-0,1 %

The growth of renewable energy consumption for transport in the EU27 between 2023 and 2024 (in energy content)

RENEWABLE ENERGY IN TRANSPORT BAROMETER 2025

A study carried out by EurObserv'ER.

Renewable energy used in transport comes mainly from biofuels blended into petrol and diesel, supplemented by biomethane for natural-gas vehicles and biokerosene in aviation, as well as electricity in rail transport and, increasingly, in road transport with the rise of fully electric and plug-in hybrid vehicles. According to preliminary data collected by EurObserv'ER, renewable-energy consumption in transport across the European Union, be it road, rail, maritime or air, powered by combustion or electric engines, has remained broadly stable at 20.6 Mtoe. However, the share of renewable energy in EU transport, as measured by the Renewable Energy Directive, is expected to increase and clearly exceed 11 % in 2024, driven by incentives that promote the use of renewable electricity in transport and sustainable biofuels.

32.6 TWh (éq. 2.8 Mtep)

Renewable electricity used in transport (road, rail, other transport modes) in the EU27 in 2024

17.8 Mtoe

Total biofuel consumption in EU27 transport in 2024

According to EurObserv'ER, biokerosene consumption doubled to reach 0.3 Mtoe in 2024, due to an increase in demand observed in France, the Netherlands and Spain.

NESTE

Decarbonising the transport sector, which as a whole (road, air, rail and maritime) accounts for roughly one quarter of the European Union's greenhouse-gas emissions in CO_2-equivalent terms (including CO_2, CH_4, N_2O and HFCs), is one of the key challenges in tackling climate change. Renewable energy in transport comes primarily from biofuels blended into petrol and diesel, supplemented by biomethane used in natural-gas vehicles and biokerosene in aviation. Renewable electricity is also used in transport, mainly in rail, and increasingly in road transport with the growing uptake of fully electric and plug-in hybrid vehicles, with already more than 12 million electric vehicles on the road in 2025 across the European Union.

RENEWABLES AT THE CORE OF EU TRANSPORT DECARBONISATION

With the implementation of the first Renewable Energy Directive 2009/28/EC (known as RED I), the European Union reshaped its renewable-energy policy for transport by requiring that the biofuels consumed within the Union meet sustainability criteria. These standards included quantitative criteria related to greenhouse-gas emissions and qualitative criteria related to land use, preventing, among other things, the production of biofuels on land with high biodiversity value, land with significant carbon stocks or peatland. Sustainability requirements for the use of biomass and biofuels were tightened further for the first time in 2015 with the adoption of Directive 2015/1513, known as ILUC (Indirect Land Use Change). This directive reflected the legislators' intention to account for the impacts of land-use change by limiting the use of biofuels derived from food crops. The adoption of the 2018 Renewable Energy Directive 2018/2001 (known as RED II) strengthened biomass sustainability criteria again by identifying feedstocks with the highest ILUC risk (such as palm oil), capping their use and phasing them out by 2030. The European transport-decarbonisation strategy now focuses on promoting the consumption of "advanced" biofuels and biomethane, renewable synthetic fuels of non-biological origin (RFNBOs) produced from recycled hydrogen and carbon, "green" hydrogen fuels, and a massive electrification of road transport, in parallel with the European strategy to decarbonise the electricity mix through renewable energy.

Since then, new milestones have been reached to accelerate the energy transition. The European Green Deal, presented in December 2019 by the European Commission, is the strategy through which the European Union aims to achieve climate neutrality by 2050. To move towards a more sustainable mobility system, the Green Deal sets a target of reducing transport-related greenhouse-gas emissions by 90 % by 2050. This will be made possible through the massive electrification of road transport and the phasing out of sales of vehicles with internal-combustion engines from 2035 onwards. This specific measure is currently under debate within European institutions, with potential adjustments being considered.

The implementation of the European Green Deal was launched in July 2021, when the Commission presented detailed measures aimed at reducing net greenhouse-gas emissions by at least 55 % by 2030 compared with 1990 levels. These climate measures are grouped under the name "Fit for 55." After an extensive legislative process involving the European Parliament and the European Council, numerous legislative acts (regulations and directives) were adopted in 2023 concerning transport, including the long-awaited revision of the Renewable Energy Directive RED II through Directive 2023/2413 (known as RED III), formally adopted on 18 October 2023 and published in the Official Journal of the European Union on 31 October 2023. In the transport sector, the renewable-energy consumption target, initially set at 14 % by RED II for each Member State by 2030, was revised under RED III. RED III provides greater flexibility to Member States, allowing them to choose between two targets: either a binding 14.5 % reduction in greenhouse-gas intensity in transport resulting from the use of renewable energy by 2030, or a binding share of at least 29 % renewable energy in the final energy consumption of the transport

Tabl. n° 1

Biofuels consumption for transport in the European Union in 2023 (in ktoe)

Country	Biodiesel	Biogasoline	Biogas*	Others liquid biofuels**	Total	Compliant biofuels***
France	2 338.7	844.7	8.7	54.9	3 246.9	100.0%
Germany	2 196.0	800.3	167.6	0.9	3 164.8	97.8%
Spain	1 792.2	151.9	0.0	0.2	1 944.3	99.9%
Italy	1 414.7	85.1	225.2	14.0	1 739.0	100.0%
Sweden	1 248.6	188.1	125.9	12.6	1 575.3	100.0%
Poland	865.3	243.6	0.0	0.0	1 108.9	100.0%
Belgium	597.3	174.0	0.1	0.0	771.3	100.0%
Netherlands	288.4	257.5	37.1	63.2	646.2	100.0%
Finland	421.4	136.6	31.3	4.2	593.6	94.8%
Romania	379.1	154.8	0.0	0.0	533.9	100.0%
Austria	395.1	99.8	0.6	0.1	495.6	100.0%
Portugal	340.3	25.4	0.0	0.9	366.7	100.0%
Hungary	224.0	87.0	0.0	0.0	311.0	100.0%
Czechia	241.3	62.6	0.1	0.0	303.9	100.0%
Ireland	249.3	32.8	2.0	0.3	284.4	99.8%
Denmark	134.0	84.0	10.8	0.0	228.8	98.1%
Greece	148.7	67.9	0.0	0.0	216.5	74.2%
Bulgaria	152.7	21.1	0.0	0.0	173.7	100.0%
Slovakia	126.4	38.7	0.0	0.0	165.1	100.0%
Luxembourg	99.8	23.3	0.0	0.6	123.8	100.0%
Lithuania	97.5	20.4	0.0	0.0	117.9	100.0%
Slovenia	85.5	8.6	0.0	0.0	94.2	100.0%
Estonia	20.1	2.3	16.0	0.0	38.4	100.0%
Cyprus	25.3	0.0	0.0	0.0	25.3	100.0%
Malta	13.3	0.0	0.0	0.0	13.3	100.0%
Latvia	3.2	8.7	0.0	0.0	11.9	9.0%
Croatia	0.3	0.0	0.0	0.0	0.3	100.0%
Total EU 27	13 898.1	3 619.2	625.4	152.0	18 294.8	99.0%

