ANNUAL BAROMETER
WOOD PELLET INDUSTRY IN PORTUGAL
2022

Key facts:

In 2021 over 1,5 million tonnes of wood were used to produce pellets in Portugal. Almost half of the pellets were **exported to power stations in northern Europe**, with Drax power station in the UK being the single biggest consumer (23%). This is likely to cause significant climate impacts.

Although pellet production decreased slightly in 2021 relative to 2020, three large new pellet factories all ramp up their production in 2022 and another large factory that had closed is being reopened. Put together, this will **increase Portugal's total production capacity by 50%**.

Portugal consumed 57% more pine[1] than the estimated productive capacity of pine stands in 2021, which required large volumes of imports. **Pellet production accounted for a fifth of total pine consumption**, even though it represented only 3% of the export value of pine products. Pellets are therefore a low-value but high-impact commodity.

Pellet producers in Portugal have **received at least 100 million Euros in direct public finance since 2008**, with the majority going to pellet mills that sell pellets to power stations in northern Europe. This is on top of the renewable energy subsidies that producers receive indirectly from power companies.

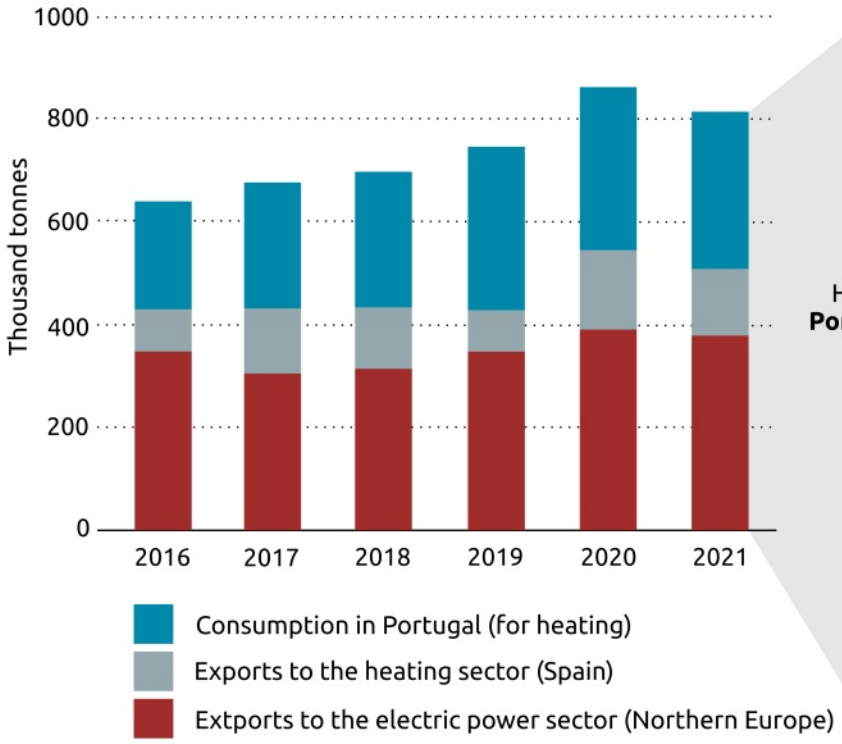
Although recent increases in the costs of feedstock have been hurting pellet producers economically, **Russia's invasion of Ukraine is likely to send international pellet prices soaring** as the EU tries to reduce its dependence on Russian gas and bans imports of Russian wood pellets.

[1] The term pine used throughout refers specifically to maritime pine (*pinheiro bravo*).

