grown for energy compete with crops for human consumption** for increasingly limited resources such as land, water, and inputs.

A preliminary study by the University of Minnesota shows that in 2020, **only 50% of the calories obtained from crops were used directly for human food.**³¹ The rest went to feed and other uses, including 5% for biofuels, a 29% increase since 2010.

Additionally, **crop-based biofuels affect food prices** through speculation and fluctuations in global markets, and can alter the availability of certain crops directly destined for human consumption. For example, at the end of August 2025, soybean oil prices dropped for several consecutive days due to uncertainty around the Trump administration's biofuel policy.³² Throughout the summer of 2025, soybean oil prices fluctuated due to biofuel policy decisions and expectations of demand.

²⁹ T&E, *CrOP30: Why burning food for land-hungry biofuels is fuelling the climate crisis*, 2025

³⁰ MDPI, *Biodiversity Impacts of Increased Ethanol Production in Brazil*, 2020

³¹ FAO, *El Estado Mundial de la Agricultura y la Alimentación*, 2008

³² University of Minnesota, *Only half of the calories produced on croplands are available for human consumption*, 2025

Using food crops for biofuel production is highly inefficient: much of the energy is lost in the process, and only a fraction is converted into useful fuel. Meanwhile, **these crops compete for land, water, and inputs with food production** increasing pressure on agricultural systems.

A T&E study estimates that the equivalent of 100 million bottles of vegetable oil is used in cars every day. It also highlights that, on average, 3,000 liters of water are needed to grow the crops required to drive 100 km using biofuels.³³

The Case of Intermediate Crops and Crops on Severely Degraded Land

The modification of the Renewable Energy Directive^{34,35} introduces intermediate crops and crops grown on severely degraded land as feedstocks for biofuels, promoting their use particularly for aviation.

Covering the soil between main crops is generally beneficial: it protects the soil and can improve its quality.³⁶

However, there are doubts about the suitability of these crops as biofuel feedstocks, due to Spain's production capacity and the associated impacts.

³³ Bloomberg, *Aceite de soja cae por cuarto día consecutivo ante incertidumbre sobre los biocombustibles*, 2025

³⁴ T&E, *CrOP30: Why burning food for land-hungry biofuels is fuelling the climate crisis*, 2025

³⁵ Boletín Oficial de Estado, *Directiva (UE) 2023/2413 del Parlamento Europeo y del Consejo*, 2023

³⁶ Ver *Análisis de la normativa sobre los biocombustibles*

³⁷ Chambres d'Agricultures France, *Les avantages des couverts végétaux*, 2025

Could They Be Produced in Spain?

- No There are no economic incentives for companies or farmers: these crops are not profitable considering the investment and risks, and would require a change in the agricultural model.
- Implementation of crops on degraded land is still in a development and learning phase to determine the best management practices. Trials with camelina and carinata have faced limitations, with some years yielding no harvest at all.³⁷
- Currently, industry professionals do not see the potential to scale up production in Spain.

Intermediate crops and crops on degraded land used for biofuels would need to be imported from other countries. This raises questions about energy independence and continues the extraction of external resources, reducing control over the real sustainability of the feedstock.

Potential Negative Impacts on Soil and Main Crops

- Increased use of inputs (fertilizers and pesticides), with associated negative effects, especially if biomass production is prioritized.
- Higher water consumption, creating competition with other crops and local water resources.
- Impacts on main crops: delayed planting, nutrient depletion, and possible yield reductions.

Legal Definition and Limitations

- The Renewable Energy Directive defines intermediate crops as: “catch crops and cover crops that are grown in areas where due to a short vegetation period the production of food and feed crops is limited to one harvest and provided their use does not trigger demand for additional land, and provided the soil organic matter content is maintained”
- This definition does not prevent all risks: it does not address the incentivization of inputs use, nutrient depletion (NPK), impacts on main crops, or consequences at production sites.

³⁷ [Cooperativas agroalimentarias, El cultivo de la camelina y la carinata impulsan la diversificación sostenible en varias zonas de España, 2024](#)

Social Impacts of Crop-Based Biofuels

Sugarcane cultivation has had **consequences for local and indigenous communities**. Communal lands are pressured or encroached upon by plantations, and the health of nearby populations is compromised by burning, dust, pesticides, and contamination of water sources. Economic benefits are usually concentrated in large industrial estates with better access to global markets rather than small producers.

At COP30, the International Indigenous Peoples Forum on Climate Change (IIPFCC) denounced that decarbonization plans, including the expansion of biofuels, are reproducing forms of “green colonialism” in indigenous communities.³⁸ The increasing demand for biofuels threatens their territories and biodiversity.

Waste-based biofuels

Second-generation biofuels, made from waste, can be a more sustainable option if certain conditions are met, but they also carry risks. Current and future demand exceeds the availability of sustainable and local feedstocks, which opens the door to fraud, compromises energy independence, and creates competition with other sectors. Therefore, these fuels should be reserved for transport modes that are difficult to electrify, such as maritime and aviation, while prioritizing electrification in road transport.

Used Cooking Oil: A Risk to Spanish Energy Security and the Environment

Used cooking oil (UCO) is largely imported from three countries: China, Malaysia, and Indonesia. Ensuring the sustainability of this feedstock is critical, as it accounts for 28% of biofuels. Demand is expected to increase as sustainable aviation fuel (SAF) targets rise.³⁹

This poses a challenge because neither Spain nor the EU have sufficient supply capacity to meet this demand. A T&E report on UCO highlights that European demand for biofuels

³⁸ [AmbiciónCOP, Desde la Amazonía hasta las salas de negociación, 2025](#)

³⁹ [ECODES, El futuro verde de la aviación en España, 2024](#)

already exceeds domestic supply and production capacity. Europe consumes four times more UCO than it can produce and collect within its territory, and eight times more than it actually manages to collect.⁴¹

According to the Ministry for the Ecological Transition and the Demographic Challenge, Spain consumes around 850,000 tonnes of oil annually.⁴² It is estimated that about 135,000 tonnes of UCO are recycled each year, mostly coming from the hospitality sector.⁴³ One of the NECP measures (Measure 1.33) aims to improve UCO collection. However, it is important to note that only a small fraction of UCO generated is collected, especially at the household level, where collection rates are around 5%.⁴⁴

This presents a significant challenge, which becomes even more critical when focusing on a single transport mode. Producing one liter of HEFA, the biofuel suitable for aviation, requires approximately 2 liters of UCO.⁴⁵ Therefore, to meet the 2% sustainable aviation fuel (SAF) target under ReFuelEU Aviation, more than 240,000 tonnes of UCO were needed in 2025.⁴⁶ This means that even if all available UCO were dedicated exclusively to HEFA production, national demand could not be met.