** Including biomethane blended in the natural gas grid allocated to the transport sector with appropriate traceability requirements. ** Including biokerosene and vegetable oil. *** Compliant biofuels (articles 29 and 30 of Directive 2018/2001 EU). Note: Breakdown between types of biofuel has been estimated by EurObserv'ER.*
Source: EurObserv'ER 2025

Tabl. n° 2

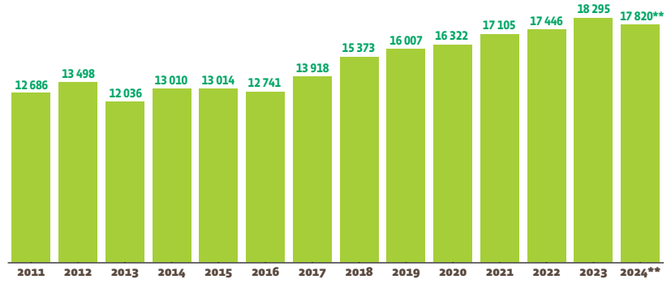
*Biofuels consumption for transport in the European Union in 2024 * (in ktoe)*

Country	Biodiesel	Biogasoline	Biogas**	Others liquid biofuels***	Total	Compliant biofuels****
France	2 332.2	910.3	12.5	74.3	3 329.3	100.0%
Germany	1 819.3	797.1	304.3	0.9	2 921.6	96.5%
Spain	1 663.3	152.8	0.2	62.8	1 879.1	99.9%
Italy	1 296.6	191.6	225.2	14.0	1 727.4	100.0%
Poland	846.5	331.3	0.0	0.0	1 177.9	100.0%
Netherlands	590.6	256.8	37.8	122.2	1 007.4	100.0%
Sweden	605.0	130.0	132.6	23.2	890.8	100.0%
Belgium	504.3	162.0	3.6	0.2	670.1	100.0%
Austria	456.0	104.1	0.7	0.0	560.8	100.0%
Romania	379.1	154.8	0.0	0.0	533.9	100.0%
Finland	324.7	130.8	31.3	0.0	486.8	100.0%
Portugal	338.7	30.4	16.7	2.2	388.1	95.1%
Czechia	243.0	92.2	0.5	0.0	335.7	100.0%
Hungary	236.0	89.0	0.0	0.0	325.0	100.0%
Ireland	276.2	46.2	2.0	0.0	324.5	100.0%
Denmark	151.9	87.3	9.1	0.0	248.3	99.6%
Greece	148.7	67.9	0.0	0.0	216.5	100.0%
Slovakia	158.2	43.8	0.0	0.0	202.0	100.0%
Bulgaria	144.8	23.6	0.0	0.0	168.4	100.0%
Lithuania	116.2	22.7	0.0	0.0	138.9	100.0%
Luxembourg	99.8	23.3	0.0	0.0	123.1	100.0%
Slovenia	81.7	8.4	0.0	0.0	90.1	100.0%
Latvia	20.1	11.7	0.0	0.0	31.8	100.0%
Cyprus	26.9	0.0	0.0	0.0	26.9	100.0%
Malta	14.6	0.0	0.0	0.0	14.6	100.0%
Estonia	0.6	0.0	0.0	0.0	0.7	100.0%
Croatia	0.1	0.0	0.0	0.0	0.1	100.0%
Total EU 27	12 875.2	3 868.2	776.6	299.9	17 819.9	99.3%

** Estimation ** Including biomethane blended in the natural gas grid allocated to the transport sector with appropriate traceability requirements. *** Including biokerosene and vegetable oil. **** Compliant biofuels (articles 29 and 30 of Directive 2018/2001 EU). Note: Breakdown between types of biofuel has been estimated by EurObserv'ER.* ***Source: EurObserv'ER 2025***

Graph. n° 1

European Union (EU-27) biofuel (liquid and gazeous) consumption for transport trend (in ktoe)*



** Compliant biofuel and not compliant. ** Estimation.*
Source: Data from 2011 to 2022 (Shares Eurostat 2025); 2023-2024 (EurObserv'ER 2025)

sector by 2030.
In addition, under the "Fit for 55" package, the Commission adopted the ReFuelEU regulation for aviation and the FuelEU regulation for maritime transport, both aimed at promoting the uptake of renewable and low-carbon fuels in these transport modes (see below). This is also expected to support the achievement of renewable-energy targets by 2030.

A SHARE OF RENEWABLE ENERGY IN TRANSPORT ABOVE 11 % IN 2024

According to preliminary data collected by EurObserv'ER, renewable-energy consumption in transport across the European Union, be it road, rail, maritime or air, powered by combustion or electric engines, remained broadly stable between 2023 and 2024 (-0.1 %) at 20.6 Mtoe. The decline in biodiesel consumption recorded in 2024 was offset by increases in other biofuel components and by higher consumption of renewable electricity in transport. The share of renewable energy in EU transport, as measured by the Renewable Energy Directive, is nevertheless expected to rise thanks to the use of multiple-counting factor that promote the consumption of renewable electricity and advanced biofuels.
It should also be noted that although European renewable-energy legislation changed in 2023, the calculation rules established by Directive 2023/2413 (RED III) will only apply from 2025 onwards. Until 2024 (and since 2021), the calculation rules of Directive 2018/2001 (RED II) continue to apply for determining the share of renewable energy in transport. This share for 2024 at EU level was not yet officially known when this barometer was prepared in November 2024. However, according to EurObserv'ER, which relies on preliminary calculations and data from certain Member States, the share of renewable energy in EU transport is expected to continue rising and to clearly exceed the 11 % threshold in 2024, with a first estimate between 11.2 % and 11.3 %, compared with 10.8 % measured in 2023 by Eurostat in its latest update. EurObserv'ER also notes that the 2023 share is likely to be slightly revised by Eurostat (by around one-tenth of a percentage point) when the SHARES results are published at the end of 2025, due to statistical revisions by some Member States concerning renewable electricity in road transport. Preliminary data from the European Environment Agency, published on 6 November 2025, indicate a renewable-energy share in transport of 11.3 % in 2024, which is 2.7 percentage points below the 2030 target of 14 % set by Directive 2018/2001. In any case, the

