ÖkoFEN pellet boiler supplied with pellets via vacuum feed from a storage silo

-0.6 %

The decrease of inland consumption from solid biofuels in the EU27 between 2023 and 2024

SOLID BIOFUELS BAROMETER 2025

A study carried out by EurObserv'ER.

The European Union's primary solid biomass energy consumption fell again in 2024, by 0.6% compared with 2023, though the decline was smaller than in the previous two years. According to EurObserv'ER, consumption stood at 94.8 Mtoe in 2024, compared with just under 95.4 Mtoe in 2023 (revised figure), far below the levels seen in 2021 (104.8 Mtoe) and 2022 (100.2 Mtoe). This trend reflects a return to a new equilibrium following the major disruptions experienced in the energy market due to rising gas prices and the tensions caused by the Russia-Ukraine war. In terms of final energy, European solid biomass electricity production decreased by only 0.9% between 2023 and 2024, reaching 78.1 TWh, while heat consumption — whether delivered through a network or used directly by end users — fell by just 1.0% over the same period, reaching 77.3 Mtoe.

78.1 TWh

The electricity production from solid biofuels in the EU27 in 2024

77.3 Mtoe

The heat consumption from solid biofuels in the EU27 in 2024

Solid biofuels, more commonly referred to as solid biomass, include all solid organic materials of biological origin that can be used as fuel for heat or electricity production. In energy statistics, solid biofuels are an aggregate of products comprising firewood, wood residues and by-products (including wood pellets), black liquor (a by-product of the pulp and paper industry), bagasse (a by-product of the sugarcane industry), animal waste, other plant materials and residues, and the renewable fraction of industrial waste. Charcoal is considered a solid biofuel but, by convention, is treated separately in statistics and is therefore not included in the indicators presented in the tables of this barometer. Renewable municipal waste is also tracked separately in statistical reporting and is not included in the solid biofuels category.

Tabl. n° 1

Primary energy production and gross inland consumption of solid biofuels in the European Union in 2023 and 2024** (in Mtoe)*

	2023		2024**	
	Production	Consumption	Production	Consumption
Germany	12.712	12.792	12.770	12.887
France	10.665	10.883	10.415	10.772
Sweden	9.729	9.761	9.448	9.475
Finland	8.323	8.578	8.164	8.432
Poland	8.204	8.188	8.208	8.212
Italy	5.709	6.864	5.854	6.918
Spain	5.682	5.682	5.626	5.626
Austria	5.206	5.152	5.305	5.168
Denmark	1.589	3.109	1.487	3.254
Czechia	3.371	3.217	3.318	3.217
Roumanie	3.165	3.183	3.096	3.153
Portugal	2.895	2.734	3.083	2.882
Hungary	1.878	1.901	1.966	1.962
Netherlands	1.557	2.011	1.504	1.909
Belgium	1.333	1.659	1.338	1.612
Lavia	2.730	1.509	2.557	1.516
Lithuania	1.284	1.286	1.383	1.385
Croatia	1.485	1.330	1.477	1.347
Bulgaria	1.380	1.372	1.240	1.239
Slovakia	1.167	1.157	1.093	1.081
Estonia	1.743	1.211	1.546	1.067
Greece	0.868	0.879	0.720	0.728
Slovenia	0.519	0.519	0.500	0.500
Ireland	0.188	0.221	0.217	0.253
Luxembourg	0.156	0.168	0.203	0.220
Chypre	0.025	0.027	0.025	0.027
Malta	0.000	0.001	0.000	0.001
Total EU 27	93.563	95.395	92.545	94.843

Excluding charcoal. ** Estimation.* ***Source: EurObserv'ER 2025.*

A 10 MTOE DECLINE OVER THREE YEARS

Although solid biofuels remain the largest category of renewable energy consumed in the European Union, their contribution has been declining over the past three years. According to EurObserv'ER, EU primary consumption of solid biofuels fell below 100 Mtoe for the second consecutive year, decreasing from 95.4 Mtoe in 2023 to 94.8 Mtoe in 2024, a drop of 0.6%. Compared with its peak consumption in 2021 (104.8 Mtoe), the decline reaches 9.6%, representing a shortfall of 10 Mtoe over three years. The decrease between 2023 and 2024 is, however, much more moderate, signaling a return to a new equilibrium.

It should be noted that several statistical revisions were made this year, with adjustments for the two previous years (2023 and 2022), both upward and downward. While such consolidations are normal and routine, Italy's revision was particularly significant, with a downward adjustment of around 1 Mtoe for 2023 and 0.7 Mtoe for 2022. According to the GSE, responsible for managing the country's energy services, the data are not yet fully finalized due to the implementation of an extensive monitoring system for volumes of solid biofuels that are compliant or non-compliant with the sustainability requirements imposed by the European Union. Germany and France, for their part, revised their 2023 solid biofuel consumption estimates upward by slightly over 100 ktep, and Spain by just over 200 ktep. Conversely, Poland made a downward revision of slightly more than 100 ktep for the same year.

