Pellets

2025

Bioenergy Europe
Statistical Report

Bioenergy Europe

EUROPEAN PELLET COUNCIL
A NETWORK OF BIOENERGY EUROPE

BIOENERGY EUROPE STATISTICAL REPORT 2025

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BIOENERGY EUROPE STATISTICAL REPORT 2025

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ABOUT

THE STATISTICAL REPORT

Every year since its debut release in 2007, Bioenergy Europe's Statistical Report has provided an in-depth overview of the bioenergy sector in the EU-27 Member States.

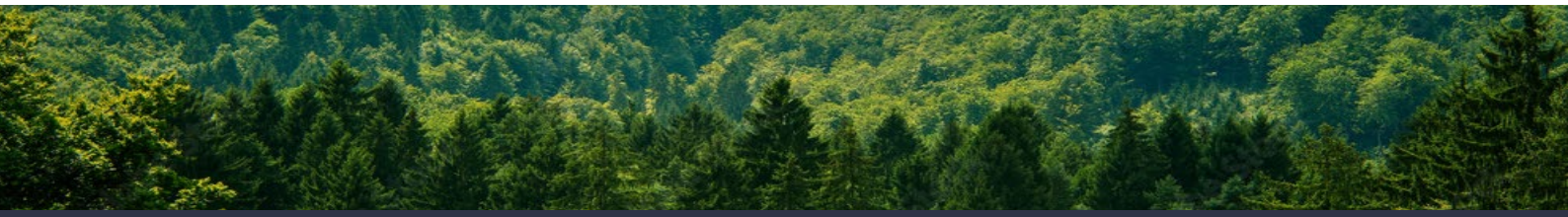
Bioenergy Europe's Statistical Report has been enriched each year with new figures and information, collecting unique data on the developments of the European bioenergy market from a growing number of international contributors.

Bioenergy Europe develops detailed reports that aid industry leaders, decision makers, investors and all bioenergy professionals to understand the situation of bioenergy in Europe.

Bioenergy Europe´s Statistical Report can get accurate and up-to-date information on the EU-27 energy system such as the final energy consumption of biomass for heat and electricity, the number of biogas plants in Europe, the consumption and trade of pellets, the production capacity of biofuels and other key information to help break down and clarify the complexity of a sector in constant evolution.

In 2017, the Report was rewarded by the European Association Awards for being the 'best Provision of Industry Information and Intelligence', a recognition after a decade of collective work.

THE EUROPEAN ASSOCIATION AWARDS 2017



Pellets Statistical Report

provides a comprehensive overview of the European & global pellets market: production & consumption of pellets, sales of pellet appliances, sustainability & fuel quality certification.

Bioenergy Landscape Statistical Report

provides up-to-date information on the overall EU energy system, the current state of play of bio-heat, bioelectricity, and biofuels, the availability and dynamics of supply, and much more.

ABOUT

BIOENERGY EUROPE

A bit of history

Bioenergy Europe is the voice of European bioenergy.

It aims to develop a sustainable bioenergy market based on fair business conditions.

Founded in 1990, Bioenergy Europe is a non-profit, Brussels-based international organisation bringing together over 40 associations and 120 companies, as well as academia and research institutes from across Europe.

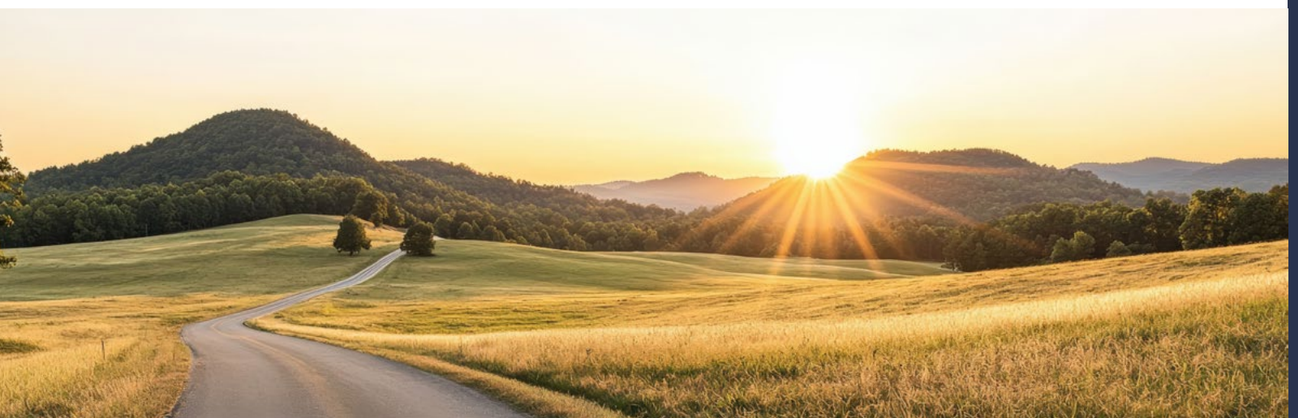
Our vision

Bioenergy Europe will be the leading player in ensuring that sustainable bioenergy is a key pillar in delivering a carbon neutral Europe.

Our mission

Bioenergy Europe facilitates the development of a sustainable, strong, and competitive bioenergy sector through:

- Promotion towards European policymakers and stakeholders for awareness, acceptance, and reputation of bioenergy.
- Promote the development of consistent, realistic, and sustainable bioenergy scenarios in the heat, electricity, and transport sectors.
- Pro-active proposals to develop more favourable European legislation.
- Tools, including certification schemes, to sustain market growth and credibility.
- Market intelligence to support decision making.
- Industry collaboration throughout the entire supply chain.
- Services to members, including support to advocacy at a national level.
- Promotion of efficient and innovative technologies within the bioeconomy.



OUR

ACTIVITIES

Bioenergy Europe carries a wide range of activities aimed at supporting its members on the latest EU and national policy developments. Bioenergy Europe works to voice their concerns to EU and other authorities, including, advocacy activities in key policy areas as well as the organisation of dedicated working groups.

Working Groups

Bioenergy Europe's working groups act as a platform for members to discuss common issues and exchange information on the state of play of bioenergy.

There are currently 6 active working groups and 3 task forces:

- Biomass Supply;
- Carbon Dioxide Removals;
- Competitiveness;
- Domestic Heating;
- Pellets;
- Sustainability;
- Task Force Communications;
- Task Force EUDR;
- Task Force National Advocacy.

Certification Schemes

Thanks to the experience and authority acquired over the last 20 years, Bioenergy Europe has successfully established two international certification schemes to guarantee high quality standard for fuels, namely, EN*plus*®, as well as the latest edition in the certification for sustainable bioenergy: SURE.

European Pellet Council

Bioenergy Europe is the umbrella organisation of the European Pellet Council (EPC). This network has been created thanks to the dynamics of Bioenergy Europe members. Today, this network brings together bioenergy experts and company representatives from all over Europe and beyond.

The European Pellet Council (EPC), founded in 2010, represents the interests of the European wood pellet sector. Its members are national pellet associations or related organisations from over 17 countries.

EPC is a platform for the pellet sector to discuss issues relating to the transition from a niche product to a major energy commodity. Issues include the standardisation and certification of pellet quality, safety, security of supply, education and training, and the quality of pellet-using devices. EPC manages the EN*plus*® quality certification.

For further information on Bioenergy Europe's Networks & Certification Schemes visit www.bioenergyeurope.org

OUR

MEMBERS*

As the common voice of the bioenergy sector, Bioenergy Europe, aims to develop a sustainable bioenergy market based on fair business conditions and does so by bringing together national associations and companies from all over Europe – thus representing more than 5000 indirect members, including companies and research centres.

Associations

Companies

Academia

*Members as of June 2025

TABLE OF CONTENTS

Index

List of figures

List of figures (continued)

List of tables

PELLETS

FORWARD

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For once, 2024 brought some good news to the industrial pellet market in Europe. Primarily driven by favourable conditions in the UK CfD scheme, consumption of industrial pellets in Europe has rebounded after a bad year in 2023. Coupled with continued growth in Asia, the global consumption of industrial pellets reached an all-time high of 26,6 million tonnes. Despite this good news, the question mark of what will happen post-2027 starts looming larger in everyone's minds. Early this year, the announcement of the new bridging mechanism for Drax brought some sense of stability, but also several questions. Drax is recognized as a vital part of the UK's energy supply, but its contribution to electricity production is expected to decrease and become more connected with periods of low generation by intermittent renewables. Practically, this translates to reduced pellet consumption, roughly at half the level of the current one. Add on top the uncertainties regarding Dutch industrial consumption post-2027, it looks like the pellet sector will soon face a supply-demand imbalance in the opposite direction of what was anticipated in 2022 with the cut-off of the Russian supply to Europe. How the market will react to this, remains to be seen.

The European premium pellet sector does appear more stable on the surface, but it is quite complicated once you look into the details. Unfortunately, 2024 showed a further decline in the sales of pellet appliances for most countries. Although, this is not totally unrelated to negative perceptions for pellet – in particular stability of pellet prices – among new, potential users, this observation should not be seen independently of the wider economic climate in Europe. Sales of competing solutions, heat pumps and fossil appliances, are also slowing down as the economy takes a negative turn and private consumers postpone major investment/home renovation decisions. And two counter-examples clearly demonstrate that this does not have to be the case: Austria and Poland. In both cases, public support schemes have helped households to switch from fossil-heating to modern, pellet fired boilers. In Austria, sales of pellet boilers reached historical highs, while in Poland, the number of applications for switching from coal to pellet/biomass heating exceeded the applications for a switch to heat pumps. Going into 2025, the future of these two support schemes remains unclear (for different reasons), which once again highlights one of our mantras: without a strong institutional voice, the pellet sector will not win any battles – and it has many to fight.

One of the most important battles for the future of the pellet heating sector is taking place at the EU level: the revision of the Ecodesign Regulation. A first proposal from the European Commission in January 2025 shocked the entire industry by introducing several extremely strict and/or unachievable requirements for biomass local space heaters and boilers. The strong political and media reaction of the sector probably shocked the Commission in turn and forced it to partly hold the reins. As usual with things that are moving from technical discussions in meeting rooms in Brussels to the wider public eye, there have been several misunderstandings about the scope of Ecodesign Regulation. It was never about banning biomass heating horizontally. However, by introducing so strict requirements for appliances that would have made practically all the products now on the market non-compatible, it would have doomed the sector to a slow death. What is most frustrating in this proposal is that it would not have solved the issue it was aiming for. Particle emissions from residential biomass heating is indeed a topic, but most of these emissions are coming from older, inefficient appliances, not modern pellet ones. Currently, the discussion has moved back again from the public domain to the Brussels meeting room, but it is not over. Again, without a strong associative voice to make the argument that pellets are a solution for the particle emission problem, not its cause, nobody should have an illusion that the situation will resolve in a favourable way.

Remaining on the political topics, the one-year postponement of the European Deforestation Regulation (EUDR) has certainly been a relief. Ultimately, the Commission and the other EU institutions recognized that the market was not ready for it, since they also failed in their task of providing proper guidance. Halfway in 2025, we are somewhere better but, like Zeno's paradox with Achilles and the tortoise, the end target still seems not exactly within reach. The good news regarding EUDR is that it is not only a pellet issue; multiple commodities are affected by it, so for horizontal issues the united voices of different sectors can bring more political muscle in the requests for simplification. Still, some topics – such as the difficulties in geolocation for processing residues, such as sawdust, that are treated in bulk – remain something mostly of concern for the pellet industry. As far as REDIII is concerned, the official transposition date of 21 May 2025 has passed and gone, with member states failing to meet this deadline (although some are more advanced). Transitioning from REDII to REDIII brings some practical challenges to market operators and certification schemes; however, the long-term impact (if any) of REDIII in the industrial pellet market remains to be seen.

At the time of writing this prologue, global geopolitical tensions are escalating at levels probably not seen since the Cuban missile crisis. The pellet sector can be confident that no volumes of its product pass through the Strait of Hormuz and thus be directly influenced by whatever happens there (short of an all-out nuclear war perhaps, which hopefully will not come to pass). If only our lives were so easy. Whatever else you may say about it, it cannot be denied that the new US administration has brought new levels of complexities in global trade and geopolitics – and eventually these are also reaching the pellet sector. As a response to the ongoing trade war, the Commission considers imposing a counter-tariff on several US products – and wood pellets is on that list. Although no decisions are taken on this yet, the consideration is adding an uncertainty that many in the pellet sector would prefer to go away.

01.

Methodology & Disclaimers

Navigating the data landscape for the pellet sector can be a challenging task. The available data is often sparse, not publicly accessible, or limited in its scope. This sector is marked by a wide array of sources, each employing their own distinct methodologies, which can make it difficult to synthesize a comprehensive understanding. It's worth noting that these factors can lead to slight inconsistencies in the data presented in this report. However, these inconsistencies should not be viewed as errors, but rather as reflections of the complex and multifaceted nature of the data landscape that exists within the pellet sector. This complexity underscores the necessity for a meticulous and thorough analysis, which we have tried to provide in our study of the pellet market. This report aims to shed light on this intricate sector, despite the inherent challenges posed by the data landscape.

All the data that is presented in this report comes from multiple sources, indicated in the annexes when it comes to production or consumption related information. Wherever possible, this data has been sourced from contributors who are knowledgeable and active in the pellet industry in their respective countries. This data collection method allows for accurate information at the national level but is naturally dependent upon the participation of our partners. For markets/countries in which we are not able to receive any contribution, various alternative methods have been employed to fill the data gap, mentioned by the terms "Own research" in the data sources column of the annex tables. These methods include the use of open access databases, the replication of a previous year's data, or the extrapolation of previous trends.

For pellet trading data, four data sources were utilized: the United Nations trading data site: UNcomtrade, Eurostat trading database or manual research. As is frequently the case with trading statistics regardless of the commodity considered, trade asymmetries can occur. This happens when the trade statistics published by a given country do not match the ones from its trading partner, for example the exports from country A to country B do not mirror the imports to country B from country A. In order to clarify the situation, the maximum flow observed for a reporter or partner has been chosen to represent the trade between those two countries.

Considering all the factors mentioned earlier, Bioenergy Europe is committed to providing the most accurate representation of the pellet sector. Despite the complexities in the data, we do our best to make sense of it all. We hope this report gives you a clear understanding of the pellet sector. Enjoy reading through the document.

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02.

Overview of the global situation

2.1 World pellet production

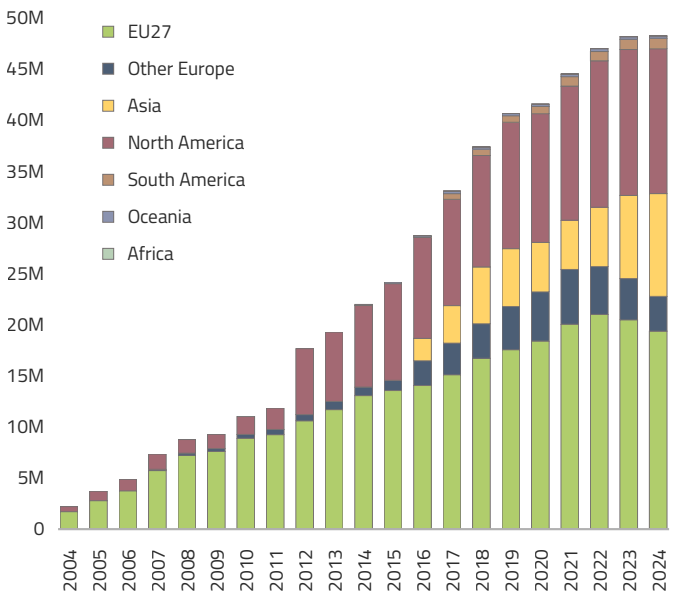
Global wood pellet production remained broadly stable in 2024, reaching around 48,3 million tonnes. This represents a **marginal increase** of just 0,2% compared to 2023, when total output stood at 48,2 million tonnes. The near-zero growth reflects a marked deceleration from the more robust expansion seen in earlier years, pointing to a maturing global market operating under mixed demand and supply conditions. While production capacity continued to expand, rising by 5% to around 75 million tonnes, the actual utilization rate declined slightly, from 67% in 2023 to 64% in 2024. This growing gap between installed capacity and actual production could be explained by different factors, including regional weather variability, fluctuations in operation costs, shifting end-use demand or increasing competition for biomass feedstocks.

European production slow down

Europe, which remains the world's largest pellet-producing region, experienced a noticeable decrease in output. Total production across the continent (EU27 + Other Europe) declined by 7%, from 24,5 million tonnes in 2023 to 22,7 million tonnes in 2024. Within this, the EU27 accounted for 19,4 million tonnes, down 5% year-on-year, while production in non-EU European countries fell more steeply by 16%, primarily driven by Russia. This downturn could have been driven by lower demand in the residential heating sector, during 2022 and 2023, where warmer than average winter conditions combined with energy crisis led to high carry-over stocks and therefore reduced market activity. In several EU Member States, demand stabilised following the exceptionally high consumption peaks observed in 2022, linked to the post-crisis fuel-switching dynamics. Policy uncertainty around future heating defossilization pathways, particularly in Germany and France, may also have contributed to a more cautious production environment.

North American output holds steady under stable export demand. In North America, pellet production remained relatively flat, registering a minor year-on-year decrease of 0,8% to reach 14,2 million tonnes. The region's two principal producers, the **United States and Canada**, maintained steady output levels amid a balanced export-oriented market. Growth in capacity was modest at 2%, and the industry operated with relatively high utilisation rates compared to Europe.

Figure 1: Evolution of global pellet production (tonnes)



Asian growth driving global production trends

Asia emerged as the only region to post significant production growth in 2024, with output rising by 24% to just above 10 million tonnes. This expansion was largely concentrated in Southeast Asian countries such as **Vietnam and Malaysia**, whose export-driven industries continued to benefit from firm demand in **Japan and South Korea**. Both countries maintained stable procurement frameworks through feed-in tariffs and co-firing mandates, allowing predictable offtake and high-capacity utilisation. The policy environment in this region remains a key enabler of growth, and any changes to Japan's FIT structure or South Korea's Renewable Energy Certificate (REC) scheme could significantly affect regional dynamics in the years ahead.

South American capacity builds on export momentum

South America recorded a moderate increase in pellet production, growing by 4% to reach 1,04 million tonnes in 2024. This growth followed continued investment in export-oriented production capacity in Brazil, where producers are increasingly targeting European and Asian industrial markets. The region's relatively low baseline and access to abundant forestry resources provide long-term growth potential, although logistical and certification barriers remain persistent challenges.

Oceania and Africa remain marginal players

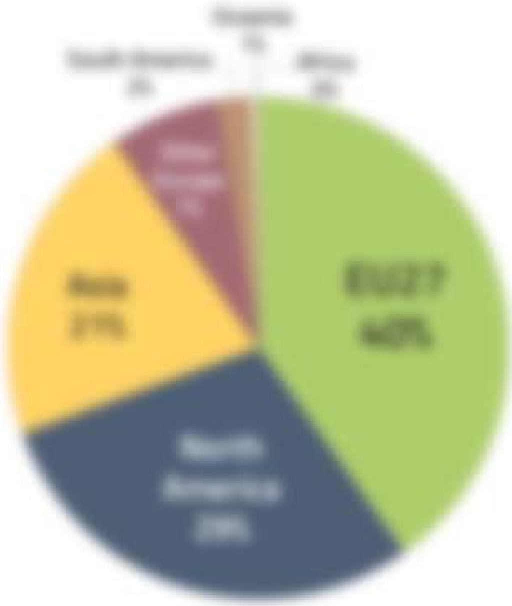
Production levels in Oceania and Africa remained relatively unchanged year-on-year, with combined output amounting to just 217,000 tonnes. These regions continue to represent a marginal share of global production, with only limited market integration at this stage. Nevertheless, several small to middle-scale projects in South Africa and Australia have signalled interest in tapping into international demand, particularly as certification frameworks become more harmonised globally.

While the data backing those allegations is still very light for now, Africa seems to have a promising future in terms of pellet production. With energy short cut concern rising in the continent, biomass power plant could be a solution for off grid remoted area. To ensure the supply of those projects, pellet production plants are starting to emerge as well.

Pellet production in Northen African countries appears to record a modest increase, with local pellet producers primarily eyeing the European small-scale pellet market. An important plant with a capacity of 120,000 tonnes per year has already opened in **South Africa.** The plant will use a combination of invasive tree species as well as wood residues from sawmills as feedstock. Currently, the total capacity of pellet production reach by African continent could be around 300,000 tonnes. Unfortunately, it is for now very hard to have a clear view on how this capacity translate in concrete production. On the other hand, the rest of the continent is preparing to scale up its production as well.

By combining projects expected in Cameroon, Dem Rep of the Congo, Rep of the Congo and Gabon, the total capacity of the continent could increase by almost half a million tonnes in the next years.

Figure 2: Distribution of the world pellet production in 2024 (%)



So, what are the major regions that produce pellets?

Figure 2 confirms that the EU27 remains the largest pellet producer, accounting for 40% of global output in 2024, despite a modest year-on-year decline. North America follows with around 30%, reflecting its stable, export-driven role in global markets.

The most notable shift is the rise of Asia, which now represents 21% of global production. This growth, primarily driven by demand from Japan and South Korea, highlights Asia's increasing role in global supply dynamics.

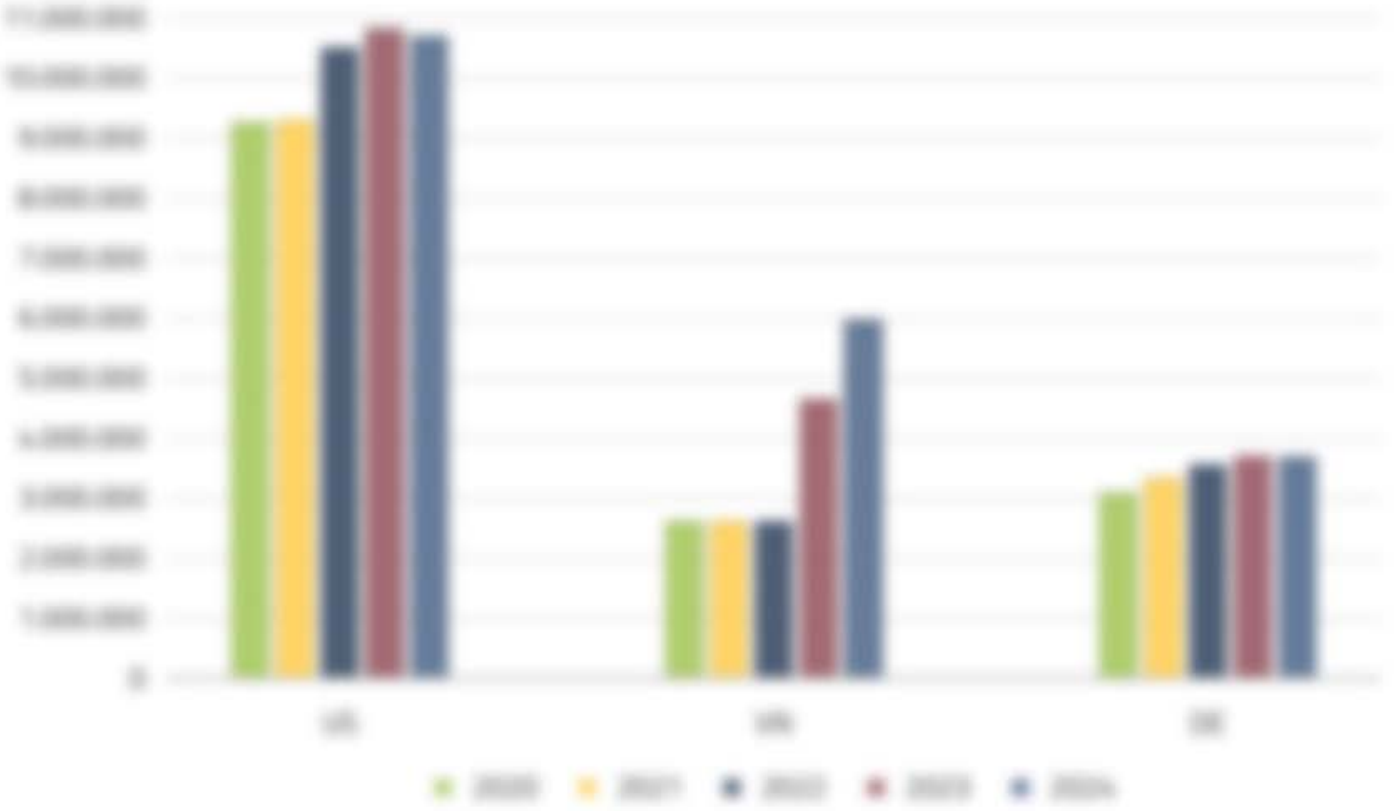
Together, these three regions make up over 90% of global production, underscoring the high concentration of supply and the ongoing transition toward a more geographically diversified market.

Table 1: Evolution of pellet production in the world by region (tonnes)

	2018	2019	2020	2021	2022	2023	2024	[illegible]
EU27	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Other Europe	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
North America	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
South America	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Asia	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Oceania	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	217,000	[illegible]
Africa	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
World	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Figure 3: Evolution of pellet production of the TOP 10 producing countries in 2024 (tonnes)

a. Top 3 producing countries



b. Remaining 7 countries in the top 10

Figure 4: Growth in pellet production by country between 2023-2024 (tonnes,%)

a. Top 3 countries of absolute growth in pellet production

b. Rest of the world

Table 2: World pellet production in 2023 and 2024 (tonnes)

	2023			2024		
	Number of operating production plants	Production capacity (tonnes)	Actual production (tonnes)	Number of operating production plants	Production capacity (tonnes)	Actual production (tonnes)
EU27	844	28,421,800	20,463,987	860	28,812,200	19,363,780
Other Europe	366	7,885,700	4,048,165	367	8,071,700	3,406,205
Total Europe	1,210	36,307,500	24,512,152	1,227	36,944,250	22,769,989
North America	121	17,676,278	14,275,469	120	18,007,865	14,159,627
South America	50	2,554,000	1,062,000	63	2,480,000	1,044,000
Asia	278	14,816,000	8,135,421	290	16,699,000	10,040,500
Oceania	13	580,000	225,000	13	580,000	211,000
Africa	7	137,000	54,000	7	137,000	54,000
Total	1,679	71,072,778	48,178,042	1,720	75,041,805	48,274,116

2.2 World pellet consumption

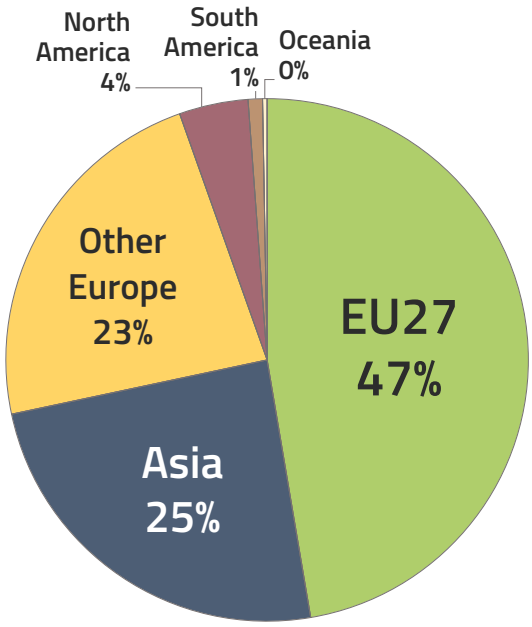
Global pellet consumption is more challenging to assess accurately than pellet production. Data regarding industrial pellet consumption are more easily accessible, since they relate to a small number of actors around the global that typically report volumes consumed in their own sustainability reports and/or for official reporting purposes. However, accurate consumption data from small-scale consumption in residential and commercial heating applications is impossible to collect and has to be estimated via alternative approaches. As such, the following data should be considered indicative only and not regarded as completely definitive.

In 2024, global wood pellet consumption reached an all-time high, exceeding **45 million tonnes for the first time**. This record comes right after the first decreasing year in consumption and underline the resilience of the pellet sector. As illustrated in Figure 5, European countries continue to drive global demand, accounting for 70% of total consumption. Yet, the geographical distribution of this consumption is shifting, indicating a potential transformation of the industry. While maintaining its leading position, the EU27 is experiencing a decline in pellet consumption compared to the peak of 2021. Indeed, since then, total consumption in the region has dropped by **1 million tonnes, representing a 4% decrease**. Although both industrial and small-scale uses have been affected, the sharpest decline has occurred in the residential and commercial heating sectors. **Other European countries,** led by the substantial demand from the UK, are not following the same trend observed in the EU27, thanks to Drax power station reactivating a significant portion of its capacity, sharply increasing its pellet consumption. In just one year, it recovered previous declines, adding nearly 3 million tonnes of additional demand. **The consumption for other Europeans countries is now reaching 10,6 million tonnes.**

Future market disruptions are expected following new UK government subsidies for the Drax power plant, effective from 2027 to 2031. Under the scheme, the plant is projected to operate at around half of its current capacity. In 2024, Drax consumed nearly 9 million tonnes of pellets which is about one-third of total European demand. A reduction of this scale would have significant repercussions for the entire pellet sector.

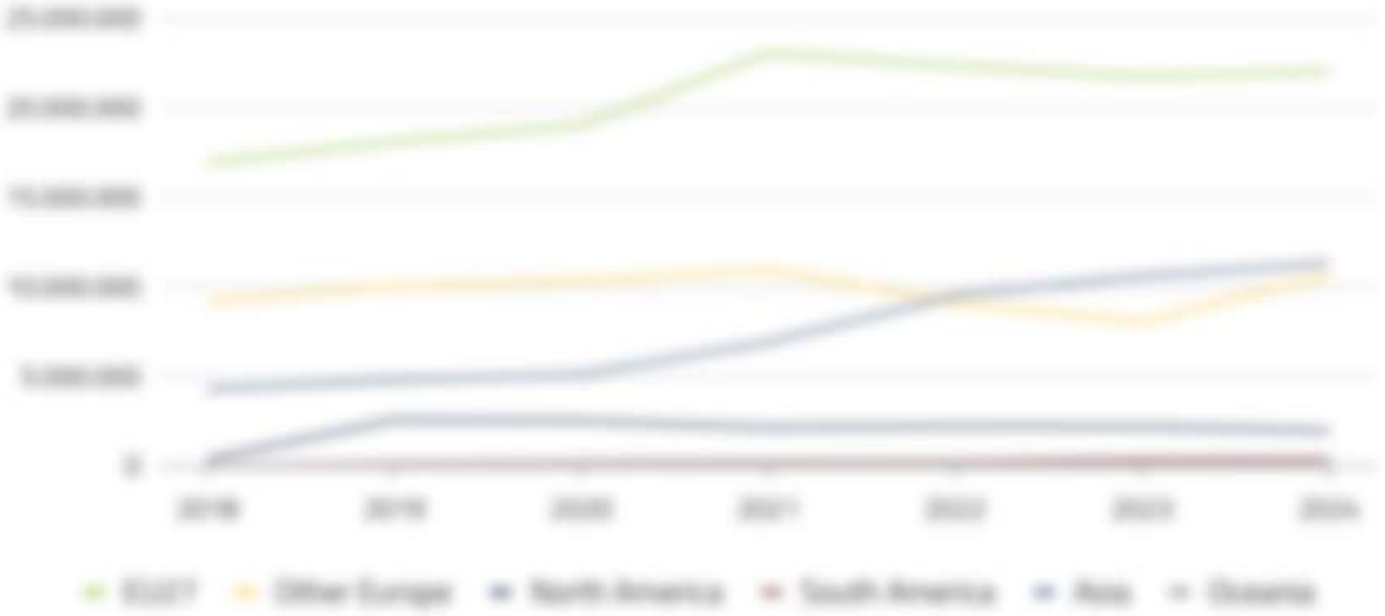
The future of global pellet consumption increasingly lies in Asia. Although reliable data on China and India remain unavailable, two other Asian countries, namely Japan and South Korea are reportedly scaling up wood pellet use for power generation. **Overall, Asia's pellet consumption has doubled over the past four years, reaching 11,5 million tonnes in 2024.** Japan is the region's largest consumer closely followed by the Republic of Korea. Notably, a clear **distinction is emerging between producing and consuming countries**. Major consumers like Japan and Korea are not expanding proportionally their domestic production but instead rely heavily on imports. In parallel, new producers such as Indonesia and Malaysia are entering the market, despite having practically no domestic consumption.

Figure 5: Distribution of world pellet consumption in 2024 (%)



Pellet consumption in **North and South America** remained relatively stable between 2023 and 2024, with a slight overall decline of 100.000 tonnes. In **North America**, consumption relates mostly to small-scale use and continues to decline, primarily driven by weather conditions. In contrast, domestic consumption in **South America** is showing modest growth.

Figure 6: Evolution of world pellet consumption disaggregated by region (tonnes)



Two continents, **namely Africa and Oceania**, record only marginal pellet consumption in 2024. In both cases, two key factors must be considered: a relatively underdeveloped pellet market on the one hand and a general lack of reliable data on the other.

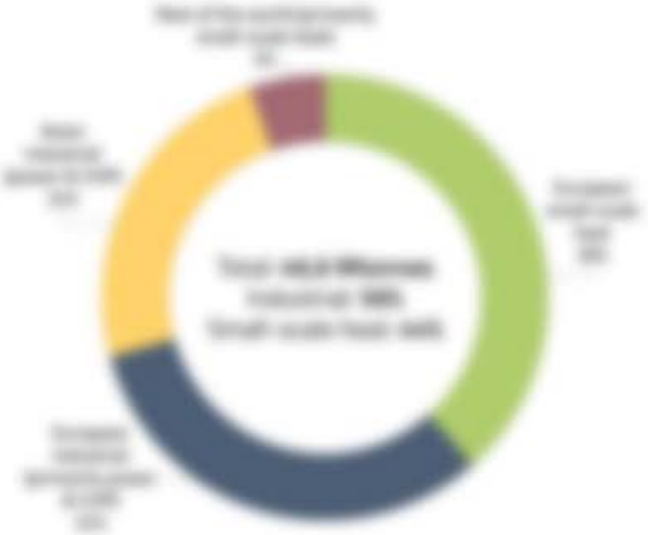
Africa remains the least represented region in this report. However, interest in biomass is growing steadily across the continent. Initiatives, such as the propellets Africa website of the World Bioenergy Association aim to support sustainable pellet production and pellet use in Africa, primarily for clean cooking applications.

Oceania faces similar data limitations. Available estimates suggest that pellet consumption in the region has remained stable in recent years, though more detailed information is lacking.

Industrial use of wood pellets is rising globally. Driven by the expansion of pellet-based power generation in Asia and the reactivation of Drax units in the UK, industrial consumption increased by 11% year on year. In contrast, small-scale demand is stagnating. In Europe, where high-quality pellets are primarily used for residential and commercial heating, challenging market conditions and not favourable weather conditions continue to hinder growth in these segments.