Tabl. n° 3

Renewable electricity used in transport (road, rail, other transport modes) in 2023 and 2024 (in ktoe)*

	2023				2024*			
Country	Ren. electricity in road transport	Ren. electricity in rail transport	Ren. electricity in all other transport modes	Total	Ren. electricity in road transport	Ren. electricity in rail transport	Ren. electricity in all other transport modes	Total
Germany	178.9	434.1	0.0	613.0	255.1	478.3	0.0	733.5
Sweden	103.2	168.5	20.7	292.3	125.7	185.3	22.7	333.7
France	50.7	170.8	24.7	246.3	79.9	196.8	27.5	304.1
Italy	25.7	191.2	57.2	274.2	32.6	197.1	59.0	288.7
Austria	44.0	116.0	71.3	231.3	61.3	130.5	74.8	266.6
Spain	32.1	131.1	9.1	172.3	42.1	154.0	11.6	207.7
Netherlands	69.2	47.6	0.0	116.8	101.8	58.0	0.0	159.9
Denmark	39.3	30.9	0.0	70.2	62.2	32.3	0.0	94.5
Belgium	24.1	32.8	2.6	59.5	45.6	37.3	0.7	83.6
Poland	3.8	49.0	2.6	55.4	5.5	59.9	3.2	68.5
Finland	25.1	22.8	0.0	47.9	35.5	27.6	0.0	63.1
Portugal	4.6	24.4	0.4	29.5	21.2	26.3	1.1	48.5
Romania	10.0	22.1	0.7	32.8	11.6	22.6	0.7	34.9
Czechia	1.6	20.1	0.8	22.5	2.4	22.1	0.8	25.2
Hungary	2.0	13.3	0.1	15.5	2.5	14.9	0.1	17.5
Croatia	0.9	11.0	1.7	13.5	1.1	11.5	1.8	14.3
Slovakia	0.5	10.2	2.9	13.6	0.5	10.4	3.0	13.9
Ireland	8.9	1.7	0.0	10.6	9.4	1.7	0.0	11.1
Slovenia	1.2	7.1	0.2	8.5	1.4	7.5	0.2	9.1
Bulgaria	0.8	6.8	0.2	7.8	0.8	6.4	0.2	7.4
Greece	0.7	5.5	0.0	6.1	0.9	6.4	0.0	7.3
Latvia	1.9	2.8	0.1	4.8	2.3	2.9	0.1	5.3
Luxembourg	1.1	1.8	0.0	2.8	1.3	2.0	0.0	3.3
Lithuania	1.4	0.2	0.4	2.1	1.8	0.3	0.5	2.7
Estonia	0.9	0.6	0.0	1.5	1.0	0.6	0.0	1.6
Malta	0.2	0.0	0.0	0.2	0.2	0.0	0.0	0.2
Cyprus	0.1	0.0	0.0	0.1	0.1	0.0	0.0	0.1
Total EU 27	633.0	1522.4	195.6	2350.9	905.8	1692.8	207.8	2806.4

** Estimation. In some countries a significant share of renewable electricity consumption in transport is not clearly traced and is allocated, by default, to the category «other transport modes».* ***Source: EurObserv'ER 2025***

increase will be smaller than that recorded in the previous year, which saw a gain of 1.1 percentage points, from 9.6 % in 2022 to 10.8 % in 2023, according to Eurostat.

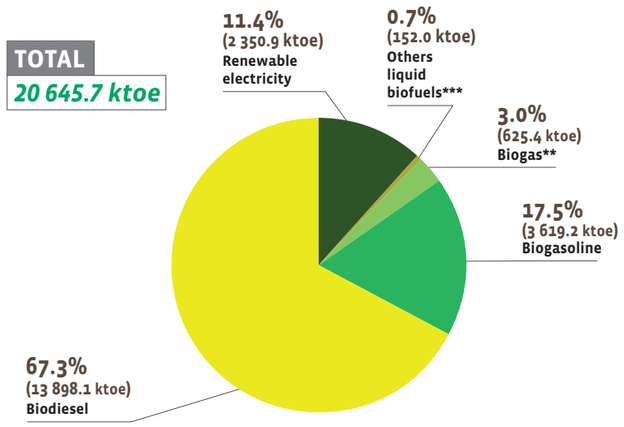
At the Member State level, developments in the share of renewable energy, taking into account incentives, are highly uneven, with some countries seeing stability while others experience increases or decreases. This is the case for Sweden, which is expected to see its share drop sharply in 2024, as the country has nearly halved its consumption of biofuels, including advanced biofuels. While Sweden's 2024 share was not yet officially known in mid-November, it is expected to be lower than the preliminary estimate of 35 % provided by the European Energy Agency. Sweden's political decision to drastically reduce its consumption of biofuels, including those produced from feedstocks eligible for double counting, has led to an increased availability of HVO-type biofuels on the European market (see below). This supply of "advanced" biofuels, or biofuels produced from used oils, has helped boost advanced-biofuel consumption in other European countries, thereby increasing their renewable share in transport. The Netherlands is among the beneficiary countries, with its share rising from 13.5 % to 19.7 %, according to Statistics Netherlands.

In November 2025, other countries published their results. In France, the share rose from 10 % to 10.8 %, in Germany from 12.2 % to 12.3 %, in Belgium from 12.1 % to 12.7 %, in Portugal from 11.2 % to 14.3 %, and in Denmark from 11.3 % to 14.3 %. By contrast, Spain saw a slight decrease, from 12 % to 11.3 %. As a reminder, the share of renewable energy in transport across the European Union has been steadily increasing since 2021 (9.1 % in 2021, 9.6 % in 2022, and 10.8 % in 2023), according to Eurostat's SHARES tool.

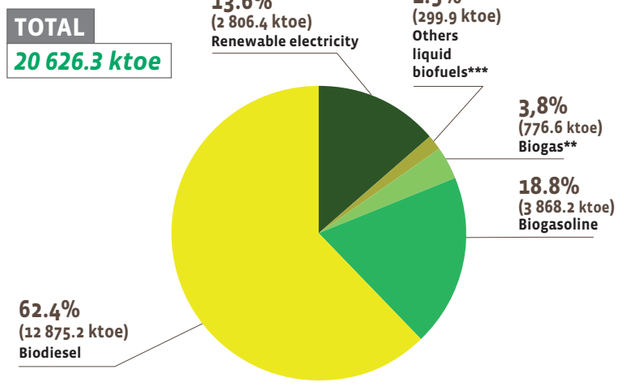
The slower growth in the share of renewable energy in transport at EU level can be explained by a significant decline in biodiesel consumption in certain Member States, due both to political decisions, adjustments in blending rates (see below), and lower diesel demand in some markets, which mechanically limits the volumes of biodiesel to be blended. The share of renewable energy in transport also depends on overall trends in total energy use in transport, which has tended to stabilize since 2023. Looking ahead, road-fuel consumption in the European Union is expected to decline structurally in the coming years, as the ongoing electrification of road transport promoted by EU authorities reduces the need for conventional road fuels.

