Activities of the state in developing wind power

Are the state's activities contributing to the faster establishment of wind farms?

Photo: Utilitas Image Bank

Report of the National Audit Office to the Riigikogu

Tallinn, 25 January 2024

Preface

The European Network of Transmission System Operators for Electricity (ENTSO-E) has concluded in its resource adequacy analysis that Estonia's power generation capacity deficit will be resolved in 2030, provided that large amounts of renewable generation capacities are added. In 2022, the Riigikogu (Parliament of Estonia) adopted a national renewable energy target in the Energy Sector Organisation Act, according to which the quantity of renewable electricity produced from 2030 will be the same as the total amount of electricity consumed in a year.

The Estonian TSO, Elering AS, forecasts that 9.4 TWh of electricity will be consumed in Estonia in 2030. In 2022, 2.6 TWh of electricity was generated from renewable energy sources. This means that less than a third of the national renewable energy target has now been met.

No major wind farms have been built in Estonia over the last decade and only in the last few years, steps have been taken to remove obstacles and simplify processes to speed up the construction of wind farms. Positive examples include reducing the restrictions imposed by national defence constraints, tackling the problem of so-called phantom customers, i.e. customers who reserve grid's capacity but do not actually provide electricity, or some of the initiatives that support the transition to renewable energy financed under the REPowerEU scheme of the European Union.

Can the national target be met by 2030? According to the Ministry of Climate, this will require the construction of wind farms with a capacity of around 2,000 MW onshore or 1,500 MW offshore. The National Audit Office finds that the necessary number of wind farms will probably not be completed by 2030, given the known measures that have been implemented so far. The Ministry of Climate is more optimistic.

The doubts of the National Audit Office are enhanced by the fact that simply building wind farms and creating capacities is not enough to achieve the target. The target will be met if these capacities to be created also generate electricity. Wind farms generate electricity when the wind blows and there is a use for all the electricity produced at the same time. When the national target is met, or even almost met, Estonia will have considerably more production capacities than peak consumption. This in turn means that simply building wind farms will not be enough to meet the 2030 target. It is at least equally important to address the creation of storage capacities and additional external interconnections, which would make it possible to export the electricity that exceeds Estonia's consumption and create the preconditions for the development of energy-intensive industry in Estonia. Also, the place nuclear energy will have in Estonia's energy portfolio in the future should be carefully analysed and decided in the near future when setting and implementing renewable energy targets.

At the end of 2023, the National Audit Office submitted to the Riigikogu an annual report on the alternatives for the Estonian electricity system. In relation to the creation of storage capacities, it had to be noted in the report that the Ministry of Climate is working on making the regulatory environment more favourable for storage capacities but lacks clear objectives for the promotion of the establishment of storage capacities

and an action plan for the implementation of the objectives set. These could be in place if the target set for 2030 is to be met. In the annual report, the National Audit Office also addressed the establishment of additional international connections. In the report, we pointed out that while the Ministry of Climate is planning new electricity interconnections, no decision has been made on any new connections, and their construction depends on the cost-effectiveness and financing options of the projects. It is a positive development that in early January 2024, the Government of the Republic received the materials for the initiation of the national designated spatial plan and the strategic environmental assessment of the Estonia-Latvia fourth electricity interconnection.

The problem with electricity export is that when the wind is blowing in Estonia, it's very likely that the wind is also blowing in the neighbouring countries and that they also produce more wind energy at exactly the same time. In the case of international connections, it must also be taken into account that electricity doesn't only move out of Estonia, but also into Estonia in an open electricity market. This means that the creation of international connections will provide an opportunity to export surplus electricity, but at the same time, their construction will also increase the supply of wind power in Estonia during windy periods. In the process of establishing connections with neighbouring countries, the actual possibility of exporting electricity will also depend on whether our neighbouring countries themselves establish further connections with other countries.