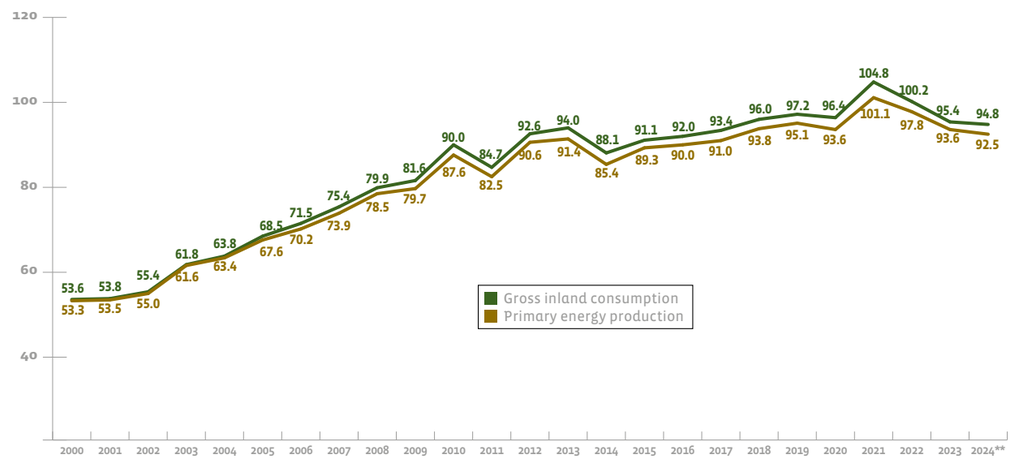
Several factors explain the decline in solid biomass energy consumption across the European Union. The first is climate-related, as heating demand fell once again across the EU. Heating needs are measured using the Heating Degree Day (HDD) indicator, which accounts both for the number of days requiring heating and the intensity of heating required. According to Eurostat, heating demand, measured over a calendar year from January to April and from Septem-

BioNorr, a pellet production plant located in Härnösand, Sweden. Waste heat from the manufacturing process is supplied to the Härnösand district heating network, providing heat equivalent to that used by 2,600 households

BERGSLAGSBILD AB

Graph. n° 1

Solid biofuels primary energy production and inland consumption growth figures for the EU27 since 2000 (in Mtoe)*



Excluding charcoal. **Estimation.* ***Sources: years 2000-2022 Eurostat, years 2023 and 2024 EurObserv'ER.*

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ber to December, decreased across the EU between 2023 and 2024, falling from 2 821 HDD in 2023 to 2 698 HDD in 2024, reaching a historic low. This decline occurred in the vast majority of EU countries, particularly in northern Europe, where winter was unusually mild, and also in eastern European countries. For comparison, 2021 was much colder than the recent average, with 3 126 HDD, which partly explains the peak in solid biomass consumption that year.

The second reason is economic. The energy crisis of 2022, which actually began in spring 2021 with rising gas prices and became structural with the Russia-Ukraine war, destabilized the solid biofuels market. One consequence was a sharp increase in wood pellet prices, driven by the surge in gas prices (necessary for pellet production) and constrained European demand due to the embargo on Russian and Belarusian imports. This scarcity then disrupted electricity production in power plants using these fuels and limited the use of domestic heating appliances. In 2023 and 2024, prices gradually returned to more normal levels. According to a report by Hawkins Wright, a provider of market analysis and intelligence services for the international pulp, paper, and biomass industries, published in early 2025, the retail price of heating pellets in Europe for the residential sector fell to around 300 euros per ton in 2024 (compared to 350–400 euros per ton in 2023), after having exceeded 600 euros per ton at the end of 2022.

Despite this return to normal, in some countries, such as Sweden and Finland, the sharp drop in wholesale electricity prices occurred more quickly than the decrease in solid biofuel prices, which again constrained electricity production in combined heat and power plants. Between 2023 and 2024, the change in pellet consumption in the European Union, across all uses (industrial and residential), was modest. According to the latest Bioenergy Europe report on pellets, the "Pellets Bioenergy Europe Statistical Report 2025," pellet consumption in the EU increased very slightly (21.9 million tonnes in 2023). However, European consumption overall (EU-27 plus other European countries) grew sharply due to strong demand from the United Kingdom. According to Bioenergy Europe, in just one year, the Drax power plant made up for its previous reductions in pellet consumption, adding nearly 3 million tonnes of additional demand. Total pellet consumption in Europe reached around 32.7 million tonnes in 2024, an increase of about 10% compared with 2023.