Graph. n° 2

Breakdown of renewable energy used in transport (all types) of the countries of the European Union to 27 (in ktoe and %) in 2023



*Breakdown of renewable energy used in transport (all types) of the countries of the European Union to 27 (in ktoe and %) in 2024**



Estimation. ** Including biomethane blended in the natural gas grid allocated to the transport sector with appropriate traceability requirements. * Including biokerosene and vegetable oil.* ***Source: EurObserv'ER 2025.***

BIOFUELS AND BIOMETHANE IN TRANSPORT

A DECLINE IN BIODIESEL CONSUMPTION

According to data collected by EurObserv'ER, overall consumption of biofuels (all components, liquid and gaseous) used in transport in 2024 fell slightly compared with 2023 (-2.6 %), from 18.3 Mtoe to 17.8 Mtoe. Biodiesel remains the main biofuel used in transport, accounting for 72.3 % of the energy content in 2024, ahead of bioethanol (21.7 %), biomethane (4.4 %), and other liquid biofuels (1.7 %).

In detail, at EU level in 2024, only biodiesel consumption declined, while all other components increased. Overall biodiesel — regardless of the feedstock used (oilseed crops, non-food feedstocks, or biomass waste) and production method (biodiesel produced via transesterification or HVO biodiesel produced via hydrotreatment) — fell by 7.4 % between 2023 and 2024 across the European Union, to just under 12.9 Mtoe.

Consumption of bioethanol and synthetic biofuels benefited from increased petrol demand in certain countries, which mechanically led to higher blending volumes. According to EurObserv'ER, biofuel consumption grew by around 6.9 % between 2023 and 2024, reaching nearly 3.9 Mtoe.

Fuel biomethane also shows positive growth at EU level, increasing by 24.2 % compared with 2023 to reach a consumption of nearly 0.8 Mtoe in 2024. This strong growth is driven by a significant increase in Germany, where consumption rose from 167.6 to 304.3 ktoe, according to AGEEStat data. This level of consumption reflects the policy choices of certain countries, notably Sweden and Italy, to prioritise the use of their biomethane production for the transport sector and to promote the use of compressed biomethane (Bio-CNG) and liquefied biomethane (Bio-LNG) fuels.

The "other biofuels" category mainly includes biokerosene used in aviation and, to a lesser extent, vegetable oil. According to EurObserv'ER, their consumption doubled again in 2024, reaching 0.3 Mtoe, driven by increased consumption in France, the Netherlands, and Spain.

Within the Member States, the evolution of biofuel consumption has sometimes been highly uneven. In Sweden, the sharp decline observed in the transport sector was expected: it resulted from a political decision taken in 2023 to significantly reduce the obligations for emission reductions related to petrol and, especially, diesel. In the Swedish system, biofuels are included in the reduction obligation scheme and are therefore subject to the same energy and carbon taxation as fossil fuels. In 2024, the obligation rate fell to 6 % for diesel (down from 30.5 %) and to 6 % for petrol (down from 7.8 %). This relaxation of requirements was primarily a political choice aimed at lowering pump prices and supporting household purchasing power. It reflects an explicit trade-off by the new conservative government between climate objectives and socio-economic constraints. According to the Swedish Environmental Protection Agency (SEPA), cited by the OECD, this reduction in blending rates could lead to an increase in emissions of around 3 Mt of CO_2 in 2024. Consumption is, however, expected to gradually rise again in 2025. The Swedish government has announced that the reduction obligation will be raised to 10 % for both petrol

Neste's largest refinery is located in Porvoo, Finland. It produces sustainable aviation fuel (SAF) and biodiesel.

and diesel from 1 July 2025 to reaffirm its European commitments. The lowering of Sweden's mandate also led to a partial reallocation of HVO biodiesel volumes to the rest of the European market. Countries such as the Netherlands and France consequently recorded a strong increase in advanced-biofuel consumption. In Spain, according to the Spanish Biofuels Federation, the decline in biodiesel consumption (-7.2 %) is partly explained by lower blending rates in the last quarter. This reduction was regulated by Resolution No. 40431 of 17 October 2024, which temporarily set biodiesel content in blends at 8 % for October, November, and December, before raising it to 10 % from January 2025. In accordance with Royal Decree 1085/2015 of 4 December on the promotion of biofuels, the minimum mandatory target for the sale or consumption of biofuels and other renewable fuels for transport was set at 11.5 % for 2024. In Germany, the decline in biodiesel consumption has a different nature. According to the Federal Ministry for Economic Affairs and Energy, the decrease is partly due to a drop in diesel consumption, itself driven by economic factors, which led to a reduction in biodiesel/HVO sales in the last quarter of 2024. In Italy, the downward trend in biodiesel consumption is explained by the decision to prioritise advanced biofuels, which are more sustainable and benefit from double counting, as well as HVO biodiesel produced from eligible feedstocks.

The rise of advanced biofuels is driven by the implementation of Renewable Energy Directive 2018/2001/EC, which reflected the European Union's intention to limit the use of biofuels from food crops and to reduce the indirect land-use change effect by identifying the feedstocks at highest risk. Advanced renewable fuels are produced from waste, residues, or non-food cellulosic materials. The feedstocks for advanced biofuels are listed in Annex IX, Part A, of Directive (EU) 2018/2001. Consumption of advanced biofuels, which also applies to the petrol sector (though to a lesser extent), is expected by EurObserv'ER to exceed 5 Mtoe in 2024 (up from 4.3 Mtoe in 2023). This consumption level does not include biofuels produced from used cooking oils and animal fats (3.3 Mtoe consumed in 2023), which are listed in Annex IX, Part B, of Directive 2018/2001. These feedstocks also benefit from double counting, but the quantities consumed are limited to 1.7 % of the energy content of fuels and electricity supplied to the transport sector. It should be noted that the final quantity of advanced biofuels consumed in the European Union was not yet known in November, as several major-consuming countries had not yet reported their consumption data at the time of this study.

Overall biodiesel consumption in the European Union, without distinguishing between the feedstocks used or the production methods, fell by 7.4% between 2023 and 2024, to just under 12.9 Mtoe.