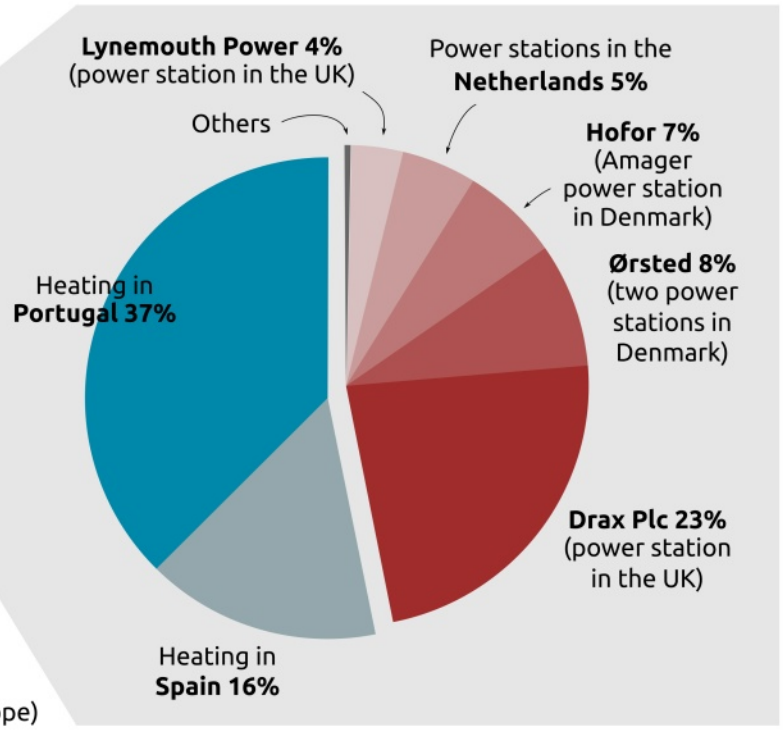
Wood pellet production in Portugal in 2021

In 2021 Portugal produced an estimated 815,000 tonnes of wood pellets, requiring over 1.5 million tonnes of biomass.[2] 510,000 tonnes were exported, and the four largest export markets were the UK (220,000 tonnes), Spain (127,000 tonnes), Denmark (121,000 tonnes) and the Netherlands (40,000 tonnes). Just over half of Portugal's pellet production was destined for industrial and residential heat production, which includes pellet sales in Portugal (38%) and exports to Spain (16%). The other half was burned in converted coal-fired power stations or other biomass plants that produce electricity in the UK, Denmark and the Netherlands.

Wood pellet production in Portugal



Main markets in 2021



Northern European power companies

The northern European power sector is a major market for Portuguese pellets, driven by strong subsidy support for biomass electricity. **Drax Plc**, operators of the world's largest biomass power station, burned almost a quarter of the pellets produced in Portugal. The other large UK-based buyer was **Lynemouth Power**, which operates another converted coal-fired power station.

Danish power companies **Ørsted** and **Hofor** accounted for a further 15% of production between them.[3] A lack of transparency in sourcing and a refusal to supply information by Dutch power companies makes it impossible to identify buyers there, although **RWE** and **Uniper** burn imported pellets to produce electricity, and are therefore the likely consumers.