This asynchronous evolution in consumption between industrial and small scale widens the gap that was already existing between the two sectors. The **industrial sector represents, in 2024, 59% of the entire wood pellet demand**, 3 percentage point more than in 2023.

Figure 7: World consumption by type of end use in 2024 (tonnes) [i]



2024 depicted a reality that might represent the future of the biomass sector. Policy frameworks and emerging consumption models increasingly aim to reduce the use of biomass in the residential sector in favour of industrial applications, where biogenic carbon is seen as one of the few viable pathways for defossilization.

Table 3: Evolution of pellet consumption in the world by region (tonnes)

	2019	2020	2021	2022	2023	2024	Growth 2023-2024
EU27	18 712 489	19 029 869	23 056 280	22 336 138	21 765 155	22 027 544	1,2%
Other Europe	10 038 373	10 356 699	10 855 232	9 136 032	8 072 156	10 655 357	32,0%
Total Europe	28 750 862	29 386 569	33 911 515	31 472 168	29 837 311	32 682 901	9,5%
North America	2 595 274	2 541 384	2 175 884	2 250 586	2 233 816	1 986 544	-11,1%
South America	166 926	211 625	241 025	246 625	360 896	415 416	14,8%
Asia	6 826 000	5 126 000	8 826 000	9 526 000	10 626 000	11 326 000	6,6%
Oceania	70 000	125 000	125 000	125 000	125 000	130 000	4,0%
Total	39 864 062	37 397 178	43 478 354	43 624 777	43 183 123	46 538 863	7,8%

Figure 8: Top 10 pellet consuming countries by end-use in 2024 (tonnes)

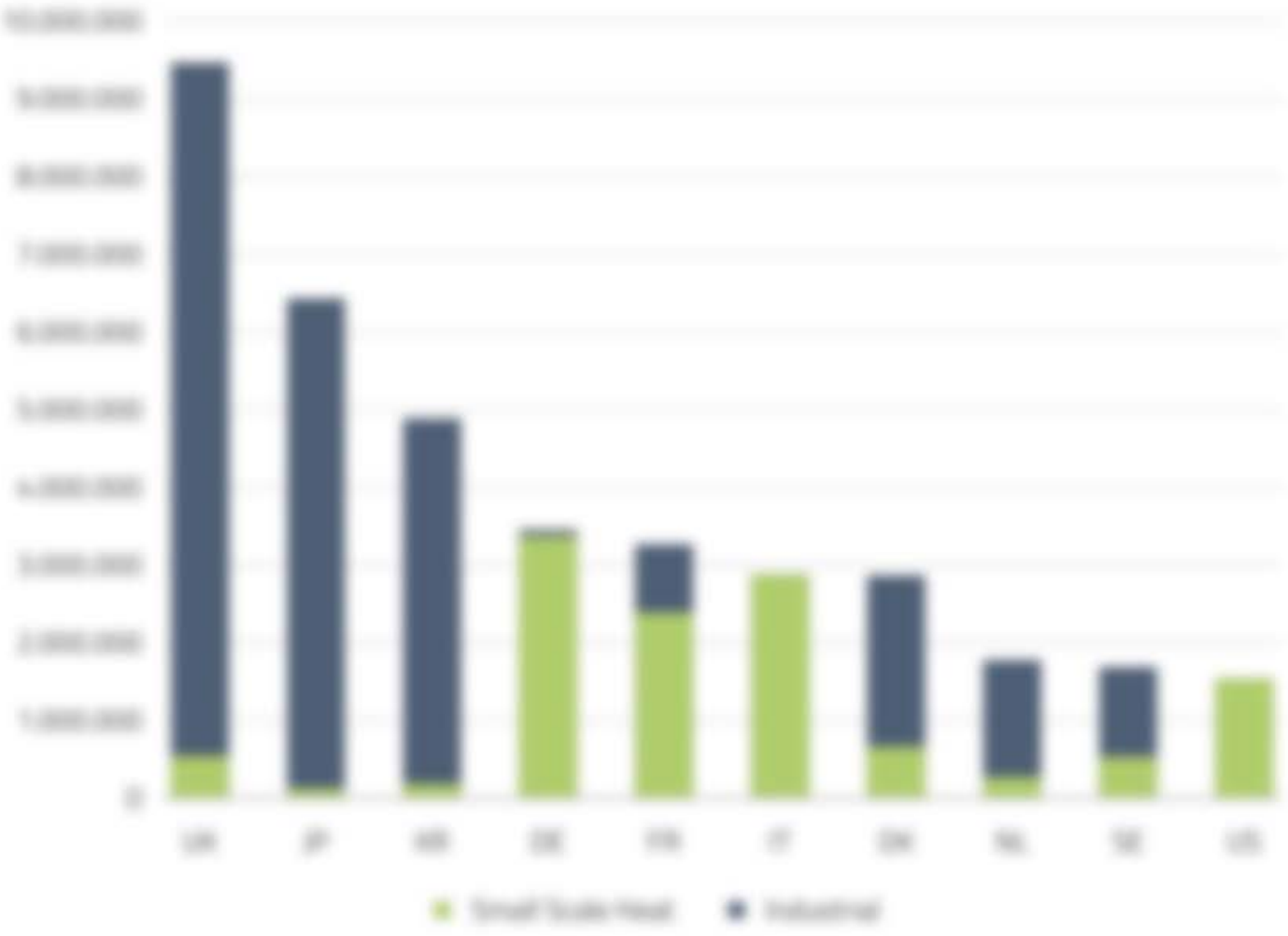


Figure 9: Growth in pellet consumption by country between 2021 and 2024 (tonnes)

a. Top 3 countries in absolute volumes

b. All countries with available data excluding the top 3

Figure 10: Evolution of industrial pellet consumption in the top 5 countries in the world (tonnes)

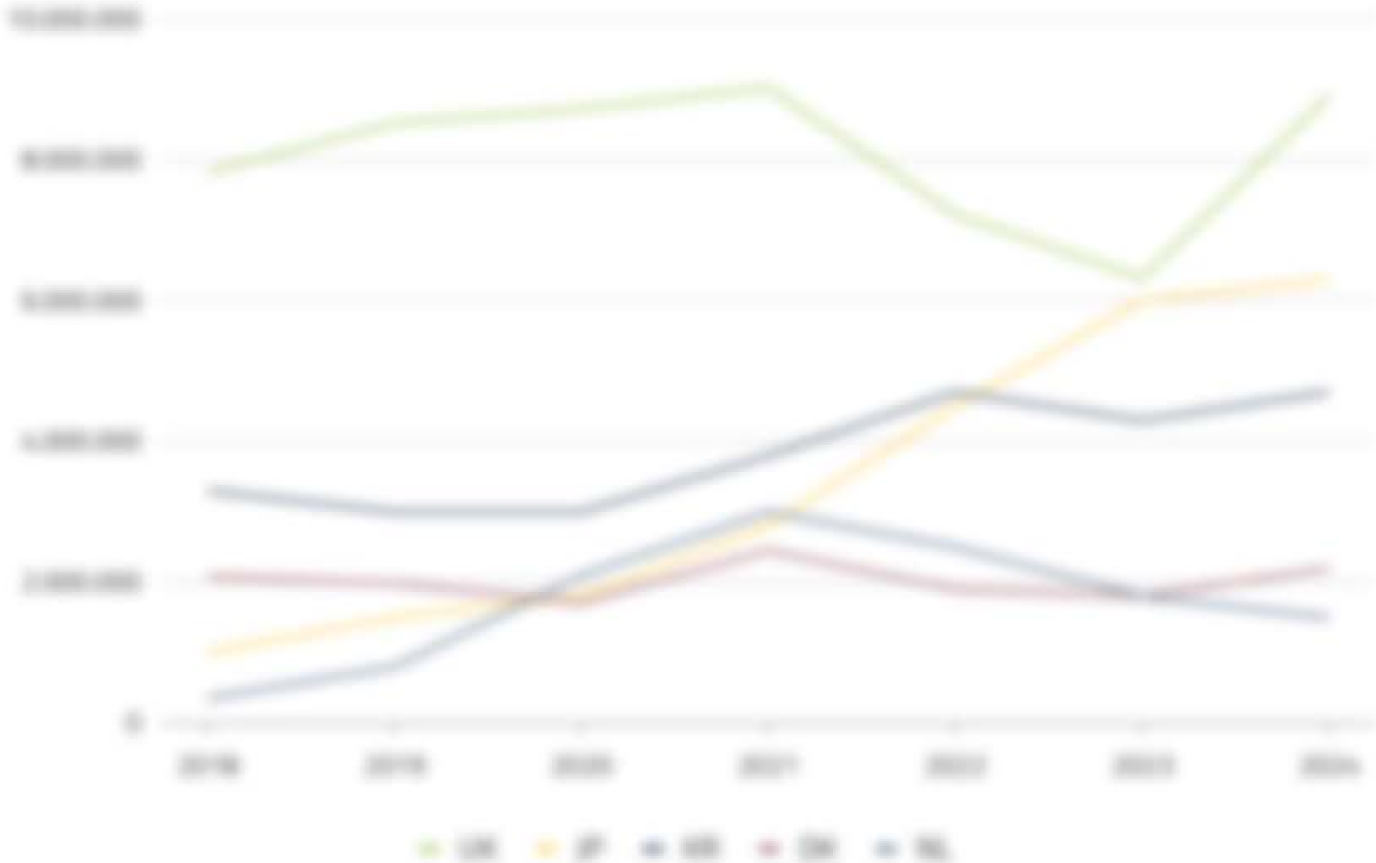


Table 4: World pellet consumption (detailed) in 2023 & 2024 (tonnes)

	2023				2024			
	Residential	Commercial	Industrial	Total	Residential	Commercial	Industrial	Total
EU27	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Other Europe	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Total Europe	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
North America	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
South America	[illegible]	[illegible]	0	[illegible]	[illegible]	[illegible]	0	[illegible]
Asia	[illegible]	0	[illegible]	[illegible]	[illegible]	0	[illegible]	[illegible]
Oceania	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Africa	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Figure 11: World pellet map of production and consumption in 2023 and 2024 (million tonnes)

2.3 Global pellet trade

2.3.1 Global export

Geopolitical tensions and energy crises triggered the most severe disruptions ever seen in global pellet trade.

In 2022, the sector experienced the most severe disruptions in the history of pellet trading, primarily driven by the war in Ukraine and related sanctions. Exports from the Russian Federation and Belarus were subject to an ongoing trading ban, resulting in a combined decline of 3,4 million tonnes in exports between 2021 and 2024.

In parallel, the ban on Russian gas triggered the most acute energy crisis in two decades, causing pellet prices to surge. **The peak impact on pellet trade occurred in 2023, with global flows decreasing by 2,5 million tonnes compared to 2021.**

Although sanctions against Russia remained in place in 2024, energy markets began to stabilise. Prices returned to near pre-crisis levels, and pellet consumption started to recover accordingly.

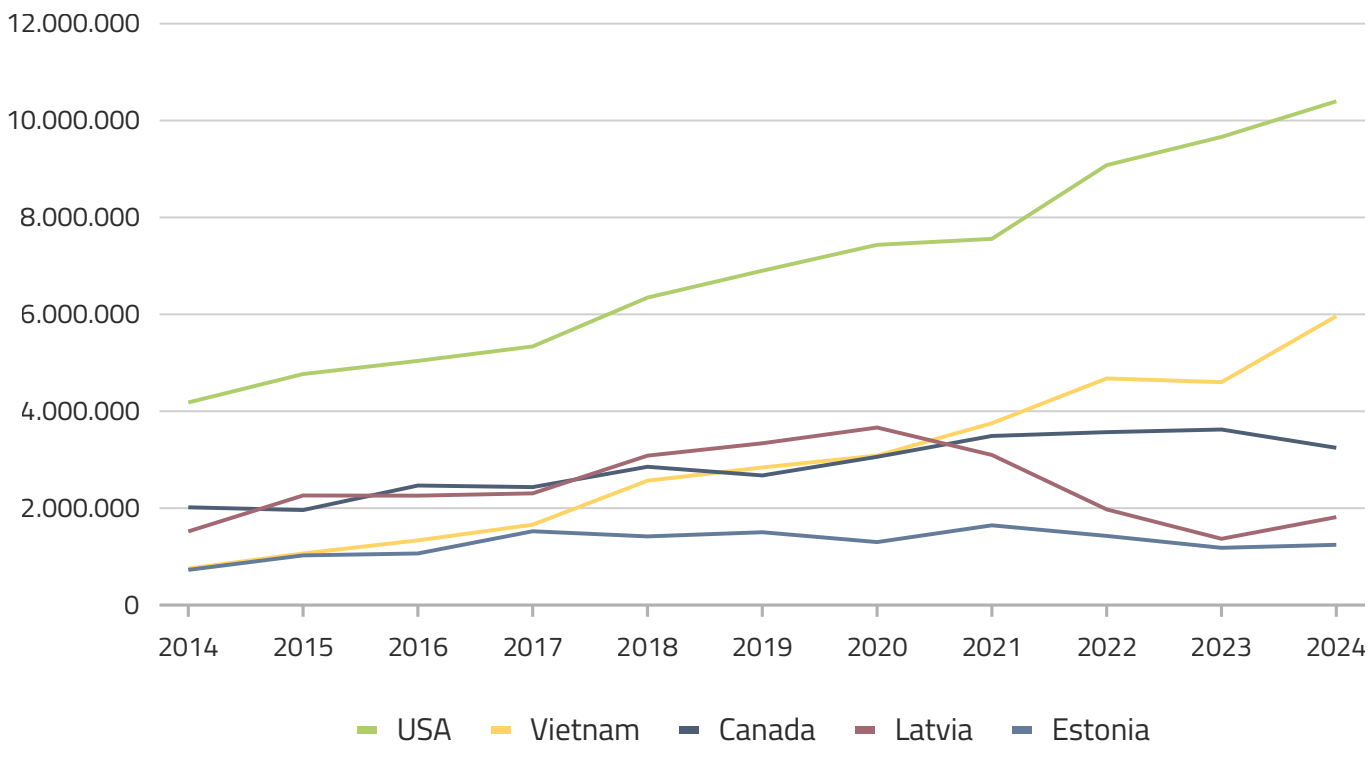
A return to normal for global pellets flows. And a new big player.

World pellet exports in 2024 nearly returned to pre-crisis volumes, reaching close to 33,5 million tonnes just 60.000 tonnes below the 2022 level and 400.000 tonnes short of 2021. While the top five exporting countries remained unchanged in 2024, Malaysia recorded unprecedented export volumes and is likely to enter the top five in 2025.

The USA strengthened its position as the world's top pellet exporter in 2024, accounting for one-third of global trade.

The United States, the leading pellet exporter in 2023, further expanded its market share in 2024, exporting 10,4 million tonnes. Its main partner, the UK, returned to typical import levels and accounted for 70% of U.S. pellet exports in 2024. A shift occurred in the ranking of their secondary export partner: **Japan overtook the Netherlands** as the second-largest importer of U.S. pellets. While exports to Japan remained relatively stable, shipments to the Netherlands dropped by half. Disaggregated data are presented in Figure 13.

Figure 12: Evolution of wood pellet exports amongst the 5 largest global exporters (tonnes)



New records for Vietnam. After entering a stabilised phase in 2023, Vietnam's pellet exports increased again in 2024, rising by 8%. The country exported **nearly 6 million tonnes**, maintaining its rank as the second-largest global exporter. Historically focused on Japan, South Korea, and the Netherlands, Vietnam expanded its export markets in 2024 to include France, which imported 300,000 tonnes. Further details are shown in Figure 14.

Rough year for Canada. Following **the record wildfires of 2023**, Canada faced another difficult year in **2024, with over 5 million hectares burned**. This led to the closure of numerous sawmill unable to operate where fires are occurring. In addition, instability in **forest policy have made cutting permits attention difficult**, leading to the closure of at least 4 major mills. These closures have jeopardised the feedstock supply for dependent pellet plants. **The result is 400,000 tonnes drop in export with this share of market being taken by Vietnam and Malaysia.**

End of the fall in exports for Latvia. After three consecutive years of declining export volumes, Latvia resumed market expansion in 2024. The country **added 500,000 tonnes** to its export total compared to 2023, **reaching 1,8 million tonnes, back to 2022 levels.**

The most significant increase came from renewed demand in the United Kingdom, where imports from Latvia rose by 75%. Trade with Denmark also picked up, growing by 54%, positioning the country as Latvia's second-largest export partner.

Stabilisation of the Estonian market. While experiencing a bit of variation on the past 10 years, **Estonian pellets exports seem to stabilise since 2022 around 1,2 million tonnes.** Even when looking at the trade disaggregated by partner countries, the volumes are quite stable between 2023 and 2024. The main shift was a reallocation of trade: **an additional 100,000 tonnes were exported to the United Kingdom, offset by a corresponding decline in exports to the Netherlands.**

The rise of Malaysia. While Estonian exports appear to have reached a saturation point, **Malaysia is experiencing the strongest export growth in its history.** With an additional 250,000 tonnes (+35% growth) compared to 2023, **Malaysia now stands at the same exported volumes as Estonia.** Naturally, the two countries don't trade with the same partners. Malaysia's trading partners align more closely with those of Canada, reflecting distinct geographic and strategic positioning in global pellet trade.

Figure 13 US pellet exports profile in 2024 (tonnes)

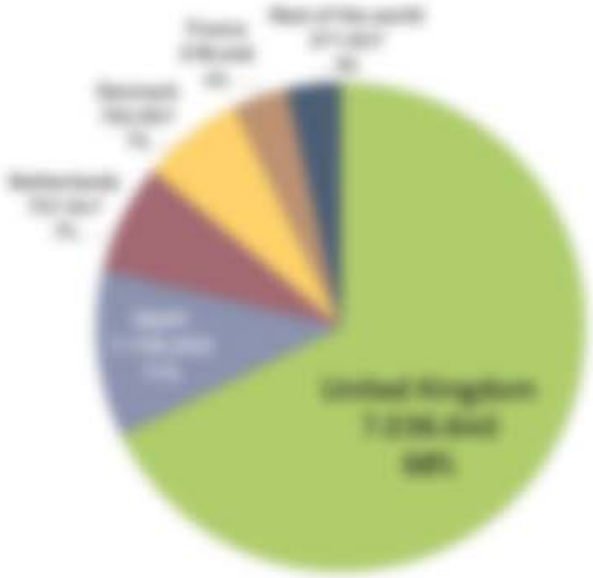


Figure 14 Vietnam pellet exports profile in 2024 (tonnes)

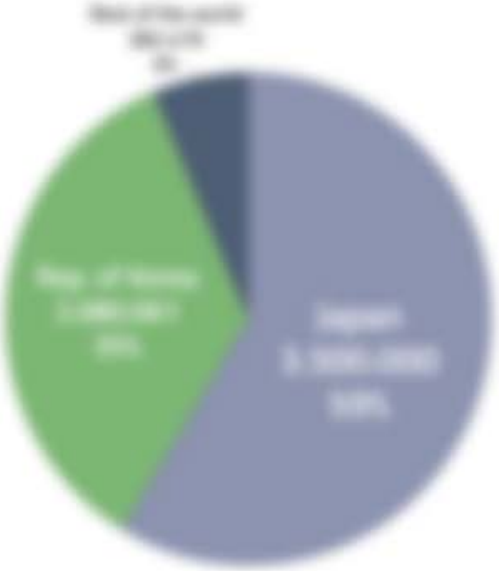


Figure 15 Canada pellet exports profile in 2024 (tonnes)

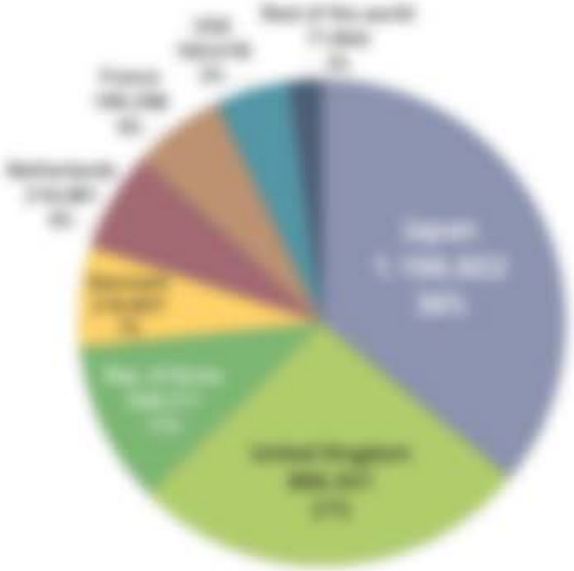


Figure 16 Latvia pellet exports profile in 2024 (tonnes)

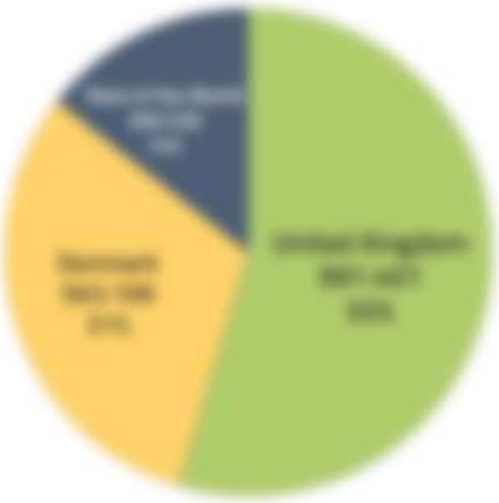
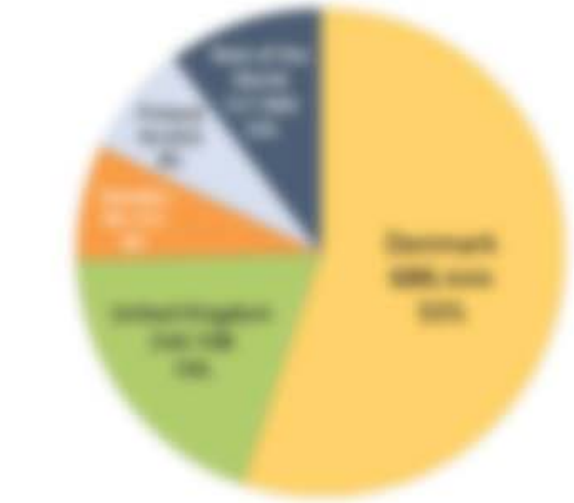


Figure 17 Estonian pellet exports profile in 2024 (tonnes)



2.3.2 Global import

As for exports, 2024 import figures have come back to their 2022 level but still fall short from pre-crisis levels by 300,000 tonnes.

A growth driven by 7 countries. *90% of the pellet volume traded globally is shared amongst the 7 largest importers. More specifically, a single country, the UK, represents by itself a third of the global imported volumes.*

The giant's partnership. With 6.7 million tonnes of pellet imports **in 2024, the United Kingdom has reached an all-time high** that broke the downward spiral trend observed between 2021 and 2023, when imports had declined by **2.3 million tonnes**. This sharp rebound was achieved in just one year. Its main supplier, **the USA, was the main driver for this increase with an additional 2 million tonnes exported to the UK compared to 2023,** reaching a total of 7 million tonnes.

Strong and steady Japanese increase. With an additional 10% of imported pellets in 2024, **Japan is now almost reaching 7 million tonnes.** The flows between Japan and its main supplier, Vietnam, are increasing and reaching 3.3 million tonnes in 2024, and now representing 52% of the country's total imports. In contrast, imports from the two other main suppliers, Canada and the USA, are decreasing. To secure the stock necessary to fulfil their growing demand, **Japan is now increasing its partnership with Malaysia and Indonesia**, both of which nearly doubled their export volumes to Japan compared to 2023.

The Korean plateau. After two years at a million tonnes of pellets imports, **South Korea has "slightly" increase its imports by 200,000 tonnes.** As for Japan, Vietnam is the main supplier of South Korea with almost 50% of the imports. Additionally, South Korea is the dominant destination for Russian pellet exports, receiving approximately 40% of Russia's total pellet shipments.

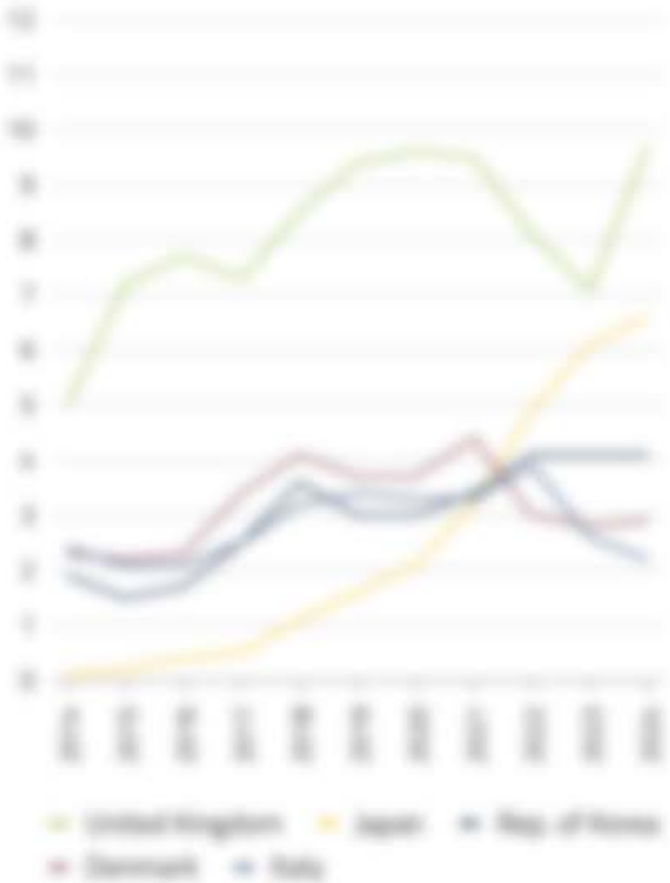
Partner reorganisation for Denmark. After an important decrease in pellet import from the Baltics due to growing wood prices, **Denmark has begun to increase its Baltics imports once again.** Overall, Denmark has stabilised the steady decrease in import that was occurring since 2021. Brazilian pellets were also imported to Denmark for the first time in 2024 with almost 100,000 tonnes.

Decreasing reliance on imports for Italy. With a drop of 450,000 tonnes of pellets imports, Italy is continuing the downward trend observed in 2023. The most noticeable difference with 2023 is the stop on imports from Ukraine, Canada and Portugal. While being relatively small flows, Italian pellet trading kept on going with the USA and Poland. Italy's consumption however managed to remain steady in 2024, underlying the importance of goods stocks for market stability.

France and the Netherlands, the two last major pellet importers globally.

A shift in industrial consumption in The Netherlands. *The Netherlands has experienced an incredibly fast increase in pellets imports between 2017 and 2020 with a growth of almost 3 million tonnes in this short period. Unfortunately,* **the evolution in the recent years proved this trend to be short-lived.** *Yet, the country remains the 6th largest importer of pellet globally with 2 million tonnes in 2024.*

Figure 18 Evolution of wood pellet imports amongst the 5 largest global importers (million tonnes)



Overseas territories driving French imports. The country has been increasing its pellet import steadily for 10 years. The import increase is primarily driven by increased industrial pellet consumption in French overseas territories (La Reunion, Guadeloupe, Martinique, and Saint-Martin). **The geographical location of these territories in the Caribbean Sea and Indian Ocean lead to a more varied trading partner profile compared to other European consumers.** USA is still the leading partner, but also Vietnam and Canada beyond of relevance. In Metropolitan France on the other hand, pellet imports are primarily related to the premium pellet sector, with Belgium being the most relevant trading partner.

Figure 19: United Kingdom pellet imports profile in 2024 (tonnes)

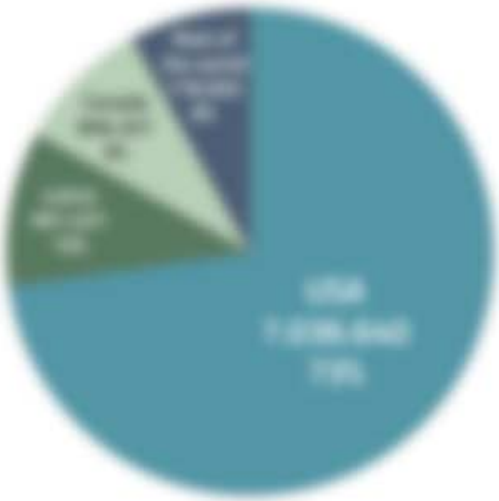


Figure 20: Japan pellet imports profile in 2024 (tonnes)

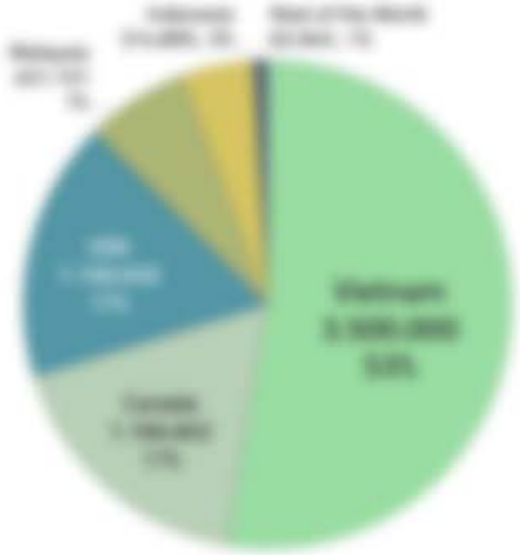


Figure 21: Italy pellet imports profile in 2024 (tonnes)

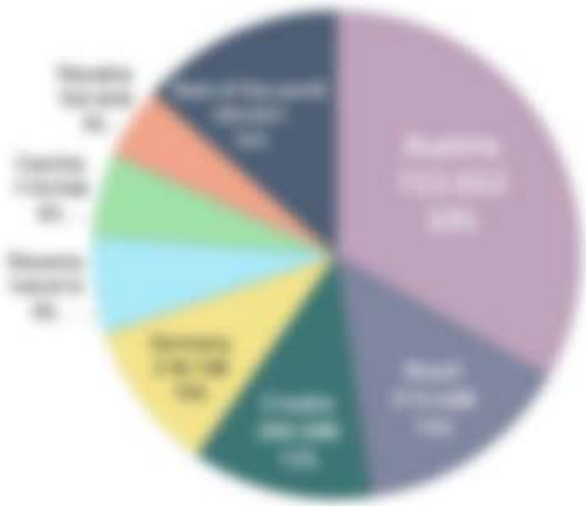
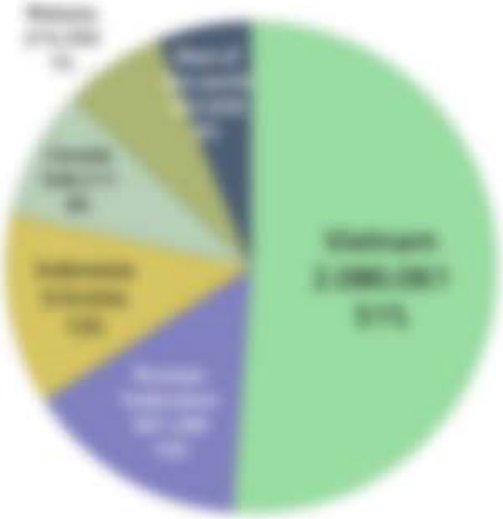


Figure 22: Denmark pellet imports profile in 2024 (tonnes)

Figure 23: Republic of Korea pellet imports profile in 2024 (tonnes)



BRÜNING GROUP

EXPERT COMMENT

Frank Grischkat

Director International Business Development

Brüning Group

What a roller coaster this has been lately! The solid biomass fuel world has been – and still is – steaming through rough and very unpredictable waters. The Russian/Ukraine war started in 2022 and - as a consequence of the EU sanctions - the Russian wood pellets volume disappeared from the market. Well, let's not debate that some smaller part of that may have entered via other "innovative" (that is: illegal) routes, but for sure the majority of Russian (and Belarusian) volumes dropped out in the middle of a wider energy crisis. After some time now the market found a new balance, also due to the commitment of the market participants to increase existing production or set up new production in US or other counties e.g. in South America.

The challenge to the market continued throughout 2024 with a threat to all market participants being EUDR: its rigid and unclear rules (at least at that time) leaving the market with an almost undoable task to implement it. The predicted chaos was postponed in the last minute with the one-year extension granted by the European Institutions in December 2024. Still many uncertainties remain for the future.

If one thought enough is enough and 2025 will start bright – we were taught to be wrong. The year started with news that the UK Government is cutting back subsidies for large scale industrial use of wood pellets leading to a significant decrease of expected demand starting from 2027. Similar action is currently discussed in the Netherlands. The expected decrease of demand in Europe does result in a need to restructure client target groups and/or capacity decrease – most likely most relevant to US based producers.

Not enough challenges? Well, here comes one more that created uncertainty in the market when the Trump administration took over the government of the USA. An Executive Order strategically intended to support US based shipbuilding in the future and to fight low-cost Chinese shipbuilding industry would have backfired to US exports of all kinds (including wood pellets). Good to mention that this has been meanwhile revised, and the drama is off the table for most cases. But distortion and uncertainty were present for an endured time earlier this year. And uncertainty is poison for the market. We still have a remaining thread to overcome: the current trade war between the US and the EU prompts the Commission to considering imposing a tariff on the import of US wood pellets (among many other products). More to come? Hope not.

Is there light at the end of the tunnel? Without doubt the answer is 100% clear YES! We will need biomass if we are taking the political decision to move away from fossil energy seriously. Solid biomass will be needed in all kinds of applications, from the current "conventional" generation of heat and power as well as in new applications for producing industries e.g. the metallurgical sector, and as input material for SAF production. Novel technological pathways, such as torrefaction, pyrolysis, and gasification will play a role there.

If I may put a "wish" to the European politicians: look into the future. Have a long-term view and vision. Stick to the decision to walk the way towards a greener future to allow the whole industry to take necessary decisions in a safe and stable political framework environment. That is good and needed for all of us - the biomass providing industries as well as the current and potential new users of biomass.

03.

European pellet production

While **2023 was already a challenging year, 2024 proved to be even worse** for pellet production. European output **peaked in 2022** when energy prices led the market to anticipate a shift toward pellets. This, however, **fell short of expectations** due to increasing pellet prices and the political pressure of the EU toward biomass appliances, reflected nowadays in the ecodesign regulation update.

After the crisis, the market shifted in the opposite direction, with pellet prices reaching too low values in certain countries that no longer provided sufficient margin to producers, leading to a decrease in the production or stock stacking.

While **EU27** pellet production already suffered from a 2,8% decreased from 2022 to 2023, the trend continues **with a 5,4% loss between 2023 and 2024.**

Countries populating the 'Other Europe' aggregate are facing an even larger decrease mainly due to the war in Ukraine. Production dropped by 13% year on year from 2021 to 2023, then dropped further by 16% between 2023 and 2024. The main driver of this decrease is Russia.