RENEWABLE ELECTRICITY IN TRANSPORT

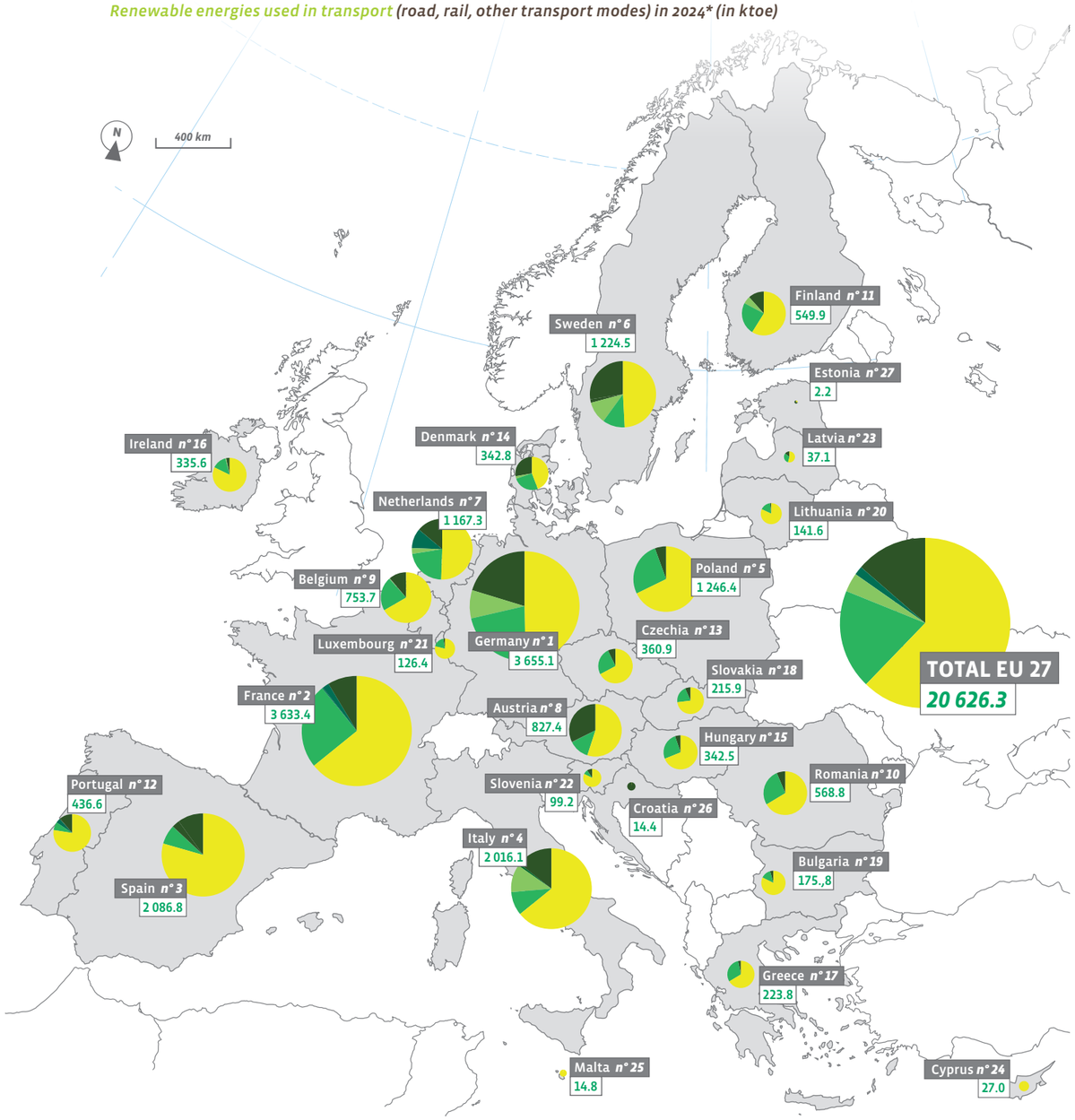
THE GROWTH OF ELECTRIFIED RENEWABLE KILOMETERS

Before addressing the electrification of transport, it should be noted that renewable electricity consumption in EU transport has been calculated since 2021 according to the rules of Renewable Energy Directive 2018/2001, and this will continue until 2024. The directive specifies that renewable electricity used in transport must be calculated based on the national electricity production mix (the option to calculate it using the EU-wide production mix has been removed). To do this, Member States must refer to the two-year period preceding the year in which the electricity is supplied in their territory (with standardized electricity production for wind and hydro), which was also the rule under the previous directive. Therefore, to calculate the share of renewable electricity used in transport, Member States must refer to their national electricity production mix from 2022, a year that was relatively favourable for the share of renewable electricity.

The trend in Europe has been much more positive regarding renewable electricity consumption in transport, driven both by the growth of the electric vehicle fleet in the EU (fully electric and plug-in hybrid vehicles), which exceeded 10 million registrations in 2024, including 2.2 million in that year alone, and by the increase in the share of renewable electricity in the national electricity mixes of EU countries.

Indeed, the share of renewable energy in electricity production across the European Union increased by 3.5 percentage points between 2021 and 2022 (from 37.8 % to 41.1 %), according to Eurostat's SHARES tool updated in October 2025,

Renewable energies used in transport ***(road, rail, other transport modes) in 2024* (in ktoe)***



Key

Country
20 626.3

Renewable energies used in transport (road, rail, other transport modes) in 2024 (in ktoe)*

Biodiesel *Biogasoline* *Biogas*** *Renewable electricity* *Others liquid biofuels****

** Estimation*
*** Including biomethane blended in the natural gas grid allocated to the transport sector with appropriate traceability requirements.*
**** Including biokerosene and vegetable oil.*
Source: EurObserv'ER 2025.

Tabl. n° 4

New passenger electric car registrations (battery electric vehicles and plug-in hybrid electric vehicle) in 2023 and 2024.