This calculation only considers aviation demand; however, most UCO currently collected is used to produce biodiesel and HVO.⁴⁷ These biofuels serve as alternatives to conventional diesel, primarily for road transport, but also in heating systems and industry. Consequently, UCO continues to be used for producing fuels for land transport, further increasing demand for this feedstock and creating competition among sectors seeking decarbonization.

This dependence increases the risk of fraud and raises questions about the traceability of biofuels, as highlighted in Transport & Environment reports on the lack of transparency for UCO sourced from Asia.⁴⁸ For example, Malaysia claims to collect only one-third of what it reports exporting, raising suspicions of fraud. China, which exports around three-quarters of Europe's UCO, is increasing its own biofuel demand and does not allow inspections on its territory.

⁴¹ T&E, UCO (Unknown Cooking Oil): High hopes on limited and suspicious materials, 2024

⁴² Ministerio de la Transición Ecológica y el Reto Demográfico, Aceites de cocina usados, 2025

⁴³ Reciclaje, Las cifras del reciclaje de aceite usado, 2024

⁴⁴ Repsol, Dale una vida extra al aceite, 2023

⁴⁵ ICCT, The cost of supporting alternative jet fuels in the European Union, 2019

⁴⁶ ECODES, Análisis del SAF en España, 2025

⁴⁷ Ver ¿En que se usan los biocombustibles?

⁴⁸ T&E, UCO (Unknown Cooking Oil): High hopes on limited and suspicious materials, 2024

As previously noted, using virgin palm oil has severe environmental consequences, being a crop with high land-use change risk.⁴⁹ Relying on UCO for biofuel production while facing actual supply constraints and subsequent issues like fraud or scarcity threatens the true sustainability of these biofuels.

Verification systems exist to ensure the sustainability of feedstocks, but flaws and weaknesses have been identified in systems accepted by the EU, leading some countries to adopt stricter criteria for importing biofuels.⁵⁰

Animal fats: Competition between sectors for limited feedstock

On the other hand, the use of animal fats has also grown significantly recently, with a 60% increase between 2021 and 2022,⁵¹ increasing dependence on other countries for this feedstock. Animal fats were previously used in other industries, such as oleochemistry and pet food, which threatens the supply of this material in these sectors and incentivizes its replacement, most likely with palm oil.⁵² The classification of animal fats in the biofuel market is uncertain, with potential fraud in categorizing types 1, 2, and 3. This implies that the CO₂ emissions from animal fats can be up to 1.7 times higher than those from conventional diesel.⁵³

Supply capacity is limited in this case as well, and it is necessary to ensure that this limitation does not lead to the use of unsustainable feedstocks. For this reason, strengthening and improving sustainability verification systems should be a key priority in biofuel development.

⁴⁹ Ver [Riesgos ambientales y socioeconómicos](#)

⁵⁰ Ver [Sistemas de verificación de sostenibilidad](#)

⁵¹ T&E, [Pigs do Fly](#), 2023

⁵² ECODES, [Biocombustibles: La batalla por la basura](#), 2025

Sustainability Verification Systems

EU-Accepted Verification Systems

Voluntary verification systems and national certification schemes in EU countries are designed to ensure that biofuels, bioliquids, biomass fuels, renewable hydrogen and their derivatives (RFNBOs), and recycled carbon fuels (RCFs) are produced sustainably, meeting EU sustainability criteria and specific methodologies for RFNBOs and RCFs. To count toward RED compliance targets, biofuels must be certified under a voluntary scheme recognized by the EU.⁵⁴

For biofuels, these systems verify that:

- Feedstock production does not occur on high-biodiversity lands or soils with high carbon content converted for cultivation.
- Renewable fuel production achieves sufficient greenhouse gas emission savings.
- Some systems also consider additional environmental and social sustainability criteria, such as protection of soil, water, air, and social aspects.

Certification requires an external auditor to verify the entire production chain, from feedstock origin and energy input to the fuel producer or distributor.

⁵³ [T&E, Pigs do Fly, 2023](#)

⁵⁴ [European Commission, Voluntary Schemes, 2025](#)

To be accepted, a verification system must be able to provide information about producers and ensure that:

- Producers comply with RED sustainability criteria.
- Sustainability information is traceable to the feedstock origin.
- Sufficient documentation exists to confirm the accuracy of information.
- Companies undergo audits before participation and regular retroactive audits.
- Auditors have the general and specific competencies required to evaluate the scheme criteria.

Recognition granted by the European Commission typically has a legal validity of five years. To date, 18 verification systems have been approved.⁵⁵ with ISCC EU and REDCert being the only schemes that include waste within their scope.⁵⁶

In Spain, Order TEC/1420/2018 establishes the detailed aspects of the National Sustainability Verification System⁵⁷ and the issuance of sustainability verification reports. Following this order, a list of sustainability verification entities is published, providing information about the verification systems used in Spain to ensure biofuel sustainability.⁵⁸

⁵⁵ [European Commission, Voluntary Schemes, 2025](#)

⁵⁶ [Biocirc, La UE evalúa la posible suspensión de la certificación ISCC para biocombustibles producidos a partir de residuos, 2025](#)

⁵⁷ [Ministerio de la Transición Ecológica y del Reto Demográfico, Sistema Nacional de Verificación de la Sostenibilidad, 2025](#)

⁵⁸ [Ministerio de la Transición Ecológica y del Reto Demográfico, Listado de EV de la Sostenibilidad, a efectos de la Orden TEC/1420/2018, de 27 de diciembre, 2018](#)

Uncertainty About Verification Reliability

These systems are important: both the EU and Spain must have the capacity to control whether biofuels sold within their territories meet sustainability and emission reduction criteria, ensuring they genuinely contribute to renewable energy and transport decarbonization goals.

However, several countries and biofuel suppliers have criticized the flaws and limitations of verification systems and controls. Multiple indicators suggest potential fraud, particularly with used cooking oil (UCO). A 2024 T&E study,⁵⁹ showed that only 9% of ISCC-certified collection points in China, Malaysia, and Indonesia were verified through audits of a sample of their feedstock origins.