In only two years Russian production has decreased by **1 million tonnes**. The production of Ukraine on the other hand was impacted but not as much as for Russia. In 2024, they produced 100.000 tonnes less than in 2023.

The total pellet **production of Europe (EU27 + Other Europe) has decreased by 7%** between 2024 and 2023. This **represents a net loss of 1,75 million tonnes** of indigenous pellet for Europe.

The current production volume represents a three-year regression, now reaching slightly below that of 2020. The peak was reached in 2022 with 25,7 million tonnes driven by expectations of sustained high demand. Economical tension linked to the Ukraine war in addition to adverse regulations changes in some Member States energy framework have led to increasing stock of wood pellets, inevitably impacting their prices and the economic viability of their production.

Figure 2a: Evolution of European pellet production by region (tonnes)

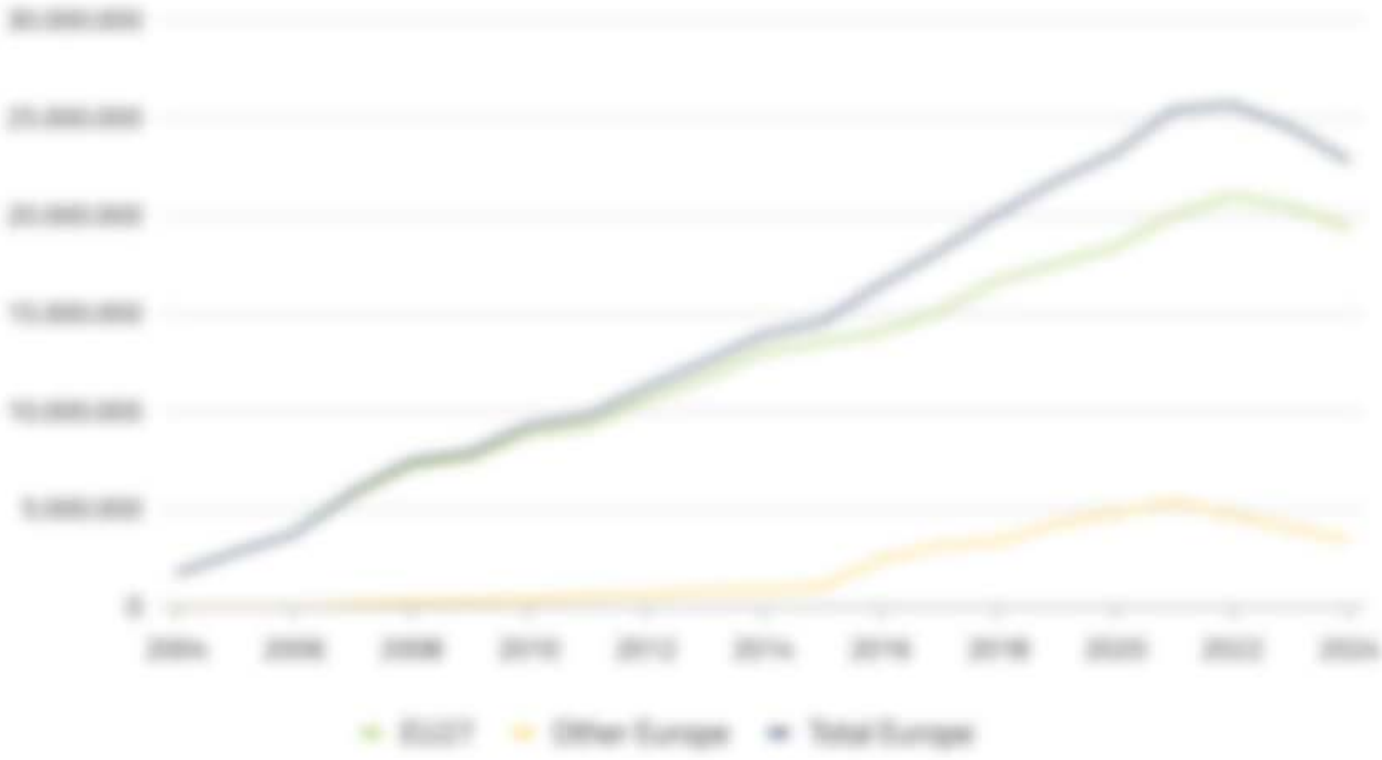


Figure 25: Map of the European wood pellet production in 2024 (tonnes)

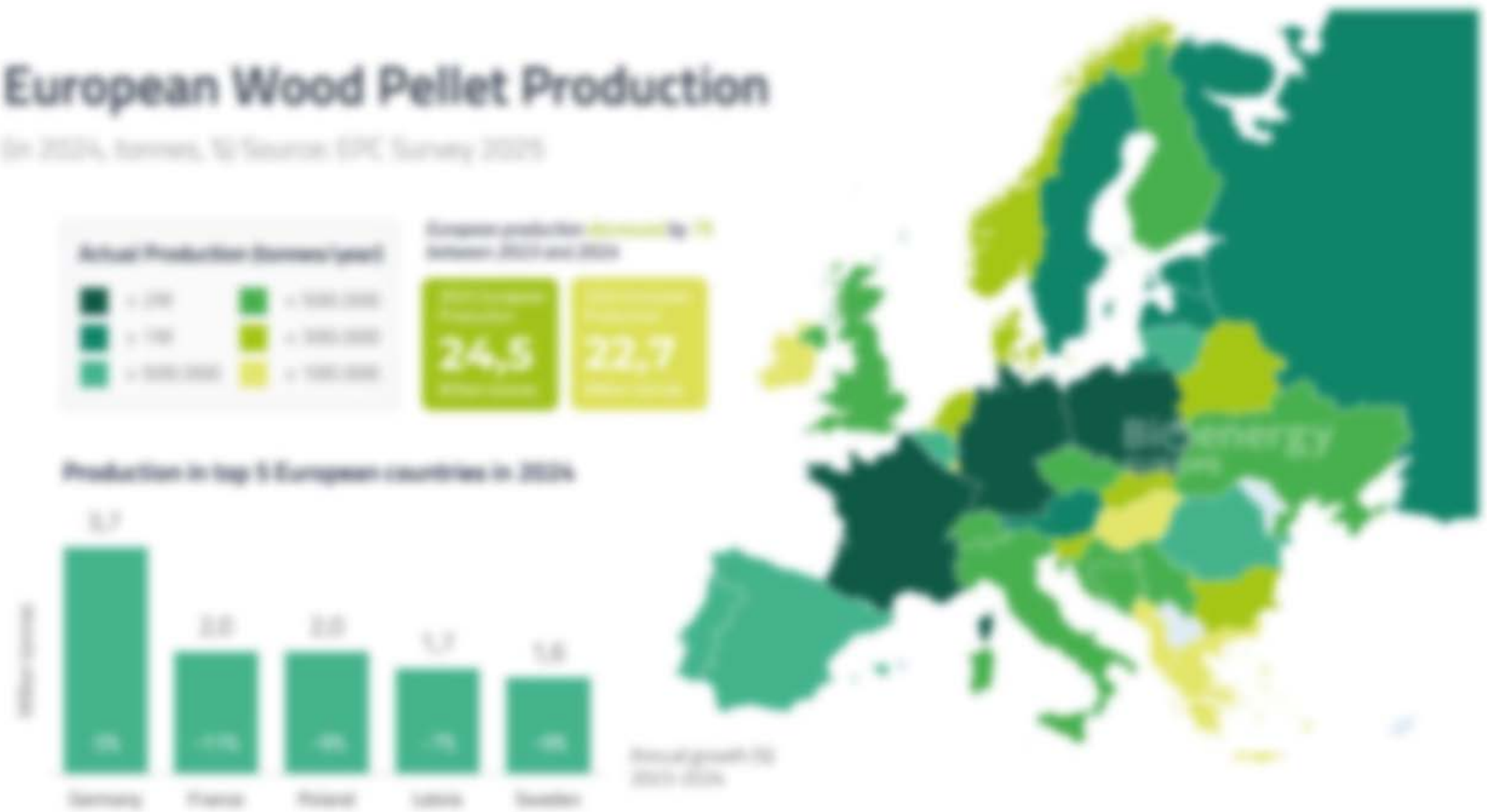


Figure 26. Evolution of pellet production in countries above 1 million tonnes of production (tonnes)

Figure 26 displays the evolution of pellet production for the countries for which 2024 production was above 1 million tonnes. Eight countries stand out in 2024, each of them with a specific evolution throughout the years.

Germany, the largest European pellet producer has experienced an overall massive growth in the past 20 years. The first peak was reached in 2012 with 2,2 million tonnes of output, followed by 4 years of difficulties. Since then, the German production resumed its increasing trends culminating **in 2023 the highest production with 2,7 million tonnes.** Although 2024 saw a slight decrease of 10.000 tonnes, the German pellet sector remains robust, maintaining near-peak production levels.

France has an interesting evolution, reflecting the one of Germany, although with more modest but consistent growth. The same disruption in 2012 occurred, but shorter in duration and impact. **The peak production was reached in 2023 with 2,3 million tonnes.** In 2024, production declined for the first time in ten years.

Poland has experienced several stagnation events during its pellet production history, **yet 2024 is the first year that went into an actual decrease in production** with 200.000 tonnes of reduced output compared to 2023. These volumes match with the decrease of Polish pellet exports for the same year which could explain those figures while consumption grew.

While having an overall positive trend, **Latvia** production has lately been experiencing some disruptions. Peak production was reached in 2021 with 2,1 million tonnes of output before going down in 2022, and back up in 2023 but below the peak level. **In 2024, production went down again** reaching a volume of 1,7 million tonnes. The country seems to be shifting its focus in terms of pellet quality, with a strong decrease in premium quality pellet used in the residential sector and probably destined for exports. Industrial pellet production is taking the lead to supply various industrial project that are retrofitting from coal to biomass.

Sweden production has been relatively stable throughout the years, but **Sweden production evolution to** follows a relatively unique path. It was historically **the largest European pellet producer 20 years ago** and kept steadily supplying along the years. 2024 production has risen by 100.000 tonnes since 2023. **While the actual production seems to have reached a balance at around 1,8 million tonnes.** Sweden has increased its capacity in 2024, reaching an all-time high of 2,6 million tonnes.

To keep up with an increasing demand in residential consumption in stoves and boilers, **Austria** is reaching its peak production in 2024 with 1,9 million tonnes of output. The country mostly aims for premium quality pellet for residential use that will be consumed locally. The return of strong subsidies for purchasing appliances in 2024 has led to an increased demand for pellet. Yet, the production capacity of the country remains stable in 2024, as it had already increased largely in 2023. **In 2024, the actual production only represents 75% of the full installed production capacity.**

Estonian production, after peaking in 2022 at 1,8 million tonnes, went on a two-year decline of 33%, reaching 1,2 million tonne in 2024. Estonia pellet production was affected by the decrease in raw material exports from Russia and high energy prices. In 2024, overall subdued demand and high stock levels prompted major **Estonian producers to deliberately reduce their production volumes**, the expectation being a return to more "normal" output levels in 2025.

Finally, **Russia** is experiencing the largest decrease in production of all major producers. While the growth seemed to be stable until 2021, the trading sanctions were lethal to the sector. In three year, the country's production of pellet decreased by half. Russian pellets were mainly exporting to the European market and, while they found in South Korea a new partner, **they seem to be facing a lack of destination for their production.** It is also possible that these pellets are now consumed internally, however due to lack of data, this option couldn't be verified.

Figure 27: Evolution of pellet production in countries between 1 million and 500.000 tonnes of production (tonnes)

Figure 27 displays the countries that produced between 1 million and 500.000 tonnes of pellet in 2024. As for the major producers, different trends can be observed.

Spain is currently the largest producers amongst the "medium" output category. Until 2020, the country was following a stable growth before decreasing for one year. It then came back on increasing production to reach its peak in 2023 with close to 760.000 tonnes produced. In 2024, the production dropped by 20% due to overall subdued demand and high stock levels from previous year.

Belgium ranked at n the major producers of Europe peaking at 820.000 tons in 2021. With the closure of the two power plants running on pellet, demand went down and as result the production followed and decreased since 2022. Yet, the lack of consumption has not impacted the production as much as expected. Belgium is increasingly becoming a trading hub thanks to its port connexions, helping to stabilise its output. While reliable information on production was hard to find in 2024, it was estimated than the production reached 600.000 tonnes. No further decline have been recorded.

Portugal has lost more than 60% of its production in ten years. Reaching 1.000.000 tonnes in 2014, Portugal production has fallen in 2024 to 370.000 tonnes. The decrease of 40.000 tonnes between 2023 and 2024 mainly occurred in the premium pellet sector. The price for 15 kg bags has largely decreased in 2024, impacting the producer's margins. It did not provide the right incentives for them to mobilise more of the installed capacity.

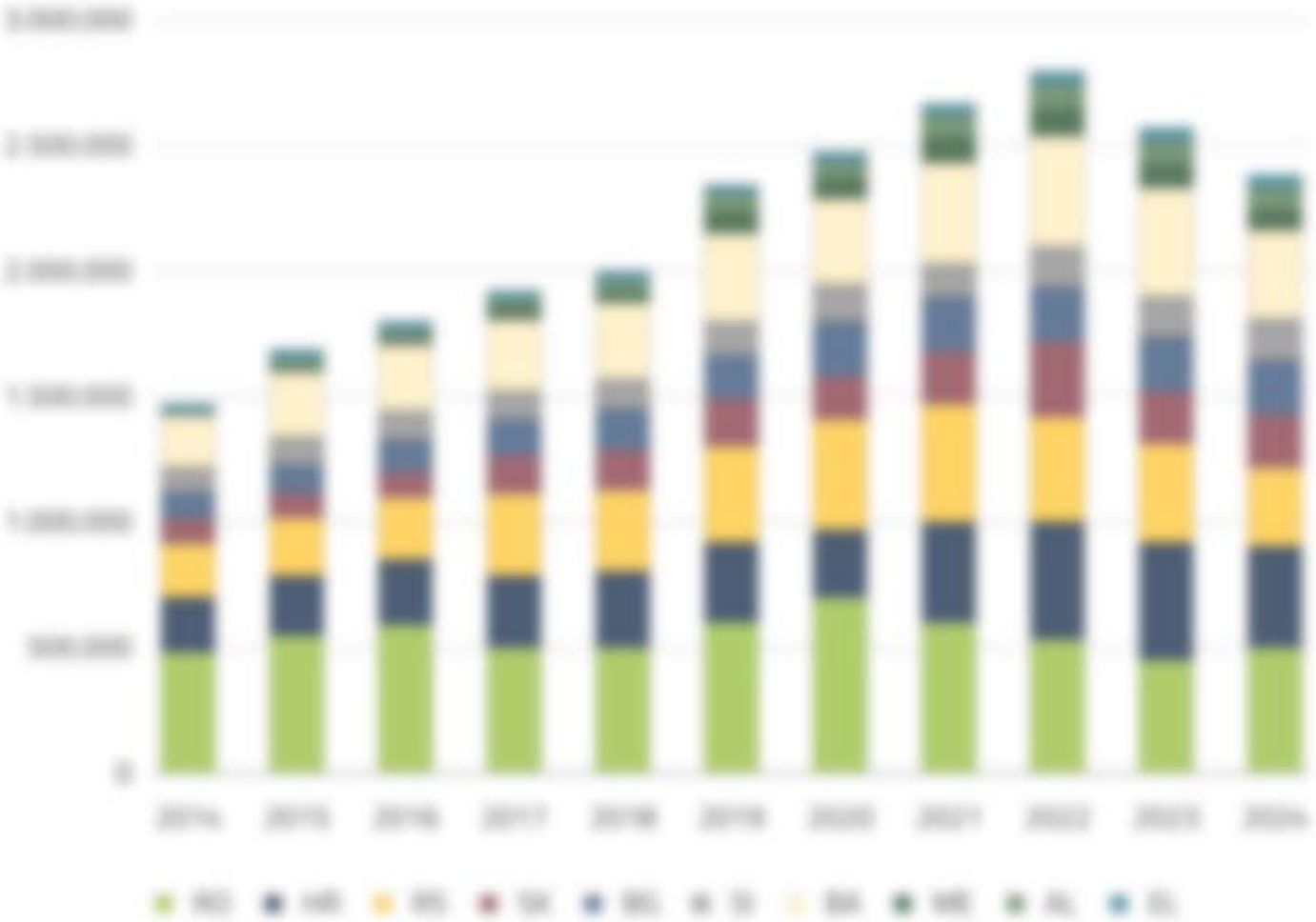
Lithuania is the most consistent country between the 1 million and 500.000 tonnes producers. Thanks to the increased installed capacity, actual output reached 540.000 tonnes of pellet in 2024, a peak in their production evolution.

After 3 years of decreasing output, Romania is showing signs of recovery in 2024. The country has modified its capacity structure, with a shift from a large pellet plant for smaller one, losing 200.000 tonnes of capacity in the process. Yet, in 2024, the country reaches half a million tons of output, 50.000 tonnes more than previous year, a 10% growth.

The Baltic region has always been an important hub for wood pellet production. Figure 28 represents the region's combined output evolution for the past 10 years. While still producing larger volumes than before the Ukrainian war, the production of the region as almost decreased by 500.000 tonnes since it peaked in 2021 above a million tons. Yet, the region remains a major producer of wood pellet and accounts **in 2024 for 7% of the global production** with 3.6 million tonnes.

Figure 28 Evolution of combine production of the Baltics countries (tonnes)

Figure 29: Evolution of combine production of the Balkans countries (tonnes)



The Balkan are facing similar trends as the Baltics. The region's output peaked in 2022 and is now reaching the lowest volumes produced since 2016. Major disruptions in production are coming from:

Croatia: 70.000 tonnes decrease

Bosnia Herzegovina: almost 100.000 tonnes

Serbia: 80.000 tonnes

Other Balkan countries have kept relatively steady production across the considered time frame, except for Romania, which is the only one growing in 2024. **Overall, the region has decreased its production by 7% and produced 1.4 million tonnes in 2024.**

PROPELLET FRANCE

EXPERT COMMENT

Eric Vial

Director

Propellet France

In my last article for the 2023 Pellet Statistical Report of Bioenergy Europe, I concluded that, given the growing questioning of subsidies for pellet heating appliances, we would certainly soon have to consider developing our sector without these aids. This premonition is being confirmed in Europe, and especially in France.

Even though wood energy is widely supported by our fellow citizens, wood energy in general, and pellets in particular, are being attacked from all sides.

Among our critics, we find:

- Competing energies: electricity. Especially in France, where nuclear power is for some more than just an energy source: an icon of national pride. On the fossil fuel side, there is also network gas, but the North American oil industry is not far behind either.
- Environmental activists and NGOs with various reasons. There are those prioritizing forest preservation at all cost. There are also those that wish to stop industrialization.
- Other industries wishing to access wood resources to decarbonize their activities: heavy industries, aviation, etc. In France, the concept of biomass closing the loop has been created: we cannot close the gap between biomass supply availability and demand projections. Thus, energy policy orientations dictate the results of studies showing that we will already lack wood in 5 years. And all this without once paying attention to the maturity or energy efficiency of these new uses.
- Health experts and doctors who indiscriminately claim that wood energy kills thousands of people due to particle emissions. In France, emission levels have been cut by more than half between 2000 and 2020, while the number of households heated by wood increased by 25%. The sector has demonstrated that new certified appliances are very efficient in terms of air quality and continues to work on this issue. 90% of current emissions are linked to appliances installed before 2011: the priority for air quality would be to replace them. Air quality has become a topic that exploits the legitimate concerns of some people, which we must reassure.

To all these detractors, add the cohort of climate change deniers, well aided by the rise of ambient Trumpism.

Our national political decision-makers are under the influence of our critics. We must extensively explain to local elected officials and consumers the reality of our energy, to provide concrete and truthful information and bring our national elites back down to earth.

In this context of a tidal wave against wood energy and a lack of knowledge among political decision-makers, our sector remains too weak, notably due to a lack of strong collective action. It is essential to join professional organizations and invest in them to exchange and create the means to carry outstrong advocacy actions.

04.

European pellet consumption

4.1 Total pellet consumption

European pellet consumption discussed here will include both EU27 member states as well as countries included in the "Other Europe" category.

Major changes in trend. Since the total consumption reached a peak in 2021 with 34 million tonnes, it hasn't stopped decreasing until **2024, the first in three years that is recording a growth in consumption**. While consumption levels are still inferior to the 2021 peak, 2024 was the second highest consumption ever recorded in the history of European wood pellet **with 32,7 million tonnes,** an evolution of +10% year on year. Figure 30 displays the evolution of this consumption in Europe.

Throughout the past years, the evolution of large and small-scale pellet consumption was very similar until the 2022 crisis where the prices of pellets and electricity went up and caused a divergence between the two end-uses. Industrial consumption went down while small-scale successfully maintained an upwards trend. 2024 marks the end of the decreasing evolution in large-scale.

Close to 3 million additional tonnes were consumed for industrial purposes in 2024. Absolute large-scale consumption volumes remain however below the small-scale absolutes, demonstrating the gap between both usages.

Residential consumption however, unlike the industrial one, never decreased in Europe. While it theoretically increased by 2% in 3 years, this rise in volumes of 300.000 tonnes is negligible. **The residential consumption of pellet seems to have found a climax in the recent years with its stabilization around 17,8 million tonnes**. Europe is the main region consuming premium quality wood pellet at small-scale with 85% of the global demand.

Even with the latest rise of the industrial consumption, Europe stands apart from the global situation when looking at small-scale/industrial ratio. **55% of wood pellets in Europe are consumed in small scale appliances for 45% in industrial**: the exact opposite of the global trend.

Figure 30: Evolution of pellet consumption in Europe by type (tonnes)

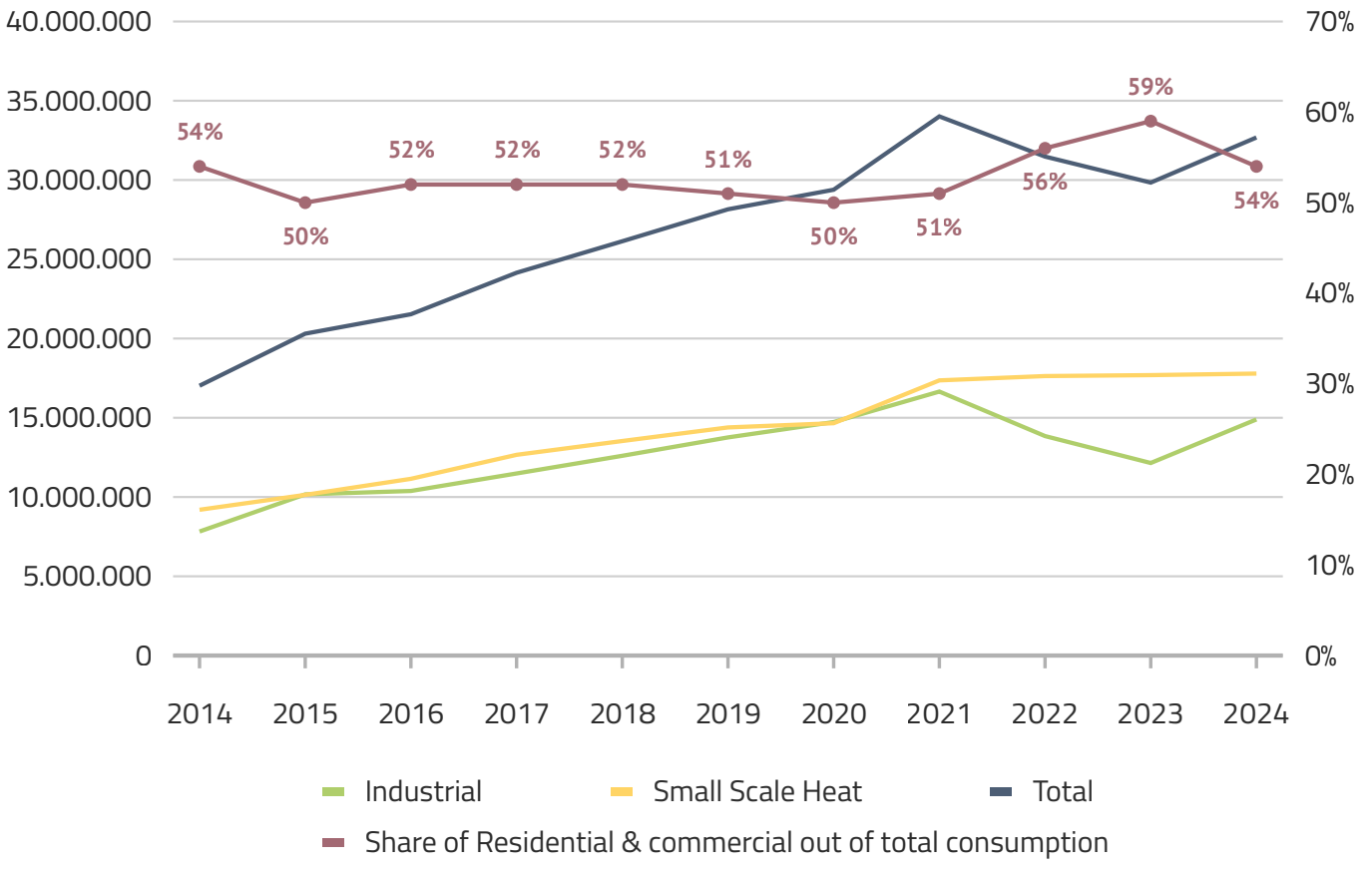
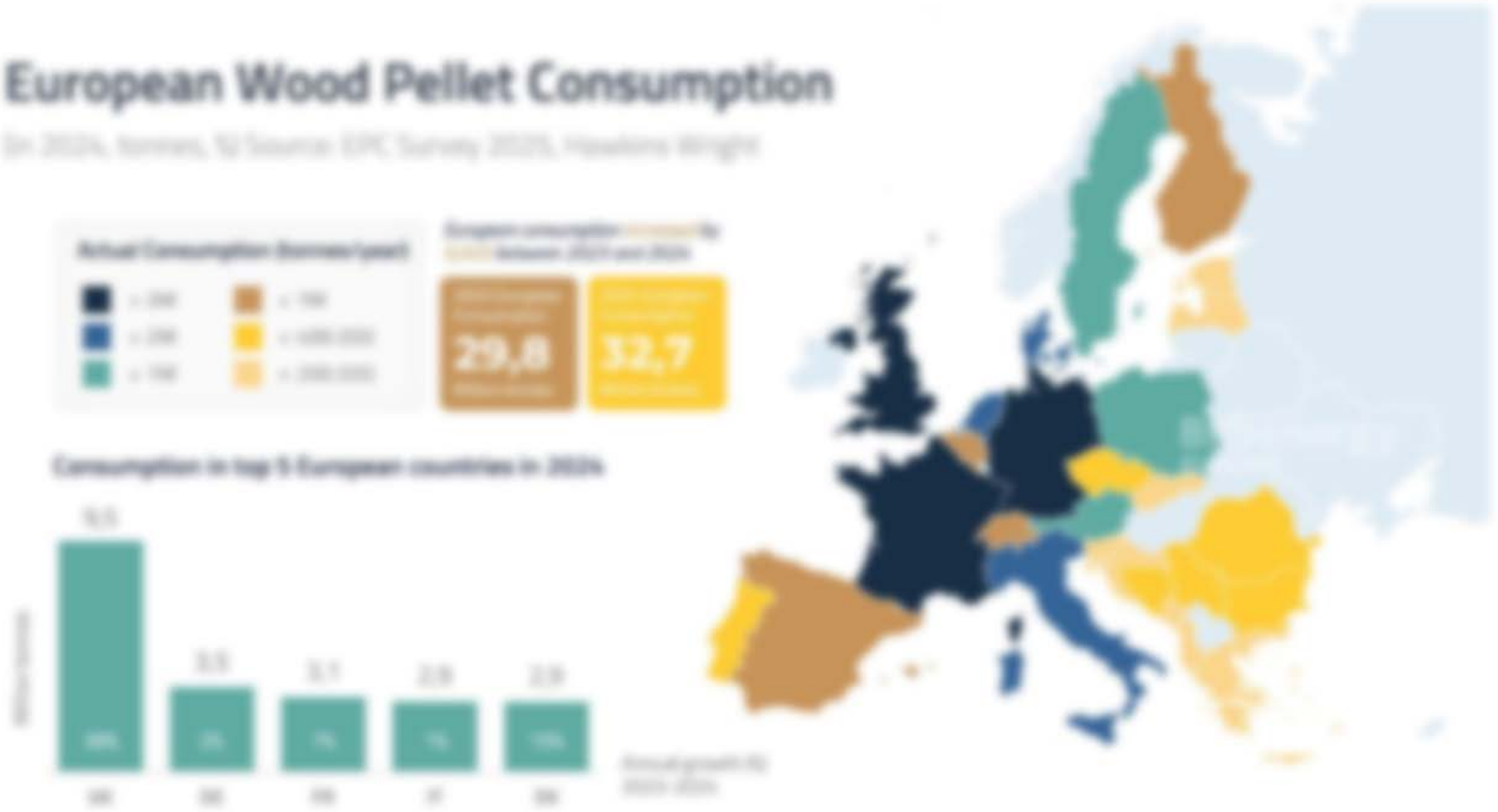


Figure 31: Map of European wood pellet consumption in 2024 (tonnes)



4.2 Small-scale consumption (residential and commercial)

Small scale consumption includes two dimensions, residential and commercial. The residential segment includes wood pellets consumed in appliances under 50 kW (usually private households), while the commercial segment represents the consumption in appliances over 50 kW generating heat consumed locally and without producing electricity (hospital, schools, etc).

Figure 32 displays the disaggregated evolution for those two components. **The larger segment, represented in green, is the small-scale consumption of wood pellet for residential purposes.** It has seen an impressive growth along the past 20 years **with +742% in 2024, European households consume 12,8 million tonnes more than in 2005.** Since its development, the premium pellet market has only experienced one year of declining consumption. As could be expected, this crisis happened in 2009 and was probably induced by the Great Recession. This led to an increase of prices for wood pellet, in some cases doubling compared to 2008 which led to massive drops in consumption. This reduction was however largely compensated by the massive growth of the following years.

The market has now entered a new phase in its development by reaching a plateau. Residential consumption initially experienced a large growth of 23% during 2021, likely driven by COVID lockdown reflexions. People started to question their installation to find more sustainable and economical ways to heat their home. **This growth led to an additional 3 million tonnes consumed in 2021 compared to 2020.** Then, the end of 2021 saw unprecedented energy crisis with forever increasing prices that frightened the new customers gained in 2020. The energy crisis peaked in 2022 and resolved at the end of 2023. Yet, it transformed heating habits of consumers and might have discouraged some new arrivals to continue with pellet heating.

2024: record high in wood pellet consumption.

While 2024 doesn't differ largely from the plateau reached before, it still grew by 1%, resulting in 14 million tonnes of pellet consumed for the first time in residential heating.

The dark blue line represents **the commercial consumption,** and while not behaving exactly like the residential segment, the market still grew steadily through the years until 2017 where the annual growth rate started to decline. It reached its lowest point in 2020 before rebounding with +13% in 2021 driven by defossilization interests. The consumption of wood pellet in commercial boilers has since then reached a similar plateau than in the residential sector. **In 2024, commercial consumption is for the first time facing a small decrease in volumes by 150.000 tonnes.**

This stabilization for both components indicates a slowdown in the purchase of new pellet appliances. The consumption is therefore more stable and driven by pellet prices and heating needs during winter.

Figure 32 Evolution of European pellet consumption for residential (<50kW) and commercial (>50kW) heat excluding CHP (Million tonnes)

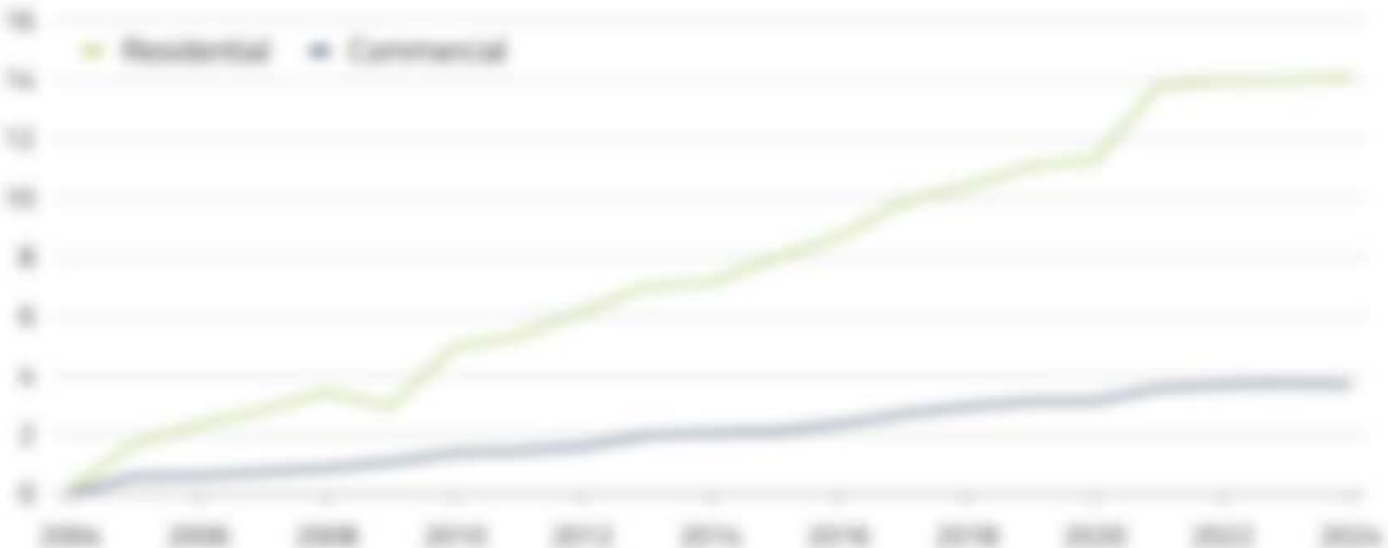


Figure 33: Heating Degree Days (HDD) per heating season (from september to april) on the past three years for 5 representative countries of Europe climate

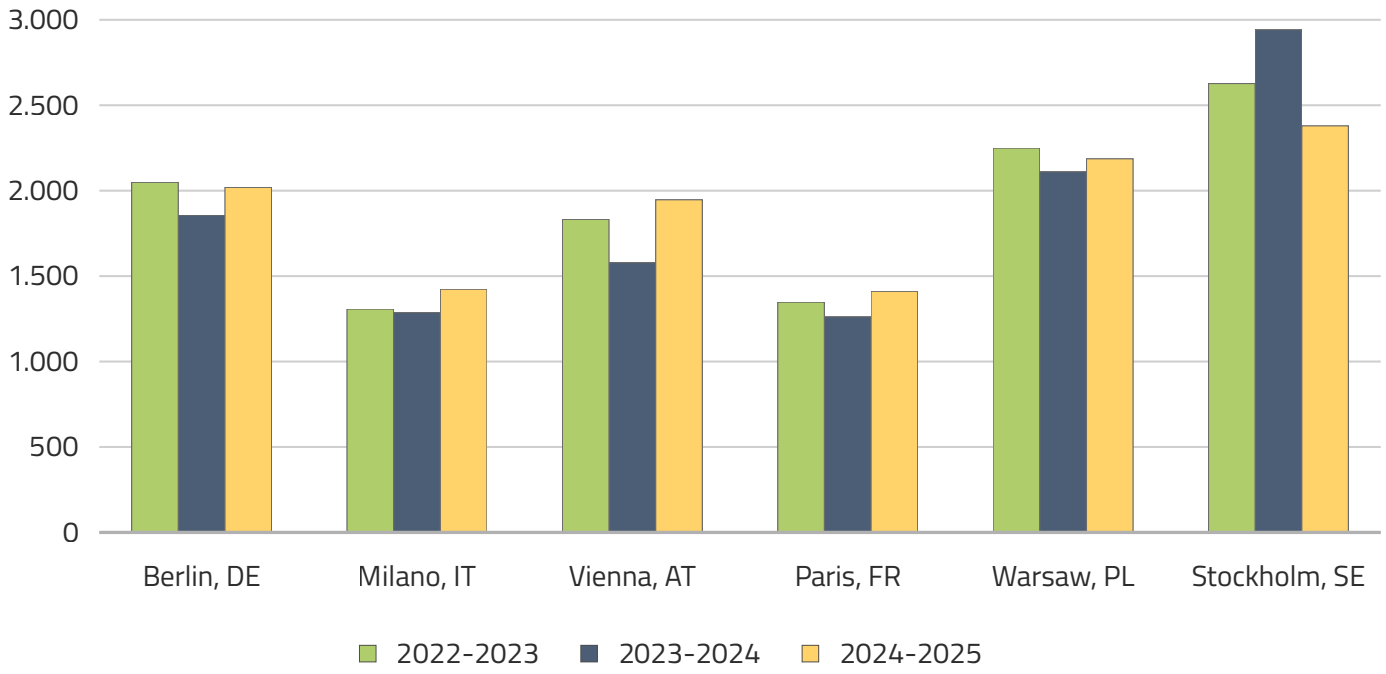


Figure 33 displays the fluctuation of Heating Degree days (HDD) between 2022 and 2025. Each day of the heating season temperatures are measured and compared to a base temperature of 15,5°C. Each degree under this temperature becomes a HDD for this day. The addition of those values along the heating season quantifies the demand for heat during said season. This year, the focus was directed on 5 weather stations representing as best as possible the diversity of wood pellet consumption in the EU. Overall, we saw a growth of the heating demand in 2024 due to a colder winter for almost every country (bigger amount of HDD).