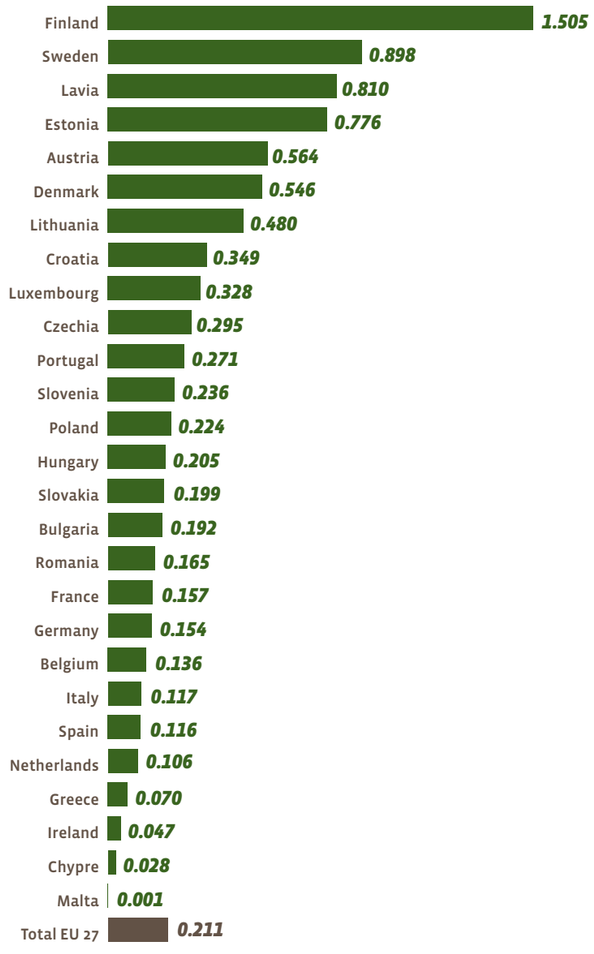
EUROPEAN PRODUCTION DOWN BY 1 MTOE

According to EurObserv'ER, European Union production of solid biofuels, that is, solid biomass harvested within the EU, stood at around 92.5 Mtoe in 2024. This represents a decrease of 1.1% compared with 2023, equivalent to a drop of 1 Mtoe in production. The difference between primary energy production and gross domestic consumption corresponds to the balance of imports and exports, as well as changes in stocks. At the EU level, net imports of solid biomass remained low (2.3 Mtoe in 2024), slightly up from 2023 (1.8 Mtoe), but still below pre-crisis levels (+2.8 Mtoe in 2020, +3.7 Mtoe in 2021). The decline in imports observed since 2021 is explained both by the embargo on Russian and Belarusian biofuels and by the gradual implementation of EU legislation on biomass use in large industrial sites, particularly biomass-fired power plants. The halt of Russian and Belarusian imports has led to a European market adjustment favoring North American (Canada, United States) and Southeast Asian (Malaysia, Thailand, Vietnam, etc.) wood pellet producers.

The distribution among the different types of solid biofuels produced in the European Union changes little from year to year. According to Eurostat in 2023 (latest available figures), it was 78.6% for firewood, wood residues, and by-products (including 6.4% pellets), 14% for black liquor, 5% for other plant materials and residues, 1.6% for the renewable fraction of industrial waste, 0.6% for bagasse, and 0.2% for animal waste.

Graph. 2

Gross inland consumption of solid biofuels by toe per inhabitant in the European Union in 2024***



*Excluding charcoal ** Estimate **Source: EurObserv'ER 2025.**

Tabl. n° 2

Gross electricity production from solid biofuels in the European Union in 2023 and 2024** (in TWh)*

	2023				2024**			
	Electricity only plants	CHP plants	Total	Compliant*** (%)	Electricity only plants	CHP plants	Total	Compliant*** (%)
Germany	4.522	5.938	10.460	100.0%	4.366	5.781	10.147	100.0%
Finland	0.000	10.642	10.642	99.1%	0.000	9.758	9.758	99.9%
Sweden	0.000	10.291	10.291	99.5%	0.000	8.867	8.867	100.0%
Poland	1.600	4.774	6.374	89.5%	1.400	4.556	5.956	89.5%
Denmark	0.000	4.977	4.977	100.0%	0.000	5.837	5.837	100.0%
France	1.235	3.507	4.742	100.0%	1.495	3.808	5.303	100.0%
Netherlands	1.384	3.571	4.955	97.0%	1.906	2.379	4.285	96.5%
Spain	3.288	0.759	4.047	96.0%	3.443	0.764	4.207	95.2%
Italy	1.629	1.811	3.439	94.8%	2.199	1.942	4.140	95.1%
Austria	0.769	2.746	3.515	98.2%	0.656	2.992	3.648	99.1%
Portugal	1.354	1.896	3.250	100.0%	1.332	1.817	3.149	100.0%
Czechia	0.001	2.438	2.439	100.0%	0.002	2.652	2.654	100.0%
Belgium	0.481	1.268	1.748	100.0%	0.201	1.377	1.578	100.0%
Bulgaria	0.186	1.523	1.708	100.0%	0.093	1.430	1.523	100.0%
Hungary	0.300	0.826	1.126	90.2%	0.484	0.928	1.412	96.3%
Estonia	0.492	0.828	1.321	100.0%	0.523	0.814	1.337	100.0%
Slovakia	0.063	0.900	0.963	100.0%	0.056	1.006	1.062	100.0%
Croatia	0.000	0.706	0.706	100.0%	0.000	0.678	0.678	100.0%
Lithuania	0.000	0.416	0.416	100.0%	0.000	0.626	0.626	100.0%
Ireland	0.322	0.026	0.347	98.8%	0.489	0.025	0.514	99.2%
Lavia	0.000	0.478	0.478	93.9%	0.000	0.457	0.457	66.5%
Romania	0.003	0.376	0.379	100.0%	0.012	0.416	0.427	100.0%
Luxembourg	0.000	0.289	0.289	100.0%	0.000	0.346	0.346	100.0%
Slovenia	0.000	0.196	0.196	100.0%	0.000	0.168	0.168	100.0%
Greece	0.023	0.031	0.055	100.0%	0.026	0.041	0.067	100.0%
Total EU 27	17.652	61.212	78.864	98.1%	18.682	59.464	78.146	98.2%

*Excluding charcoal. **Estimation. ***Compliant with the criteria of Article 29 of Directive (EU) 2018/2001 **Source: EurObserv'ER 2025.**

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Total European pellet consumption reached around 32.7 million tonnes in 2024, an increase of approximately 10% compared with 2023

Tabl. n° 3

Gross heat production in the transformation sector from solid biofuels in the European Union in 2023 and in 2024** (in Mtoe)*