More recently, a fraud case involving 288 million liters of HVO sold in Germany again questioned the effectiveness of EU-validated verification systems.⁶⁰ The companies involved were registered and verified under ISCC EU, which was almost suspended earlier this year due to another suspected fraud case.⁶¹

Germany and France have denounced unfair competition caused by the large-scale arrival of potentially fraudulent UCO.⁶² In 2024, together with the Netherlands, they informed the Commission that stricter controls were needed at biofuel production sites regardless of location and that certification of foreign biofuels as sustainable should be rejected if access to facilities is denied.⁶³ This position is also supported by the European Biodiesel Board, which published recommendations to the European Commission,⁶⁴ in February to improve traceability and sustainability verification. They argue that the rules applied to EU producers should be applied equally in feedstock-exporting countries.

⁵⁹ Ver [Riesgos ambientales y socioeconómicos](#)

⁶⁰ T&E, [Used Cooking Oil: The certified Unknown](#), 2024

⁶¹ [Panorama3, Betrug mit Biotreibstoffen: "Besser als Drogenhandel"](#), 2025

⁶² [Biocirc, La UE evalúa la posible suspensión de la certificación ISCC para biocombustibles producidos a partir de residuos](#), 2025

⁶³ [La France Agricole, « Des huiles frauduleuses plombent le marché des biocarburants »](#), 2024

⁶⁴ [Reuters, France, Germany urge tougher EU checks on biofuel imports in fraud probe](#), 2024

In 2023, Germany raised fraud allegations regarding biodiesel imported from China, prompting a European Commission investigation. The information collected did not confirm fraud, but the Commission acknowledged weaknesses in auditing practices. A working group with several member states has been created to integrate additional measures to ensure the sustainability of feedstocks from outside the EU.⁶⁵ The final text is expected in 2026, though it remains to be seen whether these measures will be sufficient to guarantee that biofuels truly meet sustainability criteria.



⁶⁵ [European Biodiesel Board, Time to act on biofuels fraud: EBB proposes ambitious reform of RED verification, 2025](#)

⁶⁶ [European Commission, Commission concludes examination of potential Chinese biofuel imports fraud, 2025](#)

Data on Biofuels in Spain

The Ministry for the Ecological Transition and the Demographic Challenge published statistics on biofuels for 2024 in October 2025. These data allow analysis of sales trends, the origin of feedstocks and biofuels, and the types of feedstocks used in biofuel production.

General Trends

Between 2023 and 2024, biofuel sales fell slightly. However, sales of HEFA, the only biofuel suitable for aviation, increased by 17,531.43%.

In Figure 1, the evolution of diesel, gasoline, and biofuel sales is compared. Sales remained relatively stable, with the exception of two declines in diesel sales in 2012 and 2020. Over the past 15 years, biofuels have never accounted for more than 9% of total fuel sales.

Trends in sales of diesel, petrol, and biofuels (m3)

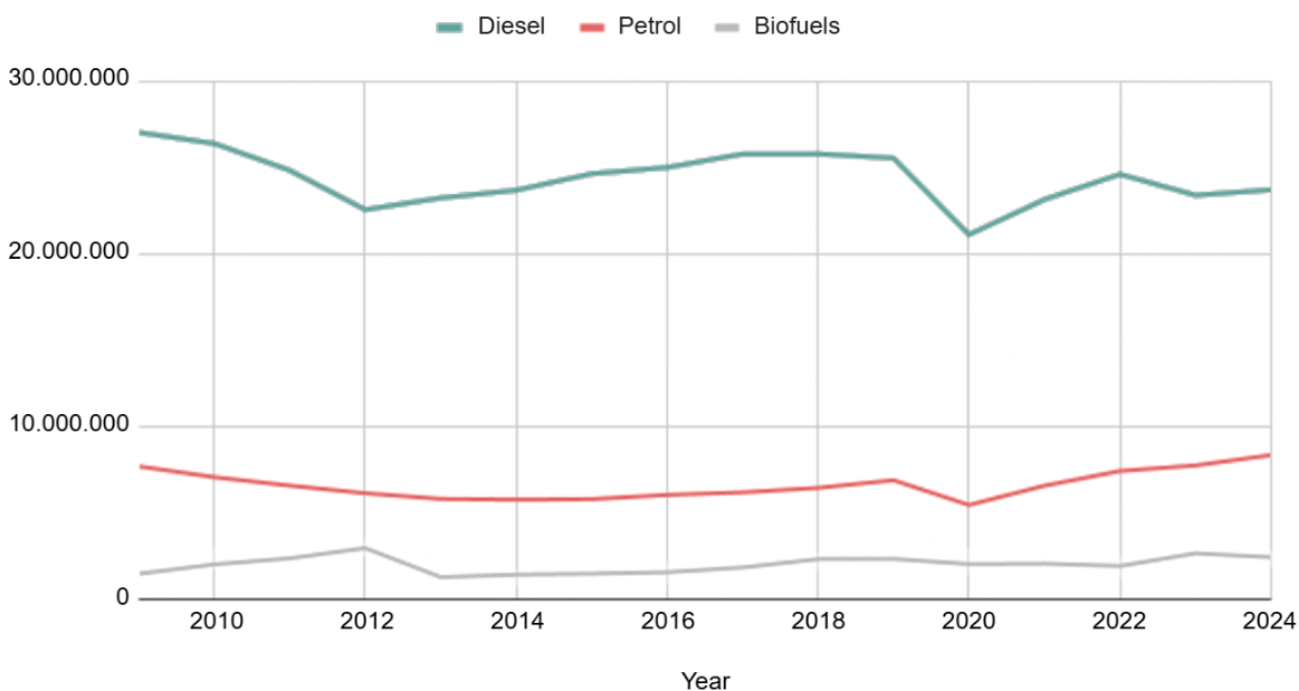


Figure 1. Comparison of diesel, petrol and biofuel sales between 2009 and 2024.

The evolution of sales by type of biofuel shows a stable trend for HVO and bioethanol, a slight decline in biodiesel, which nevertheless remains the best-selling biofuel, and a sharp increase in HEFA sales. No direct correlation is observed between the trends in fossil fuel sales and those of biofuels, so it cannot be stated that there is a direct impact between the two. Fuel sales appear to respond mainly to other external factors, such as transport demand (as reflected by the decline in 2020 during COVID), economic conditions, energy prices, or regulatory changes.