The goal of creating more renewable energy capacity may be crazy in isolation, if it's not pursued in parallel with the promotion of storage capacities, creation of conditions for electricity exports and attracting energy-intensive manufacturing investment to Estonia. If these issues are not solved, we'll have several times more potential capacity than consumption during some hours, and electricity production in some wind turbines will therefore have to be stopped. And if the capacities are not employed, but the fixed costs of the investment are allocated to the amount of electricity produced, this means that as electricity consumers, we pay for this unused capacity in one way or another. We will also pay if price guarantees given to producers to encourage them to implement renewable energy projects prove too generous and significantly exceed future market prices. More capacity to generate electricity does not automatically mean cheaper electricity. Consumers will get reasonably priced electricity if the best possible balance between supply and demand is achieved.

Success in meeting the renewable energy target will depend on how the measures that have been initiated are implemented and what additional measures the Ministry of Climate implements in the coming years. The measures taken in previous years and the new measures launched have certainly set the stage for rapid progress towards the renewable energy target. Finally, there is no reason to over-dramatise a situation where the target is not reached, but we get close to it. However, we need to avoid a situation where we're creating power that has no user and cannot be stored during a windy period.

Regarding the year 2030, it's important to emphasise what I pointed out in my 2023 annual report to the Riigikogu: "If the planned amount of

renewable energy were added after 2030, Estonia would have sufficient electricity generation capacities, but it would lack controllable production capacities. However, controllable generation capacity is needed, among other things, to ensure the frequency of electricity in the grid. The choices and decisions necessary to ensure controllable capacity must be made as soon as possible.

Janar Holm
Auditor General 25 January 2024

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Summary of audit results

The Ministry of Climate and the Ministry of Regional Affairs and Agriculture have planned and implemented several actions to accelerate the development of wind farms. However, given the deadline set in the Energy Sector Organisation Act, these actions may not be sufficient and it's unlikely that the renewable electricity target can be met by 2030. The main reason for this is that the planning and environmental impact assessment procedures, which we launched earlier, have not been made sufficiently efficient. It was also found during the audit that the EU money intended for acceleration of the uptake of renewable energy has partly been set aside and already used for activities with a questionable and indirect impact on the renewable electricity target.

Key observations

- **The amendments made in 2023 to speed up the main procedural instrument for wind farm planning – the municipal designated spatial plan – do not allow for the acceleration of planning procedures initiated before the amendment.** Most designated spatial plan procedures are already ongoing and following the changed to the procedural rules mean that certain procedural stages would have to be repeated. The main change is to waive the detailed solution stage of a designated spatial plan under certain conditions. This should make it possible to shorten the process by about two years for plans initiated after the change is made: from 4–5 years to 2–3 years. However, the time saved by eliminating the detailed solution stage is still not clear, as according to the experts, it's uncertain whether this simplification can be implemented.

- **It's possible to shorten the duration of an environmental impact assessment by agreeing on key principles and improving the use of environmental data.** Environmental impact assessment is usually the most time-consuming stage in the development of wind farms. This procedure can be made faster without sacrificing the quality of the assessment.

  The measures ministries have implemented so far to speed up the environmental impact assessment of wind farms will provide a time gain of only about 1–2 months. A major problem that makes environmental impact assessment more burdensome and time-consuming is the lack of agreement on which impacts are significant

and which are less significant. According to specialists, a great deal of time is spent on insignificant impacts, which could be excluded from the assessment.

Environmental assessment can also be made more efficient, faster, and cheaper by aggregating environmental data and making them available. As there is generally no high quality and up-to-date information on what the environmental conditions of wind farms planning areas are like, extensive surveys (e.g. on birds, bats, vegetation, marine life) have become part of every impact assessment. There is also no overview of surveys related to wind farms and data collected within the scope of monitoring, which makes it impossible to shorten the environmental impact assessment procedures to a greater extent. Creating an overview of surveys would give impact assessment experts the opportunity to reduce the volume of new surveys and to harmonise assessment methodologies.

- **The positions of the Ministry of Economic Affairs and Communications (the Ministry of Climate) on how to support the establishment of wind farms and meet renewable electricity targets have been contradictory.** Over a short period of time, the ministry has taken the view that onshore wind farms have a low probability of success and are insufficient to meet the renewable electricity targets set for 2030 but has also found that Estonia's renewable electricity needs can only be met by onshore wind farms, which no longer need support. However, a reverse auction for onshore wind and hybrid farms (which gives price guarantees to producers) was carried out in 2023. To facilitate the establishment of offshore wind farms, the Ministry of Climate carried out an analysis of whether and to what extent these developments would need financial guarantees (e.g. price guarantees) or other support (e.g. by building a transmission system, speeding up planning procedures). The ministry has not made any clear decisions so far.

