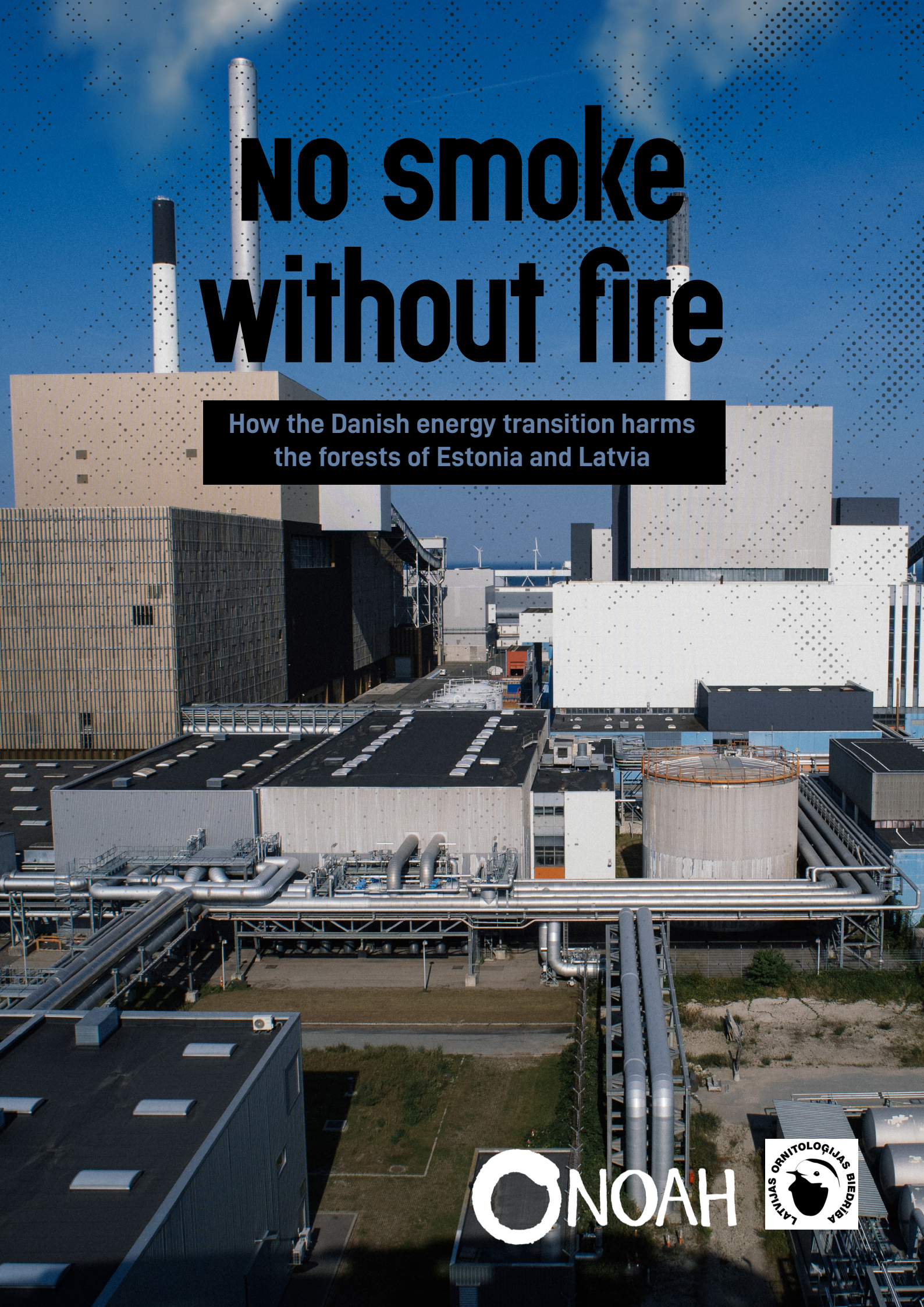


NO smoke without fire

How the Danish energy transition harms the forests of Estonia and Latvia

NOAH

LATVIJAS ORNITOLOĢIJAS BIEDRĪBA

summary

According to the Danish Energy Agency, the share of renewable energy use in Denmark has been growing rapidly over the last decades. But much of this so-called renewable energy does not come from wind and solar farms but from ancient technology; burning wood.

Denmark, through direct and indirect subsidies, switched from burning fossil fuels to burning woody biomass and hence Denmark has turned into a large importer of woody biomass from other countries and in particular from Estonia and Latvia.

The burning of woody biomass is extremely controversial and can emit more greenhouse gasses than coal and gas and can cause harm to forests and biodiversity. In order to ensure that the Danish use of woody biomass does minimal harm to nature and the climate, Denmark has introduced a law on sustainability that amongst other things specifies that it is required that particularly valuable areas are identified and protected and that requirements for consideration and protection of special species exist. Also, the forest carbon sink may not be in decline in the country of origin of the woody biomass or the forest sourcing area.

But the forests in Estonia and Latvia are suffering. In Estonia, the forests have already turned from a carbon sink to a carbon source and in Latvia the same trend is prevailing. Valuable habitats are disappearing outside and inside protected areas and forest biodiversity is declining. This can in large part be attributed to an increase in logging intensity of which the demand for woody biomass for energy is an important driver. And Denmark ranks as one of the largest, if not the largest, importer of woody biomass from the Baltic region.

The companies that import biomass to Denmark are required to provide documentation to the Danish Energy Agency for complying with the law, which can be done by using certification schemes. But as shown in this report these schemes cannot guarantee that woody biomass imported from Latvia and Estonia live up to the Danish sustainability law.

In 2025 Denmark aims to introduce stricter criteria in the law, but most likely current approved certification schemes can still be used to document compliance with the law. And so introducing stricter criteria will not solve the issues presented here.

Therefore, based on the findings presented in this report, we recommend that Denmark phases out the use of woody biomass for energy. As the first step in that direction, Denmark should stop importing woody biomass for energy from Estonia and Latvia because it most likely contributes to the declining state of the forests in Latvia and Estonia.

Wood harvester operating in Pikavere, Harju, Estonia, during nesting season, 28th May 2024. Photo: unwisemonkeys

introduction

In the effort to make the energy sector renewable, Denmark has, to a large extent, switched from burning fossil fuels to burning woody biomass. This has made Denmark a large importer of wood pellets and wood chips from Estonia and Latvia.

While forestry operations in Estonia and Latvia are promoted as sustainable by government and industry, both countries have experienced an increase in logging intensity. This has resulted in increased rates of tree-cover loss, forest fragmentation, loss of forest carbon sink capacity, and threats to forest biodiversity. In several cases, even forests in protected areas are being logged, which has led the EU to start an infringement procedure against Estonia[1].

To minimise the risk of using woody biomass from unsustainable production to produce energy Denmark has introduced a law with criteria for sustainability that also cover imported woody biomass. However, such criteria are not always effective. For instance, the production of wood pellets in Estonia has been shown to regularly fail to comply with the Dutch criteria for sustainable biomass[2].

It remains unclear whether the Danish law is upheld regarding woody biomass imported from Latvia and Estonia. That needs to change, because if the Nordic and the Baltic regions are to be developed sustainably, the governments and businesses making decisions on energy and forestry policies need clear information on the links between their policy decisions and the actual down-to-earth consequences for the climate and nature.

The aim of this report is to investigate what impact the Danish import of woody biomass has on the forests in Estonia and Latvia, and if the imported biomass complies with the Danish law for sustainable biomass.

The report was conducted as part of a collaboration project funded by the Nordic Council of Ministers between NOAH - Friends of The Earth Denmark, Save Estonia's Forests and The Latvian Ornithological Society and are based on extensive literature search, field trips to the forests, contact with government officials and with contributions from environmental organisations from other countries in Europe.

Sapling growing on tree stump in Tartu, Estonia, 21st May 2024. Photo: unwisemonkeys

denmark's "green" energy transition

Denmark is often hailed as one of the most sustainable countries in the world. The country is recognised for its overall performance on Sustainable Development Goals[3], climate change mitigation policies[4], and wind farms[5] which are front and centre in the promotion of Denmark, by the Danish government and large companies, as a country that is well on the way in its transition from fossil fuels to renewable energy.

According to the Danish Energy Agency, the share of renewable energy use in Denmark has been growing rapidly in the last decades reaching 42.8% of the total observed energy consumption in 2022 compared to 6% in 1990[6]. But the growth of renewable energy consumption in Denmark mainly stems from the increased use of biomass which constitutes up towards 68% of total renewable energy (Fig. 1).

