

Dutch Wood Pellet Imports

Is Dutch Biomass Burning Contributing to Forest Loss in Baltic States?

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About this report

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Summary

Biomass demand has significantly increased in many countries in recent years, as EU member states are looking for ways to fulfil their commitments under the Renewable Energy Directive (REDII) and the EU climate targets. This development can also be observed for Dutch consumption of wood pellets. The biomass used in large-scale co-firing plants in the Netherlands predominantly consists of wood pellets, of which more than 95% have been imported in 2019 and 2020. Imports doubled in 2019 in comparison with the previous year, and increased co-firing and expansion projects led to another significant increase in net imports and burning in 2020.

Imports from North America showed the strongest growth in 2020, reaching 42% of imports. This was followed by the Baltic states with a combined share of 30%. Latvia remained the largest individual supplier with 23% of direct Dutch imports, while Estonia accounted for around 6%, not considering transshipments from neighbouring countries. Taking the anticipated maximum volume of woody biomass burning in the Netherlands of 3.4 million tonnes at full capacity of the four co-firing projects, this would require an additional 36% increase in imports from the 2020 level.

For pellets from woody biomass, imports to the Netherlands need to adhere to specific sustainability criteria. While in 2019 still 40% of wood pellets used in large power plants were made from woody biomass, 2020 figures show a significant increase in the role of residues and waste as pellet feedstock, reducing the role of woody biomass for which sustainability criteria apply to 8% of the total in that year.

In Estonia as one of the major wood pellet suppliers to the Dutch market, forestry products are destined to various industry sectors. Among these, biomass production has seen a growing role in recent years. Pellets for export accounted for an estimated 45% of the growth in wood volumes available from logging between 2010 and 2018. Export volumes of wood pellets to key trading partners United Kingdom, Denmark and the Netherlands increased continuously - all countries with large biomass energy sectors.

While still boasting large forested areas, harvested forest areas have also seen a rapid increase in the Baltic states since 2016. In both Estonia and Latvia, clear-cutting rather than selective logging is the dominant method of final felling. In Estonia, clear felling accounted for around 80% of total felling turnout in recent years. Meanwhile, loss in tree cover has shown an increasing trend since 2012, with annual loss observed in Estonia increasing from 17,000 hectares in 2010 to 46,000 hectares in 2019, and a slight decrease to 37,000 hectares in 2020. Where replanting takes place, this cannot replace biodiversity and carbon storage loss in the short term.

In recent years, Estonian inventories of areas qualifying for protection were found to be incomplete while at the same time logging restrictions in several protected areas were loosened. Consequently, logging approvals of regeneration cutting and deforestation for land uses other than silviculture were also extended for more than 5,500 hectares of protected forest habitats falling within the Natura 2000 network. While not all these areas have indeed been logged, the developments illustrate the high risk at which these valuable forest habitats are.

The increasing tree cover loss in the Baltic region in combination with growing volumes of wood pellet exports raise concerns whether Dutch imports contribute to forest and biodiversity loss in Estonia and neighbouring countries. The reporting for the Dutch sector suggests a decreasing likelihood for direct links with deforestation due to the high share of residues and waste as pellet feedstock in 2020. However, the rapidly increasing volume of subsidised pellets imported by the Netherlands and other European countries may nonetheless contribute to increasing pressure on remaining forests. The creation of a lucrative market for residual products may indirectly incentivise logging as higher revenues can be generated.

Introduction and methodology

The Netherlands has significantly increased capacity for co-firing with woody biomass in coal-fired power plants in recent years, driven by massive subsidy payments. Most of the wood pellets used in these facilities are imported. As these imports multiplied in 2019 and 2020 and are expected to further increase in the coming years, the discussion around the origin and sustainability impacts of these supplies continues. This debate is linked to concerns over air pollution, as well as the fact that wood is a less efficient fuel than gas and coal and consequently releases even more greenhouse gas into the atmosphere than fossil fuels. Furthermore, the potential link between wood pellet production and deforestation contributes to the controversy. Next to the risk of biodiversity loss, claims that wood pellets can immediately be considered CO₂-neutral where replanting takes place ignore the so-called 'carbon debt'. This refers to the fact that it takes decades for new trees to grow back and to compensate for the CO₂-emissions, while short-term emission cuts are required to limit global warming.¹

In the Netherlands, the debate has in recent years centred on the Baltic states, and there particularly Estonia and Latvia as key suppliers to the Dutch market. These countries have experienced increasing rates of forest loss, including in valuable Natura 2000 network areas. When this generic information became public in the Netherlands in the course of 2020, it led to critical questions in the societal and political debate about these origins and whether the € 3.6 billion in subsidies for the co-firing of these wood pellets indeed supports sustainable development, whether it contributes to stopping climate change or rather makes it worse.

The Dutch Economic and Social Council (SER) recommended a phase-out of subsidies for biomass use in energy production in a report from July 2020.² While the Dutch Cabinet agreed to such a phase-out in October 2020, no timebound plan has yet been published.³

The government's main reaction to questions on this topic is that the Dutch sustainability criteria for biomass guarantee sustainable sourcing. The responsible minister suggested in debates in the parliament that only residues are being used.⁴ Therefore, the government argues that the subsidies are not responsible for any additional logging or forest degradation in the countries of origin. For 2020 this argument has been strengthened, as the latest monitoring report of the Dutch Energy Accord shows a substantial decrease in the use of woody biomass as pellet feedstock from 40% in 2019 to 8% in 2020.⁵

The aim of this research is to analyse whether the rapidly growing biomass demand on the Dutch market is one of the drivers of increased logging, negative impacts on natural forests and consequently a declining carbon stock in the Baltic countries, with a focus on Estonia.

The analysis of production, international markets, trade flows of wood pellets, and consumption in the Netherlands relies on statistical databases provided by the European Commission (Eurostat) and the Estonian government (Statistics Estonia) as well as the reporting on the Dutch Energy Accord by CE Delft. Data on individual wood pellet markets is also sourced from relevant market research reports. In relation to the regulatory landscape in Estonia as well as forest-related developments, the research uses information published by the Estonian Environmental Agency and the Forest Information System of the European Union. Data on tree cover loss in the Baltic states is sourced from the Global Forest Watch database.

Importantly, the research draws on two studies conducted by the Estonian Fund for Nature (ELF) in collaboration with the Latvian Ornithological Society (December 2020) and Estwatch (March 2021). The studies document the link between weakened regulatory frameworks and increasing clear-cutting of forests in Estonia and Latvia, including logging in Natura 2000 network forests. At the same time, they highlight the role of the growing demand for wood pellets as a possible driving force for clearing forested areas.⁶

This report first looks at the developments in wood pellet demand in the Netherlands, the origins of imports and the feedstocks used in their production in recent years (**Error! Reference source not found.**). Chapter 2 looks at Baltic wood pellet production as a key origin of Dutch imports, with a focus on Estonia. It describes production and trade developments as well as the driving forces behind the increasing forest loss observed in the countries. Finally, Chapter 3 discusses the question whether Dutch pellet demand may contribute to forest loss in the Baltic countries.

1

Wood pellet consumption in the Netherlands

The Netherlands has seen a rapid increase in consumption of woody biomass for energy production in coal-fired power plants in recent years. The following sections look at the historic development in Dutch wood pellet imports and their drivers, the key origins, and projections for future developments.

1.1 Subsidies drive up Dutch demand for wood pellets

Similar as in other EU countries, the Dutch move to biomass burning has been heavily subsidised.⁷ The Netherlands has a history as an important buyer of industrial wood pellets. Already in 2010, it was the biggest market for use in co-firing to meet renewable energy goals. However, the market rapidly declined since 2012 due to the temporary cessation of government support for the use of woody biomass.⁸ The Dutch Energy Accord, which was concluded in 2013, included financial support for the generation of renewable energy and compliance with EU climate goals. Since the agreement, the Dutch government has allocated up to € 3.63 billion in stimulation under Sustainable Energy Production (SDE+) funds for the co-firing of wood pellets with coal, with SDE+ allocations to energy companies eligible for a period of eight years (Figure 1).^{a,9} No new subsidy programmes in the category of co-firing with wood pellets in coal-fired power plants have been opened since 2018.¹⁰

Four large coal-fired power plants fall under the SDE+ subsidy programme. Uniper Maasvlakte can use them for up to 15% of capacity, for the ENGIE facility this limit is 10%, for the Amer power plant 80%, and for RWE Eemshaven 15%.¹¹ Consequently, Dutch consumption of wood pellets increased significantly since 2018.