	2023				2024**			
	heat only plants	CHP plants	Total	Compliant*** %	heat only plants	CHP plants	Total	Compliant*** %
Finland	1.083	1.036	2.119	99.1%	1.162	0.956	2.118	99.9%
Sweden	1.036	1.194	2.230	99.5%	1.048	1.035	2.082	99.5%
Denmark	0.518	1.059	1.577	100.0%	0.543	1.111	1.654	100.0%
France	0.671	0.528	1.199	100.0%	0.701	0.437	1.139	100.0%
Austria	0.611	0.353	0.964	98.2%	0.619	0.372	0.991	99.1%
Germany	0.175	0.480	0.655	100.0%	0.197	0.489	0.686	100.0%
Lithuania	0.374	0.153	0.526	100.0%	0.384	0.157	0.541	100.0%
Poland	0.150	0.378	0.528	89.5%	0.148	0.371	0.519	89.5%
Lavia	0.243	0.148	0.391	100.0%	0.251	0.152	0.403	100.0%
Netherlands	0.090	0.192	0.282	92.8%	0.095	0.204	0.299	95.7%
Czechia	0.042	0.188	0.230	100.0%	0.051	0.219	0.269	100.0%
Estonia	0.143	0.225	0.368	100.0%	0.100	0.158	0.258	100.0%
Italy	0.085	0.139	0.224	96.1%	0.084	0.136	0.220	96.9%
Bulgaria	0.017	0.115	0.132	100.0%	0.015	0.133	0.147	100.0%
Luxembourg	0.006	0.087	0.093	100.0%	0.007	0.104	0.111	100.0%
Slovakia	0.054	0.076	0.130	100.0%	0.044	0.062	0.106	100.0%
Hungary	0.039	0.047	0.086	86.2%	0.044	0.053	0.097	91.9%
Croatia	0.000	0.077	0.077	100.0%	0.000	0.073	0.073	100.0%
Romania	0.010	0.051	0.061	100.0%	0.009	0.047	0.056	100.0%
Slovenia	0.015	0.024	0.039	100.0%	0.015	0.025	0.041	100.0%
Belgium	0.000	0.037	0.037	100.0%	0.000	0.038	0.038	100.0%
Total EU 27	5.362	6.588	11.949	98.8%	5.518	6.332	11.850	99.1%

Excluding charcoal. **Estimation. ***Compliant with the criteria of Article 29 of Directive (EU) 2018/2001.* ***Source: EurObserv'ER 2025.*

FINAL ENERGY SLIGHTLY DOWN

Primary energy is the energy contained in natural resources before any possible transformation. Final energy is the energy used by the consumer, after transformation and transport, consumed and billed at its point of use. EurObserv'ER distinguishes two types of final energy use from solid biomass, namely electricity (table 2) and heat. Solid biomass heat is differentiated according to whether it comes from the transformation sector, that is, distributed via district heating networks (table 3), or used directly by end consumers (in the residential, industrial, and agricultural sectors), excluding the transport sector (table 4).

In the European Union, solid biomass electricity production has stopped declining. Between 2023 and 2024, it fell by only 0.9 % to reach 78.1 TWh (-0.7 TWh), whereas between 2022 and 2023 the decrease had been 10.8 %, equivalent to a drop of nearly 10 TWh. Considering only the portion compliant with the requirements of the 2018/2001 Renewable Energy Directive, which can be counted towards European targets, electricity production from solid biomass reached 76.7 TWh in 2024, compared with 77.4 TWh in 2023, a decrease of 0.8 %. The share of compliant solid biomass electricity production is therefore 98.2 % in 2024, with 1.4 TWh excluded.

At the member state level, trends are more pronounced, both upward and downward. The four leading producers of solid biomass electricity saw their production levels decline. The decrease was less significant in Germany (-3.0 % between 2023 and 2024), the only country to exceed 10 TWh of electricity in 2024. Finland, historically the leader in this ranking, fell to second place with a production of 9.8 TWh (-8.3 %). Sweden's production declined even more sharply (-13.8 %), and amounted to 8.9 TWh in 2024. Poland's production (6 TWh in 2024) returned to its 2022 level after a 6.6 % drop between 2023 and 2024. Against this trend, production in Denmark (5.8 TWh) and France (5.3 TWh) increased significantly (+17.3 % and +11.8 %, respectively), as did production in Italy (4.1 TWh), which rose by 20.4 %.

Regarding total heat consumption, which includes both final energy consumption (directly used by end users) and heat from the transformation sector (sold heat), it continues to decline but at a slower pace. In 2024, total heat consumption fell by only 1 %, decreasing from 78.1 Mtoe in 2023 to 77.3 Mtoe in 2024. The vast majority of this consumption (98.7 % in 2024) was deemed compliant by EU member states according to the preliminary data from the national SHARES files used to calculate the renewable energy targets under Directive 2018/2001.

Specifically, final-use solid biomass heat consumption decreased by 1.0 % between 2023 and 2024, reaching 65.5 Mtoe, or 658 ktoe less than in 2023. Among the main countries, it slightly

Tabl. n° 4

Final energy consumption from solid biofuels** in the European Union in 2023 and in 2024*** (in Mtoe)*

	2023	Compliant**** %	2024	Compliant**** %
Germany	9.615	100.0%	9.782	100.0%
France	8.218	100.0%	8.093	100.0%
Poland	6.544	89.5%	6.529	89.5%
Sweden	5.836	99.5%	5.917	99.5%
Italy	5.514	99.7%	5.366	99.9%
Finland	4.778	99.8%	4.732	99.9%
Spain	4.300	97.8%	4.217	98.2%
Austria	3.518	100.0%	3.479	100.0%
Romania	3.162	100.0%	2.951	100.0%
Czechia	2.402	100.0%	2.331	100.0%
Portugal	1.799	100.0%	1.940	100.0%
Hungary	1.508	100.0%	1.477	97.9%
Belgium	1.270	100.0%	1.276	100.0%
Lavia	0.962	100.0%	0.961	100.0%
Croatia	1.002	100.0%	0.951	100.0%
Denmark	0.899	100.0%	0.845	100.0%
Bulgaria	0.917	100.0%	0.779	99.9%
Greece	0.857	100.0%	0.701	100.0%
Slovakia	0.760	100.0%	0.674	100.0%
Lithuania	0.594	100.0%	0.660	100.0%
Netherlands	0.612	95.1%	0.634	91.3%
Estonia	0.422	100.0%	0.527	100.0%
Slovenia	0.445	100.0%	0.428	100.0%
Ireland	0.149	98.1%	0.153	98.7%
Luxembourg	0.033	100.0%	0.055	100.0%
Chypre	0.025	100.0%	0.025	100.0%
Malta	0.001	73.9%	0.001	100.0%
Total EU 27	66.144	98.7%	65.485	98.6%