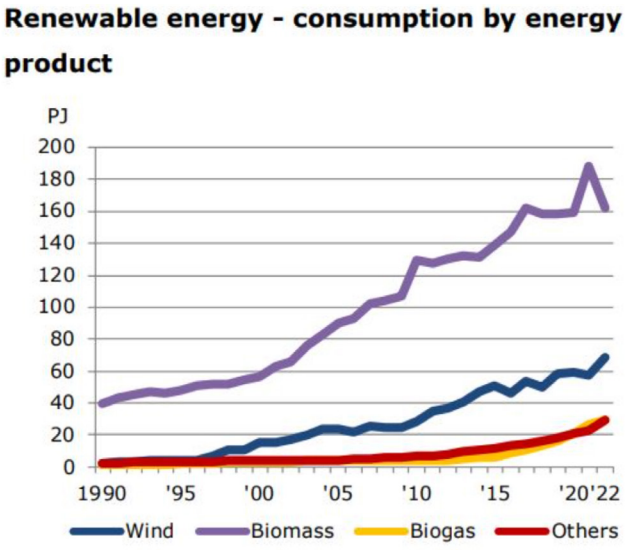


Figure 1. Consumption of renewable energy in Denmark by source[6]

This is largely due to the fact that when Denmark wanted to get rid of fossil fuels in the beginning of the 21st century, it started replacing oil and coal with woody biomass[7].

Biomass used for heat and electricity production was exempted from taxes on energy and CO_2, which was a big incentive for energy producers to move towards woody biomass consumption. Woody biomass enjoyed even more direct and indirect subsidies than other forms of renewable energy such as wind turbines and solar panels[8].

Since 2000, the use of woody biomass in Denmark has more than tripled, primarily due to increased consumption of wood chips and wood pellets. Between 2000 and 2022 the increase was 1246% and 820% for chips and pellets respectively[6].

Denmark is importing large quantities of woody biomass, especially from Estonia and Latvia, since only 44% of wood chip supply and just 1% of wood pellet supply are covered by domestic sources. In 2022 alone, Danish companies imported 3.6 million tons of wood chips and pellets of which 1.9 million tons came from Estonia and Latvia[9].

While Denmark's demand for woody biomass is expected to decline over the coming years, as the production of wind energy, solar energy, and heat pumps increases, it is still expected to play a large part in the energy mix at least within the coming decade (Fig. 2).

Additionally, municipalities around the country still plan to increase the capacity for the use of biomass in energy production[11] as investments flourish in carbon capture and storage technologies for plants that burn biomass[12, 13].

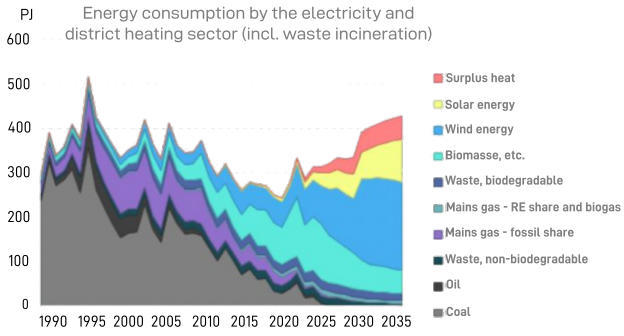


Figure 2. Energy consumption by the Danish electricity and district heating sector, by type of energy[10]

Amagerværket. HOFOR's combined heat and power plant in Copenhagen, Denmark; 3rd September 2024. Photo: unwisemonkeys

the rationale and shortcomings for the use of woody biomass in energy production

The burning of woody biomass is considered a source of carbon neutral energy under the Kyoto Protocol and the UN Framework Convention on Climate Change. **This classification as carbon neutral derives from either or both of two assumptions[14]:**

- The first assumption is that CO_2 released during burning of wood came from the atmosphere anyway and was sequestered in the past by growing trees. And if, for every tree that is felled, a new one grows up, the new trees will be able to absorb the same amount of CO_2 as the old ones have emitted when burned.
- The second assumption is that emissions should be reported within the land-use sector only to avoid double-counting emissions from biomass energy. This means, for example, that when a Danish power plant burns wood from the Baltics, the actual CO_2 emissions don't count in the Danish emissions accounting but in the land-use sector in the country that exports the wood.

These assumptions have led to a lot of criticism as expressed by EU's own Science Academy[15]:

"Labelling woody biomass as renewable has a perverse impact on the climate. Much of the biomass employed in Europe is anything but carbon neutral. Current accounting rules under the emission trading scheme let certain power plants and countries shine as climate pioneers although they actually damage the climate"
-Prof. Michael Norton, EASAC's Environment Programme Director.

To assess the true impact the use of woody biomass has on greenhouse gas emissions, proper accounting measures have to be used for the two assumptions.

First, is it true that CO_2 emitted is reabsorbed? The EU's Joint Research Centre (JRC) uses the term "carbon debt" to describe the phenomenon by which the bioenergy pathway may produce higher carbon emissions compared to a fossil fuel reference chosen for comparison[16]. The term "carbon parity point" is explained by the JRC as the point in time when bioenergy may be considered carbon neutral. This point is reached when the additional emissions caused by the bioenergy system until the payback time equals the emissions saved by substituting fossil fuels combustion.

To calculate the carbon parity point, one has to take a lot of factors into account; for instance, what kind of fossil fuels the woody biomass replaces, what types of woody biomass is used (e.g. fine woody debris, residues from sawmills, or standing live trees or old growth forest) and the loss of carbon sequestration capacity in forests compared to a situation where no woody biomass is used for energy[17].

Depending on these factors, the time to reach the carbon parity point varies from decades to centuries[18]. In general, residues and waste from forest harvesting result in the shortest periods to reach the carbon parity point. The longest periods, and thereby the most harmful for the climate, come from increasing harvest volumes or frequencies in already managed forests and the harvesting of natural forests or their conversion into plantations[19].

Second, how does the accounting system benefit Danish climate accounting? According to international rules, total national greenhouse gas emissions are calculated as the sum of emissions from different sectors[20]. As previously stated, emissions from burning biomass are not included in the energy sector emissions but are instead included in the emissions from the LULUCF sector in the country where the biomass is harvested.

An analysis commissioned by the Danish Energy Agency[21] showed that the average CO_2 emissions, measured as kilograms of CO_2 per gigajoule of energy produced, were higher from burning wood chips (116.9 kg/GJ) and wood pellets (121.4 kg/GJ) than for coal (107.1 kg/GJ) and gas (65.4 kg/GJ) in year 1. 60-100 years after combustion, emissions equivalent to the biogenic part of the CO_2 emissions is more or less recaptured in the forest carbon stock. However, due to the rules mentioned above, it still counts as zero in the Danish climate emissions accounts when Denmark burns wood chips and wood pellets imported from e.g. Estonia and Latvia.

In 2020 the Danish parliament agreed to a Climate Law that stated that Denmark has to reduce emissions of greenhouse gases by 70% by 2030 (compared to 1990) and to become climate neutral by 2050[22].

According to official accounting, in 2022 Denmark emitted 44,1 million tons of CO_2 equivalents (CO_2e) from activities within the Danish borders, which meant that Denmark only needed additional reductions of 5.4 million tons of CO_2e to meet the 2030 target[23]. But an additional 8.9 million tons are emitted from burning imported woody biomass[24] and if these emissions were to be included, Denmark would have a long way to go to reach the targets.

Furthermore, the burning of woody biomass affects more than the climate. Intensified forest management to produce additional biomass can increase pressures on forest ecosystems and thereby on biodiversity. It is crucial to properly investigate these potential negative effects because climate change mitigation measures should not conflict with the need for biodiversity conservation[25].

Wood pile in clearcut forest. Ida-Viru, Estonia; 22nd May 2024. Photo: unwisemonkeys

The Danish sustainability law

To ensure the least impact on the climate and on biodiversity, the Danish government has introduced a law on sustainability and greenhouse gas emission savings for woody biomass used for energy purposes. The law implements the EU Renewable Energy Directive[26] sustainability criteria with some additional Danish demands[27].

Compliance with the criteria of the Renewable Energy Directive is a condition for biomass-based energy to contribute to the fulfilment of Denmark's and the EU's targets for renewable energy shares and to be eligible for future support.

Industries and facilities covered by the law include:

- All electricity and heating installations above 2.5 MW
- Industrial installations above 2.5 MW
- Importers and producers of more than 5,000 tons of wood pellets/year, firewood and briquettes per year

The products that are covered are primary biomass from forests, residues from the wood industry, and woody biomass from other sources. In order to comply with the law the following series of demands are to be met (parts in bold are the Danish additions to the EU Renewable Energy Directive):

- *Sustainability demands.* It is required that legislation or systems are present at areas where the biomass is sourced that ensure (i) legality (ii) reforestation (iii) protection of designated nature conservation areas (iv) harvesting that takes into account soil quality and biodiversity with the aim of minimising negative impacts (v) harvesting that maintains or improves the long-term productive capacity of the forest. **Furthermore, it is required that particularly valuable areas are identified and protected and that requirements for consideration and protection of special species exist.**

Areas can be worthy of preservation if they have high biodiversity value, special landscape value, contain cultural heritage, or harbour special species. Areas can be particularly sensitive if they guard against erosion or protect water resources. 'Special species' are protected species or species that appear on the Danish Red List of species that have been assessed to be critically endangered (CR), endangered (EN), or vulnerable (VU), as well as similar lists in other countries.