	BATTERY ELECTRIC VEHICLES (BEV)		PLUG-IN HYBRID ELECTRIC VEHICLES (PHEV)		Total 2024 (BEV +PHEV)
Country	2023	2024	2023	2024	
Germany	524 219.0	380 609	175 724	191 905	572 514
France	298 219.0	290 614	162 950	146 392	437 006
Belgium	93 285.0	127 703	100 308	67 034	194 737
Netherlands	113 967.0	132 166	47 096	52 581	184 747
Sweden	112 179.0	94 333	61 058	63 113	157 446
Italy	66 287.0	65 620	68 464	51 792	117 412
Spain	51 611.0	57 374	62 165	58 558	115 932
Denmark	62 715.0	89 199	17 276	7 092	96 291
Portugal	36 390.0	41 757	27 146	28 346	70 103
Austria	47 621.0	44 622	16 956	16 919	61 541
Finland	29 535.0	21 868	18 087	14 863	36 731
Poland	17 070.0	16 564	13 279	14 990	31 554
Ireland	22 852.0	17 459	10 382	12 538	29 997
Greece	6 379.0	8 707	8 836	8 262	16 969
Luxembourg	11 033.0	12 778	4 802	3 831	16 609
Czechia	6 680.0	10 920	5 251	4 826	15 746
Hungary	5 799.0	8 565	5 542	5 695	14 260
Romania	14 438.0	9 795	0	0	9 795
Slovakia	2 346.0	2 227	2 997	2 243	4 470
Slovenia	4 330.0	3 148	1 156	1 162	4 310
Lithuania	2 105.0	1 779	1 059	1 685	3 464
Malta	1 515.0	2 886	990	515	3 401
Croatia	1 637.0	1 793	992	1 405	3 198
Estonia	1 445.0	1 320	560	1 268	2 588
Bulgaria	1 874.0	1 665	355	467	2 132
Latvia	1 787.0	1 270	352	798	2 068
Cyprus	788.0	1 193	511	664	1 857
Total EU 27	1 538 106	1 447 934	814 294	758 944	2 206 878

Source: ACEA (European Automobile Manufacturers Association) 2025.

and 24 out of 27 countries saw their renewable-energy share rise, which, ceteris paribus, boosted the amount of renewable electricity used in transport. The largest increases were recorded in Finland (+8.4 pp), Sweden (+7.6 pp), the Netherlands (+6.4 pp), Greece (+6.5 pp), Lithuania (+5.2 pp), Denmark (+4.3 pp), and Germany (+4.1 pp). It is worth noting that the share of renewable energy in EU electricity production continued to grow between 2022 and 2024, provisionally estimated at 47 % in 2024 by the European Environment Agency, according to the specifics of the directive. The ongoing decarbonisation of EU countries' electricity mixes directly translates into a significant increase in kilometers travelled using renewable energy, whether by road or rail. In other words, the addition of new wind farms and photovoltaic fields along European roads and railways decarbonises the kilometers travelled by electric vehicles in real time, regardless of their year of registration.

For 2024, according to preliminary data collected or estimated by EurObserv'ER, renewable electricity consumption in EU transport is estimated at 2.8 Mtoe (equivalent to 32.6 TWh of renewable electricity), representing an increase of around 19.4 % between 2023 and 2024 (+455.5 ktoe). The increase affects both road and rail transport, with a stronger dynamic in road transport (+43.1 % compared with +11.2 %). While renewable electricity consumption remains higher in rail transport (trains, metro, trams), the much faster growth of road transport electrification allows it to gradually close the gap each year. It should be noted that in some countries, a significant share of renewable electricity consumption in transport is not clearly tracked and is, by default, assigned to the "other transport modes" category.

THE 12-MILLION MARK FOR PLUG-IN ELECTRIC CARS EXCEEDED IN THE EU

According to data from the European Automobile Manufacturers Association (ACEA) presented in Table 5, registrations of battery-electric passenger vehicles (BEVs) in EU countries slowed in 2024, falling by 5.9 % compared with

Siemens' Sicharge Flex charging system for electric vehicles can deliver between 480 kW and 1.68 MW. It is compatible with many types of heavy electric vehicles, including trucks and buses.

2023, from 1 538 106 to 1 447 934 registrations. This decline contrasts with the strong increase in registrations the previous year (+37 % between 2022 and 2023). Registrations of plug-in hybrid electric vehicles (PHEVs), both petrol and diesel, also decreased again, by 6.8 % between 2023 and 2024 (after a 7 % decline between 2022 and 2023), from 814 294 to 758 944. In total, just over 2.2 million plug-in passenger vehicles were put on the road in 2024, compared with 2.4 million in 2023.

2024 was not a strong year for electric vehicles, with market shares declining in both segments (13.6 % in 2024 compared with 14.6 % in 2023 for BEVs and 7.1 % in 2024 compared with 7.7 % in 2023 for PHEVs), in the context of a slight increase in total vehicle sales across all powertrains (+0.8 % between 2023 and 2024, or 10 632 381 vehicles registered in 2024). Battery-electric passenger vehicles remained the third choice for European buyers in 2024 with a market share of 13.6 %, behind petrol engines (33.3 %) and non-plug-in hybrids (30.9 %). The market share of plug-in hybrids fell to 7.1 %, behind diesel engines (11.9 %).

This decline was expected and is primarily explained by the decision of the German government, announced on 16 December 2023, to eliminate electric vehicle purchase bonuses (up to 4 500 euros per vehicle) starting 18 December. The impact was severe, with a 27.4 % drop in BEV registrations (from 524 219 vehicles sold to 380 609), while the German market accounted for more than a third of such vehicle sales in the European Union. The decline was also significant in the Swedish BEV market (-15.9 % between 2023 and 2024), another major European market, largely due to the new conservative government's sudden removal of the 70 000 SEK (6 250 euros) bonus on 8 November 2022. The effect of this decision only materialised in 2024, as many orders had been placed before 8 November 2022 and were delivered during 2023, with lead times of 6 to 12 months due to waiting lists and component shortages. The introduction of a scrappage bonus of 10 000 SEK (less than 900 euros) for purchases or leasing in August 2024 had no impact on the market. This bonus was later increased to 25 000 SEK (less than 2 300 euros) on 27 May 2025, with retroactive effect, allowing those who had already received the previous bonus to claim the difference.

The situation, however, began to improve in 2025. According to ACEA data on registrations from January to September 2025 in EU countries, the BEV market picked up again, with growth

RENEWABLE ENERGY IN TRANSPORT BAROMETER – **EUROBSERV'ER** – NOVEMBER 2025

in this segment of 24.1 % compared with the same period in 2024 and an increased market share of 16.1 %. This upswing can be explained by the introduction of more affordable and widely available models, stricter CO_2 standards prompting manufacturers to sell more low-emission vehicles, the renewal of corporate fleets to reduce emissions and benefit from tax incentives, and the rollout of charging infrastructure, which reassures buyers.
Regarding the total stock of plug-in electric vehicles in circulation, including passenger vehicles (M1) and light commercial vehicles (N1), the European Alternative Fuels Observatory (EAFO) estimated their number at 10.2 million at the end of 2024 (6.2 million BEVs and 4 million PHEVs). According to EAFO statistics, the 12.3 million mark for plug-in vehicles was reached in the third quarter of 2025, with 7.6 million BEVs and 4.7 million PHEVs already on the road. It will take time to phase out the approximately 240 million internal-combustion passenger vehicles currently circulating in the EU.