- **There are plans to grant the support allocated for acceleration of renewable energy development from the Recovery and Resilience Plan REPowerEU – €32 million – not only to necessary activities, but also to activities that are not essential for the promotion of renewable energy.** For example, there are plans to allocate money for the purchase of equipment that is only indirectly connected to the acceleration of renewable energy and the need for which has not been explained by the parties. According to the Ministry of Climate, the plan is to create jobs for the performance of land operations, for example, but until municipal designated spatial plans are adopted, the need for the creation of jobs is not clear. EU support for the acceleration of renewable energy will end in 2026, but the spatial plans will not be adopted by then.

In the context of the reallocation of the areas of responsibility of ministries after 1 July 2023 (see Table 2), the audit recommendations are made to the Minister of Climate and the Minister of Regional Affairs.

Recommendations of the National Audit Office

Main recommendations

- The Ministry of Climate, in cooperation with the Environmental Board, impact assessment experts and experts, agree on the limits of acceptable negative environmental impacts and the most important impacts to be assessed. This helps to focus the environmental impact assessment of wind farms and to find suitable areas for the construction of wind farms.
- The Ministry of Regional Affairs and Agriculture, in cooperation with the parties involved, should resolve the practical issues in the planning and environmental impact assessment procedures that cause confusion, waste the time of local authorities and slow down the proceedings. For example, to resolve the question of whether a power line needed for a wind farm should always be treated as a structure with a significant spatial impact, and which type of plan should be used for planning its location.
- The Ministry of Climate should use the money from the REPowerEU support measure only for activities that have a clear link to meeting the 2030 targets.

Response of the Minister of Climate: the Minister agreed with many of the observations and recommendations made in the audit. However, according to the Minister, the conclusion that Estonia may not reach the 2030 renewable electricity target is not based on the audit analysis or the current situation. The Minister refers to the assessment prepared by the Environment Agency that the projected total capacity of onshore wind farms under development and to be completed before 2030 is sufficient to meet the renewable electricity target. According to the Minister, the potential for onshore wind power generation must be used first of all in order to achieve the target. Offshore wind farms are essential to meet the increasing electricity demand after 2030.

According to the Minister, investment decisions have already been made at a level that will ensure that 50% of the target is met. The Minister agreed that EU funding must be used wisely and for the accelerated development of renewable energy, and that the activities covered by the REPowerEU have been selected with this in mind. The reverse auctions planned by the Ministry of Climate will have a positive impact on the next investment decisions. Discussions have also been launched on granting price assurance for the projects needed to achieve the objective.

Comment of the National Audit Office: the Ministry of Climate and the Ministry of Agriculture of Regional Affairs and Agriculture have implemented several actions in recent months that accelerate the development of wind farms. Despite this, meeting the target set for 2030 is doubtful. The audit report highlights several problems that continue to obstruct the development of onshore wind farms – for example, the length of planning and environmental impact assessment proceedings and problems with connection to the grid.

Response of the Minister for Regional Affairs: the Ministry of Regional Affairs and Agriculture will continue to analyse the possibilities for shortening the planning proceedings of local authorities. Parties are

also offered assistance in the preparation of plans (interpretation of the law, training, drafting of guidelines, etc.).

The Minister of Regional Affairs explained how to solve practical issues in planning. The Ministry has worked on and continues to work on a number of these issues. However, in some issues, the Minister finds that there is no need for the Ministry to take further action.

Response of the Director General of the Environmental Board: The Environmental Board has several activities underway to help accelerate the development of wind power. For example, organising and collating data on the environmental status, organising advice and training, etc.

As the principles for the significant impacts of wind farms are agreed, the Environment Agency says it must be considered that knock-on impacts are site-specific and depend on the proposed activity, the planning area and the surroundings. In agreeing the acceptable impacts of wind farms, the Environment Board recognises that some compromise will be necessary. At the same time, it's very important to agree on values that must be defended at all costs. It is also very difficult to agree on an acceptable mortality rate for certain protected birds, as it's difficult to reconcile this with the bird conservation objectives of the European Union.