- *Climate sustainability* (LULUCF and carbon sinks). According to the Renewable Energy Directive, the country from which the woody biomass originates has to be a Party to the Paris Agreement and either (i) has submitted a nationally determined reduction target (NDC) to the UN that includes LULUCF; or ii) have laws to preserve/increase carbon stocks and sinks and it is documented that emissions from LULUCF do not exceed removals. **Additional Danish demands state that at least one of the following three terms has to be met: (1) that the forest carbon sink is not in decline in the country of origin of the woody biomass or the forest sourcing area; (2) the forests in the sourcing area are certified; or (3) only residues are used.**

Residues include branches and tops and whole trees that are residues from ongoing production of stemwood, including thinning. Residues from forestry must not contain stumps and roots.

- *CO_2 savings demands.* Requirements for CO_2 savings in the production chain compared to fossil energy. CO_2 savings of 75% from 2021, 80% from 2025, and 83% from 2028 for covered entities.

The CO_2 savings demands include energy consumption in the value chain, i.e. energy consumption for harvesting, transport, and processing of biomass compared with a fossil reference. The CO_2 emissions from chimneys at power plants are not included[28].

- *Documentation and control.* There are requirements for reporting of biomass consumption, biomass type, geographical origin, and other documentation requirements. Operators can use certification schemes for documentation. **Verification by a 3rd party.**

The companies that import biomass to Denmark are required to provide documentation to the Danish Energy Agency demonstrating compliance with the law[29]. Generally, this can be done by documenting

that the law is upheld through legislation at the national level in the country that the biomass is imported from, or companies can use certification schemes to prove that the law is being upheld. Most of the big importers of woody biomass for energy do the latter according to the companies' own websites.

For instance Hofor, who in 2023 imported approximately 0.47 million tons from Estonia and Latvia[30], writes:

"*It is crucial for HOFOR that sustainability can be documented. Therefore, we buy biomass that is certified by internationally recognised organisations according to international standards for sustainability of wood and biomass. We use the following three certification schemes:*

- *Sustainable Biomass Programme (SBP)*
- *Forest Stewardship Council® (FSC®)*
- *Programme for Endorsement of Forest Certification Schemes (PEFC)*" [31]

And Ørsted, who imported 1.5 million tons of wood chips and wood pellets from Estonia and Latvia in 2021[32], states that:

"*At Ørsted, we only use certified sustainable biomass, which consists of residual wood from sustainably managed production forests where the requirements for afforestation, ecosystems, biodiversity and carbon accounting are particularly high."* and *"All this is checked and approved by an independent third party (FSC, PEFC or SBP)*"[33].

The companies then only have to provide information to the Danish Energy Agency that proves that the imported biomass is certified and that the certifications are verified by a third party, which typically are certification companies such as Preferred by Nature or Control Union.

However, as described below, certification alone is not adequate to ensure the protection of forests or habitats.

Law update on the way

In May 2025 changes will be made to the Danish sustainability law because new rules from the EU renewable energy directive have to be implemented. Following demands looks likely to be added:

- No go areas (like old growth forests and heaths) to be introduced where the wood biomass can not be sourced from
- Qualitative documentation requirements on cascade use of woody biomass to be introduced
- Qualitative requirements for dead wood and clear cuts to be introduced

The Danish Energy Agency assesses that the current approved certification schemes can be used to document compliance[89].

Graanul Invest Imavere facility, Järvamaa, Estonia; 25th May 2024. Photo: unwisemonkeys

Swamp forest, Lahemaa, Estonia; 28th May 2024.
Photo: unwisemonkeys

The state of forests in Latvia and Estonia

Due to historical and ecological similarities between the countries, the forests and the issues they face are remarkably similar in Estonia and Latvia. Forest covers approximately half of the land area in both countries of which almost half again is owned by the respective state[34,35].

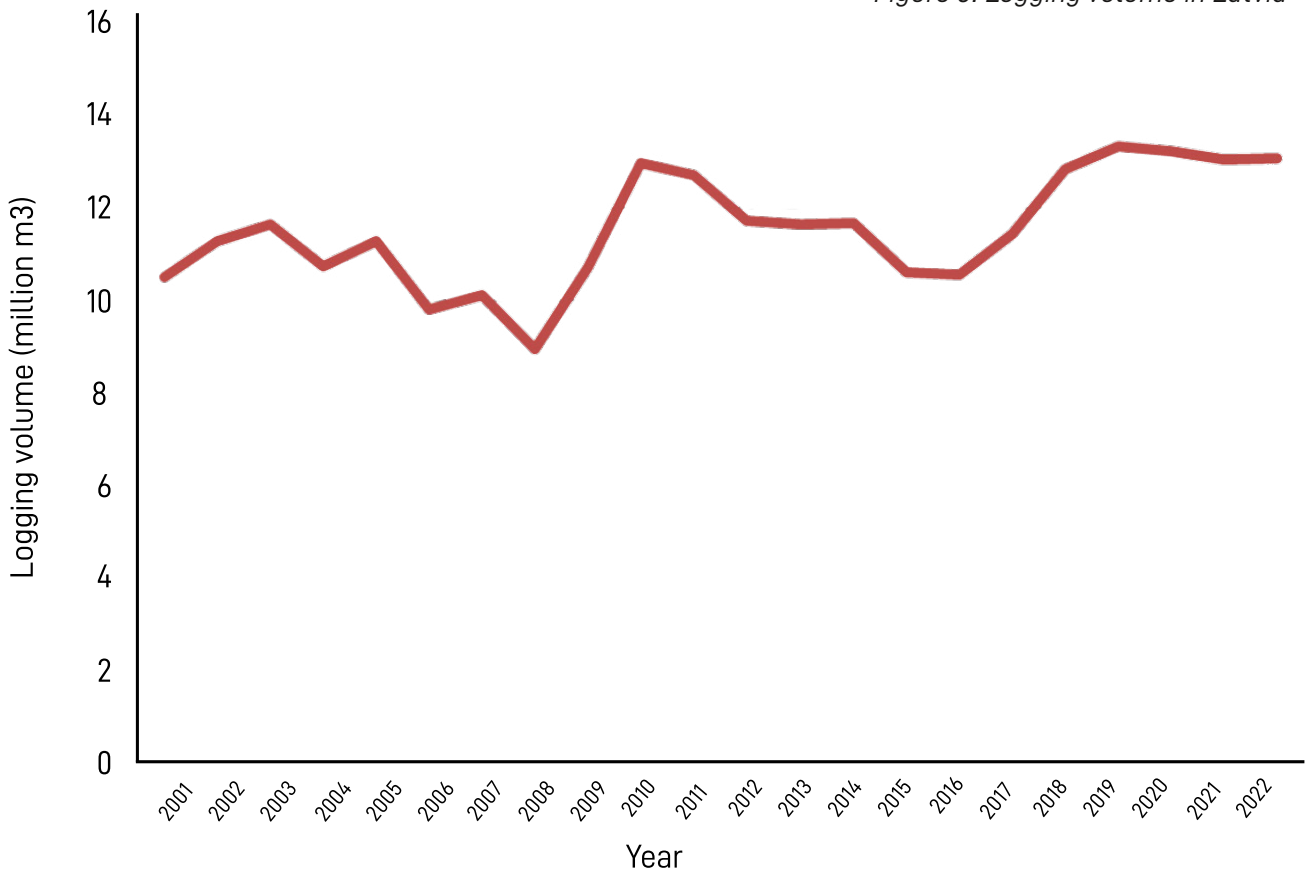
Increased logging

However, in both countries, the forest definition used in the official statistics treats "forest" as a land-use type rather than an ecosystem, due to which the total forest area includes also treeless areas (clearcuts) in which forest can potentially regrow. In both countries most of the forests are classified as semi-natural (97.6% in Estonia and 99.0% in Latvia)[36]. 35% of the total forest area in Latvia[37] and almost 40% in Estonia is forests older than 60 years[38].

In the late 1990s, both countries adopted general forest policies, which aimed at balancing the ecological, social, and economic interests in forest management with the goal of sustainable forest management[39,40].

However, the actual management of forests since then, has put a strong emphasis on the economic interests often at the expense of the other aspects of sustainable forest management, which has led to an increase in logging volume in both Latvia and Estonia (Fig. 3 & 4). More than 70% of forest area in Latvia[34] and 67% in Estonia[41] are managed with the primary goal of timber production.