Figure 1 Overview of SDE+ subsidies for realised largescale biomass co-firing projects

Company	Location	SDE round	Available annual production (GWh)	Running time	Max. subsidy (€ million)
Power Plant Rotterdam (ENGIE)	Maasvlakte, Rotterdam	SDE+ 2016 I	514.7	8	€ 296.4
		SDE+ 2017 I	43.4	8	€ 27.8
RWE Generation NL	Amercentrale, Geertruidenberg	SDE+ 2016 I	1,501.8	8	€ 720.9
RWE Eemshaven Holding II	Eemshaven, Groningen	SDE+ 2016 II	1,788.9	8	€ 930.2
Uniper Benelux	Maasvlakte, Rotterdam	SDE+ 2016 II	1,193.3	8	€ 630.1
Total			5,042.1		€ 2,605.4

Source: RVO (2021, April 2), *Projecten in Beheer SDE(+)*, peildatum 2 april 2021 (Excel).

^a The actual subsidies paid out may be lower than this maximum amount.

1.2 Rapid growth in imports of wood pellets

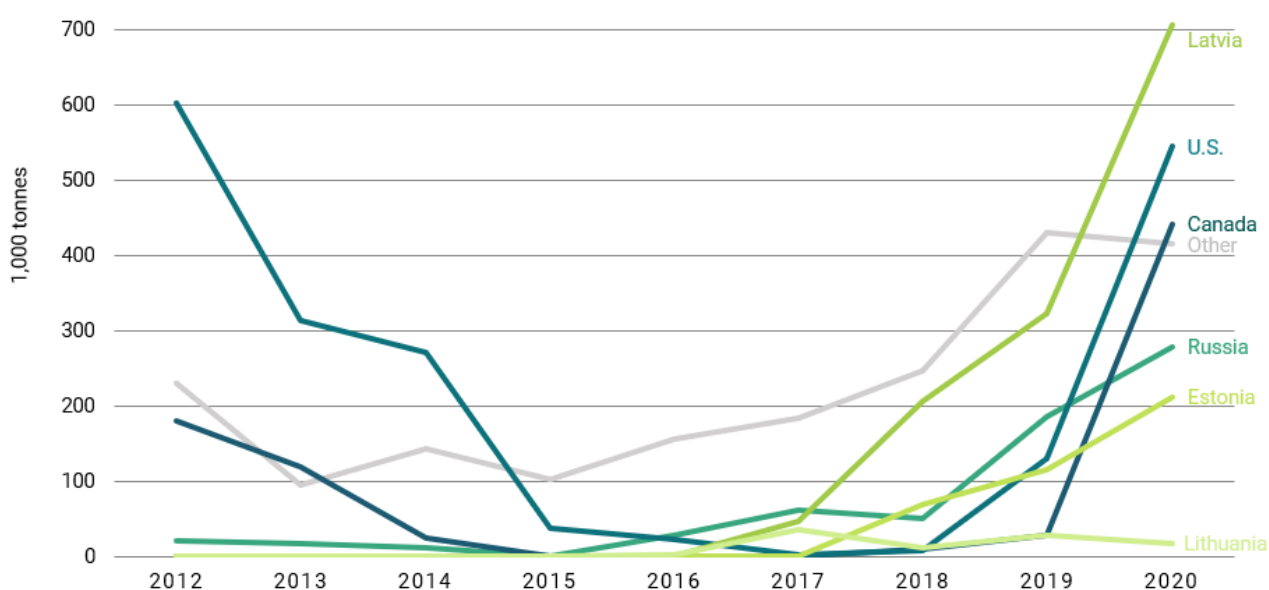
Biomass for burning in Dutch co-firing plants is only for a small share sourced domestically. In 2019, this share stood at just 4%, while the vast majority was imported.¹² Between 2017 and 2018, the Netherlands showed the second largest growth in wood pellet consumption globally based on absolute volume increase, and with 97% the highest relative increase.¹³ In 2019, imports doubled in comparison with the previous year to 1.2 million tonnes. Increased co-firing and expansion projects led to another doubling of Dutch net imports of wood pellets to around 2.5 million tonnes in 2020 (Figure 2 and Figure 3).¹⁴ Precise figures on the origin of imported pellets is not published by the industry.¹⁵ The reporting on the Energy Accord also only provides regional breakdowns. Therefore, import statistics must be used as a proxy.

Ten years ago, imports mostly originated from North America. Between 2016 and 2019, direct imports to the Netherlands were dominated by the Baltic states and Russia. This situation changed again in 2020, with imports from the U.S. and Canada showing the strongest year-on-year increase. North American origins jointly accounted for around 42% of Dutch imports, driven among other by RWE's imports from Enviva (U.S.), the world's largest wood pellet producer.¹⁶

Latvia remained the largest individual supplier though, accounting for at least 23% of Dutch supplies. Also flows from Estonia further increased in 2020, making up 6% of the total imports. Moreover, certain volumes of wood pellets from Estonia may also be included in Latvian exports (see section 2.1)¹⁷ Not considered are re-exports of wood pellets originally sourced from the Baltic states and other origins that enter the Netherlands via neighbouring EU countries, such as Belgium or the UK. Actual imports from Baltic states, considering direct as well as indirect flows, are likely higher.¹⁸ In turn, it is believed that most of the flows from Estonia, Latvia and Lithuania are direct imports, with only small volumes originating from Russia or other Eastern European origins.¹⁹ However, this does not exclude the use of raw materials from other origins in the production of wood pellets in Baltic states (see section 2.1).

At full capacity, the demand of the four biomass co-firing projects could reach much higher volumes still, up to a total of around 3.4 million tonnes per year.²⁰ This could imply a further increase in woody biomass imports by around 36% from the 2020 level (Figure 3).

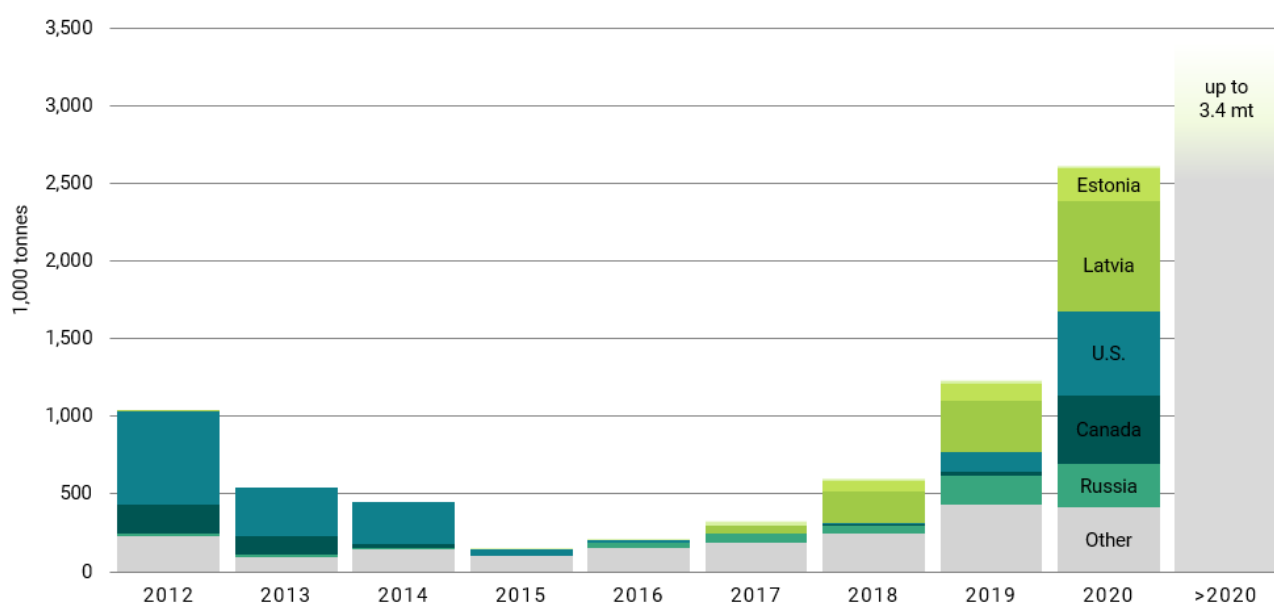
Figure 2 Dutch imports of wood pellets by country, 2012 to 2020 (1,000 tonnes)



Note: Eurostat provides statistics for wood pellets from 2012.

Source: Eurostat (2021), "EU trade since 1988 by HS2,4,6 and CN8 (DS-645593)", viewed in April 2021.

Figure 3 Total Dutch imports of wood pellets, 2012 to 2020 (1,000 tonnes)



Source: Eurostat (2021), "EU trade since 1988 by HS2,4,6 and CN8 (DS-645593)", viewed in April 2021.