Contents

Overview

National targets:

- at least 100% renewable electricity by 2030;
- renewable energy export.

Did you know that

1 TWh = 1000 GWh = 1 000 000 MWh.

According to the forecast of Elering AS, Estonia will consume **9.4 TWh of** electricity in 2030.

Source: Elering AS, 2022. Security of Supply Report of the Estonian Electricity System

Controllable generation capacity – an electricity generation device the generation capacity of which can be quickly adjusted, i.e. which can produce more or less electricity as required.

Renewable electricity generation capacity in 2022

- solar – 510 MW;
- wind – 317 MW (144 turbines)[4];
- biomass – 368 MW;
- other – 8 MW.

Source: Elering AS, 2022. Security of Supply Report of the Estonian Electricity System. Page 99

1. In 2022, the Estonian state set a target – renewable electricity must account for at least 100% of Estonia's final electricity consumption by 2030 (also referred to as the RE100 target).[1] This means that the quantity of renewable electricity produced in 2030 will be the same as the total amount of electricity consumed in a year. Until now, the target had been for renewable electricity production to account for 40% of final electricity consumption by 2030, but in the light of changing security, the climate crisis and high energy prices, the state wants to ensure its ability to generate its own electricity more quickly, meet climate targets and curb electricity price rises.

2. To meet the renewable electricity target, there must be sufficient renewable electricity generation capacities and grid connections, and the overall balance of the electricity system must be ensured.

3. In addition, the action programme of the Government of the Republic for 2023–2027 includes the wish for Estonia to become a state that exports renewable energy.[2] The source of renewable electricity generation with the highest growth potential is wind power, in particular offshore wind farms.[3]

Electricity consumption and generation

4. 8,2 TWh of electricity was consumed in Estonia in 2022.[5] 7.6 TWh of electricity was generated.[6] Thus, domestic consumption in 2022 was higher than production (i.e. in deficit). Electricity was imported into Estonia via the Finnish and Latvian interconnections to cover consumption needs.

5. The total electricity generation capacity in Estonia was 2,543 MW in 2022.[7] According to the national TSO Elering AS, the controllable generation capacities among them were 1,708 MW, including 368 MW of cogeneration plants that use biomass. In addition to capacities using biomass, there were 835 MW of other renewable electricity generation capacities (solar, wind, hydro).[8]

6. Fossil fuels are still predominantly used for electricity generation in Estonia: oil shale and natural gas. Renewable energy sources (solar, wind, hydro, biomass, biogas) account for 35% of electricity generation (see Figure 1).

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[1] Energy Sector Organisation Act, § 32[1]. Final consumption of renewable electricity is calculated as the amount of electricity produced from renewable energy sources.

[2] Action Programme of the Government of the Republic 2023–2027, fundamental principle 6.1.6.

[3] energiatalgud.ee (wind power resource) managed by the Ministry of Climate.

[4] The Purtse Wind Farm (21 MW) was added in 2023.

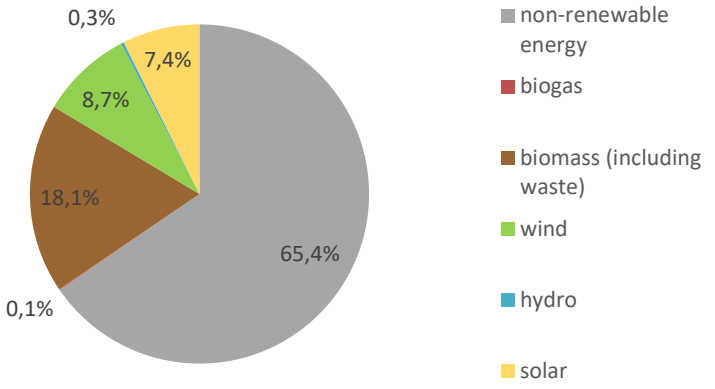
[5] Source: https://dashboard.elering.ee/et Added to this are losses, which amount to 4% of total consumption.