Italy, France and Austria, the three lowest countries in terms of heat demand among the selected ones, have seen 2024 being the coldest winter in the past three years. Their HDD exceeds by 100 the figures reached for the 2022 heating season. On the opposite, the 2023 winter was one of the warmest ever recorded.

Germany and Poland have also experienced a warmer than usual winter in 2023 with HDD being inferior by 200 units compared to the previous year. While the 2024 heating season has been colder, it didn't catch up with the 2022 heating need with figures still inferior by 100 HDD.

For **Sweden,** representing countries with high heating needs, the observations differ greatly from other countries. 2024 was the warmest winter in the past three years while 2023 was the coldest. The heating demand of the country increased by 12% between 2022 and 2023, then decreased by 20% between 2023 and 2024.

Those data are not sufficient to fully explain changes in consumption at the European scale. Each country, while experiencing relatively similar trends to their neighbours, has its own specific conditions. In addition, **the pellet consumption was dealing with a rapid growth in demand that was unrelated to weather change**. This growth was likely driven by the rapid onboarding of new consumers thanks to the interesting national subsidy schemes across the EU. Although individual consumption levels may vary across member states, each new consumer contributed to the overall demand increase. With consumption now stagnating (most likely due to the slowdown in consumer adoption as reflected in the sales of appliances), heating habits of existing consumers will play a larger role in driving the demand.

The following page represents the monthly HDDs for the aforementioned weather stations across the 3 heating seasons. It can help understand when the consumption might be higher due to colder months. Unfortunately, prediction on future heat demand evolution remains impossible in such a rapidly changing climate.

Figure 3x: Heating Degree Days for disaggregated per month for the five representative stations (HDD)

a. HDD for Germany – Station ID: X3338

b. HDD for Italy – Station ID: LIML

c. HDD for Poland – Station ID: EPWA

6 HDD for Austria – Station ID: 11035

7 HDD for France – Station ID: 07156

8 HDD for Sweden – Station ID: 02480

Figure 35: European pellet consumption for residential (<50kW) and commercial (>50kW) in 2024 (tonnes)

Figure 35 ranks European countries by their absolute consumption volumes while Figure 36 ranks them by their absolute variations of consumption between 2023 and 2024, while also providing growth rates.

The largest consumer of pellets in Europe for small-scale appliances was and still is **Germany** with a consumption volume of 3.4 million tonnes in 2024. This 3% growth represents an additional 90.000 tonnes added to the volume consumed in 2023 positioning Germany as the fourth largest growing market in Europe.

After decreasing volumes in 2023, **Italy is resuming its increasing trend in small scale appliances consumption**. The volumes in 2024 exceeded the ones from 2023 by 40.000 tonnes. With this 1% growth, Italy is securing its position as the second largest market in Europe.

The top 3 remains unchanged with France in third place. French small-scale consumption nonetheless decreased by 4% resulting in a loss of 100.000 tonnes, the third largest decrease of 2024 behind Portugal and Latvia. With colder winter in 2024, this fall cannot be attributed to weather conditions but more likely to the recent prices variations of wood pellets. Although prices dropped in 2024, high prices of 2023 might have discouraged users from transitioning to wood pellets or continuing to use them. Changes in governmental support schemes, like it's the case in France for example, can have strong disruptive impacts on the consumption by slowing the replacement of fossil appliances with pellet heating.

When focusing on the growth, the first country in the list is Poland that experienced a 19% growth in consumption, with almost 200.000 tonnes of additional pellets consumed in 2024. Thanks to the Clean Air Programme (https://czystepowietrze.gov.pl/) the country is replacing old coal appliances with pellet-based systems (among other solutions) and this is therefore driving the consumption upwards thanks to new consumers.

Similarly, **Austrian consumption has grown by 10% with 130.000 tonnes**, also driven by very interesting federal and regional support schemes for pellet boilers.

Finally, the 3rd largest growth is Romania with a 10% additional volume consumed compared to 2023, or 120.000 tonnes.

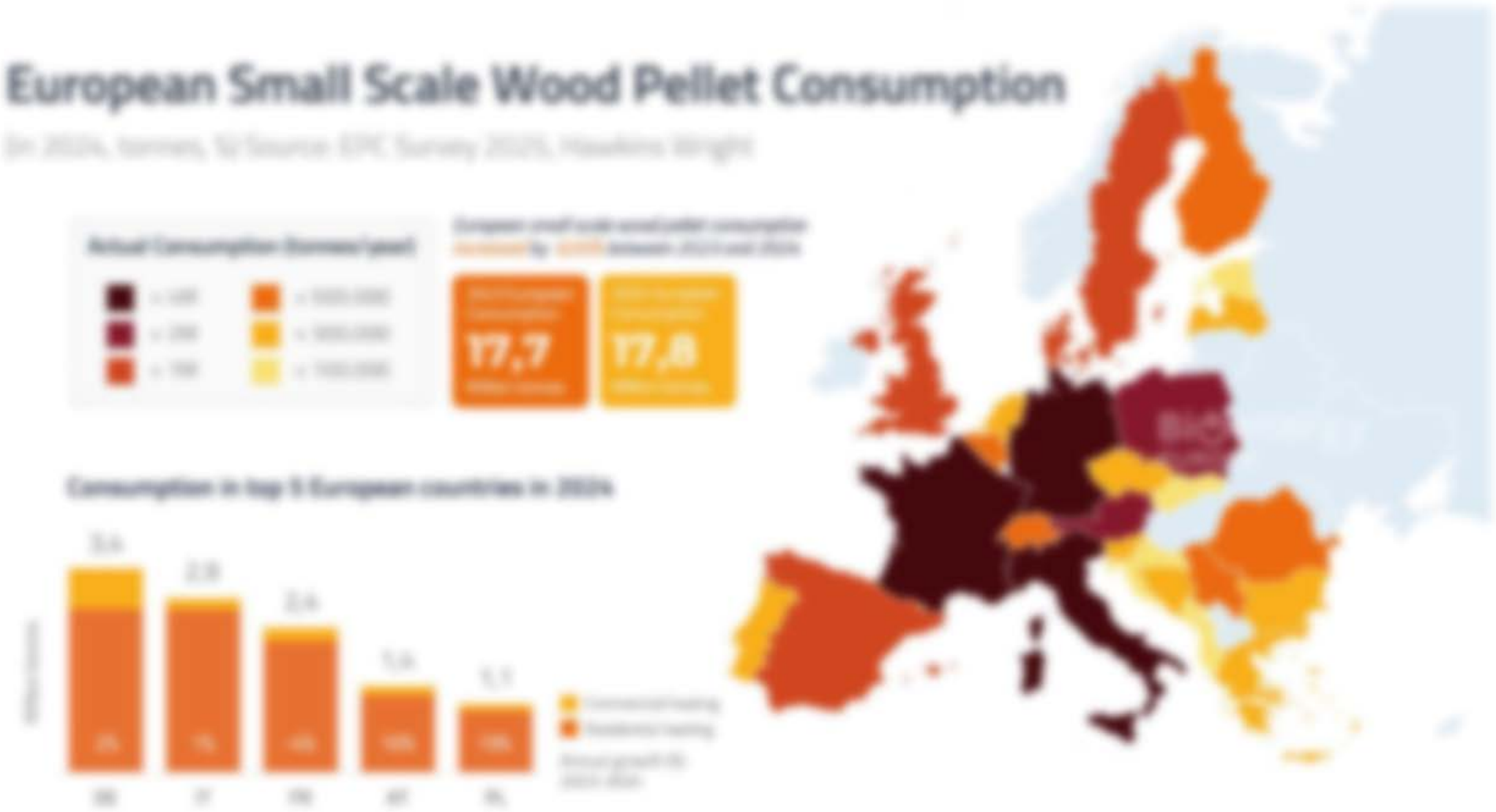
On the decreasing side, three countries hold market disturbances with drops above 100.000 tonnes in 2024. The reduction in consumption experienced in **France** is important in volume (100.000 tonnes) but relatively insignificant when put in perspective to the country's total consumption. On the other hand, **Portugal and Latvia** experienced decreases representing close to half of their total consumption. These trends might come from several factor like slowed interest from customers to unavailability of wood pellet for customers due to raw material shortages or too expensive prices. Considering the trading data, it's likely that these pellets not consumed internally contribute now to increasing the countries' exports.

Figure 36: Growth of European pellet consumption for residential (<50kW) and commercial (>50kW) by country between 2023-2024 (tonnes)

a. Top 3 countries of absolute growth in pellet consumption

b. Rest of Europe with data availability

Figure 37: Map of European wood pellet consumption in small scale appliances for residential (< 50MW) and commercial (< 50MW) sector (tonnes)



4.2.1 Focus on residential consumption

Residential consumption is the main driver of small-scale consumption with 80% of the European premium pellets being consumed in appliances under 50 kW. As seen previously, the residential market entered a plateauing phase after a large increase starting in 2020. With fewer new consumers, residential consumption is struggling to build new momentum. It is therefore now more susceptible to changes in relation to temperature during the heating season and to the prices of the wood pellets. Yet 2024 marks the first year where European consumption sits above 14 million tonnes. **In total, four countries have a consumption above 1 million tonnes**. The largest, **Germany**, is reaching a residential consumption of 2.7 million tonnes in 2024. After substantial increases between 2020 and 2021 of over +10%, the relative growth started to shrink and has fallen to -2% in 2024. The slow-down in Germany could be due to the building energy act that was revised on in 2023 which first excluded pellet boilers from the list of the sustainable heating technologies before adding them in the final version. It therefore gave mixed signals to consumers which might have impacted their decision-making process.

Figure 38 Evolution of residential (≤ 50kW) pellet consumption in Europe – 1kt/year (tonnes)

Following a decline of 200,000 tonnes in 2023, **Italy's consumption is gradually recovering**. In 2024, the consumption increased by 3% and is now close to 2.7 million tonnes. Connecting this to the sales of pellet stoves presented later in the report, part of this growth can be attributed to the onboarding of these new consumers who purchased one between 2023 and 2024, but another reason is also the HDD, as the 2024 heating season was the coldest experienced by Italy in the past 3 years.

The overall growth in pellet consumption in France in 2024 is not driven by the residential sector. With a residential consumption 100,000 tonnes lower in 2024, France is going through its very first decrease. This could be attributed to milder winter in the past years. The future of France's residential consumption also faces uncertainties due to subsidies modification. Since 2025, 50% of subsidies for wood appliances have disappeared, therefore not incentivizing consumers to choose this option over others like heat pumps.

Austria saw an increase in consumption of 100,000 tonnes in 2024, a 10% growth. This was driven by the subsidies for appliances that translated into nearly 24,000 new boilers installed. This influx of new customers increased the consumption independently of temperatures trends. Some uncertainties are rising for 2025 according to market players, as premium pellets are starting to be used in electricity generation to compensate for Russian natural gas. This new habit, while providing no disturbances in 2024, should be monitored in the coming years.

As seen on Figure 39, focusing on the countries between a million and 350,000 tonnes, **Denmark's residential consumption has been struggling for the last 3 years.** It peaked in 2021 with 940,000 tonnes but rapidly fell the following year by 300,000 tonnes. In 2024, the consumption reached its lowest point in 10 years with 370,000 tonnes. The country energy strategy for heat seems to be rather oriented to district heating network (with of the Danish households in 2023) and electrification for individual systems via heat pumps.

Spain has increased its consumption by 3%. The country is recovering slowly from the energy crisis with pellet prices that have now reached close to their pre-crisis level.

Finally, **Romania has experienced a large growth in 2024.** This increase of 120,000 tonnes could be virtual, as data for the previous year was replicated due to the lack of contributor in Romania. A smoother growth through the years would be a more realistic approached than the data displays on Figure 39.

In 2024, Germany was the largest consumer of premium pellets, but that doesn't really paint a good picture of the household's interests in using pellets, as Germany is simply the most populated EU country. Figure 40 ranks countries by the ratio of premium pellets consumed to the numbers of households (Latest data from Eurostat). Germany, with more than 40 million households, now only ranks 10th. **This provides a good indication regarding how the pellet market is more diluted in Germany than in Austria,** the 1st consumers of pellet per household. This also gives indications that Germany, while already consuming close to 3 million tonnes of premium pellets, still has room to grow.

Figure 39 Evolution of residential (≤ 50kW) wood pellet consumption in Europe for countries with a consumption between 750,000 and 1,000,000 tonnes (tonnes)

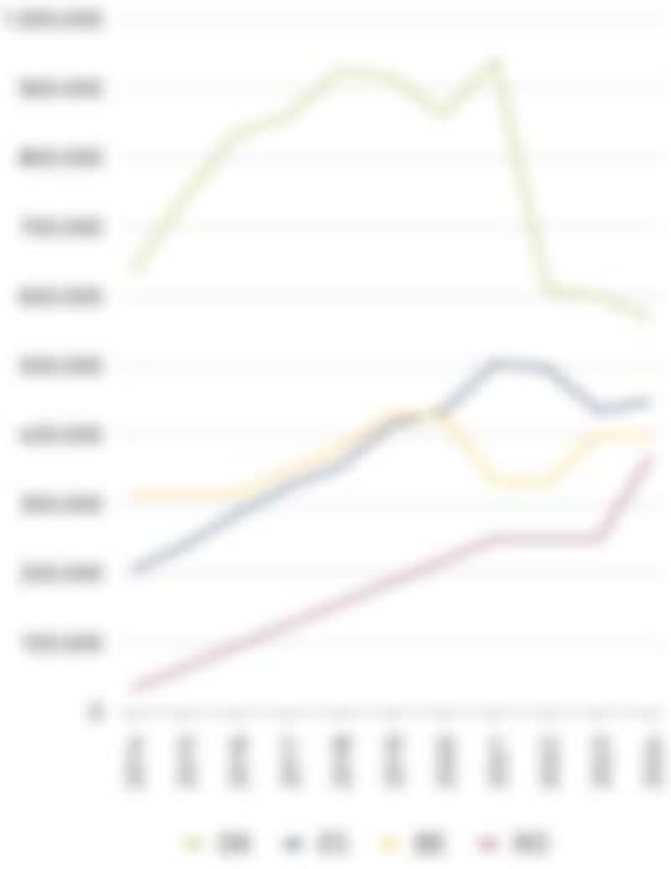


Figure 42: Volume of wood pellet consumed in the residential sector per country per household (tonnes/household)

4.2.2 Focus on commercial consumption

Commercial pellet consumption is defined as any consumption in installations with a capacity above 50 MW and below 1MW. Figure 4-1 displays the matrix of the commercial consumption's evolution for the countries above 350,000 tonnes.

The only similarity with residential consumption for this top 4 is the **the largest consumer: Germany**. The evolution of the German commercial market followed the same pattern than in the residential sector, with a slightly lower growth in 2024 of -2%. The rest of the top 4 differs completely and reflect the different energy strategies followed by European countries. For instance, in Finland where premium pellet consumption is low in the residential sector with 35,000 tonnes per year, the country compensated with an important use of pellet in the commercial sector. **The consumption is starting to recover up from the crisis and reaches 650,000 tonnes in 2024**, ten times as much as in the residential market.

While being very similar in terms of volume, **the UK, third largest country in commercial consumption** follows a different trend than Finland. The market increased largely between 2010 and 2016 and has since then stabilised.

Finally, Spain ranks 4th in terms of commercial volumes, and its evolution is constant through the years and has been more resilient to crisis than its residential consumption.

Figure 4-1: Evolution of commercial (>50MW) pellet consumption in Europe (for countries above 350,000 tonnes (tonnes)

Figure 4.2: Evolution of commercial (>50MW) pellet consumption in Europe for countries between 100,000 and 200,000 tonnes (tonnes)

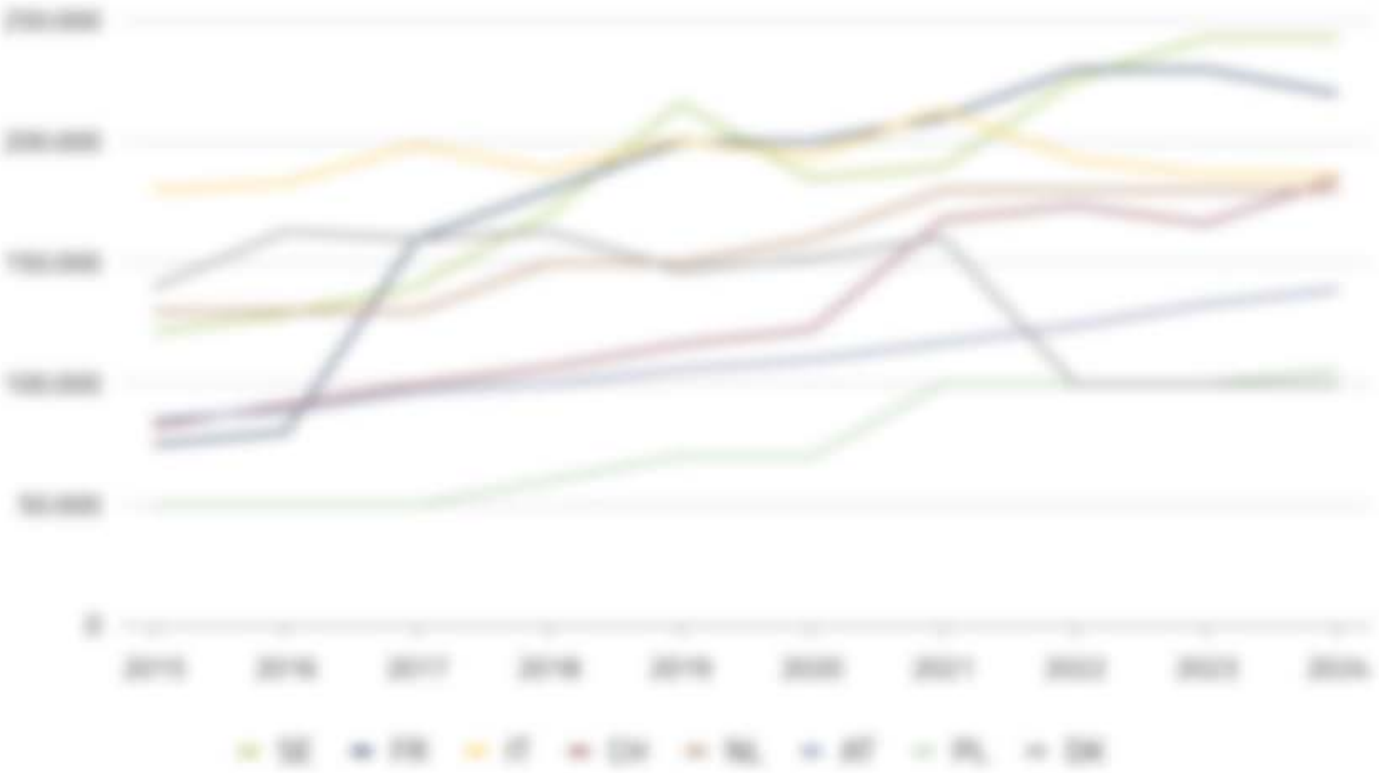
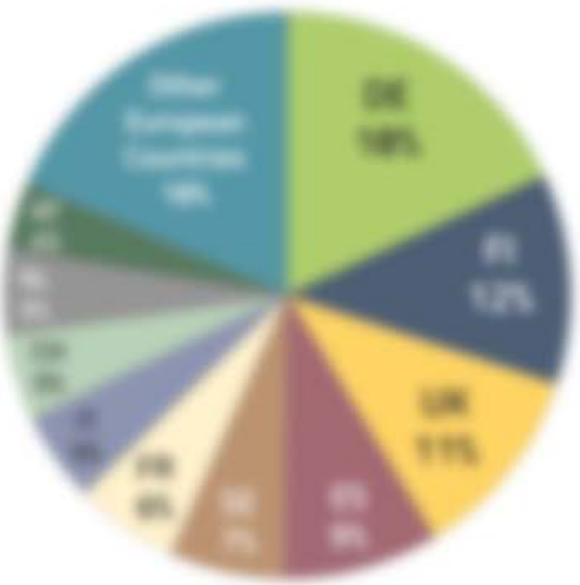


Figure 4.2 displays the evolution for countries with a consumption higher than 100,000 tonnes in 2024. Out of the nine countries exceeding this volume, **only one has seen an actual decrease in 2024: France.** Indeed, **consumption dropped** by -4% (-10,000 tonnes in 2024 and reached 230,000 tonnes. The second country that theoretically experienced a decrease in 2024 is Italy, but with only a few hundred tonnes less, this is more to be considered as a stagnation.

Two countries have seen their data replicated due to the lack of data which includes Sweden (1st consumer) and Denmark. The rest of countries have been growing in consumption in 2024. The smallest relative increase is achieved in **Austria** with a 5% growth, or 9,000 tonnes, while **Switzerland** has experienced the largest growth (+11%) with an additional 20,000 tonnes compared to 2023. The commercial demand for wood pellet of **Denmark** has substantially decreased in 2021 following the residential evolution. It dropped by 90,000 tonnes in one year before stabilising at 100,000 tonnes.

Half of the total volume consumed by commercial appliances in Europe is concentrated in the top 5 country. Germany, the largest consumer, recorded 2024 volumes equivalent to the combination of the 15 smallest countries for which data is available. In overall, the commercial demand for pellet has decreased in 2024 but not substantially. This slowdown was mostly due to Portugal and Latvia both of which halved their consumption. The cumulated drop of both countries reached 120,000 tonnes, offsetting the positive trend from the developments of other countries.

Figure 4.3: Share of European commercial (>50MW) pellet consumption by country in 2024 (tonnes)



4.3 Large-scale (industrial) consumption

Industrial pellet consumption refers to the use of wood pellets at large-scale facilities for energy generation, primarily in the form of **power-only plants** or **combined heat and power (CHP) installations**. These facilities are typically equipped to handle bulk pellet deliveries and operate under long-term sourcing contracts, with pellets used either as a full or partial substitute for coal. In power-only applications, pellets are combusted exclusively for electricity generation, while CHP plants also produce usable heat for district heating networks or industrial processes. An increasing interest is also rising in hard to abate sector to replace fossil carbon in process.

Figure xxx represents the evolution of the industrial consumption in the UK, the largest consumer in Europe. In 2022 and 2023, consumption declined significantly, likely due to a combination of factors including the energy crisis, elevated pellet prices and maintenance as well as low down activity at Drax. However, the market rebounded strongly in 2024, with consumption returning close to the 2021 peak. This recovery was likely driven by stabilised pellet prices which improved generation margins relative to gas and coal. Regarding the future of industrial consumption, it's worth it to take a closer look at the major current driver for European consumption: the UK. From 2027 onward, the UK will introduce new rules limiting the amount of power from biomass that can under its revised framework. These measures are designed to prioritise flexible use of biomass during peak demand periods and to prepare for a future transition toward carbon capture technologies. As a result, the long-term outlook for large-scale pellet consumption in the UK is expected to shift, with implications for how and when biomass is used in the power sector.

Figure xxx. Evolution of industrial pellet consumption in the United Kingdom (tonnes)

Figure xxx. Evolution of European largest consumers of industrial pellet excepted UK (tonnes)

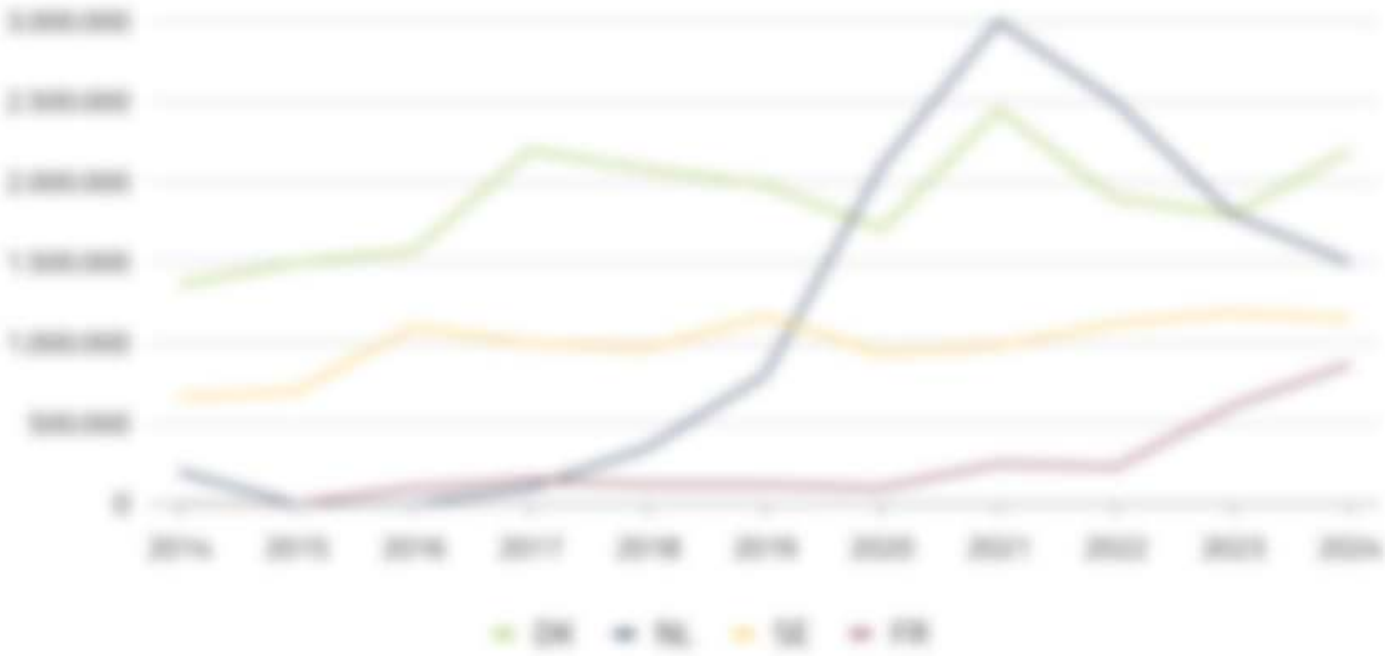


Figure 43 provides the industrial consumption data for the largest European markets but are presented separately from the UK for visibility reasons.

In Denmark, industrial pellet consumption is primarily driven by cogeneration plants supplying both electricity and district heating. The national trend closely mirrors that of the UK, with a peak in 2021 at nearly 2.5 million tonnes, followed by a decline in 2022 and 2023 as a result of high fuel prices. In 2024, consumption rebounded, reaching around 2.2 million tonnes. This recovery reflects a return to more typical dispatch patterns and stabilised market conditions. Thanks to this growth, Denmark now ranks as the **second largest industrial pellet consumer in Europe**.

In the **Netherlands**, industrial pellet consumption continued to decline in 2024, extending the downward trend observed since its peak of around 3 million tonnes in 2021. Current consumption stands at approximately 1.3 million tonnes, where pellet use rebounded in 2024, the Dutch market did not experience a similar recovery. This is primarily connected with outages at RWE's Amer co-firing plant. On the contrary, pellet consumption at RWE's Eemshaven and Uniper's Maasvlakte plants increased in 2024 compared to 2023, although remaining below historical highs in both cases. The most worrisome aspect about Netherlands however is the future outlook, since the government has not indicated any willingness to continue supporting biomass power generation, despite significant potential impact in security of supply.

In **Sweden**, industrial pellet consumption has remained remarkably stable since 2016, consistently hovering around 1 million tonnes annually. The peak occurred in 2023, reaching approximately 1.2 million tonnes, followed by a slight decline of about 4%, to reach 1.15 million tonnes in 2024. Unlike countries that experienced recent growth, such as the UK or Denmark, Sweden's market shows little expansion, largely due to its **mature biomass heating sector**. Wood pellets are primarily used in **combined heat and power (CHP) plants** integrated into the country's extensive district heating systems, many of which have already transitioned from fossil fuels to bioenergy.

In **France**, the surge in industrial pellet consumption since 2021 is largely attributed to the expansion of biomass-based power generation in the French overseas territories, particularly through the activities of Albioma. The company operates several biomass power plants in Réunion Island, Guadeloupe and Martinique. These facilities primarily utilise bagasse, a by-product of sugarcane processing, during the harvest season and switch to other biomass sources, including imported wood pellets, during the off-season. The strategic shift towards biomass and the phasing out of coal in these plants have significantly increased the demand for wood pellets. As a result, France's industrial pellet consumption grew from approximately 280,000 tonnes in 2022 to around 600,000 tonnes in 2023, reaching close to 1 million tonnes in 2024. This growth underscores the pivotal role of the French overseas territories in the country's biomass energy landscape.

Figure 4.6: Repartition of industrial pellet consumption amongst European countries in 2024 (tonnes)

05.

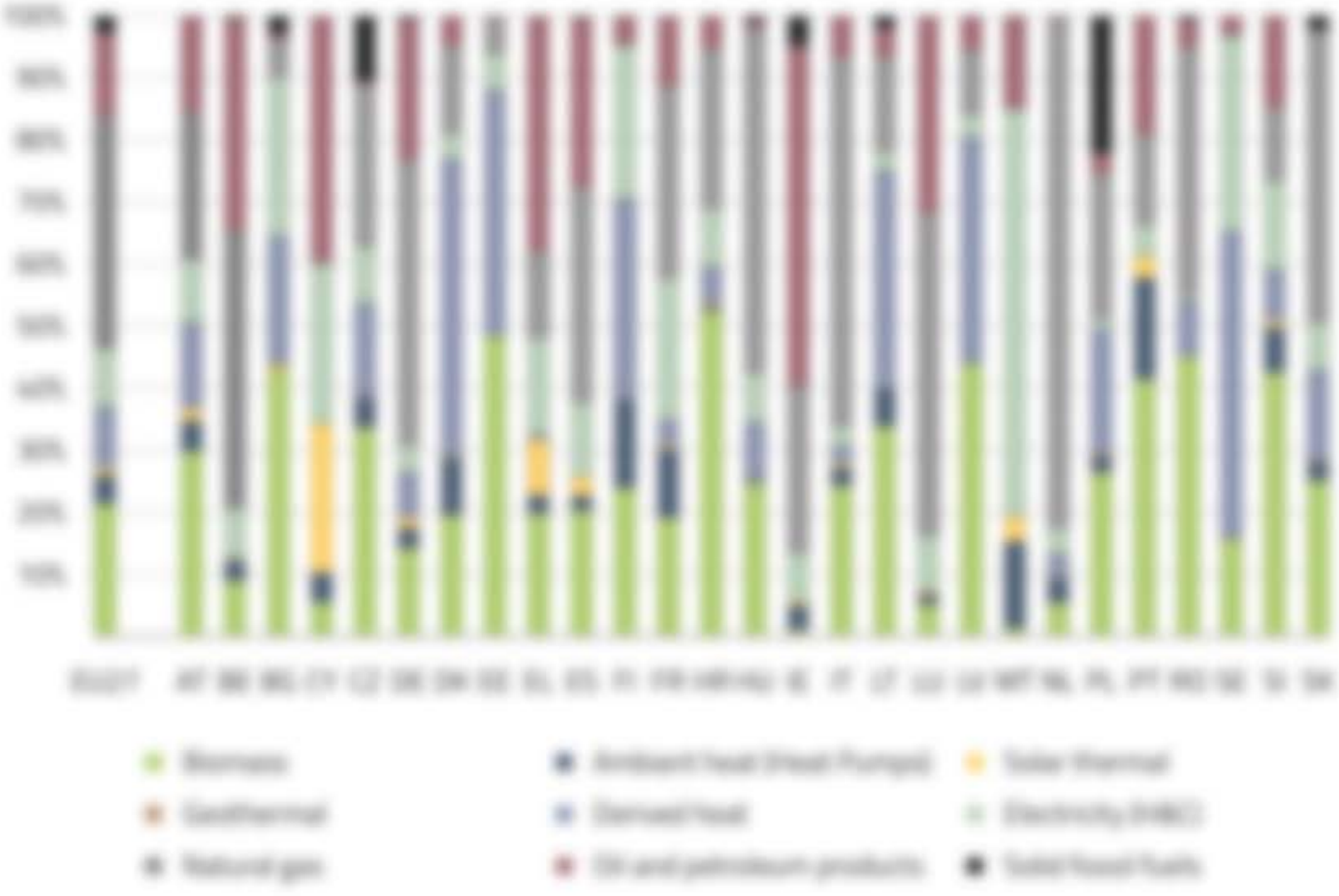
European heating appliances market

Figure 47 below presents the energy mix used for heating (and, to a lesser extent, cooling) across EU Member States in 2021. The figure shows that renewable energy sources represent only about one-quarter of household heating consumption at EU level. Natural gas remains by far the most widely used fuel in the residential sector. Major reasons for this gas supremacy reside in its price and its ease of use due to the maturity of gas grid in Europe. As dominant it is right now, **gas appliances must be switched** to renewables alternatives in the years to come.