This does not yet consider that the Netherlands Enterprise Agency (RVO) by 2020 had granted funds for more than 50 industrial power generation projects and more than 150 solid biomass projects for heat production.²¹ These plants will likely attract more imports of woody biomass in the coming years, as availability from local sources is limited. In February 2021, the Parliament voted in favour of a motion to stop subsidies for new projects relying on woody biomass.²²

1.3 Biomass categories used by Dutch energy companies

The annual analysis for the co-firing of woody biomass in coal-fired power plants by CE Delft reported that more than 826,000 tonnes of biomass were used for auxiliary and co-firing in the Netherlands in 2019, of which 98.6% were wood pellets. According to the reporting, 60% consisted of residuals and waste flows (Category 5 under the Dutch Energy Accord), 38% from woody biomass from forest units smaller than 500 hectares (Category 2), and 2% from forest units larger than 500 hectares (Category 1). Categories 1 and 2 fall under the specific Dutch sustainability criteria for biomass products. The remaining 60% were categorised as rest and waste streams.²³ This category includes sawdust, pruning waste and scrap wood, for which no transparency requirements regarding origin and precise content apply.²⁴ In a letter to the Dutch Parliament from April 1, 2021, Dutch Minister van 't Wout stated that the "[...] [r]egulation on conformity assessment of solid biomass for energy applications [...] ensures that biomass directly from forest is classified as category 1 or 2, and that residual flows from the sawmill are classified as category 5."²⁵

The new report by CE Delft for 2020 suggests that the total volume of biomass in co-firing for energy production used in the Netherlands reached almost 2.3 million tonnes, of which 94% were pellets. This volume equalled a year-on-year increase by 166%, in line with the strong increase observed in imports (Figure 3). Most of this increase stemmed from a much larger feedstock volume of secondary residues or waste flows from the wood processing industry or tertiary residual waste flows (Category 5), accounting for 92% of the total. Presumably, the majority, if not all of it, are residual flows from the wood processing industry. The role of biomass from Categories 1 and 2 decreased significantly in both volume and share, accounting for a total of 8.2% (180,000 tonnes), in comparison to 40% (327,000 tonnes) in 2019.²⁶

2

Wood pellet output by Baltic states

The Baltic region has one of the world's largest outputs of wood pellets, with Latvia and Estonia as key producers. The two countries also have increasing importance in supplying the Netherlands. Focussing on the developments in Estonia, the following sections first map the developments in wood pellet production and exports in recent years. This is followed by an overview of the status of natural forests and the role of weakened legislation as an enabler of clear-cutting.

2.1 Wood pellet production

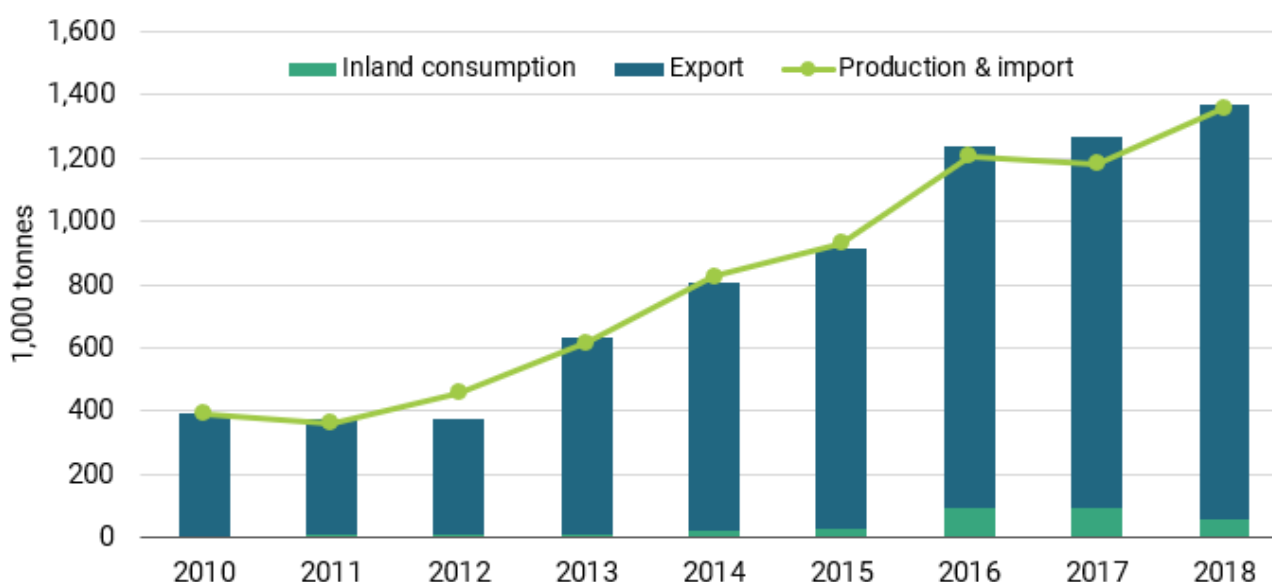
The Baltic states are important producers and exporters of forestry products, with roundwood, especially pulpwood, and woody biomass as key products.²⁷ The latter include wood pellets, for which global demand has grown considerably in recent years, including on the EU market.

Global statistics for wood pellet production show a fragmented market. The United States are the largest player with a global production share of 22% in 2019. This is followed by many countries with shares below 10%. The combined share of the three Baltic states, Estonia, Latvia, and Lithuania stayed stable at around 10% of global output since 2012, but volumes increased significantly in line with overall global production increases.²⁸ Latvia remained the largest producer in the region, with an output of around 1.6 million tonnes in 2018 and 2019.

The developments in Estonian wood pellet production and export since 2010 are illustrated in Figure 4. Official Estonian statistics currently provide data until 2018. Production and exports developed almost in parallel during those years, at compound annual growth rates (CAGR) of 15% and 14%, respectively.

During the same time, inland consumption of wood pellets remained small, with a maximum of 8% of production going into domestic use reached in 2016 and 2017.²⁹ However, in line with government plans to further increase production, it is expected that wood pellet consumption for energy purposes in the Baltic region will also further grow, driven by increasing income levels, high gas prices, and advertising campaigns.³⁰

Figure 4 Estonian wood pellet production, export, and consumption, 2010 to 2018



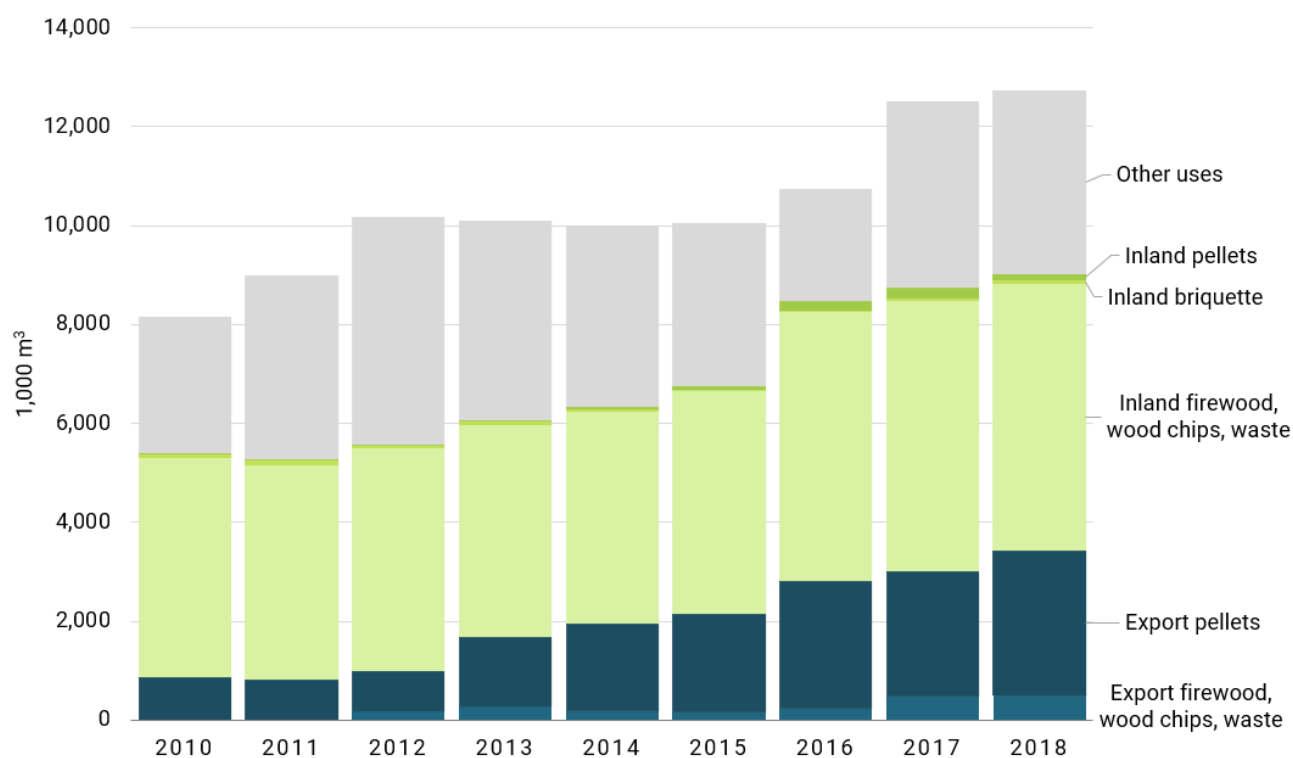
Note: Changes in stock can lead to export plus consumption being higher than production in some years.
 Source: Statistics Estonia (2021), "Energy balance sheet by year, indicator and type of fuel/energy", viewed in April 2021.