Final Energy Consumption in "Industry" and "Other sectors", excluding "Transport". **Excluding charcoal ***Estimation ** Compliant with the criteria of Article 29 of Directive (EU) 2018/2001.*
Source: EurObserv'ER 2025.

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increased in Germany (+1.7 %) and Sweden (+1.4 %), remained stable in Poland (-0.2 %), but decreased in France (-1.5 %), Italy (-2.7 %), Finland (-1 %), Spain (-1.9 %) and Austria (-1.1 %), for example.
The gross production of solid biomass heat sold through district heating networks (from the transformation sector) remained almost stable between 2023 and 2024, decreasing by 99 ktoe to just under 11.9 Mtoe (-0.8 %). This decline is largely explained by reduced output from Swedish cogeneration plants. Sweden experienced a further drop in heat sold to networks of about 6.6 % between 2023 and 2024 (-148 ktoe), totaling less than 2.1 Mtoe in 2024. A significant decrease was also recorded in Estonia (-29.9 %), equivalent to a loss of 110 ktoe. Conversely, Denmark increased its biomass district heating network output (+4.9 %), as did Germany (+4.8 %) and Austria (+2.9 %).

Tabl. n° 5

Heat consumption from solid biofuels** in the countries of the European Union in 2023 and 2024*** (in Mtoe)*

	2023	Compliant**** %	2024	Compliant**** %
Germany	10.270	100.0%	10.469	100.0%
France	9.417	100.0%	9.232	100.0%
Sweden	8.066	99.5%	8.000	99.5%
Poland	7.072	89.5%	7.048	89.5%
Finland	6.897	99.6%	6.850	99.9%
Italy	5.737	99.6%	5.585	99.7%
Austria	4.482	99.6%	4.470	99.8%
Spain	4.300	97.8%	4.217	98.2%
Romania	3.223	100.0%	3.007	100.0%
Czechia	2.632	100.0%	2.601	100.0%
Denmark	2.476	100.0%	2.499	100.0%
Portugal	1.799	100.0%	1.940	100.0%
Hungary	1.594	99.2%	1.574	97.5%
Lavia	1.352	100.0%	1.364	100.0%
Belgium	1.307	100.0%	1.313	100.0%
Lithuania	1.121	100.0%	1.202	100.0%
Croatia	1.079	100.0%	1.024	100.0%
Netherlands	0.894	94.4%	0.933	92.7%
Bulgaria	1.049	100.0%	0.927	100.0%
Estonia	0.791	100.0%	0.785	100.0%
Slovakia	0.890	100.0%	0.780	100.0%
Greece	0.857	100.0%	0.701	100.0%
Slovenia	0.485	100.0%	0.468	100.0%
Luxembourg	0.126	100.0%	0.166	100.0%
Ireland	0.149	98.1%	0.153	98.7%
Chypre	0.025	100.0%	0.025	100.0%
Malta	0.001	73.9%	0.001	100.0%
Total EU 27	78.093	98.7%	77.336	98.7%

** Gross heat production in the transformation sector and final energy consumption in Industry and «Other sectors» (excluding Transport) ** Excluding charcoal *** Estimation **** Compliant with the criteria of Article 29 of Directive (EU) 2018/2001.* ***Source: EurObserv'ER 2025.***

UPDATES FROM KEY COUNTRIES

RETURN TO BALANCE IN GERMANY

Germany is among the few countries to have slightly increased its consumption of solid biofuels between 2023 and 2024. According to AGEE-Stat, consumption rose by 0.7 % to 12.9 Mtoe (+0.1 Mtoe) after having fallen by 1.5 Mtoe between 2022 and 2023. According to EurObserv'ER, the country returned to a form of equilibrium after the sharp drop in consumption recorded in 2023. In 2022, Germany had been one of the few EU countries to significantly increase its consumption of solid biofuels. This rise had been particularly marked in industry, in connection with tensions in natural gas supply following Russia's war of aggression against neighboring Ukraine. The increase nevertheless remains modest and concerns only biomass heat, with a 1.7 % rise for end users (a gain of 167 ktoe) and a 4.8 % increase for sold heat (a gain of 31 ktoe). Biomass power plants, by contrast, were again used less intensively, likely linked to lower electricity prices, although here too without any major variation.