The ongoing energy crisis, and particularly the surge in prices for Russian gas, has encouraged many households to seek alternative and more affordable heating options.

Among these, biomass, including wood pellets, stands out as the second most common source of energy for heating in Europe, ahead of coal and oil products. It accounts for slightly more than one fifth of the total. Croatia (52.3%), Estonia (48.6%) and Romania (41.2%) report the highest shares of biomass in the residential energy mix. However, the term biomass covers a wide range of fuels and is not limited to pellets. This helps explain why some countries with a high share of biomass in household heating still show relatively low pellet consumption compared to other EU Member States such as Germany, France or Italy.

Figure 47: Share of energy used for heating and cooling in the residential sector for EU27 countries in 2021 (%)



1.1 The stove market

The first category of pellet heating systems covered in this report is pellet stoves, which are local space heaters with relatively small capacity. Table 1 on the right provides an estimate of the share of households equipped with such systems in 2024, based on the assumption of one pellet stove per household. **As in previous years, Italy ranks first** in terms of the installed stock of pellet stoves, **both in relative terms** as Table 1 demonstrates, **but also in absolutes** as shown by the Figures below displaying the evolution of this stock in in the largest EU markets, namely Italy, France, Spain and Germany.

In **Italy**, the pellet stove market **showed signs of recovery** in 2024, following a sharp decline in 2023. Annual sales rebounded to over 90,000 units, a significant increase from the approximately 62,000 units sold the previous year. This positive shift reflects a partial return of consumer confidence, supported by stabilised pellet prices and a more favourable energy context. However, despite the rebound in sales, the total installed stock of pellet stoves only recorded a modest increase between 2023 and 2024. This limited growth is due to a methodological adjustment in Italian statistics, which applies a replacement factor to account for the decommissioning of ageing appliances. As a result, a substantial number of older units were removed from the total stock, offsetting much of the new installations.

In **France**, pellet stove sales also picked up in 2024, although the rebound was more moderate than in Italy and remained well below the levels recorded in earlier years. Around 94,000 units were sold, up from 78,000 in 2023, reflecting a cautious but encouraging recovery in consumer demand. Despite this slower pace of growth, the French market showed signs of renewed momentum heading into 2025. With this latest increase, the installed stock of pellet stoves in France has surpassed 1.7 million units, strengthening its position as the second largest market for pellet-based local space heating in the EU.

Table 1: Average percentage of households with pellet stoves in 2024 for selected European countries (%)

IT	**8.79%**
FR	5.42%
ES	2.67%
AT	1.26%
DE	0.72%
LV	0.63%
CZ	0.31%
PL	0.03%

In **Spain**, the pellet stove market continued its downward trajectory in 2024, reaching its lowest sales level since data collection for this segment began in 2014. Several structural and contextual factors contributed to this persistent decline, including strong competition from heat pumps, the absence of supportive national policies, limited public understanding of the pellet sector, and sustained concerns over feedstock availability and cost. While pellet prices stabilised during the year, this alone was insufficient to reverse the negative trend or restore consumer confidence.

In **Germany**, the pellet stove market mirrored the trend observed in Spain, with 2024 marking a new low in annual sales since the beginning of consistent data tracking. The decline occurred in the context of a broader collapse in the national heating appliances market, affecting nearly all technologies, including heat pumps. Uncertainty around regulatory frameworks, reduced consumer confidence, and high upfront costs contributed to the contraction across the board. For pellet stoves specifically, the subdued sales highlight the challenges facing the sector in a year marked by hesitation in household investment and shifting policy signals.

Figure xiii Evolution of the installed stock of pellet stoves in countries with >100k installed units (n° of units)

Figure xiii Evolution of the annual sales of pellet stoves in countries with >100k installed units (n° of units)

Figure 50 shows diverging trends in the stock of pellet stoves across five smaller European markets between 2014 and 2024. Serbia and Czechia are showing steady growth, while Austria experienced a sharp drop in recent years, mostly due to the introduction of a "lifetime" parameters in the calculation of stock, meaning appliances older than 15 years are not accounted for in the updated numbers. In Serbia, the continued growth of the pellet stove market is largely driven by the affordability and local availability of pellets, limited access to gas infrastructure in rural areas, and growing interest in replacing older, more polluting heating systems, while in Czechia market expansion has been supported by national subsidy schemes for replacing outdated solid-fuel appliances, as well as by stricter emission standards that favour cleaner technologies. The sales of pellet stoves in Austria also experienced a sharp decline, reaching record low levels since the data collection process started. Switzerland remained broadly stable, with consistently low annual sales suggesting a mature and saturated market. In Poland, stove sales maintained a moderate but positive trajectory, resulting in gradual stock growth over the decade. Latvia, while previously marginal, saw a notable spike in sales in 2023, although this appears to be a temporary surge, with sales slowing down back to "normal" in 2024 as shown in Figure 51.

Figure 50: Evolution of the installed stock of pellet stoves in countries with > 100k installed units (n° of units)

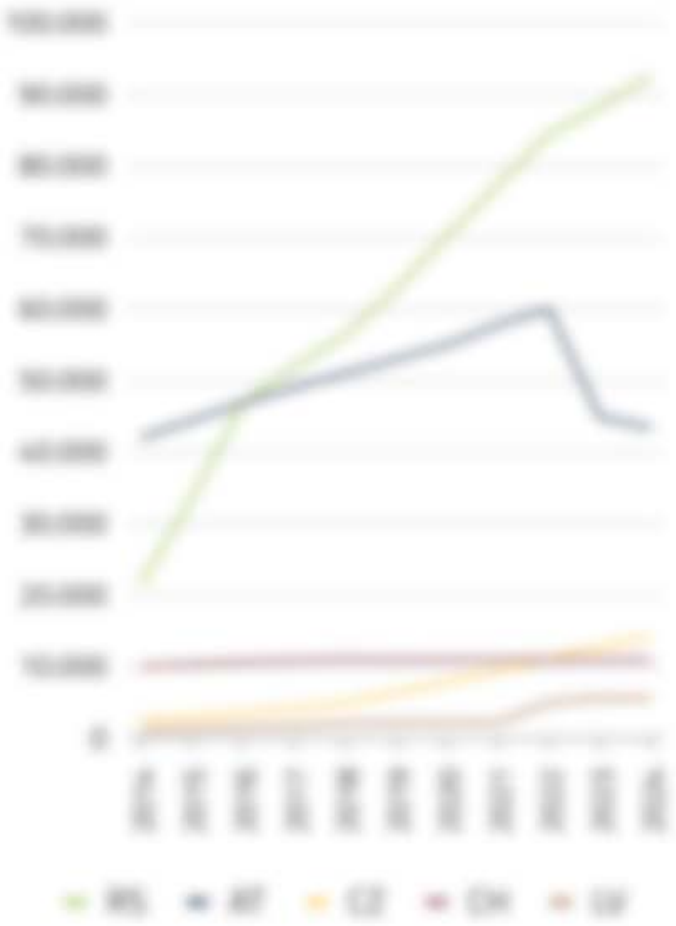
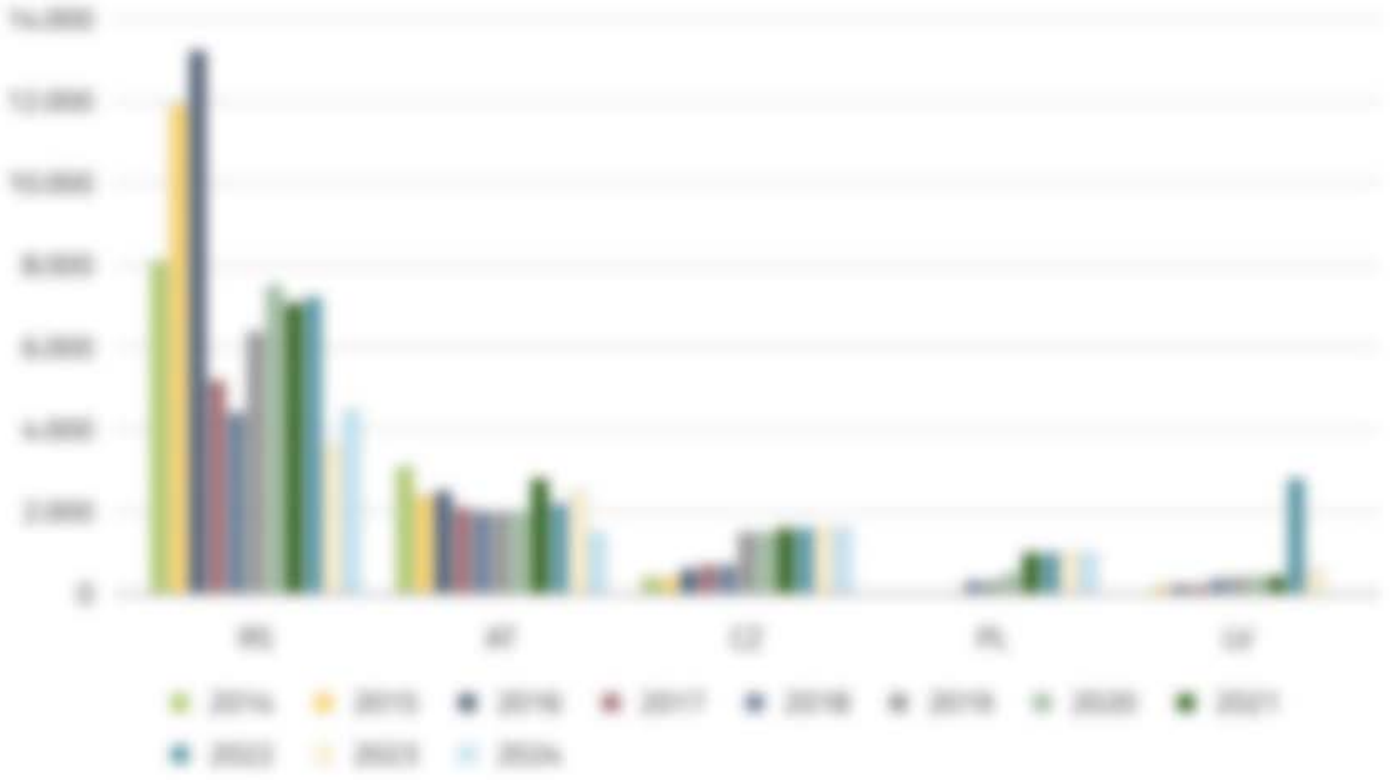


Figure 51: Evolution of the annual sales of pellet stoves in countries with > 100k installed units (n° of units)



5.2 The residential boiler market

Aside from pellet stoves, the other major type of appliance for the residential market is the pellet boiler. Table 6 displays the market penetration of households equipped with such an installation considering a maximum of one per household. Similarly to 2023, Austria takes the lead when it comes to market density, with more than 5% of Austrian households relying on pellet boilers. The following figures further display information on the stock and sales of residential pellet boilers in the EU. **In Germany**, the residential pellet boiler market experienced a sharp decline in 2024, with annual sales dropping by half compared to 2023. This marks the second consecutive year of steep contraction, as 2023 sales had already been reduced by 50% relative to 2022. The slump is part of a broader collapse in the German heating appliances market, affecting most technologies (including heat pumps which sales falling by 50%) and mirroring the trend observed in pellet stove sales. Despite this sharp decline, Germany continues to hold the largest installed base of residential pellet boilers in Europe, reflecting its historically strong market position.

Table 6: Estimated percentage of households with pellet boilers in 2024 for countries with available data (5)

AT	5.71%
LV	2.44%
PL	1.24%
CZ	1.08%
DE	1.01%
IT	0.66%
FR	0.58%
ES	0.47%

Figure 52: Evolution of the installed stock of residential pellet boilers in GWth for countries with >1GW installed units in [1] of units

In Poland, the residential pellet boiler market has expanded significantly in recent years, driven largely by robust national support schemes. **The Clean Air Program** has played a key role in encouraging households to replace old, inefficient heating systems with modern biomass alternatives. This sustained policy support has translated into rising annual sales and a steadily growing installed stock. However, the long-term outlook remains uncertain, as the continuation of this positive trend will largely depend on whether similar levels of financial support are maintained once the current programme phases out.

In Austria, the residential pellet boiler market saw a strong rebound in 2024 following a total collapse in 2023, when sales dropped to record lows. The turnaround was largely driven by the introduction of new federal and regional subsidy schemes, which significantly improved the affordability of pellet boiler installations. As a result, annual sales grew to nearly 24,000 units in 2024, setting a new all-time high for the Austrian market. This recovery underscores once more the central role of targeted public support in revitalising demand.

In France, the residential pellet boiler market continued its decline in 2024, with sales falling further after an already significant drop in 2023. Only around 7 100 units were sold during the year, marking one of the lowest annual figures in recent history. This sharp drop is closely linked to instability in the national subsidy framework, which has undergone several changes over the past year. The resulting uncertainty has undermined consumer confidence and disrupted investment planning, leading to a prolonged downturn in market activity.

In Italy, the residential pellet boiler market showed signs of modest recovery in 2024 following a sharp decline in 2023. Nearly 4,000 units were sold during the year, representing a twofold increase compared to the previous year. While overall sales volumes remain well below historical values, this rebound suggests a partial restoration of consumer interest. Compared to the ongoing contraction seen in markets like France, the Italian market appears to be stabilising, however from a low base.

Figure 53 Evolution of the annual sales of residential pellet boilers in EUR40 for country with >100k installed units (k units)

In Spain, the residential pellet boiler sale market continued its downward trajectory in 2024, with annual sales falling below 5,000 units and reaching their lowest level since the beginning of data collection. Despite this persistent decline in new installations, Spain remains one of the larger markets in terms of total installed stock, which has now surpassed 80,000 units. This reflects the strong growth seen in earlier years, even as current market momentum has significantly weakened. A similar situation can be observed in Switzerland, with less than 800 units sold for 2024. In Czechia, market contracted compared to recent years, but annual sales remained above 3,000 units. While this represents a decline from recent peaks, it is still higher than the volumes observed in the earlier phases of market development. The overall trend suggests a slowdown rather than a collapse, with the market maintaining a relatively solid base despite less favourable conditions. The Serbian market was the only one among the smaller European markets to record an increase in sales in 2024. This growth is likely driven by the affordability of pellet heating systems and the Serbian government's support for replacing outdated heating systems with biomass alternatives.

Figure 54: Evolution of the installed stock of residential pellet boilers (≤ 50kW) for countries with < 100k installed units (n° of units)

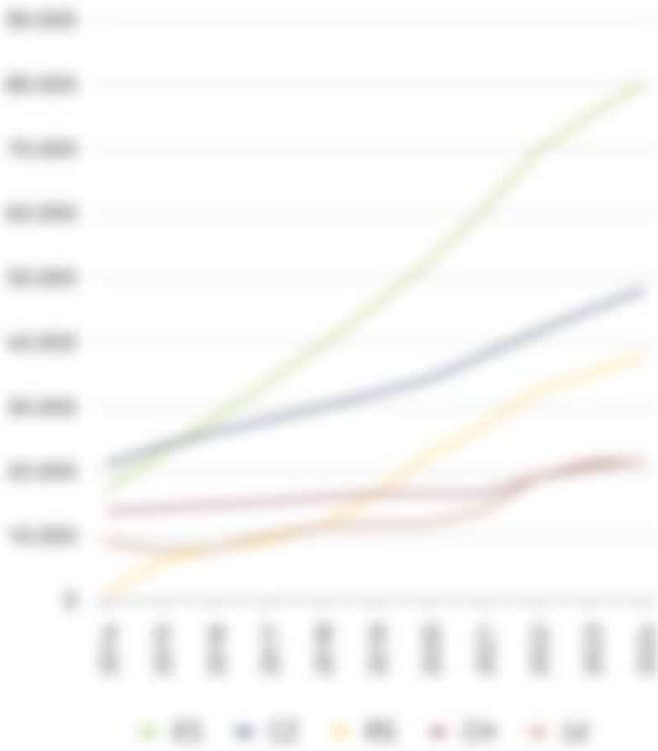


Figure 55: Evolution of the annual sales of residential pellet boilers (≤ 50kW) for countries with < 100k installed units (n° of units)

5.3 The commercial boiler market

Figure 56. Evolution of the installed stock of commercial pellet boilers in EUMS (for countries with >5k units)[1] - all units

Pellets for commercial heating (defined as dedicated heat boilers with at least 50 kilowatts of output used in residential buildings, public buildings, services, small industries, etc.) remain a niche market in most of Europe, and therefore only a select number of countries have a market substantial enough to be displayed in the series of figures below. In Spain, the commercial pellet boiler market continued to contract in 2024, with sales declining by approximately 100 units compared to the previous year. However, the drop was less pronounced than the sharp decrease observed between 2022 and 2023. Despite the slowdown, Spain remains the leading country in terms of installed capacity in this segment, with nearly 19,000 commercial pellet boilers in operation by 2024.

In Italy, the commercial pellet boiler market showed tentative signs of recovery in 2024, with sales doubling compared to the low levels recorded in 2023. While this rebound brought volumes close to those seen in 2022, they remain well below the highs of earlier years. Moreover, the current sales levels are still insufficient to offset the replacement rate of ageing appliances. As a result, the total installed stock continued to decline, falling slightly below 14,000 units in 2024.

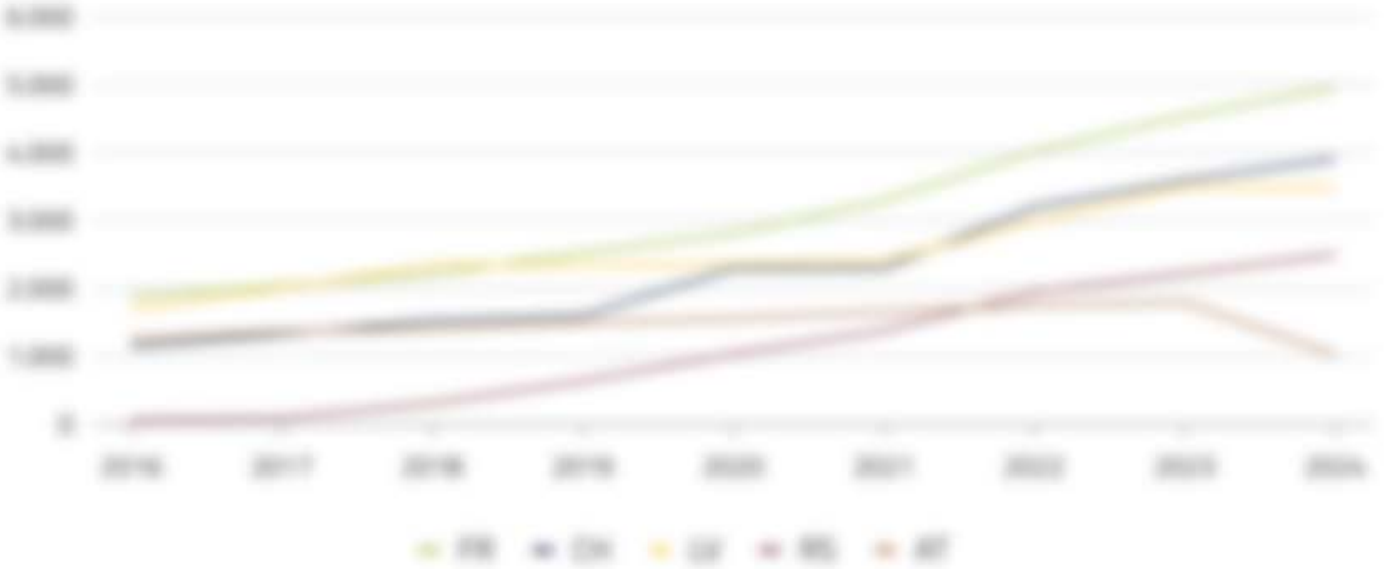
Germany's commercial pellet boiler market also declined in 2024, following the broader downturn affecting the national heating sector. The drop in sales was more pronounced than in Spain, reflecting the wider contraction across heating technologies already observed in the residential segment.

Despite this sharp slowdown, Germany remains one of the key markets in terms of installed capacity, ranking third in the EU with nearly 13,000 commercial pellet boilers in operation as of 2024.

In Poland, the commercial pellet boiler market remained stable in 2024, with sales holding steady thanks to the continuation of national support programmes. As a result, the installed stock continued to grow at a steady pace, reaching nearly 7,500 units in 2024.

Figure 57 Evolution of annual sales for commercial pellet boiler (<500kW) for countries with >1k installed units (n° of units)

Figure 58 Evolution of installed stock of commercial pellet boilers (<500kW) for countries with >1k of installed units (n° of units)



The rest of the European markets where commercial pellet boilers play a role are displayed on Figure 58. Among the smaller European markets, France, Switzerland, Latvia, Serbia, and Austria all show relatively moderate developments in the commercial pellet boiler segment. In most of these countries, the installed stock continued to grow gradually in 2024, driven by country-specific factors such as regional incentive schemes, institutional projects, or municipal heating needs. The exception is Austria, where the total number of installed units declined due to a revised statistical methodology that removes appliances older than 15 years from the active stock.

France maintains the largest installed base among these appliances older than 15 years from the active stock countries, with around 5,000 commercial boilers in operation. However, it also experienced a drop in sales in 2024, reflecting broader market hesitation. In terms of annual sales, only Serbia and Austria registered growth compared to 2023. Serbia saw a modest 4% increase, while Austria nearly tripled its sales volume. Yet in Austria's case, this growth (amounting to 66 additional units) was however not sufficient to compensate for the number of ageing systems removed from the stock.

Table 7: Estimated state of the art of stock and sales for stoves and pellet boilers in 2023 and 2024 in "pf units"

	Stoves				Residential boilers (<50kW)				Commercial boilers (>50kW)			
	2023		2024		2023		2024		2023		2024	
	Sales	Stock	Sales	Stock	Sales	Stock	Sales	Stock	Sales	Stock	Sales	Stock
AT	2.500	xx.900	1.500	x3.x00	7.980	192.300	23.987	214.100	30	1.800	96	1.028
CH	0	11.000	0	11.000	935	20.676	778	21.611	395	3.595	318	3.913
CZ	1.600	12.700	1.600	14.300	3.350	x5.050	3.100	x8.150	0	0	0	0
DE	21.000	291.500	14.000	305.500	34.100	419.000	16.000	435.000	900	12.375	650	12.900
ES	20.276	503.267	17.0x5	520.912	5.682	75.268	x.898	80.166	1.000	18.063	900	18.963
FR	78.000	1.6xx.000	94.100	1.738.000	11.500	178.000	7.100	185.x10	520	x.5x0	x.20	x.960
IT	62.263	2.310.618	90.0x6	2.311.993	1.78x	175.7x5	3.755	172.898	93	1x.151	188	13.871
LV	600	5.600	0	5.600	2.500	21.500	0	21.500	500	3.500	0	3.500
PL	1.000	x.100	1.000	5.100	x0.000	198.000	x5.000	238.000	x00	7.000	x00	7.x00
PT	3.635	88.168	x.x80	92.651	2.602	35.129	2.726	37.855	268	2.223	279	2.502

ÖKOFEN

EXPERT COMMENT

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Pellet Heating in 2024: Stability, Differentiation, and the Need for Unity

After the turbulence of recent years, 2024 marks a year of cautious hopefulness for the pellet boiler industry. The most critical factor for any recovery has been the stabilization of pellet prices. Without this, there is no foundation for rebuilding trust or demand. Fortunately, prices have remained steady so far—an essential prerequisite for market revival.

However, the pace of recovery varies significantly across Europe. While some markets are showing signs of renewed momentum, others remain sluggish. Political decisions have often added to the uncertainty, with erratic policy shifts and unclear funding frameworks unsettling both consumers and industry players. Funding policy continues to be a key driver: in Germany, political tailwinds for biomass are supporting demand, while in France and Austria, elections and coalition negotiations have created hesitation among homeowners.

The industry itself is evolving. We are seeing a growing differentiation between premium systems - like those from ÖkoFEN, which focus on innovation for efficiency, ultra-low emissions and integration with PV and battery systems - and more economical solutions that are gaining traction in price-sensitive markets. This segmentation is not a weakness but a strength, allowing us to serve a broader range of customer needs.

Security of supply is a critical issue. In Austria alone, 13 new pellet plants are planned or already under construction, which will increase production capacity by 50%. This is a strong signal for long-term availability and price stability—key factors in competing with heat pumps and fossil heating systems.

But technology and supply are not enough. Trust is the currency of our industry. We must be reliable, transparent, and united in our messaging. A coordinated European effort to communicate the ecological and economic benefits of pellet heating is more important than ever. Pellets are made from 100% wood waste and represent a model of regional circular economy. In an era of growing climate awareness, this message must be heard—by policymakers, by the media, and by the public.

There is still a strong future for pellets in the heating energy mix. But it will not come automatically. We must work for it – together.

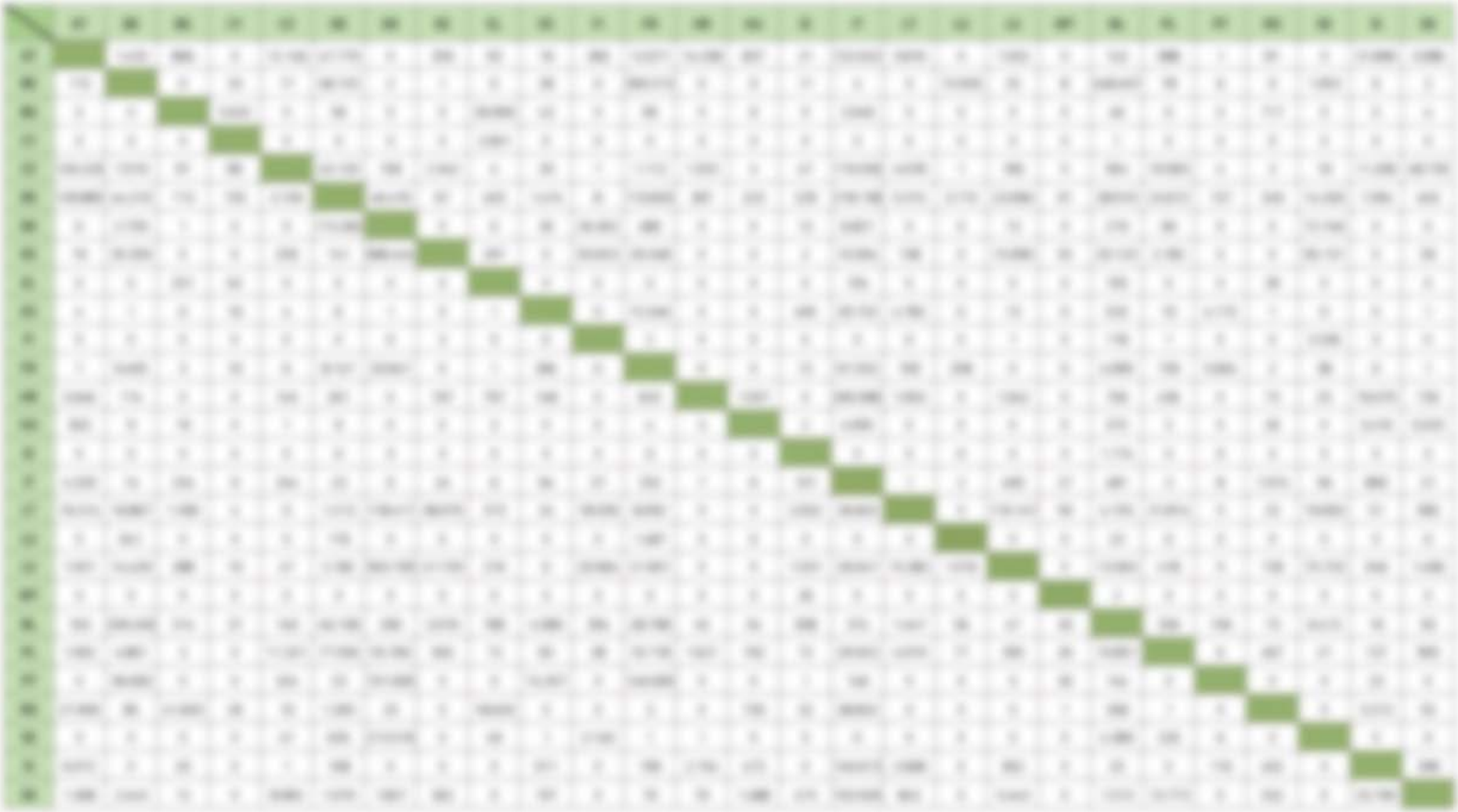
06.

EU27 pellet trade

The database build to realize this section is the combination of a UNcomtrade dataset, Eurostat dataset and various data gathered by the Market Intelligence team. To get rid of asymmetries trade where exports reporter declares different amount than the reported imports by their partner, a methodology was applied. Whenever multiples figures where existing between two countries for a same year, only the highest figure was conserved whether reported by the exporter or the importer. Figure 59 represents the balance between four flows, Production, Import, Export, Consumption. Yet, this balance can still be asymmetric as the figure do not take stock volume into account. The balance displayed by the chart is therefore the final impact of 2024 on the stock volume for a said country. While the focus is on EU countries, export and import data presented in the figure are global and are not restricted to intra-EU trade (unlike for Table 8).

Figure 59: EU27 member states pellet balance by country in 2024 - export, consumption, production and imports (tonnes)

Table 4: Intra-EU27 pellet trade in 2024 (tonnes)[a]



Note: Columns represent imports while rows represent exports. BE row is giving exports of Belgium in 2024. Belgium as therefore exported 110 tonnes to Austria in 2024.

6.1 Largest EU27 exporters

Figure 60: Evolution of the exports of pellets for countries over 500kt/annum (tonnes)

The new methodology to collect the data used in the section enable a level a precision unachieved before in this report. Some trends explored on the 2023 have therefore been revised in this report to deliver information closer to the reality.

The Figure 60, represent the evolution of exported volumes for the 5 largest European (in the 27) exporters. This valuable information is completed by a short explicative comment. For each country, the six first largest partner have been identified and disaggregated in the Table 9.

In overall, European pellet export peaked in 2020 with 13 190 000 tonnes of pellet exported then decreased down to 10,8 million tonnes in 2023. **2024 is the first in five years to reverse the decreasing trend with 0 120 000 tonnes exported.**

End of the fall in exports for Latvia. After 3 years of decreasing trend in exported volumes, Latvia have started to re-expand its market in 2024. **With an additional 500.00 tonnes since 2023, Latvia is now reaching 2022 level** with 1,8 million tonnes exported. The return of high United Kingdom imports represents the most important increase for Latvian exports that have experienced a 75% growth. The pellet trade between Denmark and Latvia has also started to increase again (+50%), making **Denmark the second largest partner of Latvia.** The volumes traded to the United Kingdom and Denmark represent together 85% of the export. On the other hand, trading with other partners is contracting to cover the volumes needed by the two biggest.

Stabilisation of the Estonian market. While experiencing a lot of variation on the past 10 years, **Estonian pellets exports seem to stabilise since 2022 around 1,2 million tonnes.** Even when looking at the trade disaggregated by partner countries, the volumes are quite stable between 2023 and 2024. **The major difference lies in additional 100.000 tonnes exported to the United Kingdom** compensated by a decrease of the same volumes to the Netherlands.

The consistent increase of Belgian exports and the decrease of other countries has raised Belgium as the third largest European pellet exporter in 2024. The closing of larges power plants combusting pellets in 2020 has allow vast volumes to **export reaching a total of 900.000 tonnes in 2024.** With close no industrial consumption, the flat country is still one of the biggest European producers as well as a large importer. Belgium's largest partner changed between 2023 and 2024 with the Netherlands replacing France. This new alliance for Belgium is almost trading 600.000 tonnes of pellets overall as there is bilateral flows (+30 from BE to NL and 230 from NL to BE).

Austrian rock. Since 2018, Austria has the most stabilized market of European countries and maybe even worldwide. They reached 880.000 tonnes of pellet export in 2024, a 10% increase since 2023. They stayed with a similar partners base than for previous years with only increasing volumes for each as difference.

Germany 2023 illusion. The strong increase in export volume for Germany in 2023 was short-lived. With a growth of 900.000 tonnes in 2023, Germany ranked as the third largest European exporter. Yet 2024 figures are much humble with a return to 2022 level. **Germany achieved 750.000 tonnes of pellets traded in 2024.**

Denmark represents the largest market loss for Germany with a decrease of 150.000 tonnes between 2023 and 2024. Second and third biggest drop in German exports are to United Kingdom with 60.000 tonnes and the Netherlands with 40.000 tonnes.

Table 9: Top 5 EU27 pellet exporting countries with their 4 largest partners in 2024 (tonnes)

Exporting Country	Partner	Tonnes of pellets
Latvia	United Kingdom	991 421
	Denmark	563 109
	Sweden	75 733
	Estonia	47 729
	Italy	26 047
	France	21 901
Estonia	Denmark	686 xxx
	United Kingdom	240 108
	Sweden	85 131
	Finland	93 653
	Belgium	35 359
	France	29 348
Belgium	Netherlands	448 427
	France	860 313
	Germany	48 125
	United Kingdom	17 968
	Luxembourg	15 926
	Sweden	1 953
Austria	Italy	723 022
	Germany	47 779
	Slovenia	31 896
	Switzerland	28 518
	Croatia	14 258
	France	12 671
Germany	Italy	218 138
	Austria	139 885
	France	110 835
	Switzerland	60 093
	Denmark	46 476
	Belgium	xx 209 857

6.2 Largest EU27 importers

European EU27's imports of wood pellets with international partners have experienced difficulties since the invasion of Ukraine by Russia has started.

Peak year was achieved in 2020 with 17,200,000 tonnes of pellets imported. They maintained to this level at the start of the crisis in 2021 but have since entered in a decreasing spiral that doesn't seem to stop.