While other industry sectors are also important destinations of forestry products, Estonian statistics illustrate the growing role of the biomass sector since 2010. The amount of wood used to produce woody biomass for the inland market as well as exports increased from an average of 60% of the total domestic logging volume between 2010 and 2014 to more than 70% on average in the period 2015 to 2018.^b

Within the woody biomass production, the growing inland consumption of firewood, wood chips and waste, and the increasing wood pellet production for export are driving the volume increase. Between 2010 and 2014, the wood used to produce pellets for export accounted on average for about 12% of the total available wood. This share increased to an average of 22% over the period 2015 to 2018 (Figure 5).³¹ Expressed in volume, pellets for export grew from an equivalent of around 875,000 m³ in 2010 to almost 3 million m³ in 2018. This means pellet production for export accounted for around 45% of the growth in wood use during that period. Looking at growth rates, total felling turnout showed a CAGR of 5% between 2010 and 2018, while the CAGR for total woody biomass was 6%. The CAGR for pellet production for export was higher, with 14% during the same period, reflecting the growing share in total wood output.

^b The largest share in annual bioenergy demand in Estonia is accounted for by wood (including firewood, wood chips and waste), with a total share of 65%.

Figure 5 Uses of total wood volume available in Estonia, 2010 to 2018 (1,000 m³)



Source: Statistics Estonia (2021), "Gross felling based on national forest inventory (NFI) by year, felling type and indicator", viewed in April 2021; Statistics Estonia (2021), "Energy balance sheet by year, indicator and type of fuel/energy", viewed in April 2021; conversions from weight to volume of wood pellets and briquettes based on FAO (2020), *Forest Product Conversion Factors*, Rome, Italy: FAO, ITTO and UN, p. 49.

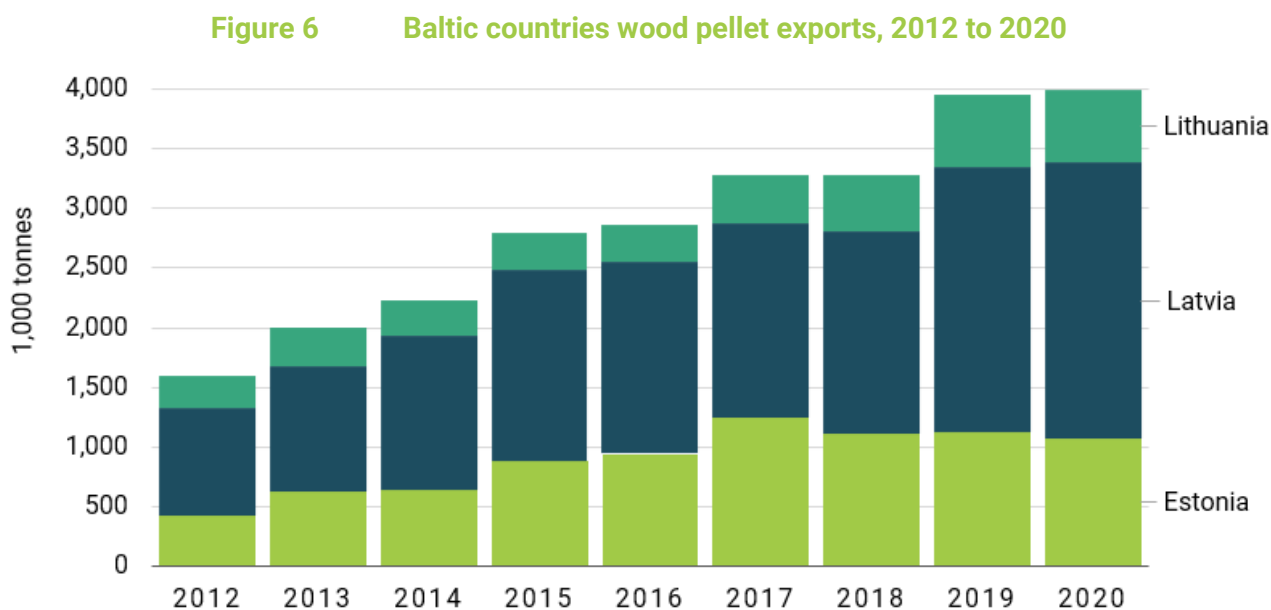
As stated by the Estonian Forest and Wood Industries Association, "[a]ll woody biomass material for bioenergy comes from residual streams, meaning that only low-quality and leftover wood that is not usable for other industries can be used for pellet production."³² As an example, Graanul Invest, by far the largest wood pellet producer in the region (see also Box 1 below), in 2019 sourced 46% of its raw material from timber industry waste and 54% from roundwood of the firewood quality class. The raw material originated mostly from Latvia (43.4%) and Estonia (41.8%), while smaller shares were sourced from Belarus (10.1%, of which 3.85% firewood), Lithuania (4.4%) and Poland (0.3%).³³ An analysis of Graanul Invest's catchment area in 2018 found that the feedstock in that year consisted for 69% of roundwood thinnings from Estonia and 31% sawdust, shavings, and chips, mostly from sawmills in Estonia and Latvia.³⁴

Estonian imports of firewood, wood chips and waste totalled 36,000 m³ in 2018, accounting for a very small share of the overall production volume of woody biomass going into domestic consumption and export.³⁵ A key origin of the Estonian imports is Latvia, which in turn imports much larger volumes of these products, especially wood chips and sawdust from Belarus and logs from Lithuania.³⁶ From the available information, it is not possible to trace these products to their final use and geographic destination.

The upwards trend in wood pellet production is projected to continue in the Baltic states. In the case of Estonia, the government expects the country's use of forest biomass for energy purposes to increase to almost double the 8.6 million m³ that a 2019 impact assessment by the Stockholm Environment Institute (SEI) evaluated as a safe level. Reportedly, the Estonian government dismissed the assessment as focussing too heavily on climate and biodiversity concerns.³⁷

2.2 Wood pellet trade

In line with the growth in production, the exports of wood pellets from the Baltic states, predominantly to other European destinations, continuously increased between 2012 and 2020 (Figure 6).³⁸



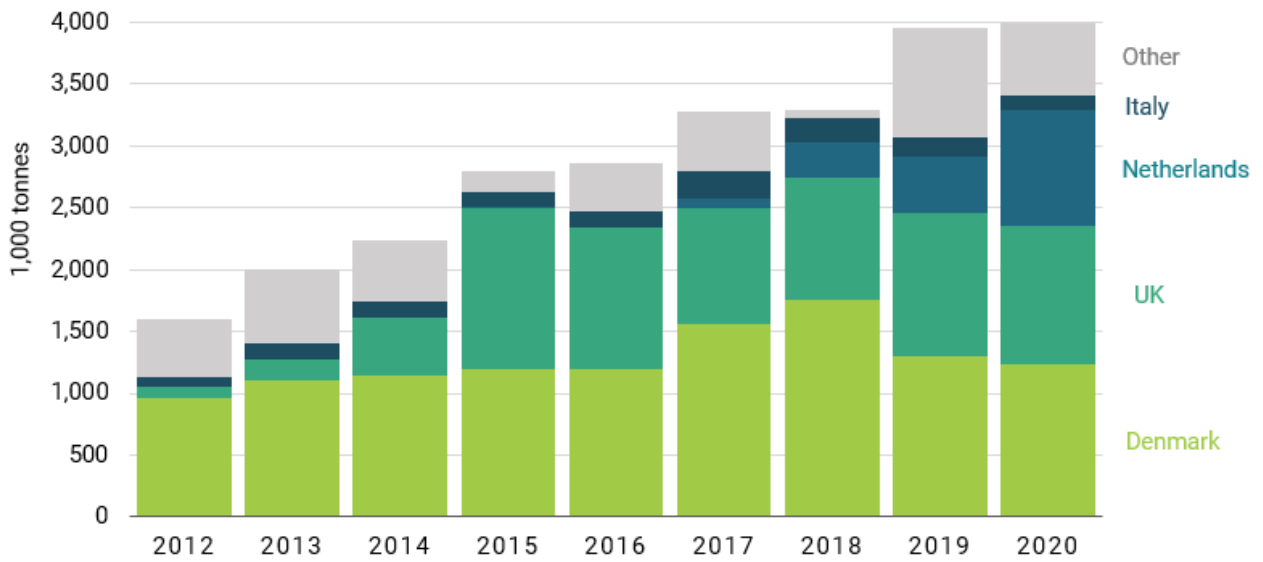
Note: Export statistics by Eurostat show slightly lower exports from Estonia in 2018 and 2019 than those by Statistics Estonia. It is not clear what the reason for this difference is. For the sake of comparability, this figure uses Eurostat data for all countries.
Source: Eurostat (2021), "EU trade since 1988 by HS2,4,6 and CN8 (DS-645593)", viewed in March 2021.