BIOMASS COGENERATION STILL STRUGGLING IN SWEDEN

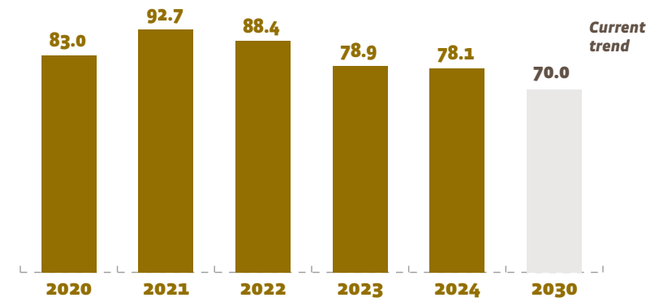
According to Statistics Sweden, primary solid biomass energy consumption declined again in 2024, reaching 9.5 Mtoe (-2.9 % compared with 2023), moving further away from its 2021 consumption record (10.2 Mtoe). This downturn once again results from lower utilization of biomass-fired combined heat and power (CHP) plants. Electricity generation from solid biomass in the country, which comes exclusively from CHP plants, thus fell by 13.8 % compared with 2023 (-1.4 TWh) to a total of 8.9 TWh. The decline is sharper than that observed between 2022 and 2023 (-8.8 %, -1 TWh). Heat production from units whose main activity is combined heat and power generation logically declined again (-13.3 %), while production from heat-only plants remained stable (+1.1 %). Overall, gross heat production in the transformation sector decreased by 6.6 % between 2023 and 2024 to 2.1 Mtoe (-148 ktoe). While the production of marketed heat fell in the country, this was not the case for solid biomass heat directly used by final consumers. The latter increased by 1.4 % to reach 5.9 Mtoe in 2024 (+82 ktoe compared with 2023).
In Sweden, electricity prices fell faster than biomass fuel costs, reducing the attractiveness of biomass cogeneration. One consequence is that CHP plants adjust their operating hours in response to price signals rather than running continuously, which reduces annual output volumes. One reason for the drop in electricity prices is the remarkable growth of wind power generation in the country, which, according to Statistics Sweden, rose from 34.2 TWh to 40.6 TWh. Wind generation has more than doubled in six years (19.8 TWh in 2019). This influx of near-zero marginal cost generation has reduced the economic space for biomass cogeneration in the electricity market and is pushing CHP plants to operate primarily in heat mode when demand is present.

SLIGHT DECLINE IN FRANCE'S CONSUMPTION

According to SDES, the statistical service of the French ministries in charge of the environment, energy, construction, housing and transport, France's primary solid biomass energy consumption declined slightly between 2023 and 2024, from 10.9 to 10.8 Mtoe (-1 %), but remains slightly above its 2022 level (10.7 Mtoe). This slight decrease is explained by milder winter temperatures in 2024 than in 2023. SDES specifies that in France, under constant climatic conditions, the average wood consumption per household using this energy source tends to decline, notably due to improvements in appliance efficiency. In 2024, the residential sector remains the main consumer of wood energy, accounting for 62 % of primary wood energy consumption. The share of the energy sector rose from 8 % in 2013 to 22 % in 2024, driven by the strong increase in wood consumption by cogeneration plants and district heating networks. The remainder is split between industry (11 %), the tertiary sector (3 %) and agriculture (2 %). Gross heat production in the transformation sector (marketed heat supplied via district heating networks) fell by 5 % between 2023 and 2024 to 1.1 Mtoe. Final energy consumption also declined by 1.5 % to 8.1 Mtoe, mainly due to lower household consumption linked to the milder winter of 2024 compared with 2023. Electricity generation from solid biofuels increased sharply (+11.8 %), gaining 561 GWh to reach 5.3 TWh in 2024. Further growth is also expected in 2025 following the restart of the Gardanne power plant in Provence, effective on 1 January 2025, after an agreement between the operator GazelEnergie and the French state. Output is planned for around 4 000 operating hours, corresponding to regular but more limited activity than in the past. With a capacity of 150 MW, Unit 4 of the Provence power plant (Provence 4 Biomasse) now produces renewable electricity and can supply the equivalent of 125 000 households—roughly twice the size of the city of Aix-en-Provence. This restart enables the biomass unit (the largest in France) to generate electricity from wood under the renewed contract. In 2025, a public inquiry was conducted into wood supply and the plant's environmental impact, and additional technical requirements were added to the operating permit by a prefectural decree at the end of 2025.
In France, the government is actively supporting the expansion of biomass-based heat through the Heat Fund (Fonds Chaleur), managed by ADEME since 2009. In 2024, the fund mobilised

Graph. n° 3

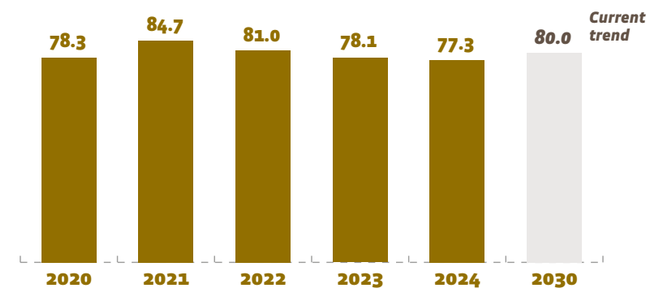
EurObserv'ER projection of electricity production from solid biofuels in the EU 27 (in TWh)*



Source: EurObserv'ER 2025.

Graph. n° 4

EurObserv'ER projection of heat consumption from solid biofuels** in the EU 27 (in Mtoe)*



** Gross heat production in the transformation sector and final energy consumption in Industry and «other sectors» (excluding transport) ** Excluding charcoal.* ***Source: EurObserv'ER 2025.***

820 million euros—up 36% compared with 2023—making it possible to finance more than 1 350 new installations producing 3.6 TWh per year of renewable and recovered heat, 68% of which comes from biomass. These projects are expected to avoid around 805 750 tonnes of CO_2 emissions annually. One illustrative example is the biomass boiler project at the Scierie de Savoie sawmill in Rognaix (Savoie). To meet new drying requirements at the industrial site and reduce reliance on fossil fuels, the company invested in a 5.5 MW biomass boiler that will recover and use wood waste generated by its own operations. The installation will cover 100% of the site's thermal needs and will be complemented by two additional timber-drying kilns. The project is expected to avoid approximately 5,700 tonnes of CO_2 emissions per year. Supported by 2.025 million euros in funding from ADEME, the facility is scheduled to enter into operation at the end of 2026. Together, these initiatives highlight the growing importance of biomass energy in supporting industrial decarbonisation and the energy transition at both local and regional levels.