The sanctions against Russia have withdrawn from the market one of the largest partners of EU27 for raw materials and wood pellets. **Between 2021 and 2024, this represents the vanishing of 2,500,000 tonnes of pellets in Europe imports just for Russia.** In total, the pellet imports in Europe have decreased by 4,6 million tonnes in 3 years. With 12,3 million tonnes in 2024, total imports of pellet exceed exports by 3,2 million tonnes.

Figure 61: Evolution of the import of pellets for countries over 500thtonnes (tonnes)

Denmark still number one European pellet importer. Ten years ago, Denmark was importing 1.2 million tonnes of pellet and was competing with Italy for the largest EU27 importer. **Starting 2015, Denmark started to engage in increasing transaction with the Baltics country** and the US, expanding its import by 1 million tonnes. After a few years, **they reach peak demand in 2021 with 4.6 million tonnes.** Nowadays, Denmark seems to have stabilize is import demand at 3.8 million tonnes. In 2024, 2.9 million tonnes were imported, slightly more than previous year. While Denmark was steadily supplied by Germany with 750,000 tonnes for 6 years, the partnership collapsed in 2024 to 40,000 tonnes. This loss in volumes was compensated by Baltics countries like Latvia.

Italy's contraction. Considered as one of the largest markets in Europe, Italy is recently experiencing a contraction of its imports like a lot of European countries. Unlike others, Italy delayed the start of this contraction by one year. **2022 represents the peak year for Italian pellet imports (3.8 million tonnes)** when it was, for most others, the start of the recent decline. The contraction that followed in 2023 is still ongoing with **Italian imports dropping to 2.2 million tonnes in 2024,** a drop of almost 2 million tonnes in 2 years. Notable changes in partnership can be found. Poland, for example, has seen its exports to Italy practically collapse same as Ukraine. More globally, partnerships with Italy stayed similar than previous 2023 but with lesser volumes.

Lack of subsidies schemes impact Dutch Market. Subsidies schemes opened in 2018 for co-firing biomass in power plant have created a vast demand for pellet between 2018 to 2020. **Each year passing, the Netherlands were importing twice the volumes of the previous years to reach 5.2 million tonnes in 2020.** But since then, no new subsidies were entitled, and the country is not planning to do so. The Dutch government plans to phase out biomass use in power generation (at least if not coupled with CCS). Imports volumes have therefore decreased since 2020. **In 2024, imports were reaching 3 million tonnes,** 500,000 less than in 2023. Their largest partner, USA has decreased its export to the Netherlands by 50% in 2024. Yet the Netherlands industrial pellet consumers manage to limit the loss by securing more volumes from new market like Canada and Thailand.

France strengthening in growth. France pellets import volumes are constantly increasing since 2014 where they started with 200,000 tonnes. **In 2024, France has risen as the 4th largest European importer with 1,8 million tonnes.** Unlike a lot of countries where the scale up of the imports was done in a few years only, France grew almost steadily by 30% each year. 2018 diverge from this trajectory with a small one-year contraction. In 2024, imports have kept their increasing trend but slower (+18%) to reach 1,8 million tonnes. Practically, most of their partnership stayed stable with three exceptions. US exports increased by 50,000 tonnes, Portugal double 2023's volume to reach 140,000 tonnes and **a new partnership was established between France and Vietnam, providing an additional 300,000 tonnes** to France imports.

Belgium ends pellet power generation plant. Previously, Belgium was a large consumer of industrial pellet for power generation. This has brought to the country an important trading market, importing up to 1,6 million tonnes in 2020. **The closing of power plants has induced a decrease in import that still rise to 700,000 tonnes in 2024.** Belgium is therefore becoming a platform for pellet trading with increasing export to absorb the still ongoing production and imports.

Table 10: Top 6 of European pellet importing countries with their 4 largest partners (tonnes)

Importing Country	Partner	Tonnes of pellets
Denmark	USA	702 857
	Estonia	686 xxx
	Latvia	363 109
	Canada	216 837
	Sweden	213 516
	Lithuania	116 x 11
Italy	Austria	722 022
	Brazil	313 x68
	Croatia	260 586
	Germany	216 138
	Slovenia	140 813
	Czechia	116 556
Netherlands	USA	757 5x7
	Belgium	xx8 x27
	Malaysia	237 05x
	Canada	216 081
	Thailand	184 796
	Viet Nam	95 159
France	USA	378 xx6
	Belgium	360 313
	Viet Nam	286 937
	Canada	195 298
	Portugal	140 000
	Germany	110 835
Belgium	Netherlands	200 x36
	USA	117 861
	Thailand	92 063
	Malaysia	80 829
	Germany	44 210
	Portugal	36000

07.

European pellet prices

Limitation of liability - Under no circumstance shall Bioenergy Europe, the EPC, nor its contributors be liable in any way for the precision, accuracy, or use of the price information provided within this section.

Table 11: VAT rate for pellets compared with general VAT rate applied in selected European countries [1]

EU27	VAT rate for wood pellets	General VAT rate
AT	13%	20%
BE	6%	21%
BG	20%	20%
CY	19%	19%
CZ	21%	21%
DE	7%	19%
DK	25%	25%
EE	22%	22%
EL	24%	24%
ES	21%	21%
FI	24%	24%
FR	10%	20%
HR	5%	25%
HU	27%	27%
IE	13.5%	23%
IT	22%	22%
LT	9%	21%
LU	17%	17%
LV	21%	21%
MT	18%	18%
NL	21%	21%
PL	23%	23%
PT	6%	23%
RO	5%	19%
SE	25%	25%
SI	22%	22%
SK	20%	20%

Other Europe	VAT rate for wood pellets	General VAT rate
AL	20%	20%
BA	17%	17%
BY	20%	20%
CH	8%	8%
MD	21%	21%
ME	21%	21%
MK	10%	20%
NO	25%	25%
UA	20%	20%
UK	5%	20%

Table 11 provides information on the applied VAT rates on all good, as well as specifically on wood pellets. VAT rates vary widely across Europe (both EU and Other Europe), and in many cases, the same rate applies as for other goods and services. However, several countries apply reduced VAT rates for wood pellets as a way to support households that rely on biomass heating. This is the case namely in Austria, Belgium, Germany, France, Croatia, Ireland, Lithuania, Portugal, Romania and the UK.

During the energy crisis of 2022 - 2023, temporary VAT reductions were used by some governments to ease the financial burden on consumers facing high heating costs. Such fiscal measures can offer short-term relief, particularly for low- and middle-income households, by making renewable heating options more affordable. While not a structural solution, reduced VAT on pellets can serve as an important tool to cushion price shocks and promote energy security at the household level.

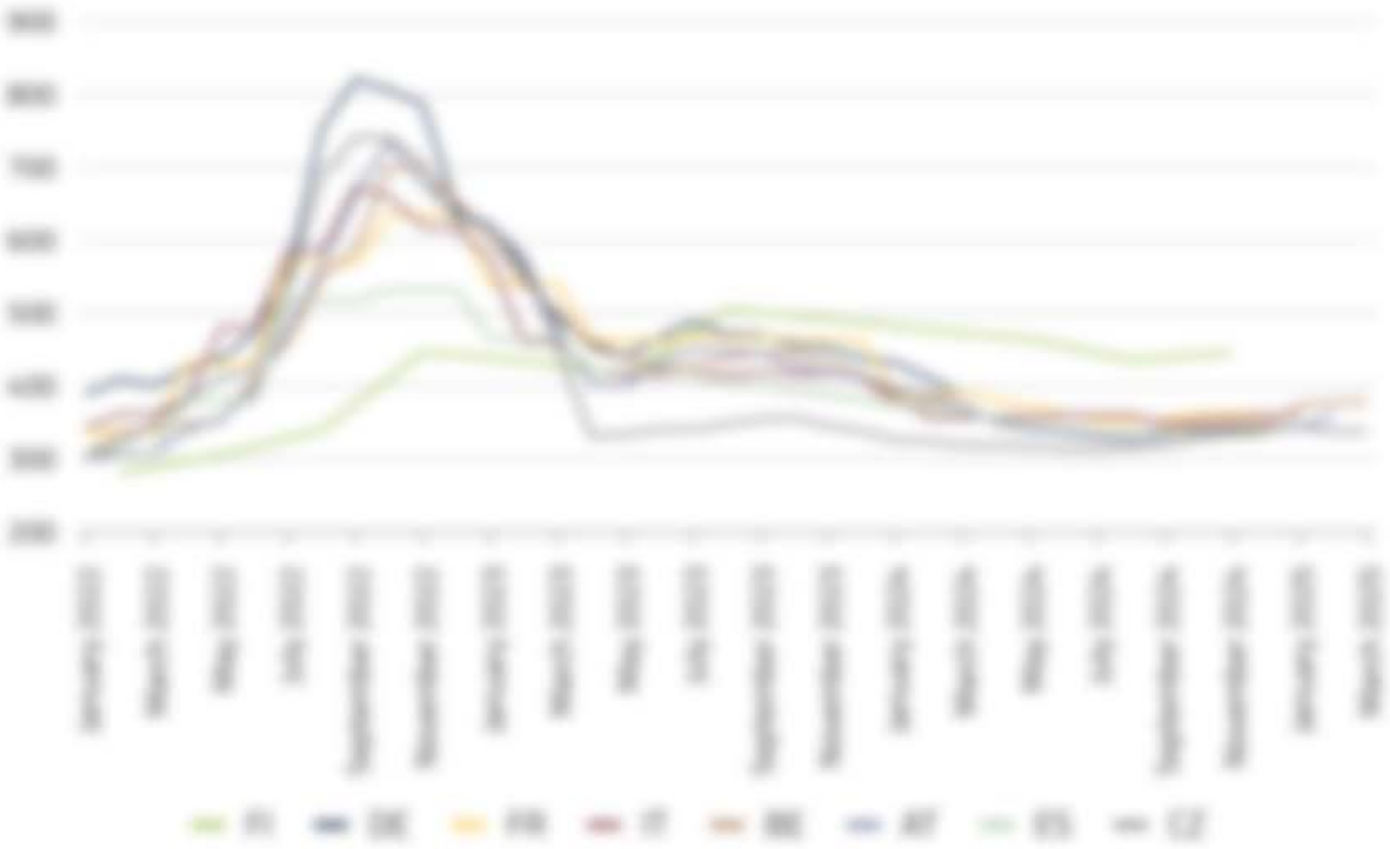
7.1 Price development of residential pellets

7.1.1 Bagged pellets

The following graphs display the prices in several European countries for bagged pellets. Those numbers correspond to retail prices, per pallet, VAT included. In the line charts displaying the evolution of prices, the countries are ranked by descending order, based on the pallet prices of December 2023.

Figure 63 display price information for bagged pellets, in the 8 most expensive markets in the Europe, ranked based on the average values calculated for December 2023, whenever the data were available. Therefore, there might be more expensive markets for which there was no data coverage available.

Figure 62: Evolution of bagged pellet prices in European countries with highest prices between 2021-2023 (retail price, € /tonne, VAT incl.)



Prices for pellets surged dramatically from mid-2021, peaking in late summer and autumn of that year. This spike coincided with the broader energy crisis in Europe, marked by volatile natural gas markets, soaring electricity prices, and geopolitical disruptions following Russia's invasion of Ukraine. Biomass heating, including wood pellets, experienced intense pressure from both supply constraints and increased demand as households sought alternatives to fossil fuels. Since early 2023, however, pellet prices have steadily declined and stabilised across all markets. By 2024, they had returned to levels that, while still somewhat higher than pre-crisis norms, are significantly more manageable for consumers.

This stabilisation reflects easing tensions in energy supply chains, but also a reduction in the demand due to a milder-than-expected winter heating season for most European countries. While current price levels remain slightly elevated compared to the years before 2021, the overall trend points to a restored balance in the market. This improved predictability offers some relief to pellet users and has helped rebuild consumer confidence, especially in countries where wood pellets are a key residential heating source. A similar trend can be observed in Figure 63, although for markets where prices are lower on average based on the available data.

Figure 43: Evolution of bagged pellet prices in European countries with lowest prices between 2022 and 2025 (retail price, € /tonne, VAT incl.)

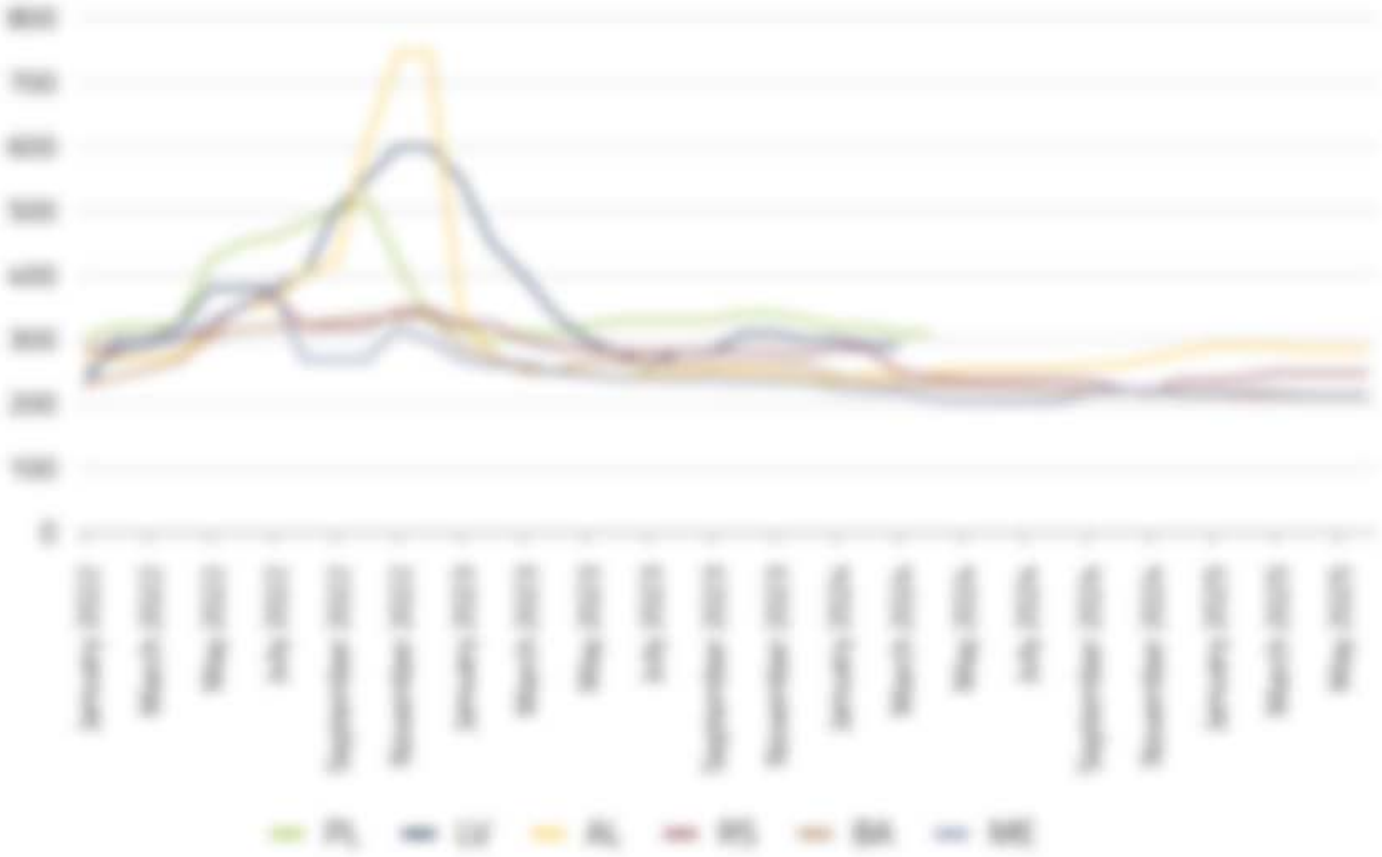


Figure 44: Min, max and average of bagged pellet prices between January 2024 and december 2024 by country (retail price, € /tonne, VAT incl.)

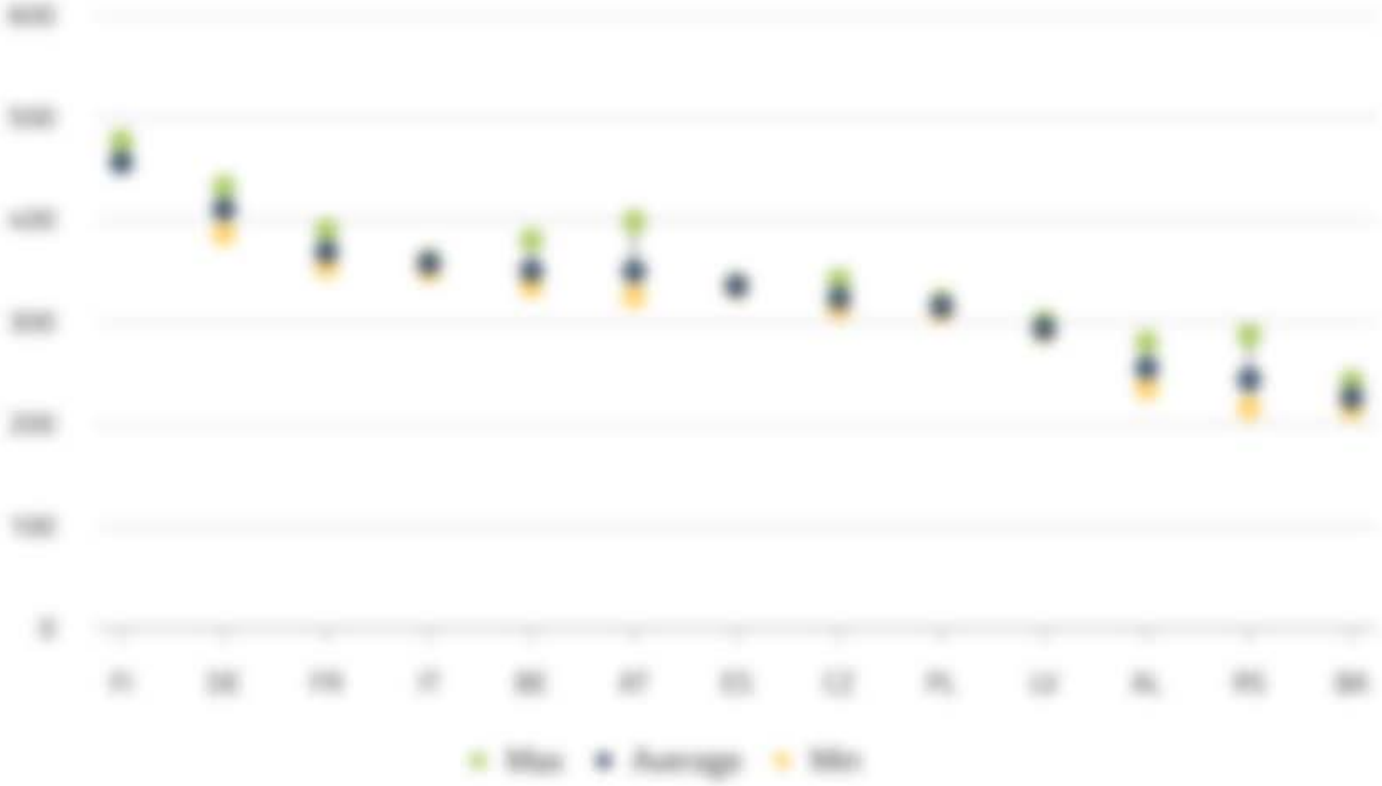


Table 12: Estimation of bagged pellet prices between January 2024 and may 2025 in Europe (retail price, €/tonne, VAT incl.)

	Jan 2024	Feb 2024	Mar 2024	Apr 2024	May 2024	Jun 2024	Jul 2024	Aug 2024	Sep 2024	Oct 2024	Nov 2024	Dec 2024	Jan 2025	Feb 2025	Mar 2025	Apr 2025	May 2025
AL	235	245	245	245	255	255	255	255	260	260	270	280	290	290	290	285	285
AT	398	388	373	352	339	336	329	325	332	342	342	342	344	360	348	335	N.A
BA	242	236	229	228	229	225	225	230	228	228	230	275	275	213	213	213	213
BE	375	380	374	350	342	336	335	335	341	344	343	346	374	378	380	380	N.A
CZ	327	325	320	320	318	315	313	317	320	329	335	341	343	338	339	N.A	N.A
DE	432	412	386	371	374	369	359	353	348	352	364	361	377	428	428	429	N.A
ES	365	365	365	337	337	337	337	337	337	334	334	334	326	326	326	N.A	N.A
FI	N.A	477	N.A	N.A	465	N.A	N.A	438	N.A	N.A	447	N.A	N.A	N.A	N.A	N.A	N.A
FR	390	390	390	367	367	367	354	354	354	362	362	362	N.A	N.A	N.A	N.A	N.A
IT	378	357	366	367	358	360	360	360	350	353	353	353	362	N.A	N.A	N.A	N.A
ME	225	230	220	210	205	205	205	205	217	221	221	218	218	218	218	215	215
RS	287	287	249	241	237	237	237	237	236	226	216	236	236	243	248	248	248

7.1.2 Bulk pellets

Figure 65 and Figure 66 shows the evolution of bulk pellet prices across several European markets from early 2022 to early 2025. While following a broadly similar trend to that of bagged pellets with a sharp price increase during the 2022 energy crisis followed by a gradual stabilisation, bulk pellets consistently remain more affordable on a per-tonne basis. This reflects the lower packaging, handling, and distribution costs associated with bulk delivery, as well as the typically larger volumes purchased for central heating systems.

As with other energy sources, bulk pellet prices surged in the second half of 2022, driven by the severe disruptions to the European energy system. However, by mid-2023, prices had significantly corrected, returning to more stable levels throughout 2024. Although they remain somewhat above pre-crisis norms, bulk pellet prices have proven less volatile than bagged pellets and continue to offer an economically attractive heating option, particularly for larger residential users and public or commercial buildings with centralised systems.

Figure 65: Evolution of bulk pellet prices in European countries with highest prices between 2022 and 2025 (delivered 50, distance: 100 km, delivery (bas inc), € /tonne, VAT incl.)

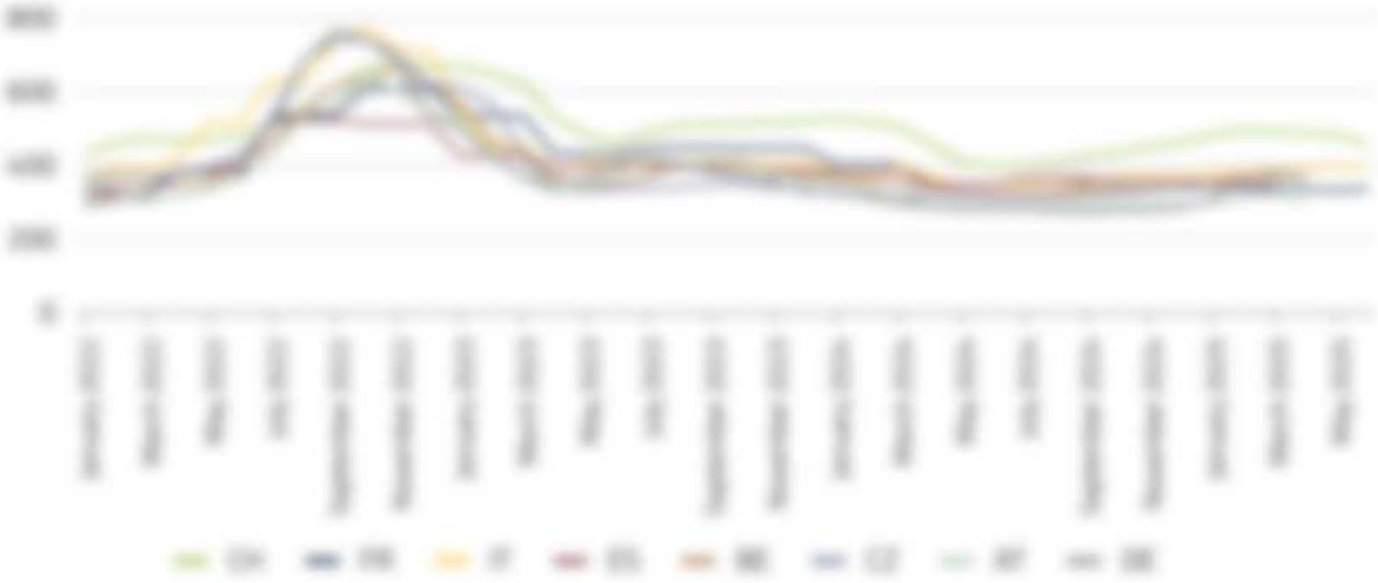


Figure 66: Evolution of bulk pellet prices in European countries with lowest prices between 2022 and 2025 (delivered 50, distance: 100 km, delivery (bas inc), € /tonne, VAT incl.)

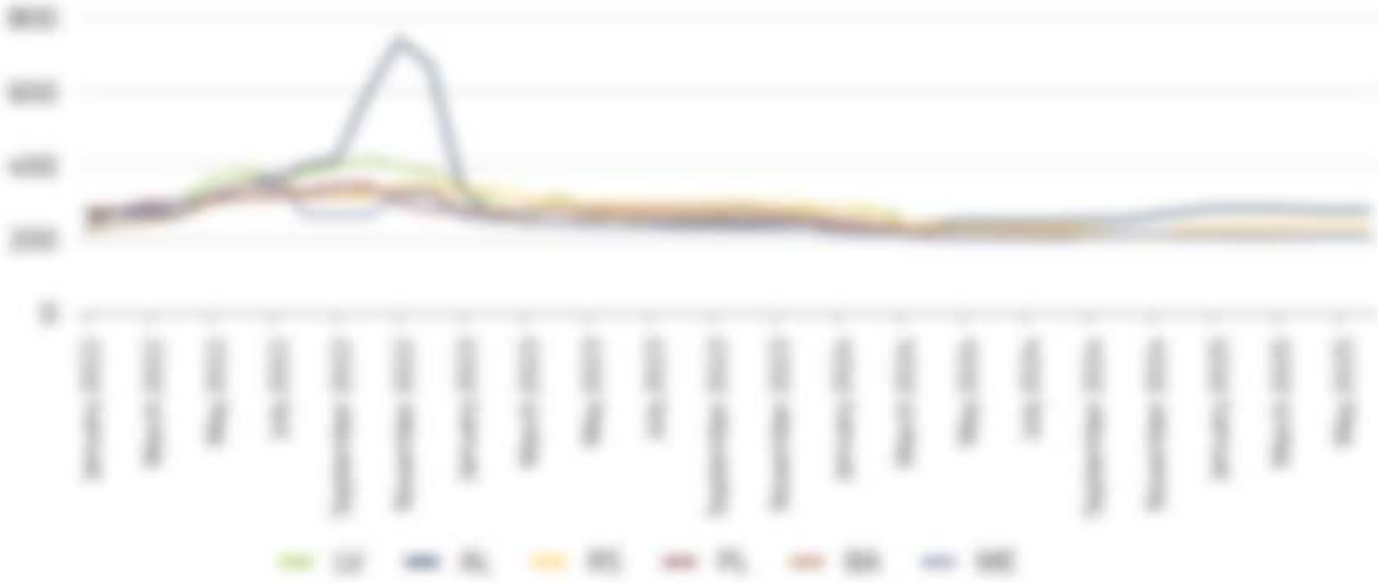


Figure 67: Min, max, and average of bulk pellet prices between January 2024 and December 2024 by country delivered at, distance: 100 km, delivery fees included, in €/tonne (VAT excl.)

Table 13: Estimation of bulk pellet prices between January 2023 and April 2024 delivered at, distance: 100 km, delivery fees included, in €/tonne (VAT excl.)

	Jan 2024	Feb 2024	Mar 2024	Apr 2024	May 2024	Jun 2024	Jul 2024	Aug 2024	Sep 2024	Oct 2024	Nov 2024	Dec 2024	Jan 2025	Feb 2025	Mar 2025
AL	230	230	240	240	250	250	250	250	255	255	265	275	285	285	285
AT	301	335	315	290	286	285	285	287	287	285	292	295	299	313	323
BA	230	230	225	225	225	222	222	218	218	218	218	213	213	211	211
BE	365	355	345	340	330	326	325	325	331	334	335	336	356	368	371
CH	527	518	505	480	477	399	402	409	423	436	450	462	487	498	N.A.
CZ	322	320	316	316	314	310	310	312	316	322	330	336	342	335	334
DE	327	314	296	289	281	282	281	278	274	276	279	286	305	363	380
ES	378	378	378	345	345	345	367	367	367	356	356	356	348	348	348
FR	423	423	423	356	356	356	351	351	351	356	356	356	N.A.	N.A.	N.A.
IT	386	361	431	366	345	345	345	345	342	365	365	365	378	N.A.	N.A.
ME	222	218	218	208	205	205	205	205	215	215	218	215	215	215	215
RS	261	261	241	235	231	231	231	231	230	235	212	228	232	235	236

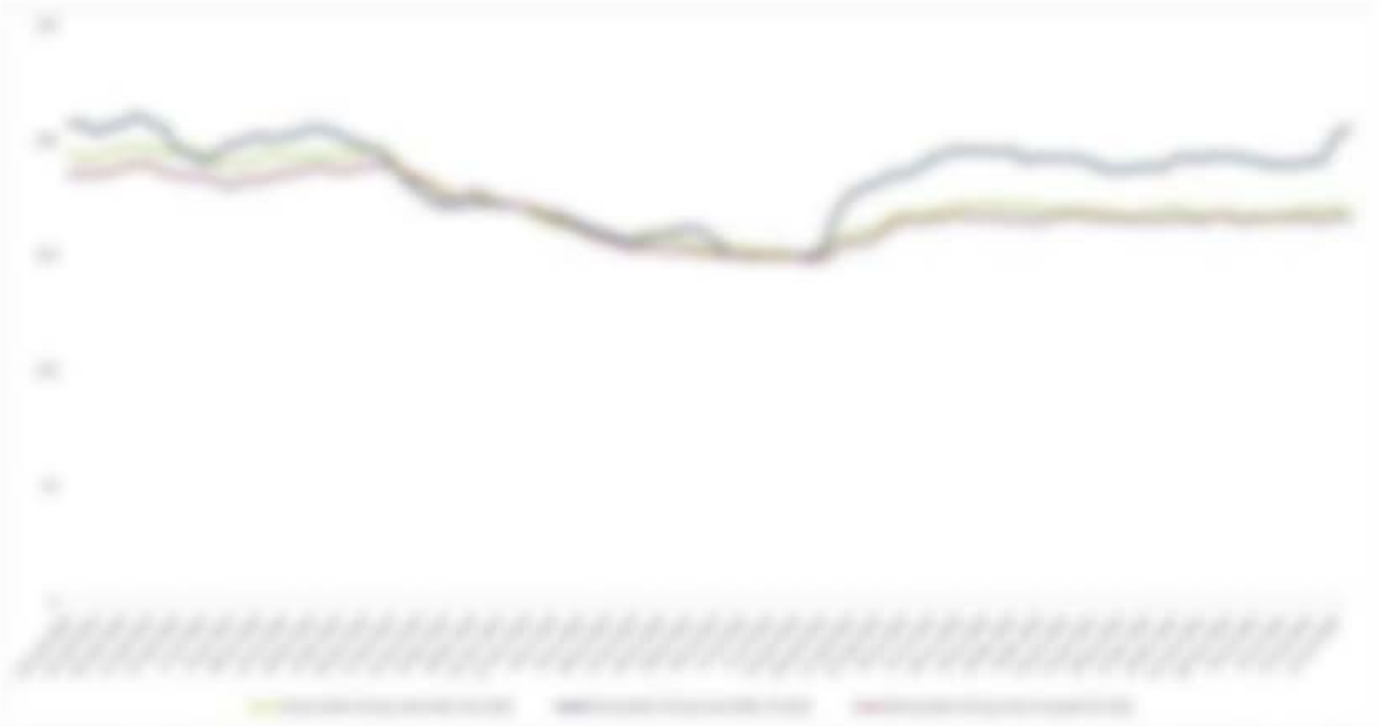
7.2 Price development of industrial pellets

Figure 68 displays the evolution of industrial pellet price indices across three key supply regions: **Baltic (FOB, EUR/t)**, **Northwest Europe (CIF, USD/t)**, and **Portugal (FOB, EUR/t)**. The difference between **FOB (Free On Board)** and **CIF (Cost, Insurance, and Freight)** is important to understand: FOB reflects the price of pellets at the point of export, excluding transport and insurance costs, whereas CIF includes delivery to the destination port. It is therefore logical that CIF prices are consistently higher, as they incorporate logistics and handling beyond the producer's gate.

From late 2023 to mid-2024, all three indices moved within a relatively narrow range, reaching their lowest point around mid-2024. From that point onward, prices began trending upward, with the **CIF Northwest Europe** index showing a more pronounced increase in the final months of the period. This divergence is probably partially due to higher transport and delivery costs but may also be amplified by currency-related effects. Since the CIF NWE index is denominated in **USD**, recent exchange rate shifts (influenced by renewed trade tensions and concerns over possible US tariff policy the Trump administration) may be contributing to a relative increase in dollar-denominated prices when compared to euro-based FOB benchmarks. Meanwhile, the **Baltic and Portuguese FOB indices** remained more stable, showing only gradual price increases but remaining currently below the average of the previous years. These trends reflect relatively steady market conditions at origin, though some minor divergence appears in early 2025 as regional dynamics and freight differentials began to play a larger role. The growing spread between FOB and CIF values in early 2025 suggests higher delivered costs, possibly linked to stronger demand in European industrial markets or limited vessel availability.

While price levels remain below the peaks seen during the 2022 energy crisis, the recent upward shift across all indices points to the emergence of a firmer market floor, driven by a combination of supply constraints and seasonal demand build-up.

Figure 68: Evolution of industrial pellet price in three strategical region of Europe between august 2023 and mai 2025 (€/tonne, ART excl.)



Source: Argus

ARGUS

EXPERT COMMENT

Global wood pellet prices elevated in 1H25

Prices for industrial wood pellets delivered to northwest Europe (NWE), as well as those loaded in Asia were markedly higher on the year in the first half of 2025, supported by stronger power generation in Europe and Asian markets.

The Argus 90-day spot cif NWE wood pellet index averaged $190.07/t in the year to 18 June 2025, up from $170.25/t during that same period a year earlier. And prices have moved above $200/t mark in recent weeks — levels unseen since late 2023 — as geopolitical tensions in Ukraine and the Middle East lent support to the overall global fuels complex.

UK, Dutch and Danish biomass-fired units have undergone fewer outages in January-June than in other recent years, supporting demand. And the whole woody biomass complex remains above the pre-2022 long-term averages, partly because raw material costs — particularly for European producers — and other production costs remain elevated.

Atlantic basin producers have also been gradually adjusting output to demand swings in recent years, with less volumes seen being offered in the spot market so far in 2025. The start-up of Enviva's 1mn t/yr Epes plant in the US state of Alabama — whose commissioning was scheduled from May — will be key to spot supply availability for the remainder of the year.