Type of biofuel	Volume sold in 2023 (m3)	Variation 2023 (compared to 2022)	Volume sold in 2024 (m3)	Variation 2024 (compared to 2023)
Biodiesel	1.449.416	-0,09%	1.216.345	-16%
HVO, co-processed HVO and maritime HVO ⁶⁷	858.184	283%	830.699	-3%
HEFA	335	495%	58.990	17531%
Bioethanol	307.545	37%	304.260	-1%

Table 5. *Evolution of biofuel sales between 2023 and 2024.*

Sales are relatively stable, with only very slight decreases for biodiesel, HVO, and bioethanol (following increases in 2023 for the latter two). What is particularly notable is the very large increase in HEFA, by 17,531%, following an already significant rise in 2023.

⁶⁷ Note: In 2024, the categories co-processed HVO and maritime HVO were created to differentiate HVO that can be used without blending. In 2023 and earlier, there was only the category 'HVO' grouping all types of HVO

What Feedstocks Are Used to Produce Biofuels?

The use of feedstocks, as well as their accounting toward biofuel sales and consumption targets, is regulated by the Renewable Energy Directive (RED III).⁶⁸ Some feedstocks are prohibited, others are limited, and some count double toward targets. Feedstocks are classified in this way to encourage the use of those considered more sustainable and to limit the use of potentially harmful feedstocks.

Feedstocks used in the main biofuels used in Spain

Biodiesel	Type of feedstock (%)
UCO	31,60%
POME	31,43%
Sulfur-contaminated soap pastes	10,55%
Rapeseed oil	8,68%
EFB	6,65%
Soybeans	5,81%
Others	5,27%

Table 6. *Type of feedstock used for biodiesel.*

HVO, co-processed HVO and maritime HVO ⁶⁹	Type of feedstock (%)
FFBs	37,15%
UCO	26,37%
Grasas animales cat.3	14,36%
POME	11,46%
Otros	6,46%

Table 7. *Type of feedstock used for HVO, co-processed HVO and maritime HVO.*

⁶⁸ Ver [Análisis de la normativa sobre los biocombustibles](#)

⁶⁹ Note: In 2024, the categories co-processed HVO and maritime HVO were created to differentiate HVO that can be used without blending. In 2023 and earlier, there was only the category 'HVO' grouping all types of HVO.

HEFA	Type of feedstock (%)
UCO	100%

Table 8. *Type of feedstock used for HEFA.*

Bioethanol	Type of feedstock (%)
Corn	82,41%
Sugarcane	16,06%
Wheat	0,96%
Others	0,56%

Table 9. *Type of feedstock used for bioethanol.*

UCO is an essential feedstock for most biofuels sold in Spain, which could lead to increased demand if biofuel sales grow. Additionally, FFBs (Fresh Fruit Bunches), a significant part of the feedstock for HVO, have been banned since 2025, which will lead to changes in the composition of this biofuel.

Crop-based biofuels

In 2024, **34.84% of biofuels were made from crops**, a figure stable compared to 2023, when they accounted for 34.39%.⁷⁰ In 2024, 844,381.24 m³ of crop-based biofuels were sold, representing 2.45% of the total fuel volume (including fossil fuels) sold that year.

All feedstocks used in 2024 and classified as “first-generation” by the CNMC⁷¹ are counted as crops.

⁷⁰ Note: Our last report on biofuels highlighted that 28.5% of biofuels were made from crops, because only the main crops (maize, palm oil and FFBs) were counted

⁷¹ [CNMC, Resolución por la que se determinan las materias primas empleadas en la producción de los biocarburantes a efectos del cumplimiento de los objetivos de venta y consumo de biocarburantes con fines de transporte, 2020](#)

1st generation feedstocks

- Canola oil
- Rapeseed oil
- Sunflower oil
- Palm oil
- Soybean oil
- FFBs (Fresh Fruit Bunches)
- PFAD (Palm Fatty Acid Distillate)
- Sugarcane
- Barley
- Corn
- Wheat

Table 10. List of crops used for biofuels in 2024.

The Case of Palm Oil and Soy

The use of palm oil for biofuel production has been prohibited since 2025 under Delegated Regulation (EU) 2019/807⁷² and the Resolution of 29 September 2021^{73,74}. The use of **PFAD (Palm Fatty Acid Distillate)**, a by-product of palm oil refining, and **FFBs (Fresh Fruit Bunches)**, the fresh fruit bunches harvested from palm plantations and the main feedstock for palm oil, was also banned.

	% of biofuels in 2023	% of biofuels in 2024
Feedstock prohibited from 2025 (palm oil, PFAD, FFBs)	20,91%	13,46%
Non-prohibited feedstock (POME, EFB)	28,25%	23,43%
Total	49,16%	36,89%

Table 11. Share of biofuels produced from palm-based feedstocks.

⁷² Boletín Oficial de Estado, Reglamento Delegado (UE) 2019/807 de la Comisión, 2019
⁷³ Boletín Oficial de Estado, Resolución del 29 de septiembre de 2021, 2021
⁷⁴ Ver [Análisis de la normativa sobre los biocombustibles](#)

We observe that, in anticipation of the 2025 ban, sales of biofuels made from palm oil, PFAD, and FFBs have already decreased. Sales of biofuels made from POME (Palm Oil Mill Effluent) and EFB (Empty Fruit Bunches), which have questionable sustainability due to fraud risks, did not increase.⁷⁵ Since these are by-products of palm oil production, it is important that their demand does not rise, as this would increase palm oil production, even though its use for biofuels is prohibited.

However, we note an increase in sales of biofuels made from soybean oil. In 2024, 3.12% of biofuels were made from soybean oil, a 595% increase compared to 2023, when it represented less than 1%. This increase can be explained by the ban on palm oil and some of its by-products and could continue into 2025. Soybean oil production has negative impacts on the environment, biodiversity, and local populations, so a rise in its use for biofuels is concerning. However, the European Commission has reviewed which crops are considered high-risk for indirect land-use change (ILUC), including soybean.⁷⁷ for the first time. If this change is validated, soybean oil will no longer be permitted for biofuel production.

Since the proportion of biofuels produced from feedstocks banned from 2025 was still significant in 2024 (13.46%), safeguards are needed to ensure that the feedstocks replacing palm oil, PFAD, and FFBs are not “a cure worse than the disease.”

Waste-Based Biofuels: UCO and Animal Fats

Used cooking oil (UCO) is the feedstock used to produce 100% of HEFA, maritime biodiesel, and maritime HVO, and it is the main feedstock for HVO (excluding co-processed HVO and maritime HVO) and biopropane.

In 2024, 27.65% of certified biofuels sold were produced using UCO, representing 669,826.24 m³.