Most wood pellet exports from the Baltic countries are direct exports from local processing and production. Wood pellet imports from Russia or other Eastern European origins are comparatively small.³⁹ In 2019, Estonia imported around 10,000 tonnes of pellets, or the equivalent of 1% of its export volume; Russia (65%) and Latvia (23%) were the main origins. Latvia imported around 295,000 tonnes or 13% of its export volume, with key origins Belarus (61%) and Russia (23%).⁴⁰

Key trade flows can firstly be observed between the Baltic countries, owing to the use of different transport routes for exports from the region. For example, Latvia imported around 27,000 tonnes of wood pellets from Lithuania and 18,000 tonnes from Estonia in 2019. Meanwhile, Estonia received around 2,400 tonnes of pellets from Latvia and 800 tonnes from Lithuania in 2019. These regional flows hamper a precise mapping of the origin of exports from the region to the European market.

As shown in Figure 7 for the period from 2012 to 2020, the wood pellet exports from the Baltic states are predominantly destined to Denmark (31% in 2020), the UK (28% in 2020), and the Netherlands (23% in 2020), all countries with large biomass energy sectors. In parallel with growing exports from the Baltic states, the share of Denmark decreased from 60% in 2012, despite remaining the biggest market and imports fluctuating around a level of 1.4 million tonnes. Imports by the UK showed a strong increase until 2015 and then fluctuated around 1 million tonnes. The strongest increase in recent years can be observed for the Netherlands, from less than 1,000 tonnes in 2015 to almost 1 million tonnes in 2020.

Figure 7 Wood pellet export destinations from Baltic states, 2012 to 2020 (1,000 tonnes)



Source: Eurostat (2021), "EU trade since 1988 by HS2,4,6 and CN8 (DS-645593)", viewed in March 2021.

2.3 Increasing forest harvesting in Baltic states



Forest area 2018

Harvested forest area 2016-18 vs. 2004-15

Estonia	58.4%	85% ↑
Latvia	54.8%	32% ↑
Lithuania	35.6%	47% ↑

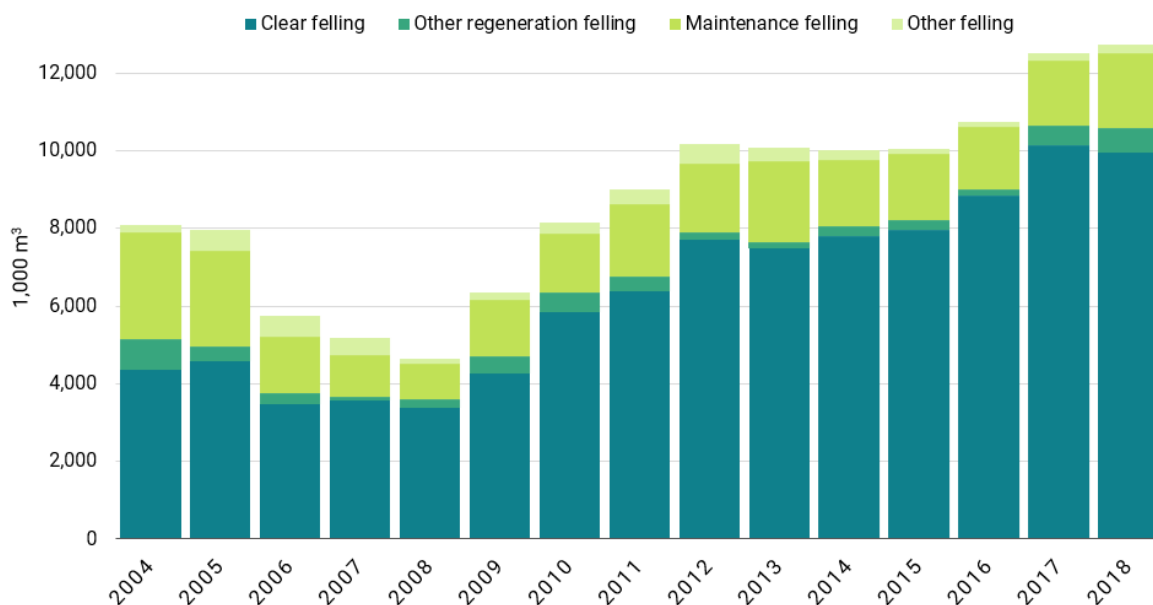
Source: Forest Information System for Europe (n.d.), "Forest basic data", viewed in March 2021; Ceccherini, G., Duveiller, G. et al. (2020, July 1), "Abrupt increase in harvested forest area over Europe after 2015", *Nature*, 583: 72-77; icon by Baristalcon, Noun Project.

The Baltic countries still boast large forest areas, with shares between 58% in Estonia and 36% in Lithuania.⁴¹ Most of the forests are classified as 'modified natural' or 'semi-natural forests', dominated by native tree species like birch, pine and spruce that have regrown after previous logging and show at least some characteristics of undisturbed natural forests. Old-growth forests have become rare.⁴²

However, the harvested forest areas have seen considerable expansion: when comparing the periods 2016 to 2018 with 2004 to 2015, the areas increased by 32% in Latvia and 85% in Estonia.⁴³ Meanwhile, the share of strictly protected forests is small, at 14.1% in Estonia and 7% in Latvia. Partial felling restrictions apply to 11.3% of forests in Estonia and 6.6% in Latvia.⁴⁴

In both countries, clear-cutting is the dominant method of final felling, rather than selective logging oriented to harvesting mature trees.⁴⁵ In Estonia, the volume share of clear felling in total felling turnout has risen steadily from an average of 67% between 2004 and 2013, to an average of 80% between 2014 and 2018 (Figure 8).⁴⁶ After the dip in 2008, when the global economic crisis meant that demand for pulpwood halted and harvests nearly stopped, felling in Estonia has seen a continuous increase until 2018.⁴⁷

Figure 8 Dominant felling types in Estonia, 2004 to 2018



Source: Statistics Estonia (2021), "Gross felling based on national forest inventory", viewed in April 2021.

Box 1 Graanul Invest linked to logging in Natura 2000 forests

The leading producer and exporter of wood pellets from the region, Graanul Invest (Estonia), is Europe's biggest producer and the second largest worldwide.⁴⁸ The company churns out 2.7 million tonnes annually in 12 facilities, four of which are in Estonia, six in Latvia, one in Lithuania and one in the United States. According to their own numbers, in 2019, the raw material for Graanul Invest's pellets production originated for 43.4% from Latvia, 41.8% from Estonia and the remainder from Belarus, Lithuania, and Poland.⁴⁹

Next to the pellet production, the company operates three forestry companies in Estonia: Karo Mets, Roger Puit and Valga Puu. In total, these companies manage more than 53,000 hectares of Estonian forest, or the equivalent of around 4% of the country's private forests. Graanul Invest is also expanding its forestry portfolio into Latvia, currently covering around 1,200 hectares. The annual cut in 2019 totalled 656,000 m³, of which 58% in own forests. The company planted 1.5 million trees for reforestation.⁵⁰

Graanul Invest claims that "[a]s a forest owner and active forest manager, Graanul Invest considers purposeful protection of nature of paramount importance, and we fulfil all the obligations applying to us. As an active stakeholder, we participate in research and working groups so that future protection measures and their possible expansion would be meaningful and take into account the combined effects of the natural environment and the bioeconomy."⁵¹

Meanwhile, Graanul sees clear-cutting not as problematic. The director of Graanul's subsidiary Valga Puu, Andres Olesk, has been quoted as saying that "clear-cutting in areas smaller than one hectare is the most sensible way to manage a forest."⁵²