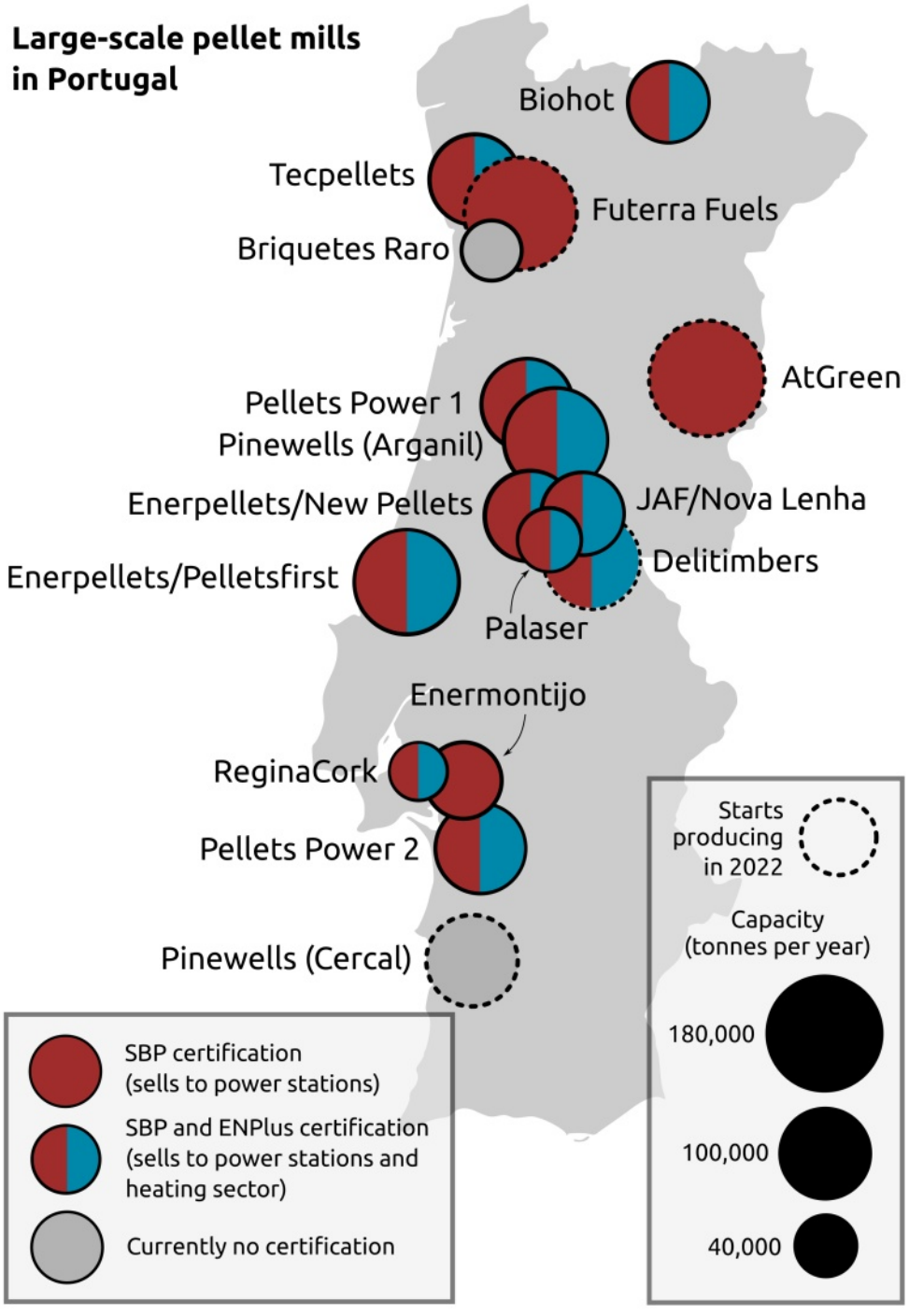
[2] These figures are estimates based on information provided by pellet producers, national import statistics and extrapolations based on production in previous years. Portugal's Ministry for Energy and Geology (DGEG) estimates a total production of 658,000 tonnes, whereas Centro PINUS estimates total production in 2021 to be 729,000 tonnes. However, these are likely to be underestimates, due to the different calculations used for arriving at these figures.
[3] Sourcing information confirmed by producers in March 2022.

Pellet mills in Portugal

There are currently 26 pellet mills in Portugal, including 16 large-scale mills (>40,000 tonnes per year) and another 10 smaller-scale producers (<40,000 tonnes per year). The total installed capacity is now over 1.7 million tonnes a year, which would require more than 3 million tonnes of wood. Pine is the main species used by pellet producers and the vast majority of the feedstock is in the form of whole trees, from final cuts or thinning operations. Secondary sources such as sawmill residues represent a much smaller share.

2022 is likely to see a significant increase in production as two new large-scale pellet mills come online (AtGreen and Delitimbers), another that came online in 2021 (Futerra Fuels) reaches full production, and a mill that closed down in early 2021 restarts operations under new ownership (Pinewells in Cercal do Alentejo). With a combined capacity of almost 600,000 tonnes a year, these pellet mills represent a 50% increase in total pellet production capacity.