⁷⁵ T&E, [Palm Oil in disguise?, 2025](#)

⁷⁶ Ver [Riesgos ambientales y socioeconómicos](#)

⁷⁷ [European Commission, Review of Indirect Land-Use Change \(ILUC\) delegated act, 2026](#)

	Amount of biofuels made from UCO (m³)	% of all biofuels
2023	681.710	25,74%
2024	669.826	27,65%

Table 12. *Share of biofuels produced from used cooking oil (UCO).*

In 2024, a smaller amount of used cooking oil (UCO) was used to produce biofuels than in 2023, although the share of biofuels made from this feedstock increased. This can be explained by the rise in sales of biofuels produced exclusively from used cooking oil (UCO), such as HEFA.

Animal fats accounted for 5% of biofuels in 2024, that is, 121,189 m³. The vast majority were category 3 animal fats, while category 1 animal fats represented only 0.01% of the feedstocks used for biodiesel.

Considering the sales and consumption obligations set out in legislation,⁷⁸ it can be assumed that the demand for used cooking oil (UCO), the exclusive feedstock for HEFA and for two of the three registered maritime biofuels, will continue to rise.

The amount of used cooking oil (UCO) used in 2024 (669,826 m³) corresponds to approximately 616,140 tonnes. It is estimated that Spain could supply between 138,000 and 322,000,⁸⁰ tonnes, representing between 20% and 48% of the used cooking oil (UCO) used to produce biofuels in 2024. Importing this feedstock creates a risk to energy independence.

⁷⁸ Ver [Análisis de la normativa](#)

⁷⁹ [Ministerio para la Transición Ecológica y el Reto Demográfico, Aceites de cocina usados, 2025](#)

⁸⁰ [Repsol, Dale una vida extra al aceite, 2023](#)

Where do biofuels and the feedstocks used to produce them come from?

Statistics allow us to know the origin of the feedstocks used to produce biofuels and where they are manufactured.

Origin of the feedstocks

Most feedstocks come from abroad. In 2024, only 15% was produced in Spain, although this is an increase compared to 2023, when it was only 9%.

	2009	2010	2011	2012	2013	2014	2015	2016
% Feedstock sourced from Spain	16%	12%	9%	6%	4%	6%	9%	3%
	2017	2018	2019	2020	2021	2022	2023	2024
% Feedstock sourced from Spain	4%	3%	6%	10%	12%	14%	9%	15%

Table 13. *Proportion of feedstock sourced from Spain between 2009 and 2024.*

In Figure 2, a slight increase in the amount of feedstock originating from Spain can be observed from 2019 onwards, but its contribution remains very small compared to the total used to produce biofuels.

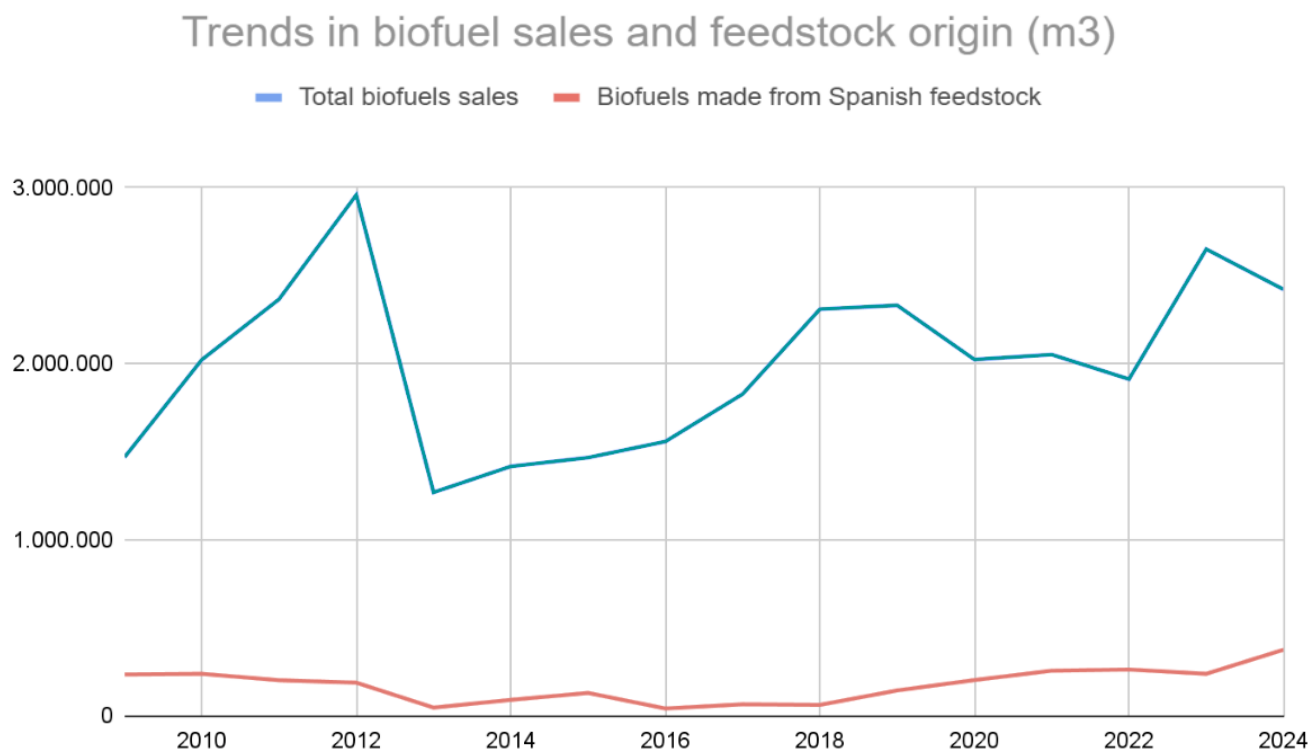


Figure 2. *Evolution of biofuel sales and the quantity of feedstock originating from Spain.*

This analysis of biofuel statistics reveals that the share of feedstock originating from Spain has increased only slightly over the past 15 years. It has not been possible to increase feedstock production in Spain in a way that would significantly raise the share of Spanish-sourced feedstock, which still accounts for only 15% of biofuel sales.

The analysis of the best-selling biofuels (biodiesel, HVO, HEFA, and bioethanol) shows a high dependence on feedstocks of external origin, mainly from outside the EU.