[6] Electricity supplied to the grid by fuel type (Excel table). Elering AS website, 15.06.2023.

[7] In addition, there is the off-market generation capacity of 250 MW at the Kiisa emergency reserve power plant.

[8] Elering AS, 2022. Security of Supply Report of the Estonian Electricity System. Page 99.

Figure 1. Share of energy sources used for electricity generation in 2022



Source: National Audit Office according to Eesti Energia AS (electricity supplied to the gird by fuel type)

Did you know that

In 2022, there were no hours in Estonia when wind turbines did not generate electricity. Solar power was not produced 39% of the time.

Source: Real-time overview of Elering AS Elering live on electricity generation and consumption

7. In 2022, a total of 2624 GWh of renewable electricity was produced in Estonia[9], of which:

- biomass (including waste incineration) 1,372 GWh;
- wind 664 GWh;
- solar 560 MW;
- other (biogas and water) 28 GWh.

8. Renewable electricity covered a third of Estonia's final electricity consumption in 2022. Thus, renewable electricity generation would have to increase at least threefold to cover Estonia's electricity consumption. The greatest potential in meeting the target is seen in the promotion of wind power, as industrial incineration of wood for electricity generation is to be phased out[10] and the potential for hydropower is almost non-existent in Estonia. The potential of solar energy can be exploited more than today[11], but it is much less efficient than wind, i.e. there are far fewer hours when power can be generated (see Table 1).

Did you know that

quantity of electricity generated (Wh) = power of generation equipment (W) × number of hours operated (h).

Table 1. Efficiency of wind and solar power and sample calculation of power generation

Energy source	Efficiency (%)*	Power generation (sample calculation) GWh/a
Offshore wind turbine	50%, i.e. 4,380 h/y	A wind turbine with a capacity of 10–15 MW generates 43.8–65.7 GWh/y.
Onshore wind turbine	35%, i.e. 3,066 h/y	A wind turbine with a capacity of 5 MW generates 15.3 GWh/y.
Solar panel	10–15%, i.e. 900–1,300 h/y	A 2.4 ha solar farm with 1.4 MW capacity generates 1.3–1.8 GWh/y.

* The forecast for 2050 is that the efficiency of offshore wind turbines will rise to 57% and that of onshore wind turbines to 43%.

Source: The National Audit Office based on the data of the Danish Energy Agency (Technology data – generation of electricity and district heating)

[9] Electricity supplied to the grid by fuel type (Excel table). Elering website, 15.06.2023.

[10] Action Programme of the Government of the Republic 2023–2027, fundamental principle 6.1.23.

[11] According to the forecast of the Green Tiger Energy Roadmap (2023), the total capacity of solar farms will exceed 1,300 MW in 2030 and 1,550 MW in 2040.

Did you know that

Estonia's largest wind farm so far is the Aulepa wind farm with a capacity of 48 MW.

9. The Ministry of Economic Affairs and Communications (MEAC) has estimated that the increase in wind power production to cover Estonia's electricity consumption would need to be at least 4.9-6.1 TWh, i.e. either around 2,000 MW of onshore capacity or 1,500 MW of offshore capacity.[12]

10. As of the end of summer 2023, there are more than 3,800 MW of onshore wind farms in the planning stage, which developers themselves consider likely to be operational by 2030.[13] Points 70-103 of this report highlight the risks, which show that building such capacity within the desired timeframe is not realistic. Onshore wind farms with a capacity of at least 315 MW are under construction from 2023–2025.[14]

Did you know that

the total potential for wind power generation of the Baltic Sea is estimated at 93 GW.

Source: Study on Baltic offshore wind energy cooperation under BEMIP. Final Report. European Commission. 2019

11. Among the offshore wind farms planned, three of the so-called first-wave developments with a total capacity of up to 3,600 MW have progressed further (building permit procedures and environmental impact assessments (EIA) have been initiated).[15]

12. There are 2,439 km^2 of areas suitable for wind power development in the Estonian maritime area, for which the Government of the Republic has established maritime area planning with an estimated potential of 15–17 GW.[16] Thus, Estonia's potential for wind power generation is much higher than needed for domestic electricity consumption.