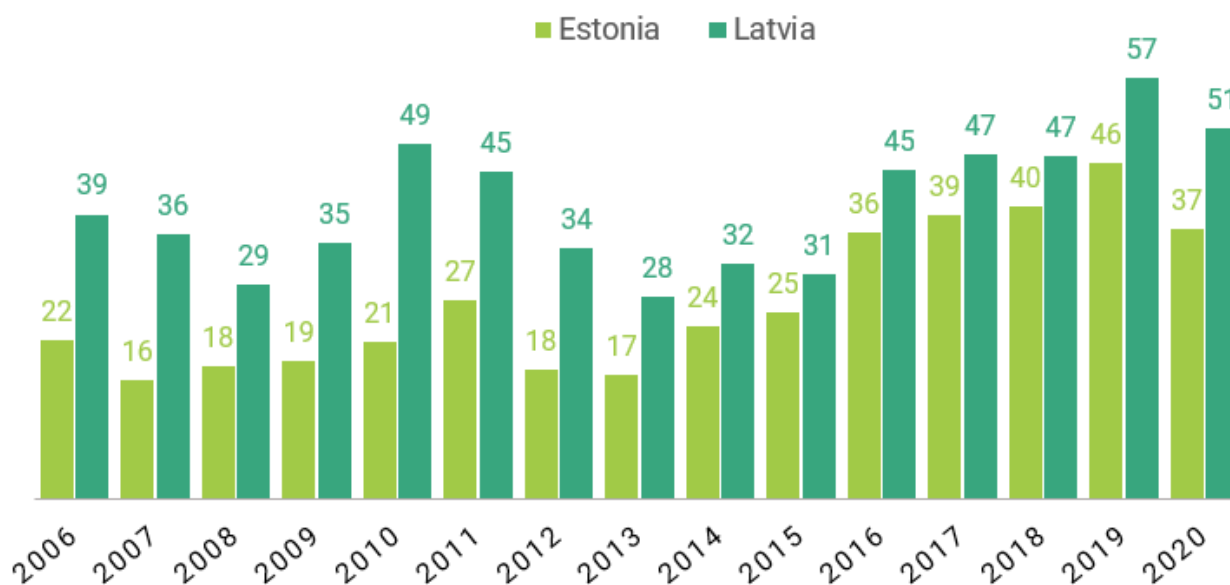
Estonian NGOs report that Graanul's subsidiary Valga Puu has been lobbying for the weakening of regulations that relate to the sustainable management of Natura 2000 network forests. Valga Puu owns a significant share of Natura 2000 forests in the southern part of Estonia. As logging restrictions under domestic law have been continuously weakened in recent years, mixed forests with more than 100-year-old trees were clear-cut by the company, including in the Haanja and Otepää Nature Parks.⁵³

The ongoing tree cover loss in Estonia and Latvia in the 15-year period from 2006 until 2020 is illustrated in Figure 9. Global Forest Watch (GFW) reports for 2019 alone a tree cover loss on respectively 46,000 hectares and 57,000 hectares in the two countries.⁵⁴ While new trees are planted, this will not make up for the related CO₂-emissions and loss of biodiversity in the short term. It is not clear whether the drop to respectively 37,000 hectares and 51,000 hectares in 2020 indicates a changing trend, or whether it is linked to the COVID-19 pandemic.

Based on projections by the European Commission, increasing deforestation rates mean that forests in Estonia and Latvia will become net sources of CO₂-emissions rather than carbon sinks after 2030.⁵⁵

The increasing demand for wood has also affected the last remaining old growth forests in the Baltic countries. A combination of incomplete mapping and lacking protection means that these important habitats are also exposed to logging activities, even more so because older trees may be classified as 'ready to harvest'. Consequently, only small patches of such forests are scattered across Estonia, covering a total of 46,700 hectares or 2% of the total forest area.⁵⁶

Figure 9 Tree cover loss in natural forests in Estonia and Latvia, 2006 to 2020 (1,000 hectares)



Note: Tree cover loss >30% tree canopy. Estimates do not consider tree cover gain through replanting.
Source: Global Forest Watch (2021), "Dashboards", viewed in March 2021.

2.4 Weakened legislation enables clear-cutting

As illustrated in Figure 9 above, tree cover loss in natural forests has been continuously increasing in Estonia and Latvia since 2013. Forests falling under the Natura 2000 network are not safe from logging either.⁵⁷ In Estonia, the Natura 2000 network covers around 380,000 hectares or 16.2% of total forests. Nonetheless, data from the Estonian Environmental Board shows that between 2009 and 2018, logging licenses were issued for 82,411 hectares within the Estonian Natura 2000 network without an appropriate impact assessment. This surface equals 22% of the total network area of the country. Under the EU Bird and Habitat Directives, any logging in Natura 2000 sites require an assessment of the impacts on the habitats' integrity.⁵⁸

Box 2 Natura 2000 forests

Natura 2000-protected zones in Estonia are managed under the Nature Conservation Act, which implements the legally binding provisions of the 1979 EU Birds Directive and the 1992 Habitats Directive.⁵⁹ The zones form a network of sites that is meant to ensure the long-term survival of the most valuable and threatened species and habitats in the EU.⁶⁰ The Natura 2000 designation does not exclude all human activities, and most of the land remains in private ownership.⁶¹

Under the EU's Bird and Habitat Directives, appropriate impact assessment is required before any logging can take place within Natura 2000 network sites.

In 2015, the Park Protection Rules were revised to allow clear-cutting in protected areas. Since then, tree cover loss in Estonia's Natura 2000 areas proceeds at an increasing pace. Among others, more than 100 hectares of forest have been logged in Haanja Nature Park on land owned by Graanul Invest since 2016, compared to less than 20 hectares in the previous five years. Felled

areas are replanted with small spruces, which count towards forest area. However, these young trees will need decades before absorbing the same amount of carbon as the mature trees that were felled. The Estonian Forest Resources Assessment shows that such “temporarily unstocked or recently regenerated” forests have increased more than 20% since 2010.⁶²

A recent analysis by the Estonian Fund for Nature and Estwatch based on government data illustrates the effect of a lack of strict legal protection on valuable forest habitats. It found that between 2008 and 2018, regeneration-cutting and deforestation notices were issued for a total area of 5,575 hectares of inventoried protected habitats, of which more than 80% were issued between 2015 and 2018. More than 1,600 hectares of protected forest habitats were indeed logged during the ten years, more than half of which took place between 2015 and 2018. The highest logging pressure was found for the forest habitat Western Taiga, which is categorised as a priority habitat requiring special protection in the EU.

One enabling factor for the issuance of logging approvals is the fact that around 49% or 182,000 hectares of the forested area in Natura 2000 sites in Estonia has not been inventoried yet. It also means that the forest loss figures in high-value habitats are likely underestimated.⁶³

Moreover, between 2011 to 2020, the logging restrictions in protected areas with forest habitats were significantly more loosened rather than tightened. This development included for example the permission of clear-cutting on areas between 0.5 and 1 hectare since 2015 in several Special Areas of Conservation (SACs) falling under the Habitat Directive.⁶⁴

Figure 10 illustrates logging on Graanul Invest land in Haanja Nature Park between 2015 and 2017.

Figure 10 Tree cover change on Graanul Invest land, Haanja Nature Park, 2015 to 2017



Source: VPRO (2020), “Money to burn”, viewed in March 2021.

3

Impacts of Dutch wood pellet imports

The question whether Dutch imports of wood pellets from Baltic states is driving deforestation in these countries remains difficult to answer. However, the data presented in the previous chapters raises concerns in relation to this role.

The then Dutch Minister for Economic Affairs and Climate Policy, Eric Wiebes, stated in 2019 that the sustainability requirements in the SDE+ would ensure that forests supplying biomass must be managed sustainably. Furthermore, sustainability criteria require the planting of new trees to account for the CO₂ that is released from burning biomass. According to the Dutch government, this approach will ensure to keep the CO₂ storage stable or to increase it in the medium term.⁶⁵ Furthermore, Wiebes in September 2020 pointed to the primary responsibility for forest policy of the Member States themselves, meaning that it is primarily up to the Estonian government to regulate forest management in the country.⁶⁶

The documentation from the Baltic region and the increasing forest loss rates raise concerns regarding the extent to which the growing demand for wood pellets is increasing the pressure on forests. In 2019, Graanul Invest alone exported wood pellets worth more than one € 100 million to the Netherlands, carrying the necessary sustainability certificates. The company stated that it does not separate the supply for the Dutch market from the rest, as explained by the head of certification and quality of the company. Reportedly, Graanul decided to *“have all biomass meet the highest criteria”*, so that the pellets can be *“freely mixed”*. According to information by Estonian officials as well as Graanul Invest, complete trees from smaller forested areas fall under the same product heading and can therefore be legally exported for use in biomass plants, despite sustainability requirements set for the product.⁶⁷ A representative of the Netherlands Enterprise Agency (RVO), which pays out the biomass subsidies on behalf of the Dutch government, was also quoted as stating that clear-cutting is a 'harvesting method' that does not conflict with the sustainability certificates of the Dutch government.⁶⁸

According to analysis of the 2020 use of biomass in Dutch energy facilities, the share of residues and waste streams accounted with 92% for a significantly higher share than in the previous year. This means in turn that 8% had to adhere to the Dutch sustainability requirements. The high share of waste streams suggests that a direct link with woody biomass from clear-cutting has become less likely. In addition, prices for wood use in other applications are higher than for woody biomass. Nonetheless, the large volume of wood pellets produced and exported in Estonia in combination with a lack of transparency on pellet supply chains leaves questions about the underlying definitions and feedstocks open. High demand may increase the removal and use of small trees or rotten wood that is not suitable for more profitable applications like building material but still fulfil an important ecological role. Moreover, even if the Dutch market can indeed rely on waste streams, the rapidly increasing volume of subsidised pellets imported by the Netherlands and other European countries may nevertheless contribute to increasing pressure on remaining forests. The creation of a lucrative market for residual products may indirectly incentivise logging as higher revenues can be generated.