Biodiesel	Origin of feedstocks in 2022 (%)	Origin of feedstocks in 2023 (%)	Origin of feedstocks in 2024 (%)
Indonesia	17,34%	34,82%	32,39%
China	44,09%	28,87%	14,53%
EU (Spain excluded)	5,43%	6,78%	14,00%
Malaysia	9,57%	11,57%	10,65%
Spain	9,02%	5,01%	8,54%
Others	14,55%	12,95%	19,89%

Table 14. *Origin of biodiesel feedstocks.*

Feedstock production for biodiesel is highly fragmented. In 2024, it was produced in more than 70 countries, many contributing less than 1% of the feedstock used for biofuels sold in Spain. Seventy-seven percent of all feedstock originated from outside the European Union.

HVO, co-processed HVO, maritime HVO⁸¹	Origin of feedstocks in 2022 (%)	Origin of feedstocks in 2023 (%)	Origin of feedstocks in 2024 (%)
Indonesia	68,73%	70,05%	50,26%
Malaysia	7,28%	10,22%	13,63%
Spain	20,50%	8,69%	23,04%
Others	3,49%	11,04%	13,06%

Table 15. *Origin of HVO feedstocks.*

Half of all HVO comes from Indonesia (58% of co-processed HVO), and less than a quarter comes from Spain, raising serious questions about the availability of feedstock in the country and the risk it poses to energy independence when relying on this decarbonization option for road transport.

⁸¹ Note: In 2024, the categories co-processed HVO and maritime HVO were created to differentiate HVO that can be used without blending. In 2023 and earlier, there was only the category 'HVO' grouping all types of HVO.

HEFA	Origin of feedstocks in 2022 (%)	Origin of feedstocks in 2023 (%)	Origin of feedstocks in 2024 (%)
China			47,97%
Malaysia			27,68%
Indonesia		36,83%	2,83%
Spain	97,83%	63,11%	16,29%
Others	2,17%	0,06%	5,23%

Table 16. *Origin of HEFA feedstocks.*

As HEFA production and sales have increased, the share of feedstock originating from Spain has decreased, falling from 98% in 2022 to 16% in 2024, with almost half coming from China. There are fraud risks associated with the import of used cooking oil,⁸² especially from countries where the EU and certification bodies cannot conduct verifications, such as China.⁸³

Bioethanol	Origin of feedstocks in 2022 (%)	Origin of feedstocks in 2023 (%)	Origin of feedstocks in 2024 (%)
Ukraine	40,08%	28,30%	35,68%
Brazil	6,51%	22,16%	18,46%
USA		6,54%	14,98%
Spain	37,71%	28,32%	21,40%
Others	15,70%	14,68%	9,48%

Table 17. *Origin of bioethanol feedstocks.*

Brazil, the United States, and Ukraine are among the world's five largest exporters of agricultural products,⁸⁴ which explains why a significant share of the feedstocks used for bioethanol production comes from these countries. These countries predominantly follow an intensive agriculture model, associated with negative impacts such as soil degradation and depletion, biodiversity loss, and increased pressure on water resources.⁸⁵

⁸² HEFA is made from 100% used cooking oil (UCO).

⁸³ Ver [Riesgos ambientales y socioeconómicos](#)

⁸⁴ [FAO, Major Commodities Exporters, 2022](#)

⁸⁵ Ver [Riesgos ambientales y socioeconómicos](#)

Origin of the biofuels

In 2024, 58% of biofuels originated from Spain, an increase compared to 2023, when this share was 48%. However, looking at each type of biofuel, there are significant discrepancies, with 85% of HVO produced in Spain, but only 39% of biodiesel.

Type of biofuel	2022	2023	2024
Biodiesel	25,26%	25,01%	39,37%
HVO, co-processed HVO, maritime HVO	91,74%	73,14%	85%
HEFA	100%	100%	45,19%
Bioethanol	97,01%	80,63%	56,89%

Table 18. *Share of biofuels made in Spain.*

Although the share of biofuels originating from Spain has increased, looking at the main biofuels we see a significant drop in the proportion of HEFA produced in Spain, falling from 100% in previous years to 45% in 2024. In its SAF Analysis in Spain,⁸⁶ ECODES highlights that the sustainable aviation fuel (SAF) targets under the ReFuelEU Aviation Regulation⁸⁷ will drive an increase in HEFA consumption and production, reaching over 1 million tonnes by 2035. Spain’s capacity to produce used cooking oil (UCO) is insufficient, and imports will increase.

The industry promotes biofuels with the argument that they improve the country’s energy independence. However, analyzing the origin of the feedstocks and the place of biofuel production shows that this argument is inconsistent. Local and sustainable feedstock availability does not increase as demand rises, and dependence on other countries grows. Furthermore, imported products are harder to control, with risks of fraud for waste materials and risks associated with intensive agriculture for crops.

An independent analysis of Spain’s supply capacity with local and sustainable feedstocks is needed. Biofuel demand should adapt to feedstock availability, not the other way around.

⁸⁶ ECODES, *Análisis del SAF en España, 2025*

⁸⁷ *Boletín Oficial de Estado, Reglamento (UE) 2023/2405 del Parlamento Europeo y del Consejo, 2023*

What are biofuels used for?

Different types of biofuels can be used in various modes of transport or, in the case of biopropane, as an energy source to generate heat, electricity, cook, and heat water in homes, businesses, and industries.

Biodiesel, HVO, and co-processed HVO can be used in road transport in diesel vehicles, while bioethanol and biogasoline are used in conventional gasoline engines. Here they have been counted as biofuels used in road transport, although some may be allocated to other non-transport uses..

Additionally, the statistics published this year provide information on the amount of biofuels used in maritime transport through the creation of new categories: maritime biodiesel, maritime biomethane, and maritime HVO.

In the case of aviation, only HEFA, the sustainable aviation fuel produced from used cooking oil (UCO), is compatible.

Types of biofuels	Amount according to usage (m3)	Proportion according to usage (%)
Biofuels used in road transport	2.351.273	97,07%
Biofuels used in aviation	58.990	2,43%
Biofuels used in maritime transport	2.787	0,11%
Biofuels used in other industries	9.259	0,38%

Table 19. Sectoral distribution of biofuel use

Almost all biofuels are being used for road transport. Given the negative impacts,⁸⁸ of biofuels and the scarcity of feedstocks originating from Spain,⁸⁹ of biofuels and the scarcity of feedstocks originating from Spain

⁸⁸ Ver [Riesgos ambientales y socioeconómicos de los biocombustibles](#)

⁸⁹ Ver [¿De dónde proceden los biocombustibles?](#)

Biofuels production projects

Spain is currently experiencing a phase of accelerated industrial expansion in the field of advanced biofuels and sustainable aviation fuel (SAF), positioning this sector as one of the central pillars of its energy transition strategy in hard-to-electrify sectors such as aviation, maritime transport, and heavy road transport. Investment is primarily being led by major traditional energy companies that are converting existing refining assets to adapt them for the production of second-generation renewable fuels, made from waste feedstocks such as used cooking oil (UCO), animal fats, and agri-food by-products.