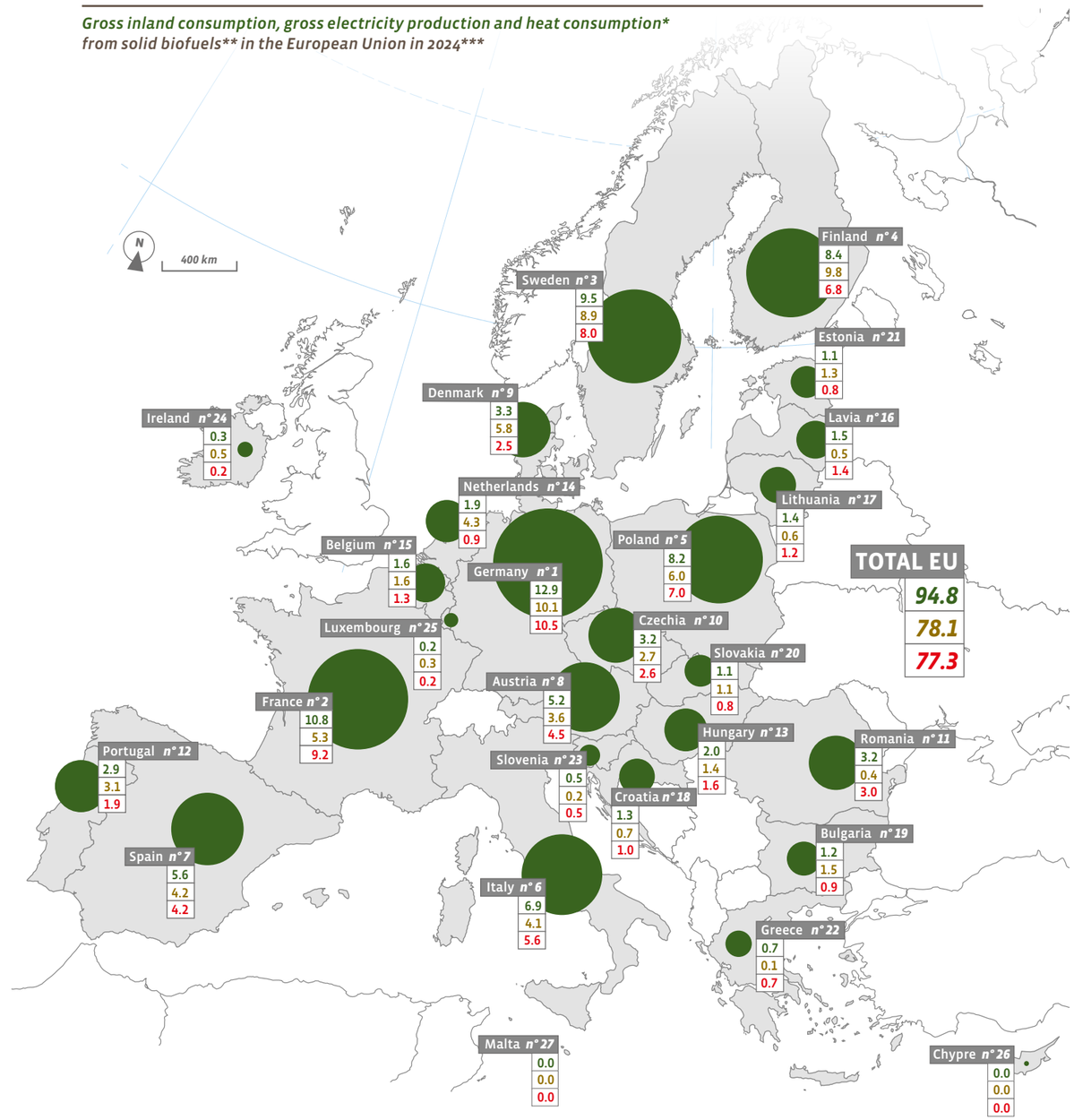

ENGIE SOLUTIONS

Biomass boiler plant at Ingredia's historic Saint-Pol-sur-Ternoise site (Pas-de-Calais), a producer of dairy ingredients including milk powders, proteins, and additives

RED III: A STRENGTHENED FRAMEWORK FOR SUSTAINABLE SOLID BIOMASS

For the European Commission, increasing the use of biomass in the EU can help diversify Europe's energy supply—both in heat production and electricity generation—while fostering growth, creating jobs, and reducing greenhouse gas emissions. However, for biomass energy to effectively contribute to emission reductions while continuing to support ecosystem services (such as oxygen production) and biodiversity conservation, it must be produced and used sustainably. Biomass production involves a chain of activities, from cultivating the raw material to its final energy conversion. Each stage of this process presents specific sustainability challenges that need to be carefully managed.
For this reason, the European Union has established strengthened sustainability criteria—first under the Renewable Energy Directive 2018/2001 (RED II), and more recently, under the revised Renewable Energy Directive 2023/2413 (RED III) of 18 October 2023, which introduces even broader criteria. The aim of RED III is to further expand the scope of sustainability requirements so that they apply to an even greater number of installations. It also seeks to discourage the use of sawlogs or industrial-quality wood for energy purposes, as well as the use of biomass solely for electricity production. Furthermore, it ensures that Member States uphold the principles of cascading use and waste hierarchy, so that biomass energy is produced in a way that minimizes market distortions for biomass-derived raw materials.
Regarding RED III, the text came into force on 20 November 2023, and Member States were given eighteen months—until 21 May 2025—to transpose certain provisions, including those amending Articles 3, 29, and 30 on bioenergy and the strengthening of sustainability criteria. During this transitional period, the rules from RED II continue to apply, with specific transitional mechanisms for existing installations. Article 3 imposes restrictions on public support for electricity-only production from forest biomass. It specifies that Member States shall neither grant new support nor renew existing support for electricity-only generation from forest biomass, except in cases where the electricity is