Pellet producers have increasingly been looking at opportunities to sell at other non-power markets or other potentially growing regions, such as Poland. But these could be offset by lower overall northwest European consumption once the current state-funded subsidies expire in 2026-2027.

In Asia-Pacific, stronger Japanese generation as well as stronger South Korean spot demand following changes in subsidy rules in December, have lent support to the fob Vietnam market. Restructuring of long-term contracts between Japanese end users and north American producers has also resulted in southeast Asian producers meeting more demand in northeast Asia.

Over the next few years, southeast Asian wood pellet production capacity is expected to grow significantly. Meanwhile, new policies and regulations in the EU, South Korea, Japan and elsewhere could support demand for biomass. But global pellet producers may also begin facing more competition for feedstock, as demand grows for new products including biocoal, biocarbon, biochar, sustainable aviation fuel and biochemicals.

Jeff Kuntz
Deputy Editor, Argus

08.

Pellet sustainability certification

Note: *this section is primarily based on data provided by SBP (Sustainable Biomass Program). Other voluntary certification schemes – such as ISCC and Green Gold Label (GGL) – are sometimes used for the sustainability certification of wood pellets, depending on legislative requirements and market preferences. However, extraction of information explicitly referring to the wood pellet sector from these schemes is generally more difficult. Bioenergy Europe remains open to the possibility of expanding the coverage of this section with information from more voluntary and national certification schemes in the EU and global markets. Information regarding the sustainability requirements for wood pellets in the EU and other jurisdictions is presented in an extremely condensed form. Interested readers are encouraged to follow the activities of Bioenergy Europe's Working Group on Sustainability for more detailed and updated information.*

Compliance with sustainability requirements has been a feature of the industrial pellet markets since their onset.

The European Union introduced for the first time EU-wide common sustainability and Greenhouse Gas (GHG) saving criteria for solid biomass fuels in 2018 through the so-called RED II (recast Renewable Energy Directive), with the aim to replace the national biomass sustainability criteria that were established independently by legislators in the major industrial pellet consuming markets in Europe (Belgium, Denmark, Netherlands, United Kingdom). Compliance with the sustainability and GHG criteria of RED II can be demonstrated either through voluntary schemes, several of which have been formally recognised by the European Commission, or through national certification schemes[1]. Following a long legislative process, RED III was adopted by European institutions in 2023. RED III builds on the criteria established in RED II further tightens certain aspects, for example aiming for higher levels of GHG savings. The deadline for member-states to transpose RED III was 21 May 2025, however at the time of writing no member state has fully progressed with the transposition of the biomass related articles. Beyond sustainability criteria, RED III introduced the concept of the 'cascading principle' of forest biomass, primarily connected with financial support received by bioenergy plants. The implementation of the cascading principle has been left open to the member-states, any impact it has on the wood pellet markets remains to be seen. The United Kingdom has also established sustainability (land) and GHG saving criteria mirroring the requirements of RED II.

Japan has established GHG saving and sustainability criteria for wood pellets, the responsible bodies are the Ministry of Economy, Trade and Industry (METI) and the Ministry of Agriculture, Forestry and Fisheries (MAFF) respectively.

South Korea has not yet established sustainability criteria for biomass / pellets. The legality of wood exports from the sourcing countries is the main criterion for approving imports. Korea Forest Service (KFS) is considering the introduction of sustainability criteria in the future.

The Sustainable Biomass Program (SBP) was initially established as an initiative of the major wood pellet buyers and since 2019 has been operating as a multi-stakeholder governed organization. In September 2022, SBP was officially recognized by the European Commission as a voluntary certification scheme under RED II. In May 2025 the scheme received a Positive Technical Assessment Under RED III by the European Commission. In September 2025, SBP received the formal recognition of SBP by the Government of Japan as meeting the requirements of its GHG and legality/sustainability criteria. For the time being, SBP certifies wood pellets, wood chips, biochar, biocarbon, and other processed wood-based products.

SBP has the lion's share of sustainability certification of the industrial wood pellet market in Europe (EU27+UK), reaching around 12.7 million tonnes or about 60.5 % of the estimated industrial pellet consumption in 2024. Remaining volumes consumed in Europe may be certified under other certification

1 https://energy.ec.europa.eu/topics/renewable-energy/bioenergy/voluntary-schemes_en

schemes that are considered appropriate by national authorities (for example, 2BSvs or Better Biomass in the Netherlands) or considered as sustainable under the provisions of national law (for example the Swedish act sustainability criteria for biofuels, bioliquids and biomass fuels). SBP also covers a relevant part (about 10%) of industrial pellet consumption in Asia. In total, worldwide consumption of SBP certified pellets reached an all-time high of 13,8 million tonnes in 2024.

Table 1a. SBP certified industrial wood pellet consumption and estimated share of industrial consumption in Europe and Asia, 2022 - 2024

Country / Region	Consumption volumes with SBP claims (tonnes)			Estimated share of industrial pellet consumption		
	2022	2023	2024	2022	2023	2024
Nordics[1]	2.411.913	2.482.323	2.575.973	74,0%	79,1%	70,8%
Western Europe[2]	9.955.990	8.524.077	10.191.948	**88,6%**	91,0%	**86,1%**
EU27 + UK	12.367.903	11.006.400	12.767.922	85,3%	**86,0%**	82,5%
Asia[3]	-	1.264.110	1.057.147	-	12,2%	9,6%
Total	12.367.903	12.270.510	13.825.069	51,9%	53,2%	51,9%

Source: SBP, Bioenergy Europe calculation

Notes: [1] Nordics include Denmark, Finland, Norway, and Sweden. [2] Western Europe includes Belgium, Estonia (data in 2024), France (incl. overseas territories), Germany, Latvia (data in 2024), Luxembourg (data in 2024), Netherlands, Poland (data in 2024), Portugal (data in 2024), and the UK. [3] Asia includes Japan and South Korea.

Wood pellets with SBP claims are estimated to correspond to almost 30 % of the total global wood pellet production. The share of SBP certification is particularly high in pellet producing countries that supply the major industrial wood pellet markets in Europe. US, the Baltics, Portugal, and Canada. In 2024, the volume of SBP certified pellets that were produced/sold worldwide exceeded 14 million tonnes, increasing by 6,7% compared to the previous year. This can be attributed primarily to the rebound in industrial pellet demand in Europe. It is relevant to note the increasing growth in wood pellets produced and sold with a SBP claim in Canada, suggesting that Canadian industrial pellets delivered not only in Europe, but also to Japan, were SBP certified.

Table 15: SBP certified producers by country/region, volume of SBP certified wood pellet sales and estimated share in total wood pellet production, 2022 - 2024

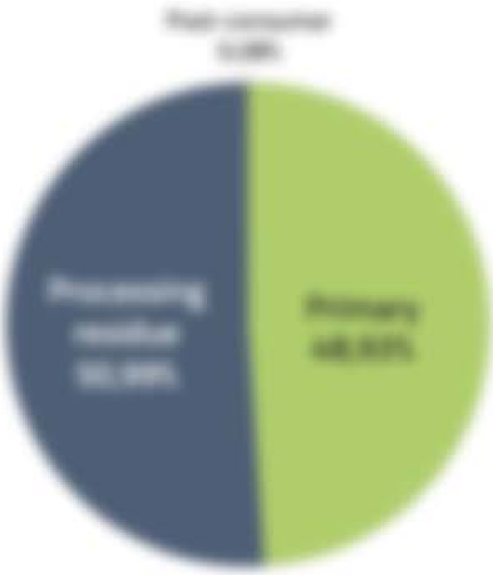
Country/region	# of SBP certified producers			Produced / Sold volumes (tonnes)			Estimated share of total wood pellet production (%)		
	2022	2023	2024	2022	2023	2024	2022	2023	2024
Belarus[1]	0	0	0	[illegible]	0	0	[illegible]	0.0	0.0
Canada	26	27	25	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Estonia	10	10	10	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Latvia	14	14	15	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Lithuania	6	6	7	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Portugal	13	13	12	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Russian Federation[1]	0	0	0	[illegible]	0	0	[illegible]	0.0	0.0
United States	33	34	37	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Vietnam	7	8	20	[illegible]	[illegible]	[illegible]	< 1.0	< 1.0	[illegible]
Scandinavia[2]	11	13	11	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Other Europe[3]	4	11	13	[illegible]	[illegible]	[illegible]	< 1.0	< 1.0	< 1.0
Rest of World[4]	3	7	16	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Total	135	142	162	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Source: SBP, Bioenergy Europe calculation

Notes: [1]SBP certificates for Belarus and Russia have been suspended since May 2022; at that time, there were 47 SBP Certificate Holders in Russia and 4 in Belarus; [2]Scandinavia includes Denmark, Finland, Norway, and Sweden; [3]Other Europe includes Belgium, France, Germany, Italy, Poland, Spain, and the UK; [4]Rest of the World includes Australia, Brazil, Chile, China (new in 2024), Indonesia (new in 2024), Malaysia, South Africa and Turkey.

SBP feedstock data suggests that a wider range of feedstocks are used to produce industrial wood pellets, unlike premium / residential wood pellets which are produced mostly using sawmilling residues. In 2024, primary feedstock accounted for 48.93% of the raw material, most of it coming from low-grade stemwood. Processing residues, such as sawdust, made up 50.99% of the raw material, while post-consumer feedstock only had a negligible contribution in the production.

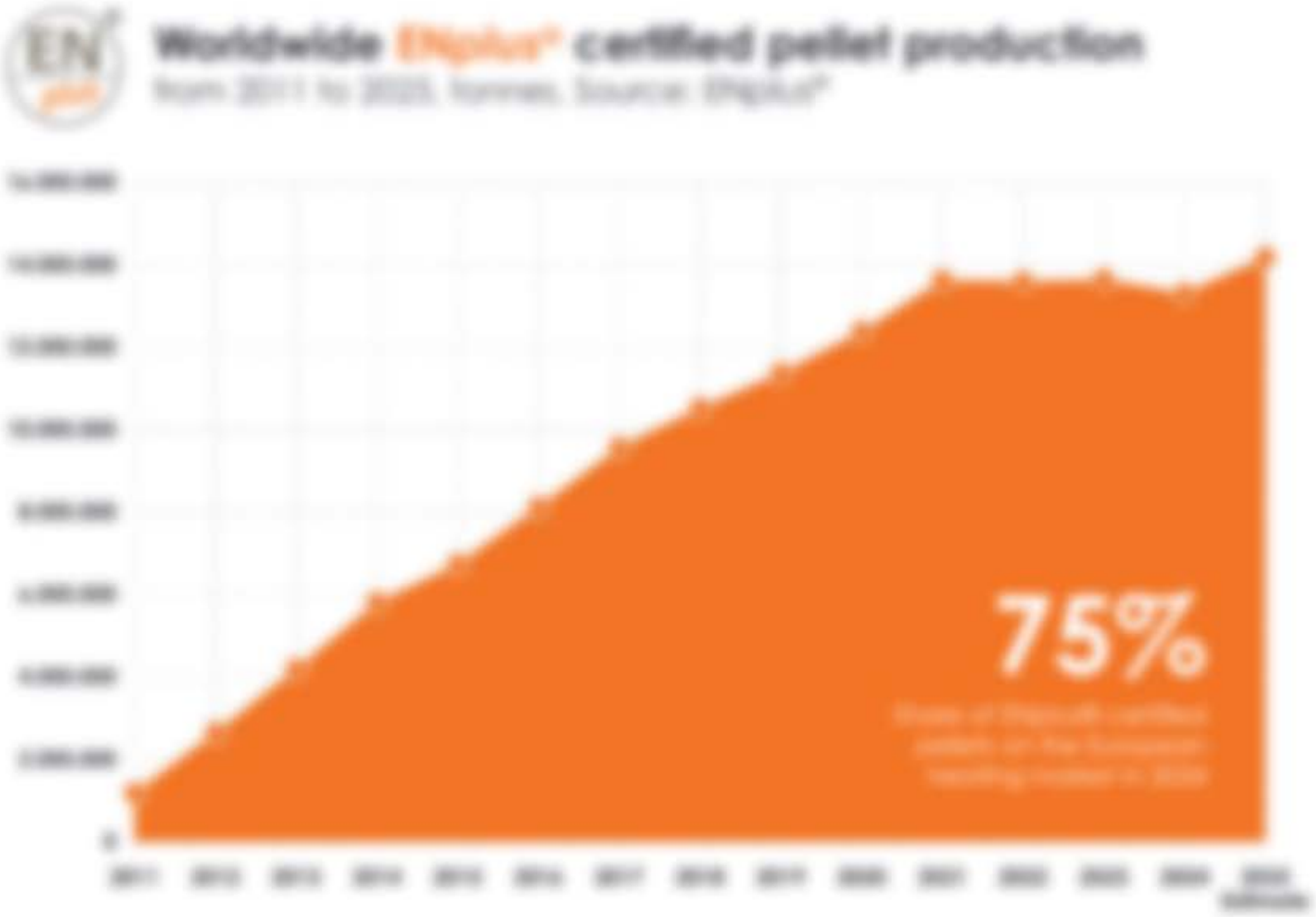
Figure 60: Feedstocks used in the production of SBP certified wood pellets, 2024



09.

Focus on ENplus®

Figure 10: Worldwide ENplus® certified pellet production from 2011 to 2023 (tonnes)



The ENplus® certification scheme ensures wood pellet quality for pellet professionals and end-users over the entire supply chain (i.e. from production to end-user delivery). The certification has been active for almost 15 years now and is governed and managed by Bioenergy Europe (through its network - the European Pellet Council) outside Germany and by DEPI (German Pellet Institute) within Germany. Furthermore, 12 national pellet associations have received licence rights from Bioenergy Europe to implement and manage ENplus® in their respective countries.

Since its introduction, the number of countries with certified ENplus® producers has grown rapidly, reaching almost 50 countries as of 2025. In 2024, the certified production volume has slightly decreased compared to 2023, mainly due to unfavourable market conditions such as the high prices from the previous year and the mild winter. However, projections for 2025 suggest that the upward trend will resume, with a more stable market and a total volume of over 14 million tonnes of ENplus® certified pellets expected.

Figure 71: Worldwide ENplus® certified pellet production plants in 2024.

Worldwide ENplus® certified pellet production plants

in 2024. Source: ENplus®

The number of ENplus® certified producers and traders worldwide has increased steadily over the years, reaching 686 producers and 608 traders by the end of 2024. The country with the largest number of certified pellet producers is Poland – a total of 76 in the end of 2024, followed by Germany and Italy which both have more than 50 producers with active certification as of May 2025. These results put ENplus® well on track to continue harmonising pellet quality at a global level.

Figure 12: Amount of countries with ENplus® certified producers from 2011 to 2025

Countries with ENplus® certified producers

from 2011 to 2025. Source: ENplus®

The ENplus® certification scheme remained stable in its presence around the world the past few years. Nonetheless, companies from countries in South America and Asia that make first steps in pellet production and have not been part of the ENplus® coverage map are more and more interested in the scheme.

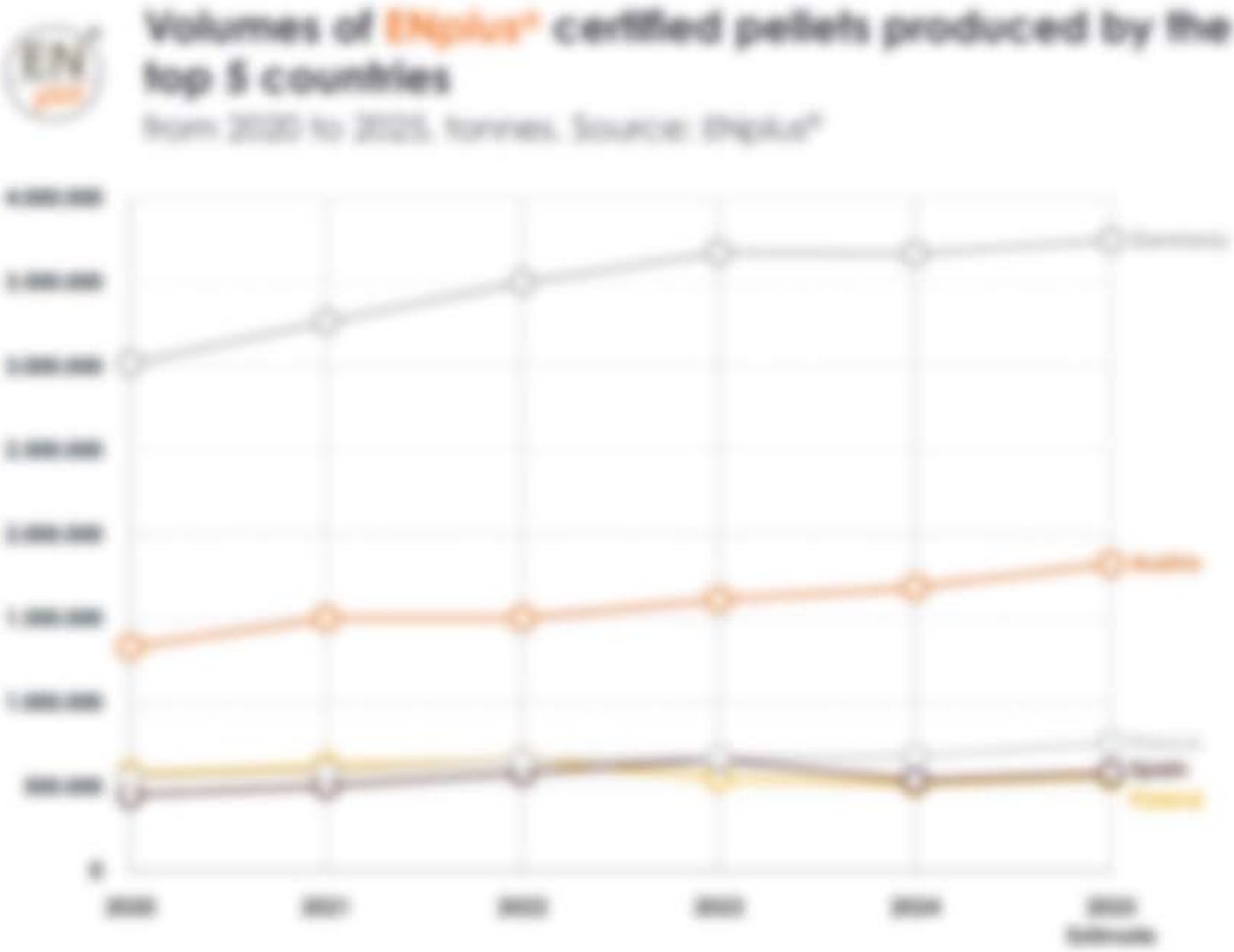
Figure 13: Total number of ENplus® certified producers/traders in 2024

Total number of ENplus® certified producers/traders

in 2024. Source: ENplus®

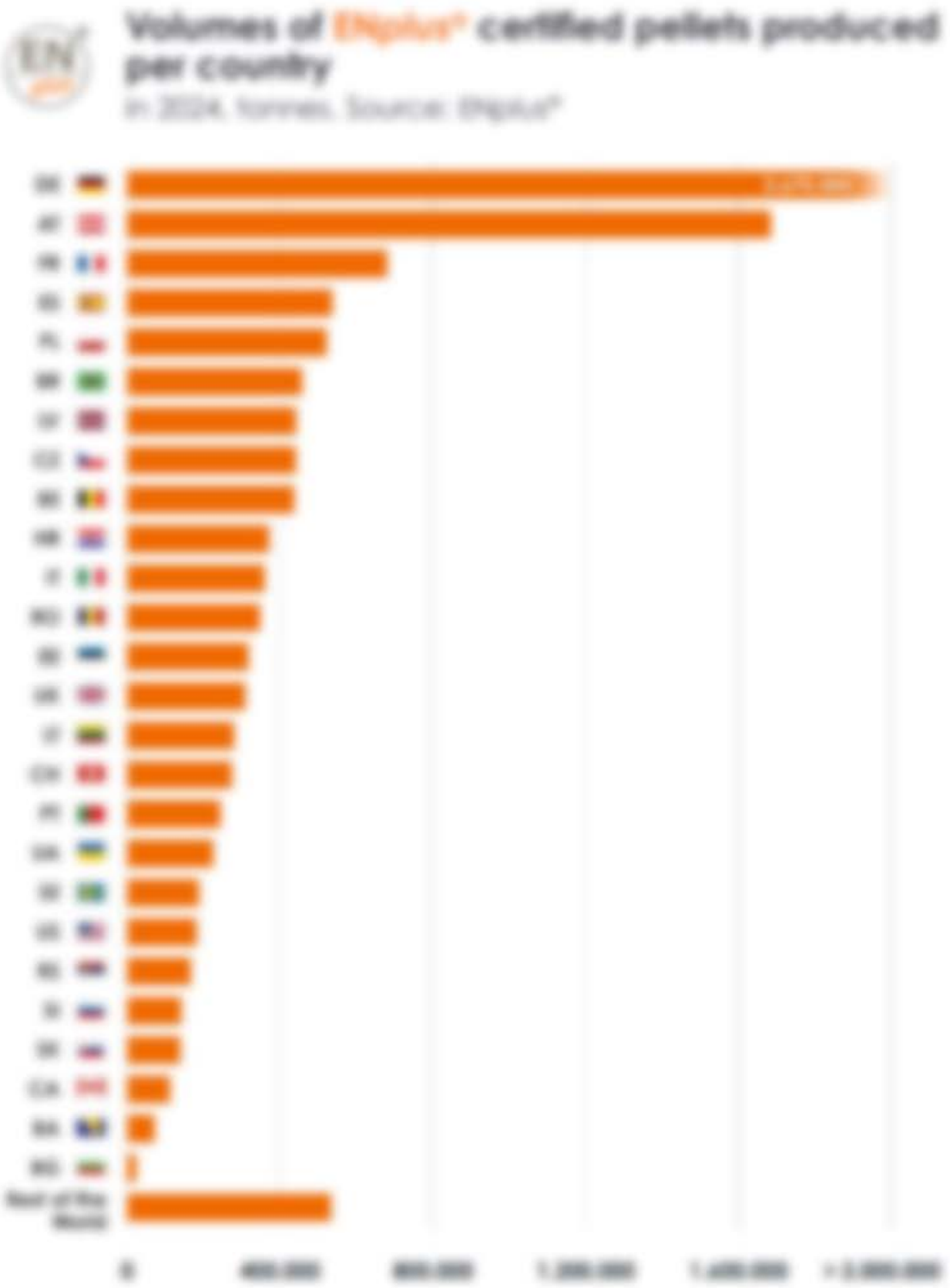
The ENplus® scheme continues to attract interest from companies around the world. In 2021, the scheme counted on 616 certified producers of pellets and 566 certified pellet traders. By 2024, these numbers had increased to 686 and 608 respectively – growth coming not only by companies within Europe but by ones based as well outside (for example, in South America and Asia). Although market conditions in 2024 have led to a number of certified producers and traders terminating their licenses, the total number of producers and traders with active certification has increased compared to previous years.

Figure 74: Volumes of ENplus® certified pellets produced by the top 5 countries from 2020 to 2025



The Top 5 countries producing the largest volumes of pellets certified with ENplus® traditionally include Germany in the lead, followed by Austria. France, Spain, Poland and Belgium has always been very close in the production volumes, shifting their positions over the years. For 2024, Belgium remains out of top 5.

Figure 70: Volumes of ENplus® certified pellets produced per country in 2024 (tonnes)



In respect to the countries with the biggest production of certified pellets, Germany remains on top with 3.67 million tonnes in 2024, followed by Austria with 1.68 million tonnes. France places on the third spot with 891.000 tonnes, with Spain and Poland following behind with around half a million tonnes each. The estimates for 2025 foresee an increase for all of aforementioned with Brazil challenging to enter top 5.

Figure 76: Volumes of ENplus® certified pellets traded worldwide from 2013 to 2025 (tonnes)

Volumes of ENplus® certified pellets traded worldwide

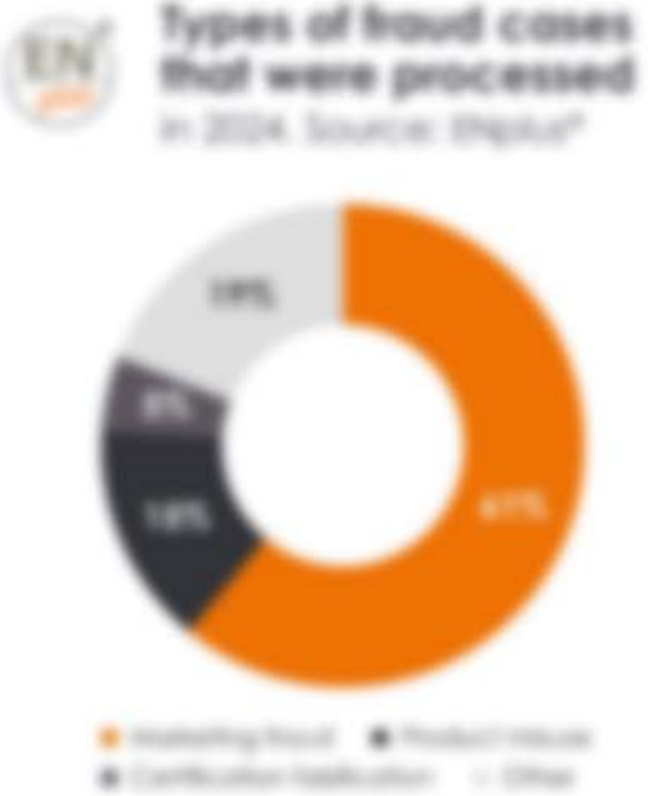
from 2013 to 2025, tonnes. Source: ENplus®

The volume of ENplus® certified pellets traded by the ENplus® certified pellet traders reached an all-time high 7.5 million tonnes in 2024. With an increasing number of certified traders and a stabilising market, the projections for the current year suggest a further increase.

ENplus® is committed to ensuring that only high-quality pellets reach consumers, and is therefore actively fighting fraud and low-quality products. In 2024, the focus of ENplus® fraud management remained firmly on adapting to the evolving nature of trademark misuse. This approach combined the handling of individual cases with a broader strategy to reinforce fraud prevention.

As in 2023, marketing fraud accounted for the majority of reported cases, with most of them consisting of false claims of certification or impersonation of legitimate businesses, including ENplus® certified companies. Although this type of fraud remains dominant, a modest decrease in more elaborate schemes involving the aforementioned imitation entities was observed compared to the previous year. In light of this, the 'Imitation Companies' list was introduced in early 2025. Placed directly beneath the Blacklist, it supports user clarity by highlighting the websites and contact details of entities to be avoided.

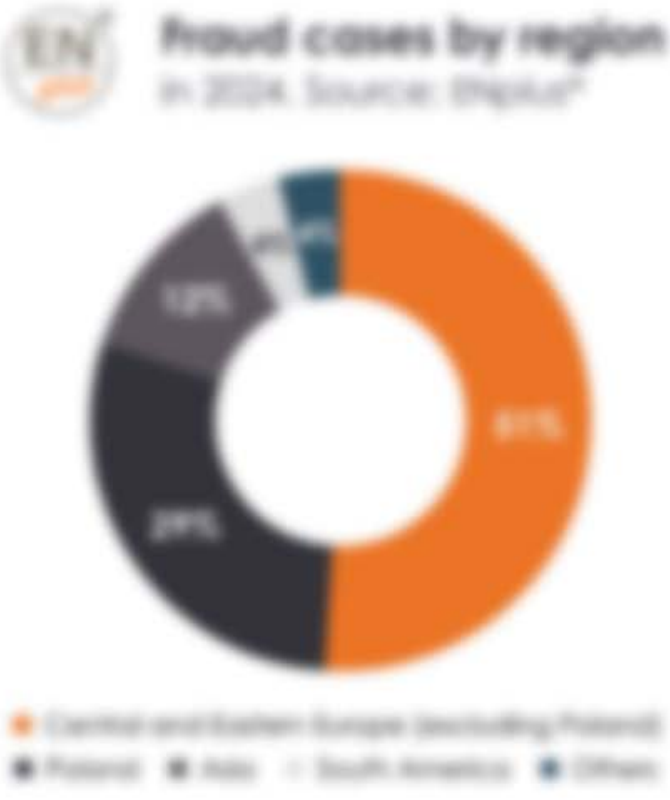
Figure 17: Types of fraud cases that were processed in 2024



Overall, fraud distribution in 2024 remained consistent, with marketing fraud leading at 47%, followed by product misuse (19%) and certificate falsifications (5%), and others (19%). Notably, the EN|plus® system has strengthened the monitoring of suspended and terminated companies, paying closer attention to businesses that are not currently certified in order to prevent trademark misuse during these periods. The outcomes were also positive: EN|plus® was able to stop or prevent further misuse of the trademark in 76% of the cases reported in 2024, meaning that these cases were successfully resolved.

21% of the cases handled resulted in being published in the EN|plus® Blacklist – a section that continued to rank among the most visited on the EN|plus® website in 2024. With these results, over 1,200 cases have been successfully addressed since 2014, reinforcing the EN|plus® enforcement capacity. This increasing number of infringement attempts highlights both the need for vigilance and the growing demand for trustworthy certified suppliers, confirming the value and relevance of the EN|plus® certification scheme.

Figure 18: Fraud cases by region in 2024



Geographically, the highest concentration of fraudulent activity came from Central and Eastern Europe as well as the Balkans, with Poland alone responsible for nearly 29% of all 2024 cases reported. Ukraine, Turkey and North Macedonia also represent a significant share. Geopolitical instability in some of these regions continues to disrupt trade channels and regulatory consistency, making it easier for unlawful actors to exploit gaps in enforcement. At the same time, economic uncertainty, particularly in regions with an unstable energy supply, can make it more tempting for companies or intermediaries to falsely claim certification in order to gain a competitive advantage.

Meanwhile, the growing recognition of the scheme in emerging markets makes the trademark a more attractive target for misuse. Early 2025 trends suggest that the fraud dynamics observed in 2024 will continue, with marketing fraud remaining the main issue and overall volumes staying stable. Notably, there have been no reported cases of certificate falsification so far this year. As of May 2025, 14 cases are under active investigation by the Bioenergy Europe's anti-fraud team and the EN|plus® National Licensors.

10.

Qualitative analysis of the pellet sector

EPC survey 2025

To better understand the evolving dynamics of the European wood pellet market, Bioenergy Europe conducted a qualitative survey via Jotform targeting national representatives of the European Pellet Council (EPC). Responses were received from seven countries: Austria, Czechia, France, the United Kingdom, Italy, Spain, and Portugal. The survey was structured around four core thematic segments: **Market Conditions & Demand**, **Policy & Regulatory Framework**, **Public Perception**, and **Supply Chain and Raw Material Availability**.

Each section contained two to three questions, with responses given on a five-point scale, where 1 indicated a strongly negative or deteriorating trend and 5 signalled a clearly positive or improving situation. This scoring system enabled respondents to express qualitative assessments in a structured and comparable manner, helping to identify general sentiment, detect national contrasts, and spot early signs of recovery or structural concern.

This exercise aims to complement quantitative market data with structured insights from national-level stakeholders, helping to uncover shared concerns, regional differences, and emerging trends across the European pellet sector. The findings contribute to a deeper contextual understanding of market sentiment, feeding directly into strategic considerations for producers, traders, equipment manufacturers, and policymakers alike.

As mentioned before, the survey was circulated among national representatives of the EPC, who possess deep sectoral knowledge and regularly engage with market actors in their respective countries. Respondents were instructed to answer each question based on the overall national context, rather than providing personal views or isolated organisational perspectives. While every effort was made to ensure informed and representative input, it is important to note that the population sample size remains limited. As such, the findings presented in this chapter should be interpreted as indicative reflections of national sentiment, rather than statistically robust conclusions.

Section 1: Market Condition & Demand

Table 10 Results of Section 1 (Market Condition & Demand)

Other Europe	Confidence today (1-5)	Optimism for 2030 (1-5)	Evolution
Austria	4.5%	4.5%	→
Czech Republic	3.5%	3.5%	→
France	4.5%	4.5%	→
Italy	4%	4%	→
Portugal	2.5%	2.5%	↓
Spain	3.5%	3.5%	→
UK	4.5%	4.5%	↑

In the first section focusing on market conditions & demand, respondents were asked the two following questions:

1) **On a scale of 1 to 5, how confident are residential end-users in choosing pellet heating systems today?**

2) **On a scale of 1 to 5, how optimistic are you about the future development of the wood pellet market in your country until 2030?**

The results can be found in Table 1x.

The results for this section highlight moderate but uneven levels of confidence among end-users in choosing pellet-based heating systems today, with little anticipated change by 2030. This suggests a broadly stable outlook in market sentiment but also points to a lack of strong momentum for improvement in responding countries. Notably, Austria stands out with the highest confidence both now and in the long term, while the UK shows a modest but positive shift. In contrast, Portugal is the only country where sentiment is expected to decline over time, indicating emerging concerns (also supported by declining numbers when it comes to production and consumption).

When asked which parameters most influence consumer demand for pellet heating systems, respondents converged on a few consistent themes across countries. Energy pricing emerged as the dominant factor, with stakeholders pointing to not only the cost of pellets themselves, but also the prices of competing energy sources, notably natural gas, heating oil, and increasingly, electricity for heat pumps.

In countries like Spain, the competition from heat pumps is intensifying, driven by their dual functionality (heating and cooling) and growing popularity in the context of Mediterranean summers. Respondents highlighted that consumer preferences are shifting, with heat pumps gaining momentum thanks to, among other things, cultural and marketing trends that position them as modern, climate-resilient solutions.

In France, the 2030 outlook should be favourable, thanks to a large remaining stock of outdated or fossil fuel powered heating systems. However, the current market dynamic is complicated by a negative narrative surrounding wood energy. This perception issue, likely stemming from misunderstandings about sustainability and emissions, is affecting consumer interest and will be further examined in the section on Public Perception.

Section 2: Policy & Regulatory environment

In the second section focusing on policy & regulations, respondents were asked the two following questions:

1) **On a scale of 1 to 5, how supportive are current national policies for the pellet sector in your country?**

2) **On a scale of 1 to 5, how significantly have public subsidies or incentives for pellet heating systems changed in the past year?**

The results can be found in the following Figure 69 and Figure 70. Responses to the first question showed a broadly aligned perception across most countries. The dominant answer was 2 out of 5, indicating that national policies are generally perceived as somewhat unsupportive of the sector. The only notable exception is Czechia, where the policy environment was judged more favourably, suggesting consistent support mechanisms. While different types of policies can influence the development of the pellet sector, subsidy schemes stood out as the most frequently mentioned measure according to the survey.

Figure 70: EPC respondents' answer to "How are current national policies for the pellet sector in your country?"

Figure 80: EPC respondents' answer to "How how significantly have public subsidies or incentives for pellet heating systems changed in the past year?"