MORE THAN 1 MILLION CHARGING POINTS IN OPERATION IN THE EU

Charging points for electric vehicles are a key element of the infrastructure needed for the energy transition toward more sustainable mobility. While most recharging for private vehicles takes place using slow chargers, ideal for overnight home charging or during work hours, public charging points, whether fast or even ultra-fast, remain essential for longer journeys.
This rollout is happening alongside the introduction of new vehicle models that, on ultra-fast charging points, can recharge a battery from 10 to 80 % in less than about twenty minutes. Battery architectures of 400 volts and 800 volts installed in high-end vehicles allow the fastest charging times. For example, the 800-volt battery architecture used by certain premium cars from manufacturers such as Porsche, Audi, Mercedes,

Tabl. n° 5

Alternating current (AC) and Direct Current (DC) public recharging points installed in the European Union countries in 2023 and 2024

	2023			2024		
Country	AC Public recharging points*	DC Public recharging points**	Total	AC Public recharging points*	DC Public recharging points**	Total
Netherlands	140 561	3 889	144 450	177 706	5 294	183 000
Germany	97 704	22 908	120 612	124 484	35 474	159 958
France	100 767	18 488	119 255	125 955	29 976	155 931
Belgium	41 903	2 459	44 362	72 193	4 626	76 819
Italy	35 195	5 918	41 113	47 803	10 386	58 189
Sweden	32 413	4 753	37 166	45 231	8 547	53 778
Spain	24 930	5 442	30 372	35 982	9 231	45 213
Denmark	20 896	2 175	23 071	30 432	5 437	35 869
Austria	15 229	3 407	18 636	24 213	6 208	30 421
Finland	8 508	2 739	11 247	12 363	4 363	16 726
Portugal	5 582	1 723	7 305	8 809	3 310	12 119
Poland	4 477	1 614	6 091	6 549	3 006	9 555
Greece	2 950	216	3 166	6 167	882	7 049
Czechia	3 389	1 275	4 664	4 466	1 893	6 359
Romania	1 817	906	2 723	2 660	1 906	4 566
Hungary	2 742	575	3 317	3 170	1 005	4 175
Ireland	2 355	470	2 825	2 802	786	3 588
Slovakia	1 690	690	2 380	2 193	1 055	3 248
Bulgaria	1 165	459	1 624	1 892	1 128	3 020
Lithuania	1 039	274	1 313	1 707	1 240	2 947
Luxembourg	2 143	179	2 322	2 310	341	2 651
Slovenia	1 346	262	1 608	1 763	393	2 156
Croatia	675	399	1 074	1 262	577	1 839
Latvia	295	239	534	676	481	1 157
Estonia	339	255	594	575	476	1 051
Cyprus	306	23	329	475	37	512
Malta	101	0	101	116	0	116
Total EU 27	550 517	81 737	632 254	743 954	138 058	882 012

** Total number of publicly accessible AC recharging points, according to the AFIR categorization, Slow AC recharging point, single-phase (P < 7.360W), Medium-speed AC recharging point, triple-phase (7.360W ≤ P ≤ 22.080W), Fast AC recharging point, triple-phase (P > 22.080W). ** Total number of publicly accessible DC recharging points, according to the AFIR categorization, Slow DC recharging point (P < 49.950W), Fast DC recharging point (49.950W ≤ P <150.000W), Level 1 - Ultra-fast DC recharging point (150.000W ≤ P < 349.000W), Level 2 - Ultra-fast DC recharging point (P ≥ 349.000W).* **Source: Data gathered by the European Alternative Fuels Observatory 2025.**

"FIT FOR 55" IN ACTION

Following an extensive legislative process initiated by the "Fit for 55" package, numerous texts aimed at establishing instruments to reduce greenhouse gas emissions in transport were published in the Official Journal of the European Union throughout 2023. These legislative texts cover the implementation of a standalone emissions trading system (ETS) for road transport, buildings, and other sectors not covered by the existing ETS; targets for infrastructure for electric vehicles and alternative fuels; emission reduction targets for light-duty road transport; emission reduction targets for heavy-duty vehicles; and targets for the use of renewable and low-carbon fuels in maritime transport (FuelEU Maritime) and aviation (ReFuelEU Aviation).
The highlight was the long-awaited revised Renewable Energy Directive, Directive 2023/2413 (RED 3), which was finally adopted and published in the Official Journal of the European Union on 31 October 2023. RED 3 significantly raised the EU's renewable energy targets to align with the European Green Deal, which sets the EU's climate neutrality goal by 2050 and an interim target of at least a 55 % reduction in net greenhouse gas emissions by 2030 compared with 1990 levels, as well as with the RePowerEU Plan outlined in the Commission's 18 May 2022 communication, which aims to make the EU independent of Russian fossil fuels well before 2030. Broadly speaking, the new directive increases the target share of renewable energy in the EU's gross final electricity consumption by 2030 from 32 % to at least 42.5 % and encourages Member States to aim for 45 %.
Regarding the transport sector, the directive offers greater flexibility to Member States by allowing them to choose between two targets: either a binding target of a 14.5 % reduction in greenhouse gas intensity in transport resulting from the use of renewable energy by 2030, compared with the reference value EF(t) for fossil fuels set at 94 gCO_2eq/MJ, following an indicative trajectory established by the Member State; or a binding target of at least 29 % renewable energy in the final energy consumption of the transport sector by 2030. This second target is far more ambitious than that set out in RED 2, which aimed for a minimum share of 14 % renewable energy in the final energy consumption of the transport sector by 2030. The binding target for reducing greenhouse gas intensity from renewable energy appears much more attainable and will logically be preferred by many Member States.
The new RED 3 rules also establish a combined binding sub-target of 5.5 % by 2030 (with an interim target of 1 % in 2025) for advanced biofuels and biogas (produced from the non-food feedstocks listed in Annex IX, Part A) and renewable fuels of non-biological origin (mainly renewable hydrogen and hydrogen-based synthetic fuels) within the share of renewable energy supplied to the transport sector. Within this target, there is a minimum requirement of 1 % for renewable fuels of non-biological origin (RFNBO) in the share of renewable energy supplied to the transport sector by 2030.
The amended directive also maintains the cap on the use of fuels produced from crops intended for human or animal consumption. Their use must not exceed more than one percentage point above their share in final energy consumption in the transport sector of each Member State as calculated in 2020, with an absolute maximum of 7 % of final energy consumption in the transport sector. It also retains the provision limiting the share of biofuels and biogas produced from the feedstocks listed in Annex IX, Part B (i.e., used cooking oils and animal fats) in the energy content of fuels and electricity supplied to the transport sector to 1.7 %, except for Cyprus and Malta. However, Member States may, when justified, increase this limit based on the availability of the relevant feedstocks, with such an increase subject to approval by the European Commission. A small accounting nuance has been added to avoid incentivising the consumption of crop-based biofuels. Specifically, when the share of biofuels produced from crops intended for human or animal consumption in a Member State is capped below 7 %, or when a Member State chooses to limit it further, that Member State may accordingly reduce the minimum share of renewable energy or the target for reducing greenhouse gas intensity, taking into account the contribution these fuels would have made toward the minimum renewable energy share or emission reduction target.
For the calculation of the numerator of the target, the main calculation rules have not been changed. Fuels based on recycled carbon can be included, and a number of multipliers are applied. The share of biofuels and biogas produced from the feedstocks listed in Annex IX, as well as the share of renewable fuels of non-biological origin, is considered equivalent to twice their energy content; the share of renewable electricity is considered equivalent to four times its energy content when used for road transport, and it may be considered equivalent to 1.5 times its energy content when used for rail transport. The share of advanced biofuels and biogas produced from the feedstocks listed in Annex IX, Part A, supplied to aviation and maritime transport is considered equivalent to 1.2 times their energy content, and the share of renewable fuels of non-biological origin supplied to aviation and maritime transport is considered equivalent to 1.5 times their energy content.