Impact of wind farms and restrictions on their construction

Environmental nuisance – the direct or indirect adverse effects on the environment, including effects on human health, well-being or property, or on cultural heritage, resulting from human activities. An environmental nuisance is also defined as an adverse environmental effect that does not exceed a numerical standard or that is not regulated by a numerical standard.

Source: General Part of the Environmental Code Act, § 3

13. The most significant negative environmental impacts of wind farms are related to the environmental nuisances emerging during their construction and operation. This establishment of wind farms includes the installation of wind turbines, the construction of roads, deforestation where necessary, and an increase in road traffic, which generates noise and air pollution. The operation of wind turbines creates noise, vibration, shading, the turbines are physical obstructions and thus have an adverse impact on birds[17], bats, marine life, and natural habitats. Visual disturbance is also important for many people.[18]

14. Compared to power plants operating on fossil fuel, wind turbines do not produce emissions to air or water, waste or use cooling water when in operation (except for some impact arising from operation and maintenance). Compared to power generated from oil shale, the

[12] Deputy Secretary General of the MEAC Timo Tatar. Journey to 100%. Policy choices (presentation). 13.06.2023.

[13] Presentation of the MEAC – Analysis of the Achievement of 100% RE 2030. 15.06.2023.

[14] The Sopi-Tootsi (255 MW) and Purtse wind farms of Enefit Green (21 MW) and the Saarde tuulepark of Utilitas (39 MW).

[15] Offshore wind farm of Saare Wind Energy (up to 1,400 MW), Saare-Liivi offshore wind farm of Utilitas (1,200 MW), Bay of Riga offshore wind farm of Enefit Green (1,000 MW). The single Nasva wind turbine in Saaremaa (4 MW) is also pending.

[16] Website of the Consumer Protection and Technical Regulatory Authority (30.06.2023).

[17] See e.g. the impact of wind turbines on birds: Estonian Ornithological Society, Eagle Club. 2022. Nationwide analysis of land birds. Annex 3.

[18] According to the Wind Farm Survey (Kantar 2021), onshore wind farms are a visual nuisance for 1/2 and offshore wind farms for 1/3 of the population.

environmental impact per kWh of wind power production is almost 200 times lower over the lifetime of a power plant[19].

Did you know that

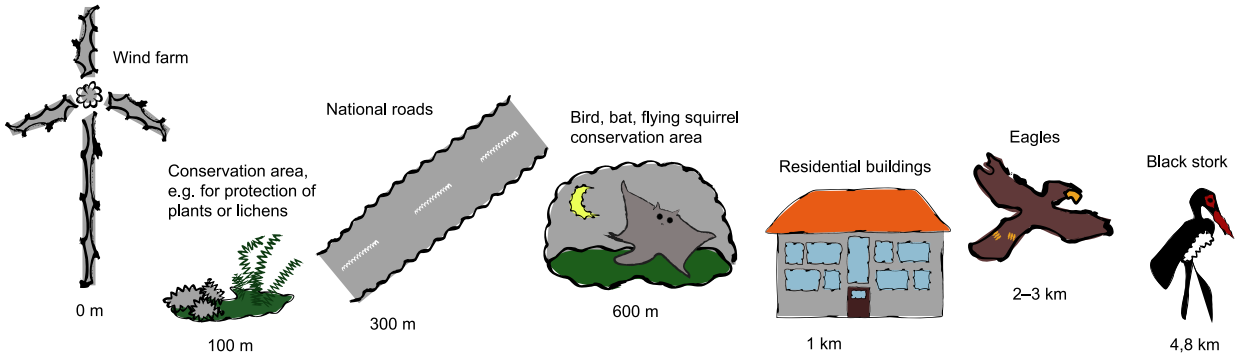
the biggest wind turbine producers Siemens Gamesa and Vestas are developing turbines that are fully **recyclable** (i.e. can reused as materials).

Sources: Siemens Gamesa website, Vestas website.