Gross inland consumption, gross electricity production and heat consumption from solid biofuels** in the European Union in 2024****



Key

94.8 Inland consumption of solid biofuels in the European Union in 2024** (in Mtoe)

78.1 Gross electricity production from solid biofuels in the European Union in 2024** (in TWh).

77.3 Heat consumption*** from solid biofuels in the European Union in 2024** (in Mtoe).

*Gross heat production in the transformation sector and final Energy Consumption in Industry and "Other sectors", excluding Transport. ** Excluding charcoal. *** Estimation.*
Source : EurObserv'ER 2025.

SOLID BIOFUELS BAROMETER 2025 – **EUROBSERV'ER** – DECEMBER 2025

STÉPHANIE LIMONGY/DÉPARTEMENT DE L'AUDE.

The Limoux wood-fired heating plant in Occitanie, inaugurated in 2023 on the site of a former tile factory. Its three-kilometre district heating network serves public buildings and both collective and individual housing, using around 2,000 tonnes of locally sourced wood per year

produced in an outermost region (note: an outermost region is a territory of the European Union located outside the European continent) or where electricity is generated alongside carbon capture and storage. Member States are also prohibited from providing direct financial support for the use of sawlogs, veneer, industrial-quality roundwood, stumps, or roots for energy production, or for renewable energy derived from waste incineration, unless the separate collection requirements set out in Directive 2008/98/EC have been met.

Article 29, paragraph 1, lowers the minimum threshold for the application of sustainability criteria to biomass fuels used in installations producing heat, electricity, or cooling, from the current 20 MW to 7.5 MW. The aim is to ensure greater environmental effectiveness of sustainability standards and greenhouse gas emission reductions. Article 29-3 adds "semi-natural forests" (that is, old-growth semi-natural forests) and heathlands to the list of areas where harvesting is prohibited for biodiversity protection purposes. Finally, Article 30, paragraphs 1 and 6, sets out obligations for conducting audits and establishing simplified national systems for installations producing electricity, heat, or cooling with a total nominal thermal capacity between 7.5 MWth and 20 MWth.

At the end of 2025, the transposition of RED III had not been fully completed in several countries. Consequently, the European Commission decided to issue reasoned opinions to Greece, Italy, France, Cyprus, Hungary, Malta, Poland, and Portugal, on the grounds that these Member States had not fully incorporated the provisions of the amending Directive (EU) 2023/2413 into their national law.

Certain legal provisions allow for a bit of extra time in implementing the new sustainability criteria. Given the operational challenges faced in applying RED III in the wood-energy sector, France, for example, informed the European Commission of its decision to apply the "grandfather clause" defined in Article 29.15 of Directive (EU) 2018/2001, known as RED II, to the wood-energy, biomethane, and biogas cogeneration sectors. This clause allows existing installations to continue operating under RED II criteria until the end of 2026, and in some cases until 31 December 2030 for installations with a purchase tariff signed before November 2023. It enables the companies concerned to remain subject to the directive as it stood before 21 May 2025—that is, under RED II—rather than being immediately required to comply with the new criteria of the revised RED III directive.

These measures reflect a shared intent to balance the legal certainty of existing investments with the gradual strengthening of the European sustainability framework. As things stand, the expected timeline foresees full transposition of the directive by the end of 2026.

For the current year, as well as the years ahead, significant uncertainties remain regarding the use of solid biofuels for electricity generation. Several factors are currently weighing on power production: the reduced competitiveness of large biomass plants due to falling wholesale electricity prices (which are declining faster than the effective cost of solid biofuels), the implementation of the new European directive (RED III) that tightens sustainability requirements linked to production subsidies, and strained trade relations between the European Union and certain pellet-exporting countries. The ongoing trade dispute between the United States and the EU, for instance, raises the prospect of new tariffs on American wood pellets. According to EurObserv'ER, it now appears that a portion of the solid biofuels currently used in high-capacity power plants will be redirected toward more sustainable uses. This shift is already happening with wood pellets. The long-term trend is for solid biofuels to be prioritized for meeting heat demand, either through direct use or via the supply of heat from biomass boilers or cogeneration units. □

Sources : AGEE-Stat (Germany), Terna (Italy), SDES (France), Ministry of Industry and Trade (Czechia), ENS (Denmark), Statistics Netherlands, GUS (Poland), Ministry for Ecological Transition and the Demographic Challenge (Spain), Statistics Austria, SPF Économie (Belgium), Statistics Finland, Statistic Sweden, CRES (Greece), Central Statistical Bureau of Latvia, Statistics Estonia, DGEG (Portugal), NSI (Bulgaria), SEAI (Ireland), Statistics Lithuania, Statistical Office of the Republic of Slovenia, NSI (Romania), Hungarian Central Statistical, NSO (Malta), EurObserv'ER, SHARES Eurostat.

The next barometer will be dedicated to wind power.

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