Figure 3. Logging volume in Latvia[42]



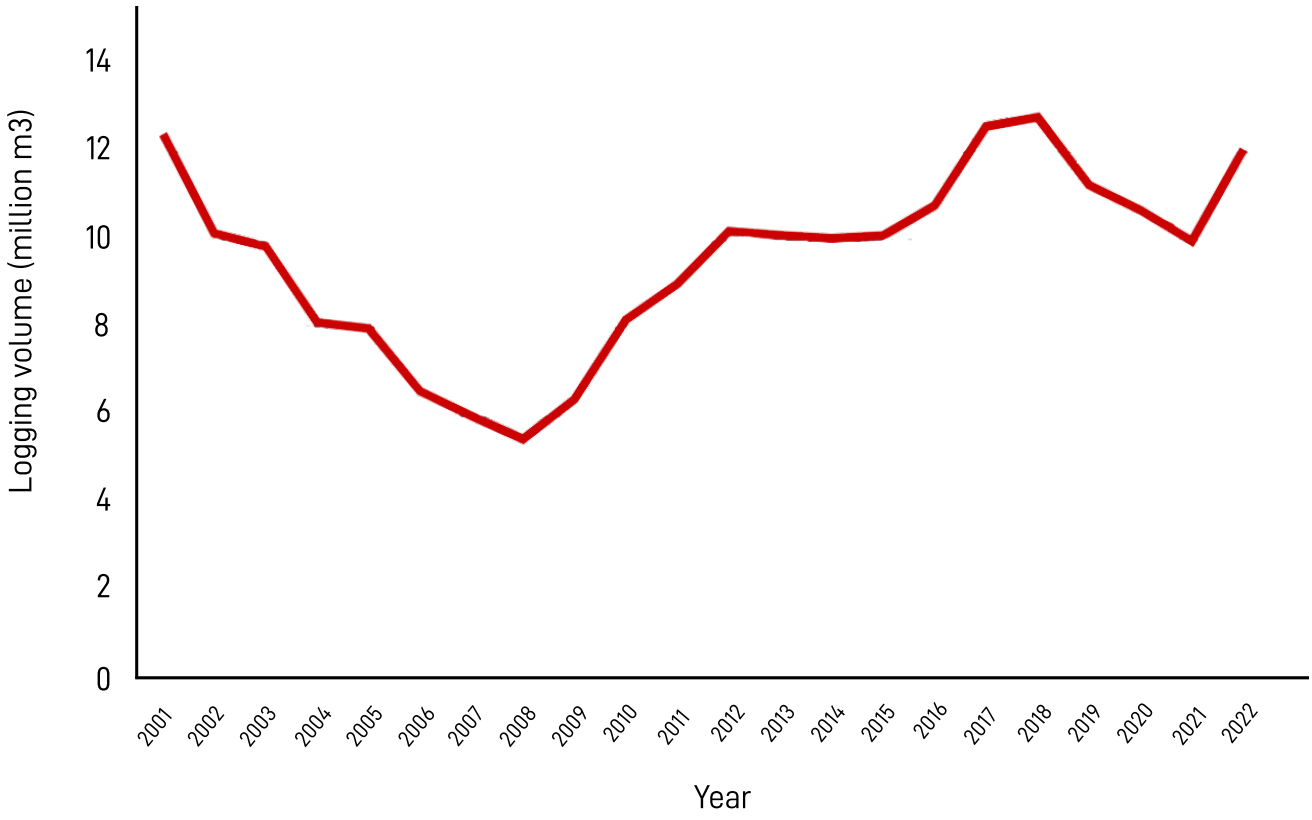
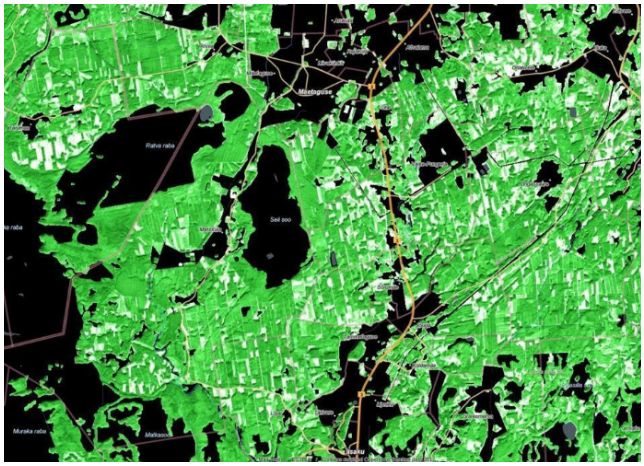


Figure 4. Logging volume in Estonia[43]

As a result of this logging intensity, the relative tree cover loss from 2001 to 2023 has been 26% in Latvia and 22% in Estonia, rating them second and third in Europe with only Portugal reporting a higher relative tree cover loss[44]. This indicator does not show the net tree cover change (as it does not include tree cover gain), and crucially, tree cover loss usually occurs in older stands, while the gain is the result of young stands reaching the height to be included in the 'tree cover'.



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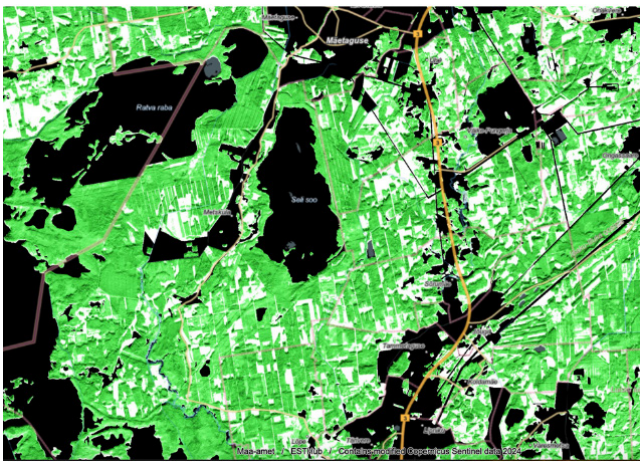


2024.

The disappearance of forests (shown in white) from Estonian Alutaguse National Park in 7 years. The area is one of the main habitats of a rare mammal, the flying squirrel, which is very sensitive to clear cuttings[45]

An example of decreased tree cover between 1994-1999 (top) and 2019-2022 (bottom) in Latvia.

Young Hazel Grouse
Photo: Tiit Jürisson

Forest birds under pressure

Intensive forestry has had an impact on forest biodiversity in Estonia and Latvia. And although some species benefit from such changes, the overall impact has been negative.

In Latvia, the forest bird index, which shows the overall population change of common forest specialist bird species, is showing a 'moderate decline' between 2005 and 2022 (Fig. 5). The Black Stork, once used as a symbol of the relative naturalness of the forests of Latvia, has become critically endangered on a national level. Examples of other nationally threatened forest bird species are Hazel Grouse, Pygmy Owl, Boreal Owl, Goshawk, Common Buzzard, Three-toed Woodpecker, and Marsh Tit[46].

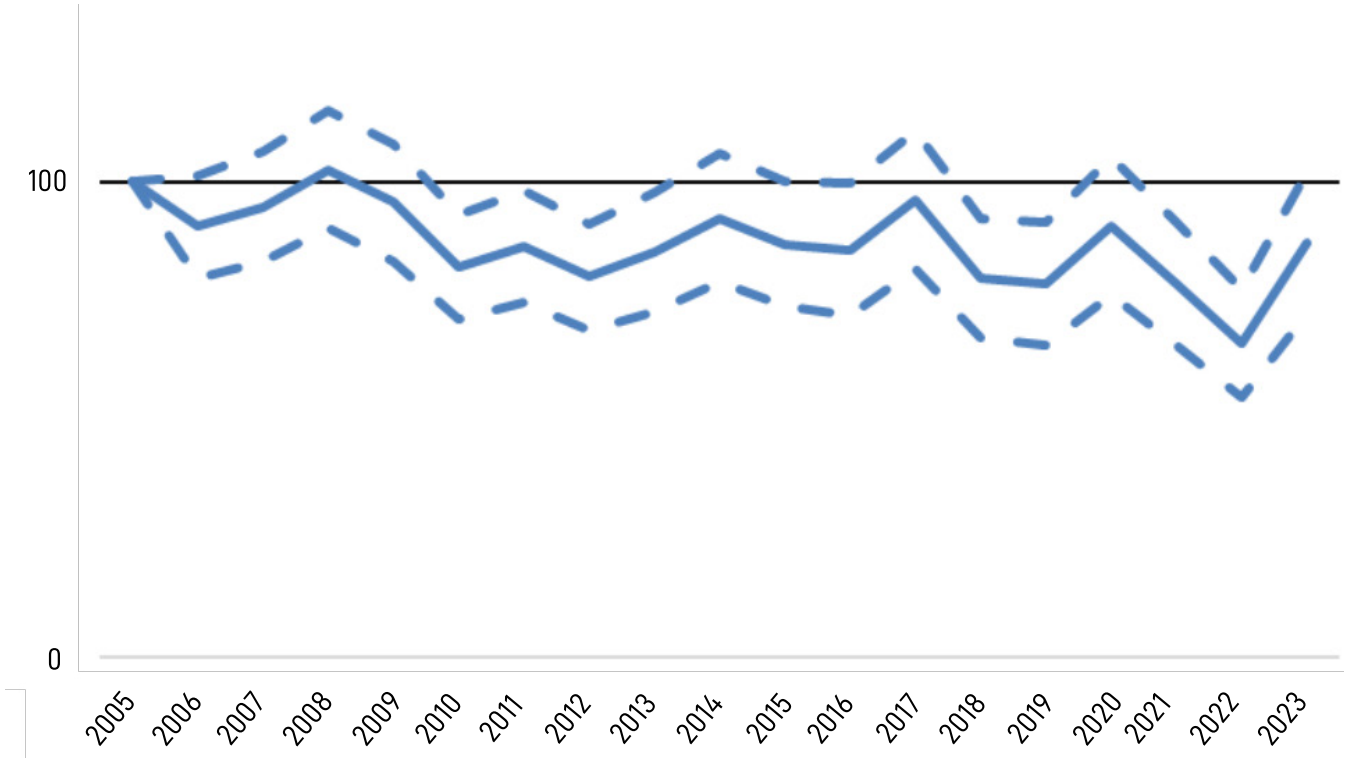
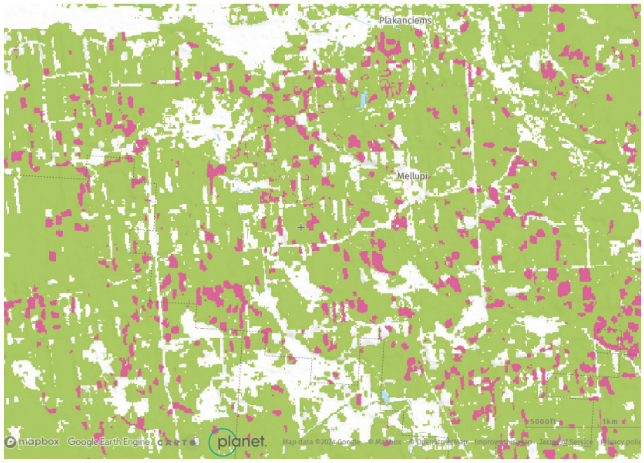