The total volume of investment announced in projects directly related to biofuels and SAF in Spain since 2023 exceeds, in aggregate terms, €3–4 billion. These investments include new production plants, capacity expansions at existing refineries, and the development of associated logistics infrastructure. In terms of capacity, declared corporate targets point to a potential production of between 4.5 and 5.5 million tonnes per year by 2030, if all announced projects are realized. However, currently operational capacity remains below these projected figures, reflecting the typical gap between strategic announcements and effective industrial deployment.

Project	Company	Type of biofuel	Estimated production capacity (tonnes/year)	State
Cartagena plant ⁹⁰ (Cartagena, Murcia)	Repsol	Second generation biofuels	250,000	Functioning
Puertollano plant ⁹¹ (Puertollano, Ciudad Real)	Repsol	Second generation biofuels	250,000	Conversion of the plant for biofuel production
La Rábida plant ⁹² (Palos de la Frontera, Huelva)	Moeve/ Bio-oils	SAF and hidrobiodiesel	500,000	In construction

⁹⁰ Repsol, Repsol ha comenzado la producción a gran escala de combustibles renovables en Cartagena, la primera planta de la Península Ibérica, 2024

⁹¹ Repsol, La planta de combustibles 100% renovables de Puertollano alcanza varios hitos de su construcción, 2025

⁹² Bio-oils, Planta de Huelva, 2026

Project	Company	Type of biofuel	Estimated production capacity (tonnes/year)	State
Berantevilla ⁹³ (Álava, La Rioja)	Gunvor	Biodiesel	40,000	Functioning
Planta Huelva ⁹⁴ (Huelva)	Gunvor	Biodiesel	110,000	Conversion of the plant for bio-fuel production
Teruel (Teruel)	Solarig	SAF	48,000	In development
Castellón ⁹⁵ (Castellón)	BP	SAF and co-processed biofuels	~330,000	Stopped

Table 20. *Biofuel and SAF projects in Spain.*⁹⁶

The development of the sector presents several relevant structural characteristic:

- **Predominance of advanced biofuels (2G):** Most projects focus on producing biofuels from waste. However, biofuels made from food and feed crops are still being sold.
- **Strong focus on SAF:** Spain is positioning itself as one of the emerging hubs for sustainable aviation fuel production in Southern Europe. Nevertheless, both regulations and the automotive industry continue to rely on biofuels as a decarbonization pathway for cars.
- **Dependence on imported raw materials:** Although production is partly domestic, a substantial portion of the waste used (especially UCO) comes from abroad, raising questions about traceability, actual sustainability, and strategic autonomy.

Overall, Spain is consolidating itself as one of the main European centers for advanced biofuel and SAF production, leveraging its existing refining infrastructure and a European regulatory framework that promotes mandatory renewable fuel use in aviation and transport. However, the effective realization of the announced capacities, along with the lack of sufficient local and sustainable raw materials, casts doubt on the relevance of this model for decarbonizing transport.

⁹³ Gunvor, Gunvor Biofuel Berantevilla, 2026

⁹⁴ Gunvor, Gunvor Biofuel Berantevilla, 2026

⁹⁵ Castellón Diario, BP aumentará su producción de biocombustibles en Castellón a 330.000 toneladas, 2025

⁹⁶ Para más información, ver *Escenario de los biocombustibles en España*

Policy recommendations

1

Comprehensive Analysis of Production Capacity and Sustainability:

Spain should develop, in collaboration with relevant stakeholders, an independent analysis of the real potential, costs, and impacts of biofuel projects. This study should include, at a minimum:

- Availability of local raw materials.
- Capacity for collection of waste and residues (such as UCO).
- Raw material requirements to meet established targets.
- Social and economic impacts of projects and sector investments.
- Market distortion effects.
- Impacts on biodiversity and ecosystem services.
- Limits and risks associated with biofuels.
- Actual greenhouse gas emission reductions, taking into account the full life cycle.

This analysis should guide the implementation of RED III in Spain and the adaptation of regulations to the local sustainable production capacities.

2

Prioritization of Biofuel Use in Hard-to-Electrify Sectors:

From 2026 onwards, biofuel consumption and sales targets should be allocated by type of transport:

- **Road transport:**

Minimize biofuel use as much as possible, aiming for 0 %.

- **Maritime and aviation transport:**

RNFBOs (Renewable Fuels of Non-Biological Origin) should be prioritized, although biofuels made from local and sustainable raw materials can serve as a transitional solution.

Advanced biofuels and RNFBOs should be reserved for these hard-to-electrify sectors, while simultaneously promoting electrification and energy efficiency in sectors that can be electrified, such as road transport.

3

Establishment of Clear Limits for High-Risk Feedstocks:

The phase-out of palm oil should be maintained, and a resolution should also classify soy as a high-risk biomass, with its elimination no later than 2027. Other crops with similar risks should be progressively phased out before 2030.

Usage limits should be established for food and feed crops in the production of biofuels and biogas, ensuring their gradual reduction until complete elimination by 2030.

4

Promotion of RNFBOs under RED III:

It is necessary to raise the national target for RNFBOs to 2 % (with double counting) and make it binding, to ensure that RED III targets are not met exclusively with Annex IX Part A biofuels. The target for advanced biofuels should not be increased.

5

Strengthening Sustainability Verification and Combating Fraud:

Traceability, control, and certification systems for feedstocks should be improved to ensure they meet sustainability criteria.

It is important to urge the European Commission to enhance monitoring against fraud in the imports of feedstocks for advanced biofuels, ensuring compliance with Article 29 of RED III on sustainability and emission savings.

Current system weaknesses need to be identified, and robust mechanisms established to certify the provenance of feedstocks and their origin as waste.