References

- 1 Norton, M., Baldi, A., Buda, V. et al. (2019, August 19), "Serious mismatches continue between science and policy in forest bioenergy", *Bioenergy*, 11: 1256-1263;
European Academies Science Advisory Council (EASAC) (2019, December 12), "Leading scientists warn: Wood pellets threat to climate – "No silver Pellet", online: <https://easac.eu/media-room/press-releases/details/leading-scientists-warn-wood-pellets-threat-to-climate-no-silver-pellet/>, viewed in April 2021;
Norton, M.
Serman, J.D., Siegel, L. And J.N. Rooney-Varga (2018, January 18), "Does replacing coal with wood lower CO2 emissions? Dynamic lifecycle analysis of wood bioenergy", *Environmental Research Letters*, 13: 015007.
- 2 Sociaal-Economische Raad (2020, July), *Biomassa in Balans: Een Duurzaamheidskader Voor Hoogwaardige Inzet van Biogronstoffen*, Report to the Secretary General of Infrastructure and Water, and the Ministry of Economic Affairs and Climate.
- 3 Minister of Infrastructure and Water, Van Nieuwenhuizen-Wijbenga (2021, January 19), "Uitstel beantwoording vragen van het lid Van Raan over het uitfaseren van subsidies voor houtige biomassa", online: <https://www.tweedekamer.nl/kamerstukken/kamervragen/detail?id=2021D02315>, viewed in March 2021.
- 4 For example:
Tweede Kamer (2017, September 7), "Aandeel hernieuwbare energie", online: <https://debatgemist.tweedekamer.nl/debatten/aandeel-hernieuwbare-energie?start=4294>, viewed in May 2021;
Tweede Kamer (2017, June 26), "Energieraad (formeel)", online: <https://debatgemist.tweedekamer.nl/debatten/energieraad-formeel-26-juni-2017?start=562> and <https://debatgemist.tweedekamer.nl/debatten/energieraad-formeel-26-juni-2017?start=3500>, viewed in May 2021.
- 5 Van Grinsven, A., Leguijt, C., van der Veen, R. and E. van den Toorn (2021, May), *Convenant Duurzaamheid Biomassa – Jaarrapportage 2020*, Delft, Netherlands: CE Delft.
- 6 Estonian Fund for Nature (2020, December), *Hidden Inside a Wood Pellet*;
Kiis, M., Kuresoo, L. and U. Lilleväli (2021, March), *How Well Are Protected Forests of High Conservation Value Cared For? Changes in Logging Pressure and Restrictions of Protected Forest Habitats Within the Natura 2000 Network in Estonia*, Estonia: Estonian Fund for Nature and Estwatch.
- 7 Mehta, A. (2020, February 3), "EU urged to stop substituting biomass for coal as concerns over climate impact grow", *ReutersEvents Sustainable Business*, online: <https://www.reutersevents.com/sustainability/eu-urged-stop-substituting-biomass-coal-concerns-over-climate-impact-grow>, viewed in March 2021.
- 8 Walker, S. and W. Strauss (2019, January 7), "2019 global wood pellet markets outlook", *Canadian Biomass Magazine*, online: <https://www.canadianbiomassmagazine.ca/2019-wood-pellet-markets-outlook-7190/>, viewed in March 2021.
- 9 Flach, B. (2020, May 26), *Dutch Wood Pellet Imports Surge to a New Record in 2019*, USDA Foreign Agriculture Service GAIN Report NL2020-0017.
- 10 Wiebes, E. (2019, November 19), "Beantwoording vragen over inzet van biomassa als energiebron", *Letter to Parliament*, Dutch Ministry of Economic Affairs and Climate.
- 11 Basis & Beleid (2019, June), *Onderzoek werkgelegenheidseffect van het wetsvoorstel verbod op kolen voor de elektriciteitsproductie*, Report commissioned by the Ministry for Economic Affairs and Climate;
RWE (n.d.), "RWE Generation NL", online: <https://benelux.rwe.com/rwe-generation-nl>, viewed in April 2021.
- 12 Langeveld, J.W.A., Quist-Wessel, P.M.F. and M. Gortworst (2020), *Gebruik van Houtige Biomassa Voor Energieopwekking – PBE Jaarrapportage 2019*, Bergen op Zoom, Netherlands: Stichting Platform Bio-Economie (PBE), p. 13.
- 13 Bioenergy Europe (2020), *Statistical Report 2019 – Pellet*, p. 23.
- 14 *Energia* (2021, April 6), "Nederlandse import houtpellets verdriedubbeld".
- 15 Natuur & Milieu (2021, Maart), *Biogronstoffen voor Nederlandse Kolencentrales*, Utrecht, Netherlands.
- 16 *Energia* (2021, April 6), "Nederlandse import houtpellets verdriedubbeld".

- 17 FutureMetrics (2020), "Global wood pellet trade 2019", online: <https://www.futuremetrics.info/global-trade-sankey-map/>, viewed in April 2021;
FutureMetrics (2020), "Global wood pellet trade 2020", online: <https://www.futuremetrics.info/global-trade-sankey-map-2020/>, viewed in April 2021
- 18 Flach, B. (2020, May 26), *Dutch Wood Pellet Imports Surge to a New Record in 2019*, USDA Foreign Agriculture Service GAIN Report NL2020-0017.
- 19 Flach, B. (2020, May 26), *Dutch Wood Pellet Imports Surge to a New Record in 2019*, USDA Foreign Agriculture Service GAIN Report NL2020-0017.
- 20 *Argus Media* (2020, January 6), "Viewpoint: European pellet demand to outpace supply", online: <https://www.argusmedia.com/en/news/2045555-viewpoint-european-pellet-demand-to-outpace-supply?backToResults=true>, viewed in March 2021.
- 21 RVO (2021, April 2), *Projecten in Beheer SDE(+), peildatum 2 april 2021 (Excel)*;
Flach, B. (2020, May 26), *Dutch Wood Pellet Imports Surge to a New Record in 2019*, USDA Foreign Agriculture Service GAIN Report NL2020-0017.
- 22 Tweede Kamer (2021, February 25), "Gewijzigde motie van het lid Van Esch c.s. over geen nieuwe subsidie voor houtige biomassa (t.v.v. 30175-360)", online: <https://www.tweedekamer.nl/kamerstukken/moties/detail?id=2021Z03880&did=2021D08416>, viewed in April 2021.
- 23 Van Grinsven, A., Leguijt, C. and R. Van der Veen (2020, June), *Convenant Duurzaamheid Biomassa – Jaarrapportage 2019*, Delft, Netherlands: CE Delft, pp. 12-13.
- 24 Dupont-Nivet, D., Woutersen, E. and S. Blok (2020, December 9), "Hoe Estse bomen worden opgestookt in onze centrales", *Investico*, online: <https://www.platform-investico.nl/artikel/hoe-estse-bomen-worden-opgestookt-in-onze-centrales-geannoteerd-verhaal/#annotation-32134-48>, viewed in April 2021.
- 25 Van't Wout, B. (2021, April 1), "Beantwoording vragen over de duurzaamheid van houtige biomassa", *Klimaatweb*, online: <https://klimaatweb.nl/beleid/beantwoording-vragen-over-de-duurzaamheid-van-houtige-biomassa/>, viewed in April 2021.
- 26 Van Grinsven, A., Leguijt, C., van der Veen, R. And E. van den Toorn (2021, May), *Convenant Duurzaamheid Biomassa – Jaarrapportage 2020*, Delft, Netherlands: CE Delft, pp. 12-13.
- 27 *FAOStat* (2021), "Forestry production and trade", online: <http://www.fao.org/faostat/en/#data/FO>, viewed in March 2021.
- 28 *FAOStat* (2021), "Forestry production and trade", online: <http://www.fao.org/faostat/en/#data/FO>, viewed in March 2021.
- 29 Statistics Estonia (2021), "Energy balance sheet by year, indicator and type of fuel/energy", online: https://andmed.stat.ee/en/stat/Lepetatud_tabelid__Majandus.%20Arhiiv__Energeetika.%20Arhiiv/KE023, viewed in April 2021.
- 30 Bioenergy Europe (2020), *Statistical Report 2019 – Pellet*, p. 31.
- 31 Statistics Estonia (2021), "Gross felling based on national forest inventory (NFI) by year, felling type and indicator", viewed in April 2021;
Statistics Estonia (2021), "Energy balance sheet by year, indicator and type of fuel/energy", viewed in April 2021;
FAO (2020), *Forest Product Conversion Factors*, Rome, Italy: FAO, ITTO and UN, p. 49.
- 32 Estonian Forest and Wood Industries Association (2021, May), *Letter in Reply to Natuur & Milieu Factsheet on Bioenergy*.
- 33 Graanul Invest (2020), *Sustainability Report 2019*, p. 19.
- 34 Indufor (2020, February), *Drax Power Limited - Catchment Area Analysis in Estonia – Final Report*, Helsinki, Finland: Indufor, p. 6.
- 35 Statistics Estonia (2021), "Energy balance sheet by year, indicator and type of fuel/energy", online: https://andmed.stat.ee/en/stat/Lepetatud_tabelid__Majandus.%20Arhiiv__Energeetika.%20Arhiiv/KE023, viewed in April 2021.