YANNICK BROSSARD/DPPI

The Renault 5 E-Tech electric can be charged using AC or DC power, via a household outlet, a home wallbox, a standard public charger or a fast-charging station. The city car offers up to 410 km of driving range.

Kia, Hyundai, Xpeng, and others enables peak charging power of over 250 kW. The charging time from 10 to 80 % is thus reduced to 15 minutes for the Smart #5, 18 minutes for the Hyundai Ioniq 6, and a record for a Chinese model, the Xpeng G6, which can charge in 12 minutes (from 10 to 80 %) with a maximum charging power of 451 kW.

A new generation of chargers is being rolled out in Europe, promising charging power of over 1 MW for trucks and more than 400 kW for cars. ABB and Siemens have already launched 400 kW chargers, such as the ABB E400 and Siemens SiCharge D. Ionity is going even further, deploying Alpitronic HYC 1000 chargers since the second half of 2025, produced by the Italian start-up Alpitronic, capable of delivering up to 600 kW. Currently, the Chinese crossover sedan Nio ET9 is the only production electric car capable of accepting 600 kW DC charging, according to its technical specifications. The use of the full power of the HYC 1000 is therefore expected to be extremely rare in the short term. However, the system allows multiple cars to be charged simultaneously at more than 200 kW each. These chargers are designed to prepare for the future and for increased charging power in high-end electric vehicles.

Meanwhile, driven by public authorities, the network of public charging points continues to expand across the European Union. According to EAFO data, the number of public charging points in the EU increased by around 39.5 % between 2023 and 2024, rising from 632 254 (including 81 737 DC chargers) to 882 012 (including 138 058 DC chargers). Deployment remains rapid, and by the end of the third quarter of 2024, the number of public charging points had exceeded one million (1 032 626, including 170 673 points delivering direct current).

This rapid growth across the European Union, however, masks significant heterogeneity, with coverage still very partial in some countries and, conversely, very rapid deployment in others such as Germany, France, the Netherlands, and Belgium. In 2024, these four Member States

STAYING THE COURSE ON ELECTRIFICATION!

In conclusion, the decarbonisation of transport in Europe represents a genuine technological and industrial revolution, pursued on two complementary fronts: on one hand, the rapid reduction of emissions from internal-combustion engines through the introduction of cleaner fuels, and on the other hand, the expansion of electrification in road vehicles. These efforts are part of the ambitious Green Deal, which aims to cut transport-related greenhouse gas emissions by 90 % by 2050, with a key milestone being the cessation of sales of vehicles with internal-combustion engines from 2035. This deadline is currently the subject of debate within the industry and European institutions. Indeed, this measure is likely to "reshuffle the cards" of the automotive value chain, as some manufacturers already have greater expertise in producing strategic components, such as batteries, than others. Some manufacturers, facing still-limited electric vehicle sales, international competition—particularly from China—U.S. tariffs, declining global profits, and economic pressures, are calling for flexibilities and hope to benefit from the review clause provided by Regulation (EU) 2023/851, which amends Regulation (EU) 2019/631. According to Article 11, paragraph 1, this clause requires the European Commission in 2026 to assess progress toward the 100 % CO_2 reduction target for 2035 and to examine whether adjustments are needed, taking into account technological developments, such as the growth of plug-in hybrids, as well as the effectiveness of industrial support mechanisms. The concerns of the automotive industry are not uniform. Manufacturers that anticipated the transition to electric vehicles and invested heavily in batteries, infrastructure, and R&D are much less critical of the 2035 deadline, seeing the ban as a strategic opportunity, provided that flexibility mechanisms and support measures are implemented. This divergence highlights the decisive role of industrial preparedness and mastery of strategic components, such as batteries, in the future competitiveness of the European automotive industry. Beyond industrial considerations, transport decarbonisation is a strategic challenge for the European Union, which must reconcile climate ambitions, technological innovation, and competitiveness in the face of intense international competition. The regulatory framework already in place, through the "Fit for 55" package and CO_2 standards for new vehicles, provides a solid foundation to support this ambitious transformation of European mobility. □

Sources used : Ministry of Ecological Transition-SDES (France), AGEE-Stat (Germany), Ministry for the Ecological Transition (Spain), GSE (Italy), Statistics Netherlands, Federal Public Service Economy-FPS (Belgium), Statistics Austria, Swedish Energy Agency, ENS (Denmark), Ministry of Industry and Trade (Czechia), DGEG- General Directorate of Energy and Geology (Portugal), NSI (Bulgaria), Official statistical portal (Lithuania), CSB (Latvia), Statistics Estonia, Statistical office SIStat (Slovenia), EAFO, ACEA, Eurostat, EurObserv'ER

The next barometer will cover solid biofuels

This barometer was supported by

Supported by RÉPUBLIQUE FRANÇAISE Liberté Égalité Fraternité — ADEME AGENCY FOR ECOLOGICAL TRANSITION

This barometer was prepared by Observ'ER, and co-financed by Ademe, the French energy agency. However, this document reflects the views only of the authors, and Ademe cannot be held responsible for any use which may be made of the information contained therein.

RENEWABLE ENERGY IN TRANSPORT BAROMETER – **EUROBSERV'ER** – NOVEMBER 2025