Figure 5. National forest bird index (± standard error) of Latvia[47]

Not all species threatened on a national level are protected by law. Furthermore, outside Natura 2000 areas there are no actual measures of habitat protection even for many of the species included in the legal list of specially protected species[48]. For a selection of these species, the designation of microreserves (small strictly protected areas) is possible according to law.

However, to designate a microreserve the presence of the species during the breeding season is not enough. An occupied nest has to be found[49]. Also the FSC and PEFC standards do not ensure conservation of the habitats of these species outside Natura 2000 areas and microreserves, which means that no real protection of species and habitats exist in production forests.



Recent (2020-2023) tree cover loss, marked in red, in one area in Latvia identified as priority for conservation of Pygmy Owl[44]

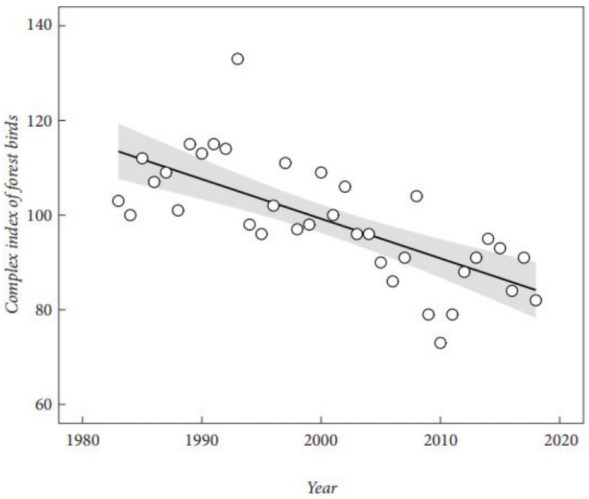


Figure 6. Index of 53 Estonian forest bird species during 1983-2018[54]

In the species conservation plans for owls[50] and woodpeckers[51], priority areas for the conservation of specially protected species of these groups have been identified. However, these areas are not legally protected and the forest management plan for state forests managed by "Latvijas valsts meži (Latvia's State Forests)" allows clearcuts in these areas[52]. Therefore, even after formal approval of the species conservation plans, these habitats are still being destroyed. Analysis done by Andris Avotiņš shows that the likelihood of tree cover loss in these priority areas is increasing and is especially high for Pygmy Owl and Three-toed Woodpecker[53].

In Estonia, forest birds are also declining (Fig. 6) and the destruction of habitats of protected bird species is documented even in protected areas[54]. Intensified forestry has been identified as the most plausible explanation for the observed decline[55].
Lahemaa National Park in northern Estonia is one of the designated areas for the conservation of Three-toed Woodpeckers, according to the EU Birds Directive, Annex I[56]. Unfortunately, destructive logging was observed within a forest area owned (at the time of logging) by one of Graanul Invest's subsidiaries, destroying a documented habitat for this species (Fig. 7). Graanul Invest is the largest pellet producer in Estonia and Latvia and a company that has been linked to the export of woody biomass to Denmark on several occasions[57,58,59].

Pygmy Owl
Photo: Tiit Jürisson

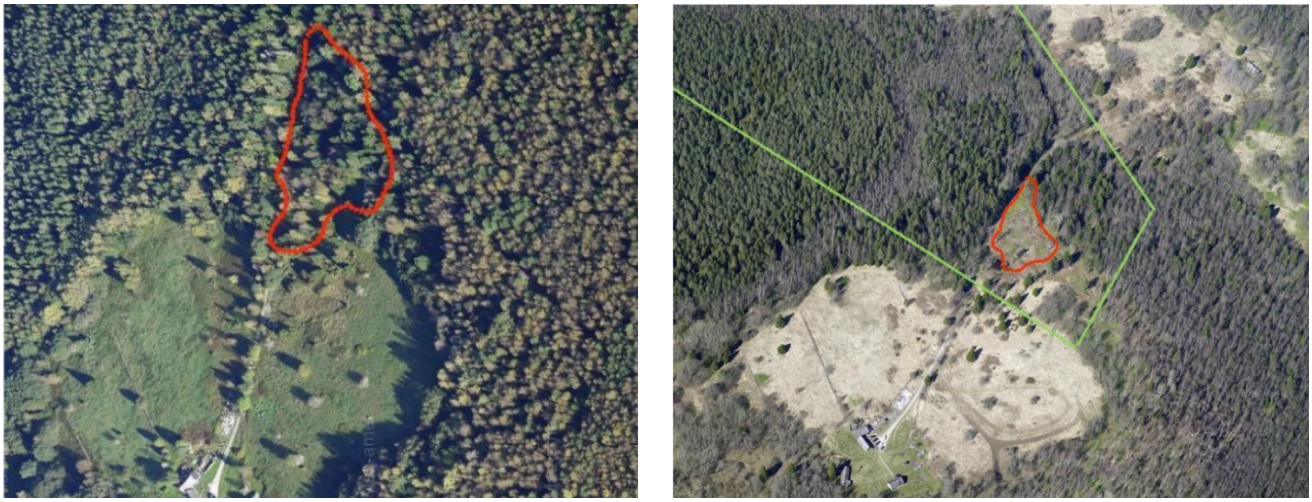


Figure 7. Parksi, Harju County, Lahemaa Natura 2000 area. The red line marks the clearcut in a forest owned by Karo Mets OÜ (forest management company) in 2017. The green line is the breeding habitat of the Three-toed Woodpecker[2]

Loss of forest habitats

According to the EU Habitats Directive[60], the EU member states are obliged to ensure favourable conservation status of the habitat types listed in Annex I of the Habitats Directive. However, in Latvia all except one (the status of which is unknown) of the forest habitats listed in this annex (12 of them found in Latvia) are in an unfavourable status. The situation in Estonia is only slightly better. Eight out of ten forest habitats are in unfavourable status[61]. Nevertheless, in 2021 the European Commission started an infringement procedure against Estonia because of forest habitat loggings in Natura 2000 areas[1] and forestry was identified as the main threat to these habitats[62]. According to the Estonian National Audit Office, the Ministry of the Environment has not organised the protection of protected forests in such a way as to ensure the preservation of the natural values of these forests[63].

Unfortunately, these habitats are continuously being logged. The Nature Conservation Agency of Latvia found that between 2020 and 2023 more than 9000 ha of these habitats have been destroyed[64]. The habitats included in Annex I of the Habitats Directive are being destroyed not only in private forests but also in the state forests. According to the data provided by the Nature Conservation Agency of Latvia, 874 ha of these habitats were destroyed in the forests managed by "Latvijas valsts meži" in 2021, 225 ha – in 2022 and 143 ha – in 2023. These forests are PEFC and (at the time of logging) also partially FSC certified, which means that they are considered low risk under SBP and therefore live up to the Danish sustainability law and could in principle be exported to Denmark as wood chips or wood pellets. In Estonia a total of 1,663 hectares of protected Annex I forest habitats within Estonian Natura 2000 areas were lost from 2008-2018[65]. National and international conservation regulations are being overlooked and other national environmental requirements are not met. An example shows a clear-cut in the river bank in Kõdu, located in Järva County, Central Estonia (Fig. 8 and 9). In Estonia, the legally safeguarded watersheds governed by the Water Act encompass a 10-meter protection zone along rivers, streams, and primary ditches, where logging is prohibited without approval from the Estonian Environmental Board.

Data from 2018-2019 reveal that 54 hectares within these protected zones were clear-cut across land owned by three forestry companies associated with Graanul Invest at the time. This equates to 7% of all water protection zones on Graanul-owned lands at the time, spanning over 300 sites across Estonia. This pervasive trend underscores a systemic issue, indicating a consistent practice of tree removal within water protection zones throughout the country[2].