- 36 Eurostat (2021), "EU trade since 1988 by HS2,4,6 and CN8 (DS-645593)", online: <https://appsso.eurostat.ec.europa.eu/>, viewed in April 2021.
- 37 SEI (2019, December), *Metsanduse Arengukava 2030 Arengustenaariumite Mõju Analüüs*; Fern (2020, May 12), "Estonia discards the impact assessment of its forestry development plan", online: <https://www.fern.org/publications-insight/estonia-discards-the-impact-assessment-of-its-forestry-development-plan-2138/>, viewed in March 2021.
- 38 Calculations by Kiis, M. et al. based on Statistics Estonia, In: Kiis, M., Kuresoo, L. and U. Lilleväli (2021, March), *How Well Are Protected Forests of High Conservation Value Cared For? Changes in Logging Pressure and Restrictions of Protected Forest Habitats Within the Natura 2000 Network in Estonia*, Estonia: Estonian Fund for Nature and Estwatch, p. 11.
- 39 Flach, B. (2020, May 26), *Dutch Wood Pellet Imports Surge to a New Record in 2019*, USDA Foreign Agriculture Service GAIN Report NL2020-0017.
- 40 Eurostat (2021), "EU trade since 1988 by HS2,4,6 and CN8 (DS-645593)", online: <https://appsso.eurostat.ec.europa.eu/>, viewed in March 2021.
- 41 Forest Information System for Europe (n.d.), "Forest land cover in 2018", online: <https://forest.eea.europa.eu/topics/forest-basic-data>, viewed in March 2021.
- 42 Estonian Environmental Agency (2020), *Yearbook Forest 2019*, p. 12; Estonian Fund for Nature (2020, December), *Hidden Inside a Wood Pellet*, p. 23.
- 43 Forest Information System for Europe (n.d.), "Forest basic data", viewed in March 2021; Ceccherini, G., Duveiller, G., Grassi, G. et al. (2020, July 1), "Abrupt increase in harvested forest area over Europe after 2015", *Nature*, 583: 72-77.
- 44 Estonian Environmental Agency (2020), *Yearbook Forest 2019*, p. 6; Estonian Fund for Nature (2020, December), *Hidden Inside a Wood Pellet*, pp. 9-10.
- 45 Estonian and Latvian annual forest statistics, in: Estonian Fund for Nature (2020, December), *Hidden Inside a Wood Pellet*, p. 11.
- 46 Statistics Estonia (2021), "Gross felling based on national inventory", online: https://andmed.stat.ee/en/stat/majandus__metsamajandus/MM03/table/tableViewLayout1, viewed in April 2021.
- 47 Indufor (2020, February), *Drax Power Limited - Catchment Area Analysis in Estonia – Final Report*, Helsinki, Finland: Indufor, p. 32.
- 48 Woodvillepellets (n.d.), "About", online: <https://woodvillepellets.com/about/>, viewed in March 2021.
- 49 Graanul Invest (2020), *Sustainability Report 2019*, p. 20.
- 50 Graanul Invest (n.d.), "Business areas", online: <https://www.graanulinvest.com/eng/business-areas/forestry>, viewed in March 2021; Graanul Invest (2020), *Sustainability Report 2019*, p. 4.
- 51 Graanul Invest (2020), *Sustainability Report 2019*, p. 16.
- 52 Blok, S., Dupont-Nivet, D. and E. Woutersen (2020, December 5), "Hout uit beschermd bos voor Europese biomassacentrales", *Investico*, online: <https://www.platform-investico.nl/artikel/hout-uit-kaalkap-beschermde-bossen-voor-biomassa-europese-centrales/>, viewed in March 2021.
- 53 Estonian Fund for Nature (2020, December), *Hidden Inside a Wood Pellet*, p. 18.
- 54 Global Forest Watch (2021), "Dashboards", viewed in March 2021.
- 55 European Commission (2016, July), *Impact Assessment Accompanying the Proposal for a Regulation of the European Parliament and of the Council on the Inclusion of Greenhouse Gas Emissions and Removals from Land Use, Land Use Change and Forestry into the 2030 Climate and Energy Framework and Amending Regulation No 525/2013 of the European Parliament and the Council on a Mechanism for Monitoring and Reporting Greenhouse Gas Emissions and Other Information Relevant to Climate Change*, COM(2016) 479 final.
- 56 Estonian Fund for Nature (2020, December), *Hidden Inside a Wood Pellet*, p. 15.
- 57 Estonian Fund for Nature (2020, December), *Hidden Inside a Wood Pellet*; Avotiņš, A. and A. Auniņš (2019), "When is it going to be enough?", *Problems in Biodiversity Conservation in the Baltic Forests and Possible Solution*, November 25.

- 58 Data by the Estonian Environmental Board, quoted in: Estonian Fund for Nature (2020, December), *Hidden Inside a Wood Pellet*, pp. 17-18.
- 59 Riigi Teataja (2021), "Nature Conservation Act", online: <https://www.riigiteataja.ee/en/eli/515112018002/consolide>, viewed in April 2021.
- 60 European Commission (n.d.), "Natura 2000 sites designation", online https://ec.europa.eu/environment/nature/natura2000/sites/index_en.htm, viewed in March 2021.
- 61 European Commission (n.d.), "Natura 2000", online: https://ec.europa.eu/environment/nature/natura2000/index_en.htm, viewed in March 2021.
- 62 VPRO (2020), "Money to burn", online: <https://www.vpro.nl/argos/lees/onderwerpen/money-to-burn/interactive.html>, viewed in March 2021.
- 63 Kiis, M., Kuresoo, L. and U. Lilleväli (2021, March), *How Well Are Protected Forests of High Conservation Value Cared For? Changes in Logging Pressure and Restrictions of Protected Forest Habitats Within the Natura 2000 Network in Estonia*, Estonia: Estonian Fund for Nature and Estwatch, pp. 18, 21, 28.
- 64 Kiis, M., Kuresoo, L. and U. Lilleväli (2021, March), *How Well Are Protected Forests of High Conservation Value Cared For? Changes in Logging Pressure and Restrictions of Protected Forest Habitats Within the Natura 2000 Network in Estonia*, Estonia: Estonian Fund for Nature and Estwatch, p. 24.
- 65 Wiebes, E. (2019, November 19), "Beantwoording vragen over inzet van biomassa als energiebron", *Letter to Parliament*, Dutch Ministry of Economic Affairs and Climate.
- 66 Wiebes, E. (2020, September 7), "Antwoord op vragen van de leden Van Raan en Wassenberg (beiden PvdD) aan de Ministers van Economische Zaken en Klimaat en van Landbouw, Natuur en Voedselkwaliteit over de ecologische ramp achter biomassa die uit Estland komt (ingezonden 25 mei 2020)", online: <https://zoek.officielebekendmakingen.nl/ah-tk-20192020-4025.html>, viewed in May 2021.
- 67 Blok, S., Dupont-Nivet, D. and E. Woutersen (2020, December 5), "Hout uit beschermd bos voor Europese biomassa-centrales", *Investico*, online: <https://www.platform-investico.nl/artikel/hout-uit-kaalkap-beschermde-bossen-voor-biomassa-europese-centrales/>, viewed in March 2021.
- 68 Blok, S., Dupont-Nivet, D. and E. Woutersen (2020, December 5), "Hout uit beschermd bos voor Europese biomassa-centrales", *Investico*, online: <https://www.platform-investico.nl/artikel/hout-uit-kaalkap-beschermde-bossen-voor-biomassa-europese-centrales/>, viewed in March 2021.

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