Figure 10 therefore focuses on this aspect, offering additional insights into national trends and recent changes on the subsidy side. In **Austria**, respondents described the overall framework as relatively stable, however 2024 showed a lot of fluctuations in subsidies, as underlined by the score of 1 out of 5. In early 2024, very generous investment support was offered in Austria, triggering a boom in appliance sales (particularly boilers) and setting a new record. This momentum however was abruptly interrupted when a new government took office and revised the scheme downward, suspending what had been one of the most favourable programmes in Europe. As a result, and while 2024 sales values are strong, the outlook for 2025 is more uncertain. Sales could still be relatively high next year though due to administrative delays in the scheme's registration process. In **France, Portugal, and Spain**, respondents indicated a general decline in subsidy support for pellet heating systems in 2024. This trend aligns with the observation that appliance sales in these countries have not returned to pre-crisis levels. In Spain, no new national subsidy schemes were introduced in 2024. While some regional or municipal programmes may still be active, respondents noted that their number and scope have diminished. Nonetheless, pellet systems might still indirectly benefit from broader frameworks, such as building renovation or energy efficiency programmes, though these are often not pellet-specific. The situation in France has evolved rapidly. Respondents reported that financial support for domestic pellet systems was reduced by 50% within just eight months in 2024. If current trends continue, subsidies could disappear entirely by 2026, raising concerns not only for the residential sector but also for the commercial pellet heating market, which is also affected by shifting eligibility criteria and reduced incentive amounts. In contrast to the countries experiencing sharp declines in support, Italy, Czechia, and the United Kingdom reported a more stable policy environment regarding subsidies. However, stability does not necessarily equate to strong or expanding support. In **Italy**, while the policy framework appears steady on the surface, the respondent noted a **gradual reduction in financial support for biomass technologies**, including pellets. Czechia maintains a subsidy scheme targeted on replacing outdated heating systems, particularly coal-fired boilers, which continues to support pellet boiler sales.

In the UK, the landscape is defined by the legacy Renewable Heat Incentive (RHI). While closed to new applicants, the scheme still covers both domestic and non-domestic pellet heating systems already enrolled. One of the scheme's conditions is that fuel used must be of ENplus® A1 standard, which helps preserve the quality and integrity of domestic consumption. However, without a follow-up incentive framework, there is a risk that once RHI contracts expire, households and businesses may revert to fossil fuels or lower-quality biomass, undermining current progress.

Section 3: Supply chain & raw material availability

The third section focused on supply chains & raw material, and the two following questions were asked:

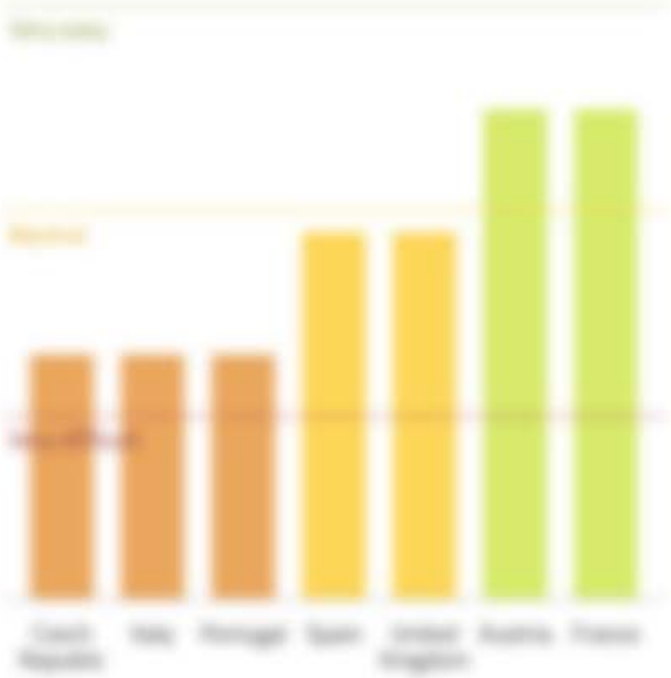
1) **On a scale of 1 to 5, how adequate is the availability of raw materials for pellet production in your country?**

2) **On a scale of 1 to 5, how easy is it for the pellet sector in your country to access feedstock despite competition with other sectors (e.g., pulp, panels)?**

The answers are represented in Figure 11 and Figure 12.

Figure 11: EPC respondents' answer to "How adequate is the availability of raw materials for pellet production in your country?"

Figure 82: EPC respondents' answer to 'How easy is it for the pellet sector in your country to access feedstock despite competition with other sectors (e.g. pulp, panels)?'



Stakeholder responses reveal significant regional disparities in raw material availability, with Southern Europe expressing growing concern over supply constraints. Italy and Portugal each rated raw material availability at 2 out of 5, indicating that current supply is insufficient to meet the needs of their pellet sectors. Spain, with a score of 3 out of 5, shares similar concerns, albeit to a lesser degree. In these countries, respondents pointed to a common challenge: although biomass resources are present, they are often underutilised or difficult to access. Low-value biomass, such as forest residues and shrubland material, accumulates in unmanaged or poorly maintained areas, conditions that also exacerbate wildfire risks during the summer months. Respondents stressed that more effective mobilisation strategies, including support for extraction, logistics, and centralisation infrastructure, would be necessary to unlock this untapped potential. Addressing this issue could offer both energy and environmental co-benefits, contributing to wildfire prevention and local rural economies. Austria and Czechia both reported a normal situation, but with underlying challenges. For example, the Czech respondent highlighted that a significant portion of national timber production (estimated at nearly 50%) is exported. This high export share reduces the volume of wood processed domestically, which in turn limits the availability of sawdust which is the key input for pellet production. While raw material access is not currently a critical constraint in these countries, such trends raise concerns over long-term feedstock security for domestic pellet producers. Both France and the UK reported relatively strong raw material availability, scoring 4 out of 5. In these countries, supply is not considered a barrier to domestic pellet production at this stage.

The second question in this section focused on how difficult it is for the pellet sector to compete with other industries, notably pulp & paper and panel board manufacturers, when accessing raw material. Responses indicate growing competition pressure, particularly in countries with fragmented supply chains or high logistical costs. Czechia, Italy, and Portugal rated the level of difficulty as relatively high, citing competition from as a limiting factor for pellet producers. In Portugal and Italy, respondents specifically noted that transportation costs for raw forest material are a key disadvantage. In Spain and the UK, the level of competition is considered moderate, with scores of 3 out of 5. However, the Spanish respondent warned that competition dynamics are rapidly evolving, driven by a shrinking raw material base. One of the key causes is the increasing reluctance of landowners and forest managers to intervene in forests, opting instead for minimal management or passive conservation. While this approach may stem from environmental or socio-political concerns, in the Spanish context, marked by rising wildfire risk and underutilised biomass, this strategy is counterproductive. It reduces the flow of available material and allows combustible residues to accumulate in landscapes already vulnerable to fire. In contrast, respondents from France and Austria reported that competition for raw material is not currently a major concern, with both countries assigning a score of 4 out of 5. No additional comments were provided, suggesting that the situation remains stable and manageable for the time being.

Section 4: Public perception

The fourth section focused on public perception, and the three following questions were asked:

1) **On a scale of 1 to 5, how is the public perception on bioenergy and wood pellets in your country?**

2) **On a scale of 1 to 5, how has the media coverage of bioenergy and wood pellets in your country been in the past year?**

3) **On a scale of 1 to 5, how well informed is the general public in your country about the sustainability of wood pellets?**

The answers are represented in Figure 13, Figure 14, and Figure 15.

Responses to the first question suggest that public opinion remains mostly neutral, with a few countries leaning slightly positive and one clear outlier leaning negative. This reflects an overall lack of strong public engagement with the topic in many countries but also growing regional divergence in narratives around bioenergy and sustainability. The UK reported the lowest score among respondents, indicating a generally negative public perception of the pellet sector. One of the likely drivers of this sentiment is the dominant role of large-scale biomass power generation which alone accounts for close to 65% of the UK's pellet use. Of the approximately 6.5 million tonnes of pellets consumed annually in the UK, nearly 5 million tonnes are used for industrial power generation, while only about half a million tonnes are consumed in small-scale applications such as residential and commercial heating. This imbalance shapes public perception. Large-scale biomass installations tend to attract more scrutiny, often being associated with concerns around deforestation, carbon accounting, and long-distance transport. Meanwhile, the benefits of local, small-scale pellet heating are comparatively less visible or recognised. As a result, the sector's reputation in the UK is strongly influenced by the visibility and criticism of utility-scale projects, rather than the practical decarbonisation benefits of domestic or community-level heating.

One key element when it comes to shaping the public perception is how the sector is described in the media. Therefore, such a question was also asked to respondents, and the results can be found below.

Figure 83: EPC respondents' answer to "On a scale of 1 to 5, how is the public perception on bioenergy and wood pellets in your country?"

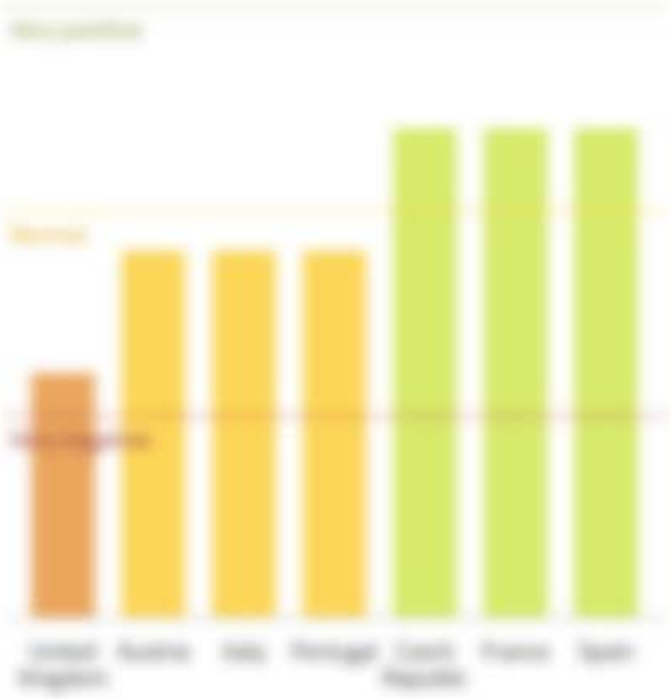
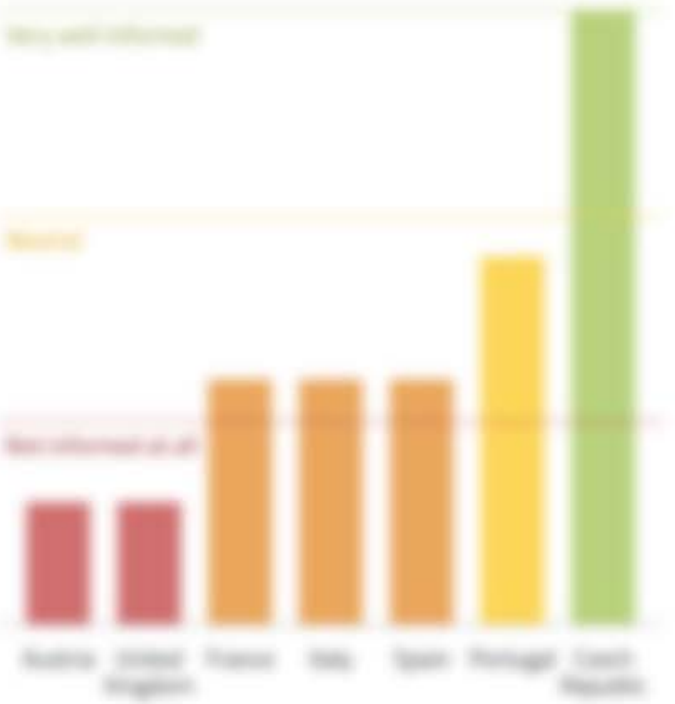


Figure 84: EPC respondent's answer to "On a scale of 1 to 5, how has the media coverage of bioenergy and wood pellets in your country been in the past year?"

This additional information can help better understand why the public perception is as it is. As shown in Figure 73, responses reveal diverse trends across Europe, ranging from mostly neutral coverage to actively negative campaigns. Three countries, namely France, Portugal, and the UK, reported relatively negative media coverage of the pellet sector. In the case of France, this appears to contradict the earlier score on public perception, which was closer to neutral or slightly positive. This divergence may reflect a disconnect between top-down narratives and bottom-up realities: while media and certain national institutions may express criticism often related to sustainability or forest management, the widespread presence of small-scale biomass heating systems in rural areas may support a more favourable public sentiment based on lived experience. In Czechia and Austria, respondents noted that recurrent negative media coverage revolves around fine particle emissions, especially from wood burning. However, the impact of this narrative varies: while Austria reported a noticeable effect on public perception, the Czech Republic appears less affected, scoring higher on the public perception scale. This suggests that the local framing and level of public education on combustion technologies play a role in moderating the influence of such narratives. It is important to note that concerns about air quality and fine particles are valid in the context of traditional biomass systems (e.g. open fireplaces or old stoves), but modern pellet systems are designed to meet strict emission standards. Their use of controlled combustion, high efficiency, and quality-assured fuels like ENplus® A1 pellets results in substantially lower fine particle emissions, a message that is not always effectively communicated in the public sphere. Spain presents a case similar to France, where public perception of the pellet sector leans slightly positive, yet media coverage remains neutral. This contrast reinforces the idea of a disconnect between institutional narratives and lived public experience. In Spain, as in France, the relatively high penetration of small- and medium-scale biomass heating systems, especially in rural or semi-rural areas, may be shaping a more favourable perception from the ground up, even if mainstream media and political discourse do not actively support or promote the sector. In Italy, the two scores are more closely aligned, with both public perception and media coverage assessed as neutral. This suggests a more coherent narrative, where the sector is neither strongly promoted nor publicly criticised. In such an environment, market development is likely to be more dependent on direct consumer experience and word-of-mouth, as opposed to being driven or hindered by national media framing. The final question explored how well the public understands the sustainability of wood pellets, particularly the fact that premium pellets in the EU are largely made from sawmill residues. This positions pellet production as a key part of the circular bioeconomy, adding value to by-products and supporting efficient wood use. Responses were mostly negative, with low awareness reported in nearly all countries. The only exception was Czechia, where the public is seen as relatively informed. This lack of awareness leaves the sector vulnerable to misinformation, especially as debates around biomass intensify. Without clear communication about how pellets contribute to resource efficiency and value chain optimisation, their public image risks being mixed with less sustainable forms of bioenergy. Improving public understanding of pellets' role in the wood value chain and decarbonisation efforts should be a priority for both national actors and EU-level stakeholders.

Figure 85: EPC respondents' answer to "On a scale of 1 to 5, how well informed is the general public in your country about the sustainability of wood pellets?"



Annexes

11.1 Country Abbreviations

AT	Austria	SI	Slovenia
BE	Belgium	SK	Slovakia
BG	Bulgaria	AL	Albania
CY	Cyprus	AU	Australia
CZ	Czechia	BA	Bosnia and Herzegovina
DE	Germany	BR	Brazil
DK	Denmark	BY	Belarus
EE	Estonia	CA	Canada
EL	Greece	CH	Switzerland
ES	Spain	CL	Chile
FI	Finland	CN	China
FR	France	ID	Indonesia
HR	Croatia	JP	Japan
HU	Hungary	KR	South Korea
IE	Ireland	ME	Montenegro
IT	Italy	MY	Malaysia
LT	Lithuania	NO	Norway
LU	Luxembourg	NZ	New Zealand
LV	Latvia	RS	Republic of Serbia
MT	Malta	RU	Russia
NL	Netherlands	TH	Thailand
PL	Poland	UA	Ukraine
PT	Portugal	UK	United Kingdom
RO	Romania	US	United States of America
SE	Sweden	VN	Vietnam

Conventions to geographic regions

EU27: European Union Member States.
Other Europe: Albania, Belarus, Bosnia and Herzegovina, Montenegro, Norway, Russia, Serbia, Switzerland, Ukraine, United Kingdom.
Europe: EU27+Other Europe.
Balkan countries: Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Greece, Montenegro, Romania, Serbia, Slovakia, Slovenia.
Baltic countries: Estonia, Latvia, Lithuania.

11.2 Symbols and abbreviations and decimal prefixes

Symbol	Meaning
.	Decimal separator
,	Thousand
N.A.	Data not available

11.3 General conversion factors for energy

To From	TJ	GWh	Mtoe	Mcal
TJ	1	0.278	0.024	0.239
GWh	3.6	1	0.086	0.86
Mtoe	41.868	11.63	1	10
Mcal	4.187	1.163	0.1	1

11.a. ENplus® requirements for wood pellets

Quality class	ENplus® A1	ENplus® A2	ENplus® B	Unit	Testing standard
Diameter (as received)	6 ≤ D ≤ 7	6 ≤ D ≤ 7	6 ≤ D ≤ 7	mm	ISO 17829
Length (as received)	3.15 ≤ L ≤ 40 (a)	3.15 ≤ L ≤ 40 (a)	3.15 ≤ L ≤ 40 (a)	mm	ISO 17829
Share of pellets with a length > 40 mm (as received) Category L = 40, Max 40 < L ≤ 45	value to category is to be stated	value to category is to be stated	value to category is to be stated	w-%	ENplus® Guidance Document 30
Moisture (as received)	≤ 10.0	≤ 10.0	≤ 10.0	w-%	ISO 18134
Ash (dry basis)	≤ 0.70	≤ 1.20	≤ 2.00	w-%	ISO 18122
Mechanical durability (as received) (c)	≥ 98.0	≥ 97.5	≥ 97.5	w-%	ISO 17831-1
Bulk density (as received)	600 ≤ BD ≤ 750	600 ≤ BD ≤ 750	600 ≤ BD ≤ 750	kg/m³	ISO 17828
Particle density (as received)	value to be stated	value to be stated	value to be stated	g/cm³	ISO 17892-3
Content Fines (D: 3.15 mm) (d) (e) (as received)	value to be stated	value to be stated	value to be stated	w-%	analysis based on ISO 17831-1, cl. 9
Fines (< 3.15 mm) Bunker (as received)	≤ 2.0	≤ 3.0	≤ 3.0	w-%	ISO 18846 in 1 g)
Fines (< 3.15 mm) Bagged (as received)	≤ 2.0	≤ 2.0		w-%	ISO 18846 in 1 g)
Net calorific value (as received)	≥ 16.5 (f)	≥ 16.5 (f)	≥ 16.5 (f)	kWh/kg	ISO 18125
Additives (as received)	≤ 2.0 (g)	≤ 2.0 (g)	≤ 2.0 (g)	w-%	
Nitrogen (dry basis)	≤ 0.3	≤ 0.5	≤ 1.0	w-%	ISO 16948
Sulfur (dry basis)	≤ 0.04	≤ 0.04	≤ 0.04	w-%	ISO 16994
Chlorine (dry basis)	≤ 0.02	≤ 0.02	≤ 0.02	w-%	ISO 16994
Arsenic (dry basis)	≤ 1	≤ 1	≤ 1	mg/kg	ISO 16968
Cadmium (dry basis)	≤ 0.5	≤ 0.5	≤ 0.5	mg/kg	ISO 16968
Chromium (dry basis)	≤ 10	≤ 10	≤ 10	mg/kg	ISO 16968
Copper (dry basis)	≤ 10	≤ 10	≤ 10	mg/kg	ISO 16968
Lead (dry basis)	≤ 10	≤ 10	≤ 10	mg/kg	ISO 16968
Mercury (dry basis)	≤ 0.1	≤ 0.1	≤ 0.1	mg/kg	ISO 16968
Nickel (dry basis)	≤ 10	≤ 10	≤ 10	mg/kg	ISO 16968
Zinc (dry basis)	≤ 100	≤ 100	≤ 100	mg/kg	ISO 16968
Ash deformation temperature	≥ 1200	≥ 1100	≥ 1100	°C	ISO 21404 (j)

a. A maximum of 1% of the pellets may be longer than 40 mm. No pellets longer than 45 mm are allowed.
b. 100 pellets should be measured (after sieving with a 3.15 mm sieve) for the length distribution mass where only 50 are recommended in the ISO 17829. The results shall be both expressed by the exact value and the category (L 40, L 45).
c. At the loading point of the **transport vehicle** at the production site.
d. At **company** gate or when loading **big bags** or truck for deliveries to end-users.
e. At **company** gate, when filling bags (**bagged pellets**).
f. The indication "≤ 10 mm" respective "≤ 25 mm" designates particles which pass through a round hole sieve with an aperture size of ≤ 10 mm, respective ≤ 25 mm, according to ISO 16106-2.
g. ISO 18846 will be replaced by ISO 5370.
h. Equal ≥ 16.5 MJ/kg as received.
i. The amount of additives in production shall be limited to 1.0 w-% while the amount of post-production additives (e.g. coating oils) shall be limited to 0.2 w-% of the pellets.
j. Ash is produced at 815 °C. All characteristic temperatures listed in ISO 21404 shall be stated in the report.

Note: The results are considered conforming if the value reported by the laboratory is within the specified limit.
Source: ENplus® Handbook

11.3 Glossary

Pellet	In this report, the word 'pellet' is always in reference to 'wood pellet' unless otherwise stated in cases where 'agropellet' is specified.
CO_2 - Carbon Dioxide Equivalent	Carbon dioxide equivalent is the standard unit for comparing the global warming potential of any greenhouse gas over a specified period of time. In this way, the relative severity of all greenhouse gas emissions can be evaluated in terms of one agreed reference point.
Commercial consumption/use	Volume of pellets used in dedicated heat boilers with a capacity greater than 50 kW. This class includes dedicated heat boilers used in residential buildings, public buildings, services, industry and excludes combined heat and power appliances (CHP).
Dedicated power pellets consumption/use	Volume of pellets used for electricity production in a plant only producing electricity without recovering the heat generated during the process.
Derived heat	According to Eurostat, derived heat covers the total heat production in heating plants and in combined heat and power plants. It includes the heat used by the auxiliaries of the installation which can mon fluid and losses in the installation network heat exchanger. For auto-producing entities (= entities generating electricity, and/or heat wholly or partially for their own use as an activity which supports their primary activity) the heat used by the undertaking for its own processes is not included.
Industrial pellet consumption	Pellet consumed in large scale CHP and power plants.
Residential consumption/use	Volume of pellets used in domestic stoves and dedicated heat boilers with a capacity below 50 kW.

11.4 Detailed statistics tables

Table 17 Detailed world pellet production by country in 2023 and 2024

	2023			2024		
	Number of operating production plants	Production capacity (tonnes)	Actual production (tonnes)	Number of operating production plants	Production capacity (tonnes)	Actual production (tonnes)
EU27	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
AT	50	2,240,700	1,725,000	53	2,630,000	1,797,700
BE	10	955,000	605,000	10	955,000	510,000
BG	65	324,000	216,000	65	324,000	216,000
CY	0	0	0	0	0	0
CZ	42	880,000	475,000	43	880,000	442,000
DE	66	4,100,000	3,710,000	68	4,100,000	3,700,000
DK	4	260,000	121,600	5	275,000	100,000
EE	20	1,800,000	1,325,615	20	1,800,000	1,187,200
EL	70	130,000	50,000	70	130,000	50,000
ES	63	1,750,000	757,379	64	1,825,000	604,622
FI	28	686,000	354,000	29	696,000	324,000
FR	73	2,950,000	2,250,000	76	3,050,000	2,000,000
HR	26	920,000	470,000	26	920,000	425,000
HU	5	148,000	14,000	5	148,000	14,000
IE	1	40,000	27,500	2	60,000	27,500
IT	48	475,000	404,000	55	490,000	475,000
LT	23	824,000	476,290	23	824,000	536,190
LU	1	50,000	42,500	1	50,000	42,500
LV	29	2,300,000	1,865,200	29	2,300,000	1,736,800
MT	0	0	0	0	0	0
NL	4	385,000	225,000	4	385,000	225,000
PL	142	2,750,000	2,200,000	135	2,500,000	2,000,000
PT	25	1,506,100	615,000	25	1,506,100	575,100
RO	21	750,000	450,000	21	750,000	500,000
SE	56	2,510,000	1,757,703	56	2,486,250	1,576,068
SI	10	210,000	160,000	10	210,000	164,000
SK	19	357,000	215,000	20	372,000	215,000
Other Europe	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
AL	16	130,000	93,426	16	130,000	89,600
BA	41	560,000	433,400	41	560,000	353,200
BY	67	1,000,000	250,000	67	1,000,000	250,000
CH	25	447,000	341,000	23	475,000	323,000

ME	13	155,000	96,880	13	155,000	81,400
MD	4	160,000	150,000	6	200,000	175,800
RS	91	688,000	352,115	95	675,000	313,024
RU	78	3,780,000	1,436,000	78	3,780,000	1,100,000
UA	27	764,000	524,000	26	833,000	410,000
GB	10	427,700	312,370	12	464,700	309,575
North America	121	17,676,178	14,275,400	120	18,007,883	14,159,427
CA	45	4,720,000	3,450,000	43	4,666,000	3,450,000
US	76	12,956,178	10,825,400	77	13,341,883	10,709,427
South America	50	2,054,000	1,063,000	53	2,480,000	1,054,000
AR	6	197,000	62,000	7	229,000	62,000
BR	28	1,341,000	700,000	29	1,615,000	700,000
CL	11	375,000	236,000	12	385,000	276,000
MX	2	16,000	4,000	2	16,000	4,000
UY	3	125,000	0	3	135,000	0
Asia	278	14,816,000	8,135,427	290	16,009,000	10,044,500
CN	116	6,507,000	873,000	116	6,507,000	873,000
ID	8	682,000	630,000	8	682,000	630,000
JP	6	138,000	125,000	6	138,000	125,000
KR	15	802,000	700,000	17	1,030,000	619,000
MY	22	1,045,000	800,000	26	1,420,000	1,300,000
TH	16	862,000	210,000	16	862,000	500,000
VN	80	4,700,000	4,862,427	86	5,000,000	5,975,000
TR	15	80,000	30,000	15	80,000	22,500
Oceania	13	580,000	225,000	13	580,000	217,000
AU	9	385,000	100,000	9	385,000	100,000
NZ	4	195,000	125,000	4	195,000	117,000
Africa	7	137,000	34,000	7	137,000	34,000
ZA	6	105,000	25,000	6	105,000	25,000
TN	1	32,000	9,000	1	32,000	9,000
World	1,479	71,072,178	48,179,042	1,720	75,541,503	48,274,176

Table 18 Detailed World pellet consumption by country in 2023-2024

	2023			2024		
	Residential & Commercial	Industrial	Total	Residential & Commercial	Industrial	Total
EU27	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
AT	[illegible]	0	[illegible]	[illegible]	0	[illegible]
BE	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
BG	[illegible]	0	[illegible]	[illegible]	0	[illegible]
CY	0	0	0	0	0	0
CZ	[illegible]	0	[illegible]	[illegible]	0	[illegible]
DE	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
DK	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
EE	[illegible]	0	[illegible]	[illegible]	0	[illegible]
EL	[illegible]	0	[illegible]	[illegible]	0	[illegible]
ES	[illegible]	0	[illegible]	[illegible]	0	[illegible]
FI	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
FR	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
HR	[illegible]	0	[illegible]	[illegible]	0	[illegible]
HU	0	0	0	0	0	0
IE	0	0	0	0	0	0
IT	[illegible]	0	[illegible]	[illegible]	0	[illegible]
LT	0	0	0	0	0	0
LU	0	0	0	0	0	0
LV	[illegible]	0	[illegible]	[illegible]	0	[illegible]
MT	0	0	0	0	0	0
NL	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
PL	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
PT	[illegible]	0	[illegible]	[illegible]	0	[illegible]
RO	[illegible]	0	[illegible]	[illegible]	0	[illegible]
SE	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
SI	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
SK	[illegible]	0	[illegible]	[illegible]	0	[illegible]
Other Europe	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
AL	[illegible]	0	[illegible]	[illegible]	0	[illegible]
BA	[illegible]	0	[illegible]	[illegible]	0	[illegible]
BY	0	0	0	0	0	0
CH	[illegible]	0	[illegible]	[illegible]	0	[illegible]
ME	[illegible]	0	[illegible]	[illegible]	0	[illegible]

RO	0	0	0	0	0	0
RS	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
RU	0	0	0	0	0	0
UA	0	0	0	0	0	0
UK	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
North America	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
CA	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
US	[illegible]	0	[illegible]	[illegible]	0	[illegible]
South America	[illegible]	0	[illegible]	[illegible]	0	[illegible]
BR	[illegible]	0	[illegible]	[illegible]	0	[illegible]
CL	[illegible]	0	[illegible]	[illegible]	0	[illegible]
Asia	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
ID	0	0	0	0	0	0
JP	136,000	6,000,000	6,136,000	136,000	[illegible]	[illegible]
KR	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
MY	0	0	0	0	0	0
TH	0	0	0	0	0	0
VN	0	0	0	0	0	0
Oceania	75,000	50,000	125,000	75,000	[illegible]	[illegible]
AU	15,000	0	15,000	15,000	0	15,000
NZ	60,000	50,000	110,000	60,000	[illegible]	[illegible]
Africa	0	0	0	0	0	0
ZA	0	0	0	0	0	0
World	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Table 10 References

	Production data sources	Small scale consumption data sources	Industrial consumption data sources	Trading data sources	Appliances data sources	Pellet prices data sources
EU27	-	-	-	-	-	-
AT	ProPellets Austria	ProPellets Austria	N/A	Eurostat	ProPellets Austria	ProPellets Austria
BE	Valbiom, Own research	Own research	Hawkins Wright	Eurostat	N/A	Valbiom
BG	Own research	Own research	N/A	Eurostat	N/A	N/A
CY	N/A	N/A	N/A	Eurostat	N/A	N/A
CZ	Czech Pellet Cluster	Czech Pellet Cluster	N/A	Eurostat	Czech Pellet Cluster	Czech Pellet Cluster
DE	DEPI	DEPI	DEPI	Eurostat	DEPI	C.A.R.M.E.N.
DK	Own research	Own research	Hawkins Wright	Eurostat	N/A	N/A
EE	SBP, Own research	Own research	N/A	Eurostat	N/A	N/A
EL	Replicated data	Replicated data	N/A	Eurostat	N/A	N/A
ES	AVEBIOM	AVEBIOM	N/A	Eurostat	AVEBIOM	AVEBIOM
FI	LUKE	LUKE	Hawkins Wright	Eurostat	N/A	LUKE
FR	Propellet France	Propellet France	Hawkins Wright	Eurostat	Propellet France	Propellet France
HR	Own research	Own research	N/A	Eurostat	N/A	N/A
HU	Replicated data	N/A	N/A	Eurostat	N/A	N/A
IE	Own research	N/A	N/A	Eurostat	N/A	N/A
IT	AIEL	AIEL	N/A	Eurostat	AIEL	AIEL
LT	Own research	N/A	N/A	Eurostat	N/A	N/A
LU	Replicated data	N/A	N/A	Eurostat	N/A	N/A
LV	Own research	Own research	N/A	Eurostat	[illegible]	N/A
MT	N/A	N/A	N/A	Eurostat	N/A	N/A
NL	Replicated data	Replicated data	Hawkins Wright	Eurostat	N/A	N/A
PL	Own research	Own research	Hawkins Wright	Eurostat	Polish Pellet Council	N/A
PT	ANPEB	ANPEB	N/A	Eurostat	N/A	N/A
RO	Own research	Own research	N/A	Eurostat	N/A	N/A
SE	Pelletsförbundet	Pelletsförbundet	Hawkins Wright	Eurostat	N/A	N/A
SI	Own research	Own research	N/A	Eurostat	N/A	N/A
SK	Own research	Own research	N/A	Eurostat	N/A	N/A
Other Europe	-	-	-	-	-	-
RS	University of Belgrade Faculty of Forestry	University of Belgrade Faculty of Forestry	N/A	Eurostat	N/A	University of Belgrade Faculty of Forestry
BA	University of Belgrade Faculty of Forestry	University of Belgrade Faculty of Forestry	N/A	Eurostat	N/A	University of Belgrade Faculty of Forestry

BY	Replicated data	Replicated data	N/A	Lifecentrale	N/A	N/A
CH	Profolder Switzerland	Profolder Switzerland	N/A	Lifecentrale	N/A	Profolder Switzerland
ME	University of Belgrade Faculty of Forestry	University of Belgrade Faculty of Forestry	N/A	Lifecentrale	N/A	University of Belgrade Faculty of Forestry
RS	Belex	Belex	N/A	Lifecentrale	N/A	N/A
BE	University of Belgrade Faculty of Forestry	University of Belgrade Faculty of Forestry	University of Belgrade Faculty of Forestry	Lifecentrale	N/A	University of Belgrade Faculty of Forestry
RU	Own research	Own research	N/A	Lifecentrale	N/A	N/A
UA	Own research	Own research	N/A	Lifecentrale	N/A	N/A
UA	UA pellet council	UA pellet council	Hawkins Wright	Lifecentrale	N/A	N/A
North America	-	-	-	-	-	-
CA	APHC	APHC	Hawkins Wright	Lifecentrale	N/A	N/A
US	US Energy Information Administration	US Energy Information Administration	N/A	Lifecentrale	N/A	N/A
South America	-	-	-	-	-	-
AR	Own research	Own research	N/A	Lifecentrale	N/A	N/A
BR	Own research	Own research	N/A	Lifecentrale	N/A	N/A
CL	Own research	Own research	N/A	Lifecentrale	N/A	N/A
MX	Own research	Own research	N/A	Lifecentrale	N/A	N/A
UY	Own research	Own research	N/A	Lifecentrale	N/A	N/A
Asia	-	-	-	-	-	-
CN	Own research	Own research	N/A	Lifecentrale	N/A	N/A
ID	Own research	Own research	N/A	Lifecentrale	N/A	N/A
JP	Own research	Own research	Hawkins Wright	Lifecentrale	N/A	N/A
KR	Own research	Own research	Hawkins Wright	Lifecentrale	N/A	N/A
MY	Own research	Own research	N/A	Lifecentrale	N/A	N/A
TH	Own research	Own research	N/A	Lifecentrale	N/A	N/A
VN	Own research	Own research	N/A	Lifecentrale	N/A	N/A
TW	Own research	Own research	N/A	Lifecentrale	N/A	N/A
Oceania	-	-	-	-	-	-
AU	Own research	Own research	N/A	Lifecentrale	N/A	N/A
NZ	Own research	Own research	Hawkins Wright	Lifecentrale	N/A	N/A
Africa	-	-	-	-	-	-
ZA	Own research	Own research	N/A	Lifecentrale	N/A	N/A
TN	Own research	Own research	N/A	Lifecentrale	N/A	N/A
World	-	-	-	-	-	-

BIOENERGY EUROPE STATISTICAL REPORT 2025

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