Figure 8 &9. Kõdu, Järva County. Aerial photos show riverbanks before (above) and after clearcutting (below).The red dashed line marks the Madara River. The clearcut has happened without any respect to the 10-meter buffer zone along the river[2, 66].

Clear cuts in Natura 2000 sites, Võru, Estonia; 31st May 2024. Photo: unwisemonkeys

Logging of priority habitat 9010 Western Taïga in Latvia. November 2021*

Loss of forest carbon sinks

Intensive logging threatens not only the biodiversity of forests, but also the ability of forests to mitigate climate change (Fig. 10 & 11). In recent years, forests in Estonia have even become a carbon source rather than a sink. The increase in logging intensity is one of the main factors behind the declining forest carbon sink both in Estonia and Latvia. Following a clear-cut, it requires 10-15 years for forests in temperate and boreal zones to regain their status as carbon sinks, and 20-40 years until the initial emissions linked to the clear-cut are offset[67, 68].

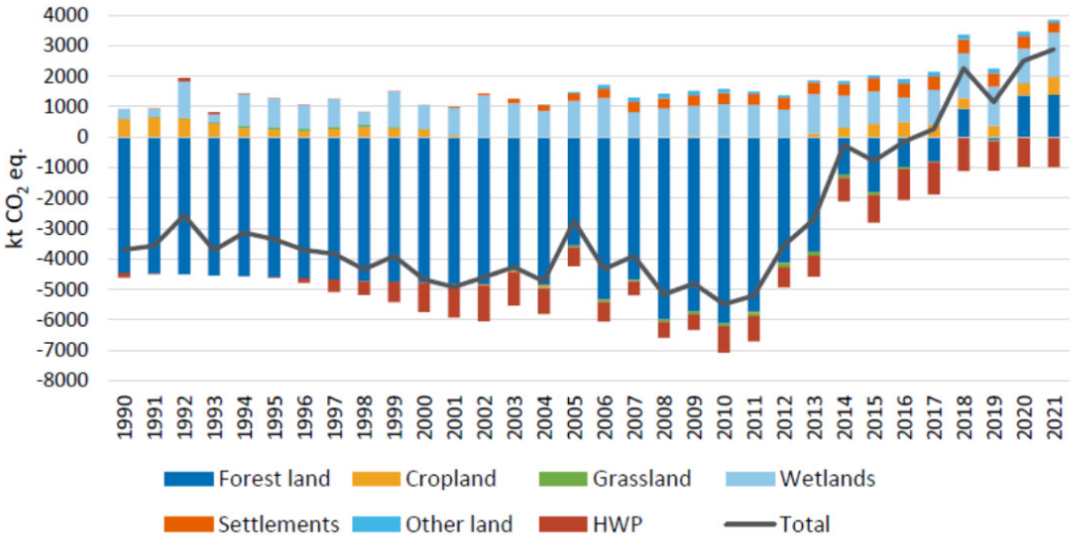


Figure 10. Trend in net emissions from LULUCF sector in 1990-2021 in Estonia[69]

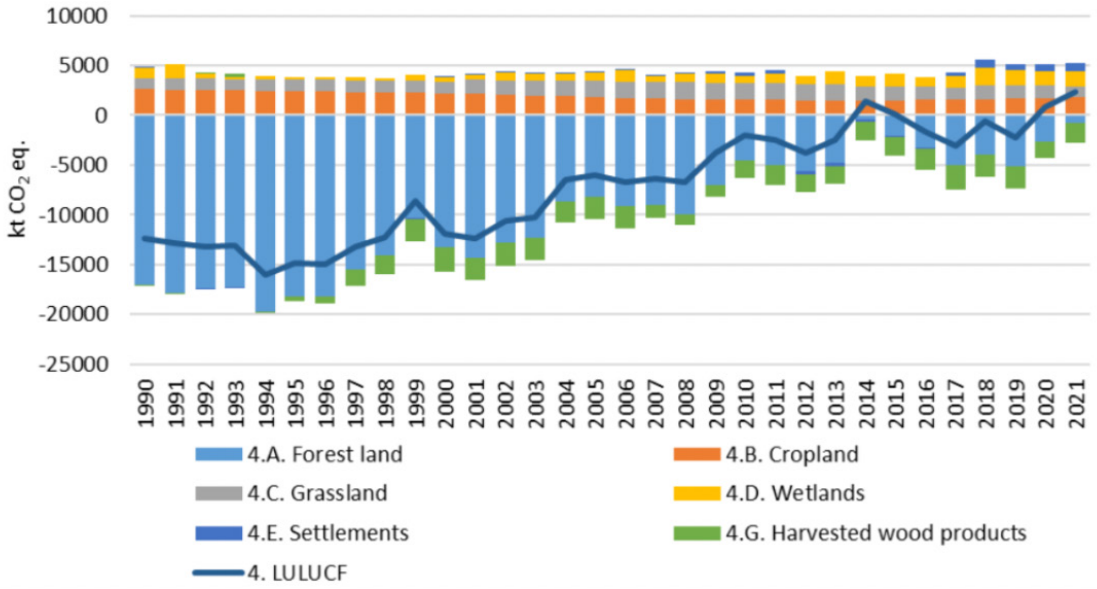


Figure 11. Trend in net emissions from LULUCF sector in 1990-2021 in Latvia[70]

The European Environmental Agency has published a forecast that paints a stark picture of Estonia's and Latvia's Land Use, Land-Use Change, and Forestry (LULUCF) sector. The agency predicts 35.1 million tons of CO_2 equivalent emissions for 2021-2030 for Estonia and 20.9 million tons for Latvia[71].

Newly felled forest in Pikavere, Harju, Estonia, during nesting season; 28th May 2024. Photo: unwisemonkeys

compliance of forest management in Estonia and Latvia with the Danish sustainability law

In the following section we will focus on the additional demands from the Danish sustainability law and on how it seems highly unlikely that woody biomass from Latvia and Estonia can meet these criteria.

As mentioned earlier, the additional Danish climate sustainability demands state that one of three terms has to be met: (1) that the forest carbon sink is not in decline in the country of origin of the woody biomass or the forest source area; (2) the forests in the source area are certified; or (3) only residues are used.

Carbon sinks and logging volume

One of the ways to meet the Danish climate sustainability demands is to ensure that the forest carbon sink is not in decline in the country of origin, or the forest source area. However, as demonstrated above, in both Estonia and Latvia, the forest carbon sink is declining. Notably, in Estonia forest land has even become a CO_2 source in recent years. Clearly, the requirement for no decline in carbon sink has not been met unless it has been documented that a specific sourcing area upholds the carbon sink capacity. Information on sourcing areas is not made publicly available in Denmark so it is impossible to check if this were to be the case but it seems extremely doubtful that all woody biomass exported to Denmark should come from sourcing areas that upholds the carbon sink capacity.

Furthermore, one of the main reasons for the decline in the forest carbon sink in both of the countries is the increase in logging volume. If this increase is, at least partially, driven by the biomass exports to Denmark then the biomass used in Denmark is not only sourced from forests with a declining carbon sink but is actually contributing to the decline.

According to the Estonian National Wood Balance reports from Keskkonnaportaal covering 2008 to 2021, there was a significant increase in the wood chips and wood pellets production sectors in Estonia (Fig. 12)[72].

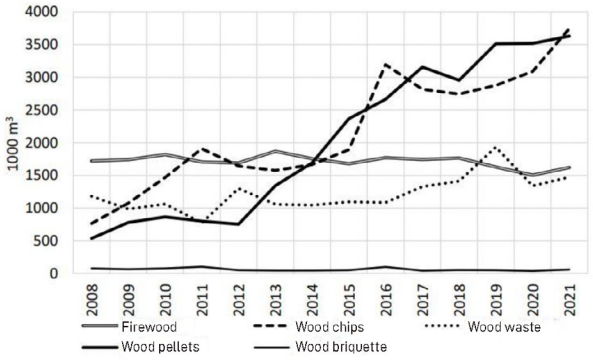


Figure 12. Production of fuel wood in Estonia[72].

Denmark has consistently emerged as Estonia's primary foreign trade partner for fuelwood export products from Estonia in recent years. Fuelwood come in different kinds but a vast majority of the fuel wood exports comes from wood chips and wood pellets. Remarkably, as shown in Fig. 13, more than half of exported fuel wood from Estonia ends up in Denmark, according to Statistics Estonia, adding up to a value of 154 million euros in 2023[73].

There is a large difference in total volume between what Estonia claims to export to Denmark (up towards 1.8 million tons of wood chips and wood pellets in 2022) compared to what Denmark report to import from Estonia (app. 1 million tons in 2022). This may be explained due to the fact that import and export of goods from other EU countries does not need to be declared to customs data. Trade within EU countries is therefore based on questionnaires.