Pellet certification is an indication of the intended use of the pellets, and there are two main types of certification. Sustainable Biomass Partnership (SBP) is a voluntary scheme required by power station operators that aims—but fails—to ensure sustainability of supply, and ENPlus is a voluntary but relatively strict standard certifying the quality of the pellets. SBP pellets are predominantly destined for electricity generation in power stations, whereas ENPlus pellets are generally higher quality and used in heating systems. The larger mills either only have SBP, as in the case of AtGreen, or have SBP and ENPlus, where they sell to both markets. Smaller mills exclusively have ENPlus certification, as they sell mostly to the domestic heating markets. The smaller mills also tend to be associated with sawmills and use higher quantities of genuine residues (secondary feedstock), whereas the larger mills are much more dependent on roundwood (primary feedstock).



AtGreen: Portugal's largest pellet mill comes online

The AtGreen pellet factory is currently under construction in Guarda, in central Portugal, and is expected to begin production later in 2022. It will be the largest in the country by capacity and capable of producing 180,000 tonnes annually, **which will require 300,000 tonnes of wood**. The company has received **over 7 million Euros in EU finance**, representing half of the total construction costs. The company estimates that 99% of its feedstock will be from primary sources, and therefore directly from forestry operations. In order to justify such high wood demand AtGreen claims that it is contributing to effective forest fire fighting, as well as reducing emissions in the power generation sector. According to media reports, all of its production for the next few years has **already been sold to power companies in northern Europe**.

Public finance for pellet mill construction

Pellet production has received around 100 million Euros in public finance since 2008, primarily through the European Regional Development Fund (ERDF) and the *Quadro de Referência Estratégico Nacional (QREN)*.[4] Three quarters of the support has financed pellet producers that supply power stations such as converted coal-fired power stations in northern Europe, and almost 12 million Euros was given to pellet companies that are no longer operational or never produced pellets. Also of concern is the fact that almost 4 million Euros has been awarded to Greenpellet Lda. to build a new pellet mill in Serpa. Although there are no publicly-available details on the capacity of this new plant or where it will source biomass from, the development of another new pellet mill is highly worrying.

[4] Information collected from pellet manufacturer websites and Portugal2020 and QREN project lists.

What are the impacts on Portuguese forests?

It is well documented that:

1) Portuguese pine forests are in sharp decline, and more pine is being removed from forests than can be sustainably harvested. This has led to a lack of raw materials for pine-related industries, large volumes of imports, and steep increases in the price of pine throughout 2021 and beyond; and
2) the pellet industry is the second largest consumer of pine after the sawmill industry, and mainly consumes roundwood directly from forests.

The decline in pine stands is closely associated with forest fires, that result in large volumes of raw material being made available suddenly and cheaply. This masks the over-consumption of wood and often drives down prices, which creates a false perception that there is an abundance of low-value raw material available for industrial use.

According to Centro PINUS, pellet production used 780,000 m^3 of pine roundwood in 2021, accounting for a fifth of all of the pine consumed. This figure is also equivalent to almost half of what the group states is the annual sustainable harvest rate for all industrial uses. In addition, around 20% of the biomass used is from other species such as eucalyptus, bringing the total volume of wood consumed by the pellet industry to 1.4 million m^3. Overall, Portuguese industry used 2.36 million m^3 more pine than the estimated productive capacity of pine stands, resulting in a structural deficit of 57% (the impacts of which are obscured by imports). Coupled with the aditional harvest rates justified by forest fires, this represents a dramatic annual decline in biomass resources in pine forests. As a consequence, a "striking rise in harvested forest area" has been recorded in Portugal in recent years, and government figures show a 27% decline in pine forests between 1995 and 2015, and a loss of over 15,000 ha of forests, agroforestry and scrub areas from 2015 to 2018.

Even the industry association that represents pellet companies (*Associação das Indústrias de Madeira e Mobiliário de Portugal (AIMMP)*) is alarmed by what is going on. It recently described how biomass stocks in forests are being depleted year-on-year, which is leading to the closure of businesses. Particularly affected is the sawmill industry, which has been reduced to 350-400 mills today from a high of over 1000.