Conclusion

- The analysis presented throughout this report highlights that biofuels are playing an increasingly significant role in European and Spanish energy and climate policies, particularly in the context of transposing the Renewable Energy Directive and the targets set in the 2023–2030 National Integrated Energy and Climate Plan (PNIEC). However, the available evidence shows that their development in Spain faces structural limitations that call into question their ability to contribute effectively and sustainably to transport decarbonization.
- On one hand, environmental and socio-economic risks associated with biofuels persist, both when produced from crops, with impacts linked to indirect land-use change (ILUC), deforestation, and pressures on food prices, and when based on waste. In the latter case, the actual availability of feedstocks such as used cooking oil is limited and far below growing demand, which increases competition for use, raises incentives for fraud, and questions the integrity of sustainability verification systems currently accepted by the European Union.
- On the other hand, the analyzed data show a growing dependence on imported feedstocks and biofuels, to the detriment of domestic production. This trend weakens the argument that biofuels strengthen Spain's energy independence and security and shifts a significant portion of the environmental and social impacts associated with their production outside national and European territory. Additionally, the rapid expansion of certain biofuels, such as HEFA, intensifies pressure on scarce resources and accentuates system vulnerabilities.

Glossary

Biogasoline:

Synthetic gasoline produced from biomass, organic waste, or biogas, which can be blended with conventional gasoline or used directly in internal combustion engines. Its production reduces dependence on fossil fuels and lowers the carbon footprint of transport.

Biomethanol:

Alcohol produced from biomass, organic waste, or biogas, usable as fuel in internal combustion engines or as a component for producing other liquid biofuels. Considered an advanced biofuel if derived from waste or sustainable feedstocks.

Biopropane:

Renewable propane obtained from biomass or organic waste, which can replace fossil propane in heating, transport, or industrial processes, significantly reducing greenhouse gas emissions.

Bioethanol:

Alcohol produced from biomass, crops, or organic waste through fermentation, used as an additive or substitute for gasoline in internal combustion engines.

Biofuels:

Liquid or gaseous fuels produced from organic matter of plant or animal origin, such as crops, plant residues, or organic waste, through physical or chemical processes.

Biodiesel:

Liquid fuel produced from vegetable oils, animal fats, or organic waste through a transesterification process.

Camelina:

Plant in the crucifer family, similar to rapeseed, with oil-rich seeds used for various purposes, including biofuel production.

Carinata or Brassica carinata:

Winter oilseed crop, non-genetically modified, cultivated for oil production, mainly for biofuel purposes.

Certified Biofuels:

Biofuels whose production and origin have been verified by recognized certification systems, such as ISCC or REDcert, to ensure they meet environmental, social, and traceability sustainability criteria. Unlike other conventional biofuels, certified biofuels ensure, in principle, that feedstocks do not contribute to deforestation, indirect land-use change (ILUC), or negative social impacts, and that the production process meets EU greenhouse gas emission reduction standards.

Conference of the Parties (COP):

Annual meeting of countries that are signatories to UN treaties (such as the UN Framework Convention on Climate Change) to make decisions and agree on actions against climate change and biodiversity loss.

EFB (Empty Fruit Bunch):

Fibrous, lignocellulosic by-product of the palm oil industry.

Energy Content:

Amount of energy a fuel can provide, usually measured as lower calorific value (LCV) in megajoules (MJ) per unit of mass or volume, used to quantify and compare renewable fuels' contribution to transport energy targets.

FFB (Fresh Fruit Bunches):

Freshly harvested palm fruit bunches, the raw material processed to extract palm oil.

Food and Agriculture Organization (FAO):

UN specialized agency dedicated to ending hunger, achieving food security, and improving nutrition.

Fourth-Generation Biofuels:

Biofuels produced from genetically optimized feedstocks designed to enhance carbon dioxide capture.

First-Generation Biofuels

(or conventional biofuels):

Biofuels produced from crops that can also be used for human or animal food, such as corn, sugarcane, soy, palm, or rapeseed.

Greenhouse Gas Emission Intensity:

Amount of greenhouse gases emitted, usually expressed in kilograms or tonnes of CO₂ equivalent per unit of energy produced or product, reflecting a fuel, process, or

activity's environmental impact. This allows comparison of energy options and guides climate-friendly decisions.

HEFA**(Hydroprocessed Esters and Fatty Acids):**

Type of HVO designed for aviation applications (SAF). Produced from oils and fats through hydroprocessing to ensure high quality and engine compatibility.

Hydrobiodiesel (HVO):

Liquid biofuel obtained from vegetable oils, animal fats, or organic waste via hydroprocessing. Chemically similar to fossil diesel and can replace it directly in engines.

Indirect Land-Use Change (ILUC):

Occurs when land is diverted to new uses, such as biofuel production, displacing agriculture to other areas and causing conversion of forests or other ecosystems, generating carbon emissions.

Inputs:

In agriculture, any raw material used in food production chains, such as fertilizers, seeds, pesticides, machinery, or animal health products.

International Indigenous Peoples Forum on Climate Change:

Platform coordinating indigenous participation in international climate negotiations, including COPs and official meetings, to agree on positions and defend indigenous priorities.

NPK:

Acronym for the three primary plant macronutrients: Nitrogen (N), Phosphorus (P), and Potassium (K), essential for foliar, root, and overall development.

PFAD (Palm Fatty Acid Distillate):

By-product of palm oil refining, obtained by distilling crude palm oil to remove impurities and increase final product purity.

POME (Palm Oil Mill Effluent):

Liquid waste generated in palm oil extraction mills, a polluting by-product rich in organic matter.

Renewable Energy Directive (RED):

EU directive establishing a common framework to promote renewable energy across sectors, including binding EU targets for 2030, regulating self-consumption, and setting common rules for renewable electricity, heating, cooling, and transport.

**Second-Generation Biofuels
(or advanced biofuels):**

Biofuels produced from various types of waste and by-products, such as agricultural, forestry, industrial, or urban residues, as well as non-food crops like camelina and carinata, including cover crops or crops grown on degraded land.

Sustainable Aviation Fuel (SAF):

Biofuel for aviation produced from sustainable feedstocks (waste, used oils, specific biomasses, or RNFBs) that reduces green-

house gas emissions compared to conventional aviation fuel and is compatible with existing engines and infrastructure without modifications.

Third-Generation Biofuels:

Biofuels produced from algae, sewage sludge, or municipal solid waste.

Used Cooking Oil (UCO):

Vegetable oil that has been used for frying or cooking food in homes, restaurants, or industry and is no longer suitable for its original purpose due to thermal and chemical degradation. It becomes a waste product that can be used to produce biofuels or products like soaps and detergents.

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