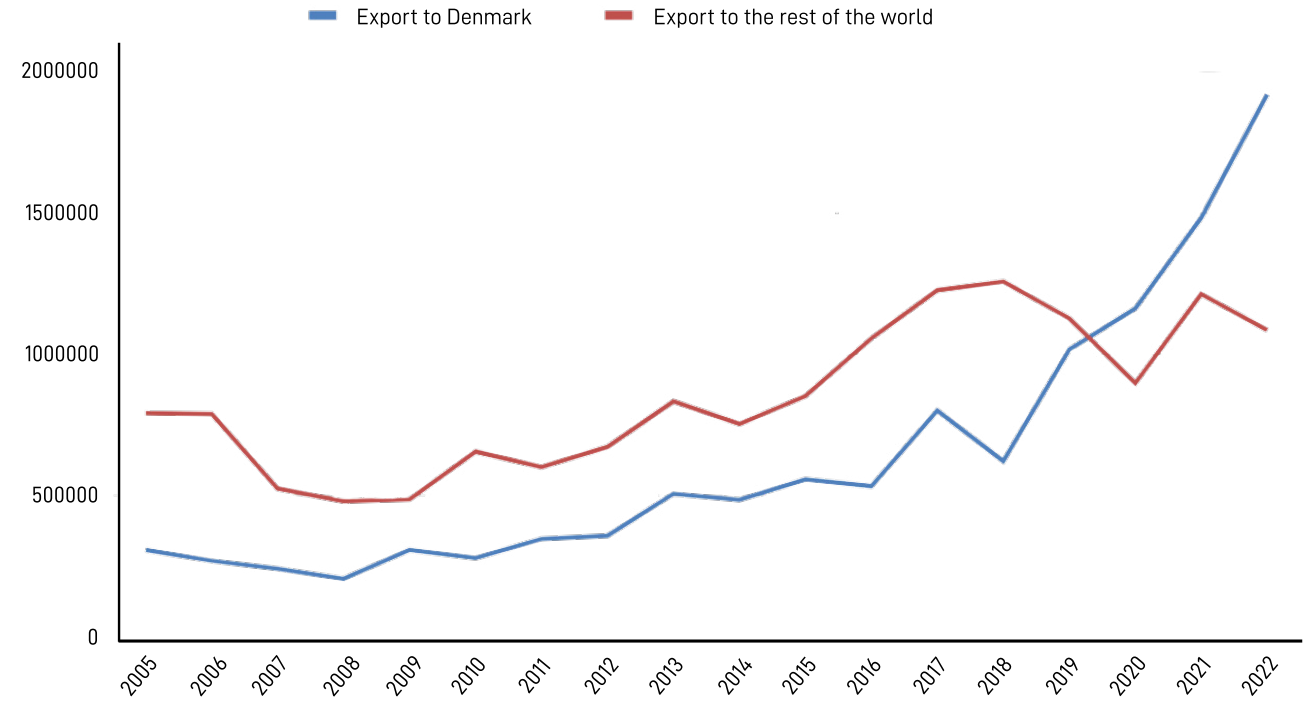


Figure 13. Total fuelwood (in tons) export from Estonia to Denmark and to the rest of the world[73].

The situation is rather similar in Latvia. The importance of fuelwood in wood product export in Latvia has increased dramatically. In terms of value, it was 7.8% of total wood product export in 2005 but 16.1% in 2022 (Fig. 14). During the same period, the fuelwood export from Latvia to Denmark has increased steadily, reaching 960.000 tons in 2022. The relative importance (in terms of amount, not value) of Denmark as a fuelwood export market has also increased: from 10% of total fuelwood export in 2005 to 21% in 2022 (Fig. 15), making Denmark the biggest importer of fuelwood from Latvia in 2022[74].

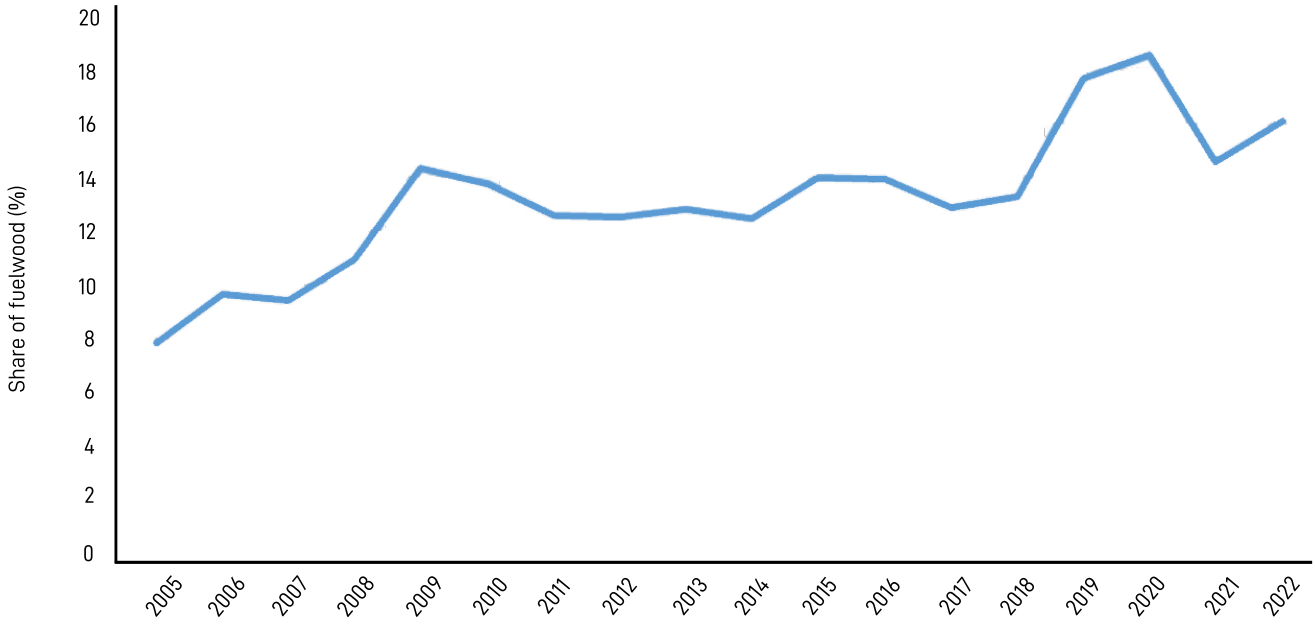


Figure 14. Fuelwood share of total wood product exports in Latvia[74]

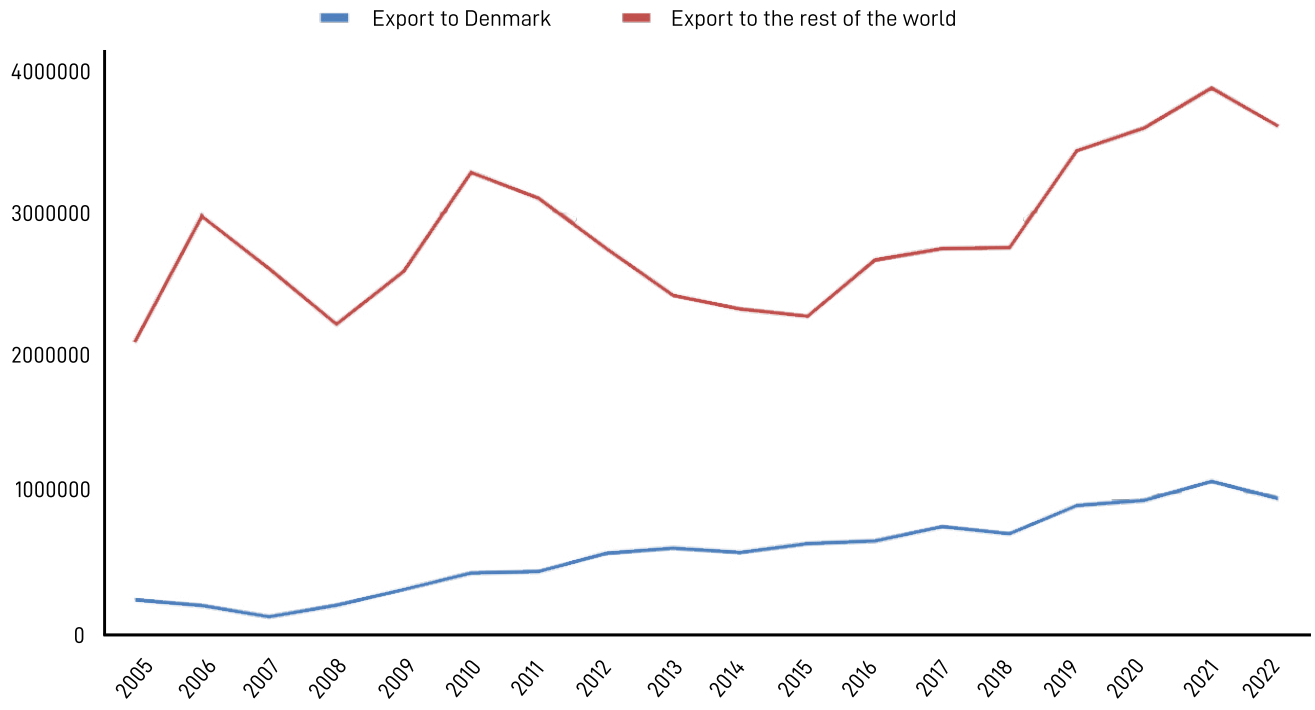


Figure 15. Total fuelwood (in tons) export from Latvia to Denmark and to the rest of the world[74]

It is clear that due to the importance of biomass export markets, the demand for woody biomass for energy is an important, though not necessarily the only, driver of the logging intensity of forests and the loss of the forest carbon sink in both Latvia and Estonia. Also, the increase in the share of fuelwood of total wood product exports indicates that the growing demand for fuelwood is a driver of logging intensity. Representatives of the timber industry have also pointed to the price of fuelwood (or wood pellets in particular) as one of the factors driving the fluctuations in logging volumes[75,76,77,78].