As is the case in other regions of the world, pellet production in Portugal is an additional and growing pressure on forests, which could incentivise wood to be harvested sooner, whereby pine trees aren't left to grow for long enough such that they could have value to other industries like sawmills. The pellet industry also directly competes with other industries and incentivises burning over uses that keep the carbon in the wood, such as construction or furniture-making. This in turn is leading to a shortage of pine in Portugal, forcing other industries to import large quantities each year or to close down. Industries such as furniture-making are also better for the economy—despite the fact that pellet production used a fifth of the pine consumed in the country in 2021, the value of its exports represented just 3% of the overall value of Portugal's pine industry exports.

What are the climate impacts of burning pellets?

Pellet producers say that burning pellets is low-carbon and sustainable, and the emissions from the combustion of pellets are therefore ignored completely. The industry claims that new tree growth reabsorbs the carbon released when the pellets are burned, but for this to be true the amount of carbon in pine forests would need to remain consistent each year. As already discussed, this clearly isn't happening.

Although the pellet industry in Portugal claims that only forestry residues and industrial wastes are used as feedstock, the larger pellet mills are clearly dependent on large volumes of roundwood or sections of tree trunk. However, the immediate carbon emissions associated with burning wood are greater than for burning coal, and carbon payback periods vary greatly depending on what type of wood is being burned. Any primary feedstock (directly from forestry operations) has negative climate impacts, and the larger the diameter of the wood, the greater the impacts. A recent study in the US shows that even wood pellets made primarily from pine plantation thinnings have a negative impact on the climate for more than 40 years.

In the case of forestry residues, allowing them to safely decompose in the forest would be a much better option for the climate and for soil health. A recent study looking at biomass power stations that burn forestry residues in the US under comparable circumstances to Portugal concluded that, after 10 years, the net emissions impact (NEI) ranges from 41%–95%. This means that if the wood had been allowed to decompose naturally rather than burned, after 10 years there would be 41%–95% less carbon in the atmosphere.

What is the 2023 barometer likely to look like?

Over the past year Portugal has seen huge increases in the price of domestic pine, up to 50% by some estimates. At the same time, the value of pellet exports decreased by 17% in 2021, matching an overall decrease in production that industry sources attribute to the scarcity and increase in price of raw materials. The forecast was looking bleak for the industry, and it was predicted that large pellet mills in particular would begin to close down over the next couple of years.

However, the war in Ukraine could significantly change the pellet industry's outlook. A boycott of Russian gas and oil in Europe will lead governments to prioritise other forms of energy, meaning a boost for biomass, which already accounts for almost 50% of the EU's "renewable" energy mix. Extra support for the biomass industry is therefore likely to lead to increases in the price of pellets, which will make it more economically attractive for producers, even in the face of continued increases in the price of pine. On top of this, a ban on imports of Russian wood products including pellets is also likely to lead power companies to increase sourcing in Portugal, especially since Russia's two main export markets for their pellets in 2020 were the UK and Denmark.

These factors, coupled with the huge jump in pellet production capacity this year, should send alarm bells ringing across the country. 2022 could see a significant increase in demand for wood from the pellet industry, which would put even more pressure on Portugal's disappearing pine forests.

Action that must be taken now:

Increase transparency in pellet production and sourcing of wood: Accurate data on the total production of pellets and the quantity and type of raw materials used is currently not recorded anywhere. The Portuguese government must require pellet producers to report on these key figures, and this information should be made publicly available.

Introduce a moratorium on new pellet capacity: The pellet industry is competing for increasingly scarce biomass resources with other industries that produce higher value products that also keep carbon locked in the wood for far longer. Therefore, a moratorium needs to be urgently introduced in Portugal, both on the licencing of new pellet mills and the expansion of capacity at existing mills.

End public finance for pellet production: The benefits that the pellet industry brings in terms of the small number of jobs created do not compensate for the significant impacts that it is responsible for. The construction of new pellet mills and upgrades to existing ones should not be supported with public development finance.

Increase public investment in pine forest management for the sustainability of forest resources: The long growing cycles and high risk associated with pine means that it is unattractive to private landowners. The fact that pine stands are generally located in small fragmented properties also means that landowners do not have access to public incentives that could keep the trees in forests for longer, and ensure a more sustainable end-use.

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