Policy, not just market forces, also has an impact on logging volumes and the demand for fuelwood in Latvia. In 2022, the Regulation on Felling Trees in Forest[79] was amended by the Cabinet of Ministers with a specific aim to increase the supply of fuelwood (specifically wood chips). This was done by reducing the final felling diameters (the threshold values for final felling to be allowed). As this amendment posed serious risks to forest biodiversity, environmental NGOs submitted a complaint to the Constitutional Court, and in April 2024 the court cancelled the amendments[80].

Residues

A second way to meet the Danish Climate sustainability demands is to ensure that only wood residues are used for fuelwood production. However, the term 'residues' can be misleading. While it may give the impression that only wood-processing leftovers are used, the term actually applies also to 'primary feedstock', i.e., trees taken directly from forests[81]. While some of it may comprise tree-tops and branches, harvesting of which would have less negative impact on carbon balance and forest ecosystems, it also includes tree trunks/roundwood, which is deemed unsuitable for other use in the timber sector but can be of crucial importance in forest ecosystems (e.g., trees with micro-habitats or exceptionally large trees). Harvesting and burning of tree trunks also has an important adverse impact on carbon balance[82].

As mentioned before, Graanul Invest is the biggest pellet producer in Estonia and Latvia, which is why this company is used as an example in this report. In all of the Graanul plants the main (62–73%) feedstock is 'SBP compliant primary feedstock'. It is not clear how much of this is roundwood, though clearly it is part of this category as the reports state:

Osula Graanul pellet factory, Võrumaa, Estonia; 21st May 2024. Photo: unwisemonkeys

"*...forestry returns that end up in the energy sector are low-quality wood, logging residues, and defective logs.*" Therefore, it is clear that most of the feedstock used by these companies comes directly from the forest, but the amount of roundwood used is unknown. The material is mainly obtained from clearcuts and thinning.

If it is not certain that only residues are used and if the forest carbon sinks in Estonia and Latvia may be declining then the only way that the demands on climate sustainability in the Danish Law can be met is if the forests in the sourcing area are certified. As previously described, certifications are no guarantee that the wood doesn't come from protected areas which leads to another additional demand in the Danish sustainability law.

Protection of species and habitats

The Danish law also requires that particularly valuable areas are identified and protected and that requirements for consideration of special species exist. This demand is considered fulfilled when a management system at the sourcing area level ensures that the harvesting area is assessed and reviewed in the field before harvesting by a competent person. The review is required to be documented in maps and work descriptions that can be used by relevant parties and ensure that the identified values and species are protected. The SBP, FSC-Forest Management and PEFC-Forest Management certification systems are examples of management systems at the sourcing area that could be recognised as evidence that the additional sustainability requirement for woody biomass is met.

But as demonstrated in previous sections, protected species and habitats are threatened by forestry in both Estonia and Latvia. The claim that forests where woody biomass for Denmark is sourced are managed to ensure the protection of species and habitats according to Danish Law is not supported by data.

SBP has developed a risk assessment for both Latvia[83] and Estonia[84].

In Latvia, two biodiversity risks are highlighted:

- Nesting areas for a number of species including those in the Birds Directive Annex 1 are not identified and registered in the forest register databases and thus in practice are unprotected outside those territories with a special protection regime.
- There is a threat of significant damage to woodland key habitats and EU-protected habitats located in private forests.

In addition to the first point, it must be noted that in both Estonia and Latvia there is no obligation (neither by law nor by certification standards) to survey the particular forest plot for protected species before harvesting. This does not seem to live up to the additional Danish criteria which states that the harvesting area should be assessed prior to harvesting and reviewed in the field by a competent person[29].

Regarding the second point, as the data by Latvian Nature Conservation Agency shows, the EU-protected habitats are destroyed not only in private forests but also in state forests. This means that this risk is greatly underestimated by the aforementioned risk assessment.

In the case of Estonia, there are three biodiversity-related specified risk objects based on the SBP risk assessment:

- Officially registered woodland key habitats (WKHs)
- Potential WKHs
- Natura forest habitat types that are in Natura protection areas limited management zones

The specified risks above are valid only for non-certified private forests. This is because, according to Estonian legislation, protecting WKHs is optional for private forest owners. They can choose to sign a contract with the State to protect WKHs. In such cases, the State pays compensation to the owner for the protection of the WKH. If the private forest owner does not want to protect the WKH they are allowed to cut it.

Graanul Invest (and some other companies) measures to mitigate these risks are clearly insufficient. The Supply Base Report for Graanul Invest says: "Theoretically, the biggest risk is related to the largest suppliers, as it is possible to control only a part of their work on a random basis, but in Graanul Invest group companies, this risk is reduced by purchasing wood from large suppliers with FSC Controlled Wood references." However, it is evident that in FSC and PEFC-certified forests and forests managed under FSC Controlled Wood, habitats of specially protected species as well as EU-protected habitats are both being destroyed (see above).

Furthermore, some issues not addressed by the SBP Risk Assessment cannot always be dealt with on a stand level, including:

- destruction of birds' nests (including threatened and protected species) due to logging during the breeding season
- increasing tree cover loss and the resulting forest fragmentation due to the prevailing forest management by clear-cuts
- loss of forest carbon sink

The loss of potential and unmapped high conservation value forests has happened in Estonia also under FSC certification. It is estimated that around 5700 hectares of unmapped woodland key habitats were logged from 2010 through 2019[85] in the state forest that is FSC-certified to this day and was also certified while cutting these forests. It is important to note that woodland key habitats are the last remaining old-growth forests in Estonia and are hotspots for threatened forest species[86].

Woodpile from logging in FSC-certified state forest. Loboria pulmonaria, a red listed lichen that has lost 81% of its habitats within the past 100 years in Estonia, can be seen growing on a log[87]

The mitigation measures implemented by producers based on the SBP Risk Assessment are not sufficient to ensure that feedstock for woody biomass production is sourced from sustainably managed forests.

conclusions

Based on the findings presented in this report, it can be concluded that:

- Forest certification schemes, or risk mitigation measures, cannot guarantee that wood chips and wood pellets exported from Latvia and Estonia comply with the Danish sustainability law.
- Overall forests in Latvia and Estonia are not managed sustainably and some of the national scale issues in forest management cannot be solved by certification schemes focusing on individual stands or holdings.
- Pellet producers indicate the whole of Latvia and Estonia as their supply base without disclosing exact areas of sourcing wood and there are no demands on the companies that import woody biomass to Denmark to provide geographical information on source area to the public.
- Therefore, it is not possible to evaluate if the forests from which the wood exported to Denmark is sourced are managed any better than business as usual, but that is highly unlikely due to the large share of exported fuelwood from Estonia and Latvia that Denmark imports.
- Furthermore, even if the Danish sustainability law were followed to the letter, the burning of woody biomass is still emitting greenhouse gases. The time it takes to reach the carbon parity point is so long as to worsen climate change for decades which is not an effective climate strategy, especially given that the Paris Agreement targets are becoming increasingly unlikely to be reached[88].
- Introducing new demands in the Danish law, which can be met by using the current ineffective certification schemes, will not solve the issues that are described in this report.

Recommendations

Based on the findings in this report we recommend that Denmark phase out the use of woody biomass for energy. And as the first step in that direction, Denmark should stop importing woody biomass for energy from Estonia and Latvia because, as this report demonstrates, it is extremely doubtful that supply imported from these countries live up to the Danish sustainability law and because it can contribute to the declining state of the forests in Latvia and Estonia.

Clear cuts in Natura 2000 sites, Võru, Estonia; 31st May 2024. Photo: unwisemonkeys

Photo: unwisemonkeys

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NO SMOKE WITHOUT FIRE

How the Danish energy transition harms the forests of Estonia and Latvia

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About NOAH:
The planetary boundaries are already significantly exceeded. The Global North uses and has historically used the most resources and bears the main responsibility for environmental degradation and global warming. A sustainable transformation of local and global production, transportation and consumption patterns is necessary, if all present and future generations are to have equal access to the Earth's resources without overburdening the environment. NOAH fights for a just and sustainable world where decisions are made democratically. We fight for environmental justice.

NOAH is the Danish member of the largest international network of environmental organisations, Friends of the Earth.

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