15. In the case of wind turbines, the extraction and production of the materials needed for their construction has the greatest environmental impact, while the construction and operation/maintenance of the wind farm has a smaller impact.[20] Waste is generated at the end of a wind turbine's life, much of which can be recycled. For example, steel and aluminium, which account for 2/3 of the impact of material use, can be fully recycled. Turbine magnets are used to produce new magnets. The main problem is the recycling of epoxy and fibreglass turbine blades, but they can be crushed and incinerated to generate energy and used as a material in cement production.

16. The impact and nuisances associated with wind farms means they cannot be built everywhere. Construction is limited by the protection of species and habitats (nature reserves, bird migration routes, protection of nest trees), human settlements, technical installations, etc. For example, wind farms are generally not planned closer than one kilometre to residential buildings. Examples of the extent of the restrictions related to wind farms are shown in Figure 2.

Figure 2. Scope of restrictions on onshore wind farms*



* Restrictions related to feeding areas may be added in relation to protected birds.

Source: Environmental Board, Environment Agency, Estonian Ornithological Society

Did you know that

to lift the height restrictions on wind farms, the state is investing €141.5 million in new radars for the Defence Forces.

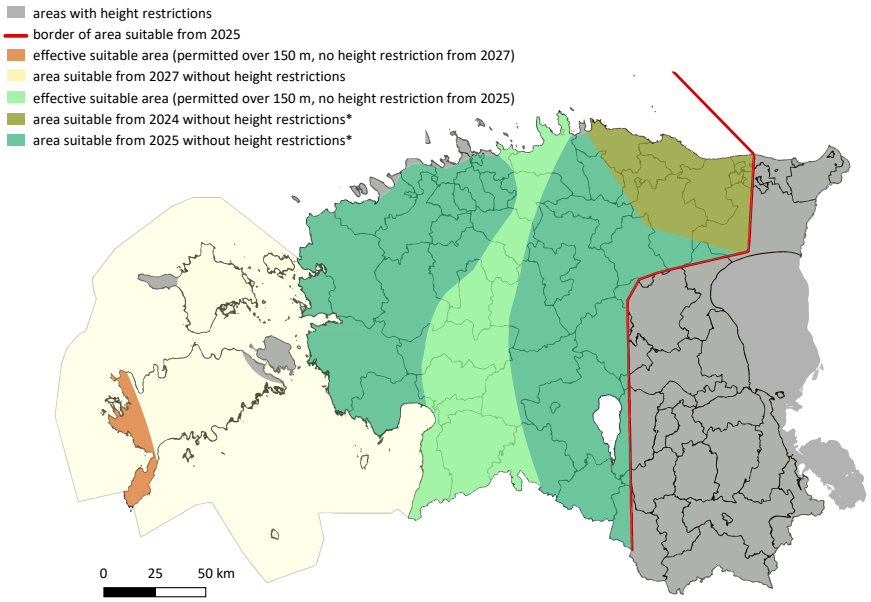
Source: Centre for Defence Investment

17. So far, height restrictions have been established on wind turbines in Estonia to protect the operation of national defence structures or their construction has been prohibited in full, as wind turbines interfere with the detection of objects by radars and radio reconnaissance activities. However, most of the territory of Estonia will be free of height restrictions from 2024–2027 (see Figure 3).

[19] Specific CO_2 emissions of oil shale power 1,040 g/kWh (A. Siirde, "Analysis of Greenhouse Gas Emissions from Estonia Oil Shale Based Energy Production Processes. Life Cycle Energy Analysis Perspective," Estonian Academy Publishers, Tallinn, 2013). Special CO_2 emissions of a wind turbine 6 g/kWh (Siemens Gamesa, Environmental Product Declaration SG 8.0-167 DD (product declaration of a wind turbine).

[20] Environmental Product Declaration SG 8.0-167 DD. Siemens Gamesa (wind turbine product declaration).

Figure 3. Areas where height restrictions related to national defence will be lifted for the development of wind farms



* Excluding in the area of the eastern border and areas close to radars.

Source: National Audit Office according to the data of the Ministry of Defence and the Ministry of Regional Affairs and Agriculture

18. Even if a potential wind farm development area is outside any restricted areas, a site-specific survey (e.g. potential locations of protected species and habitats, marine fish breeding areas and bird migration corridors) must generally be carried out to identify the location with the least potential impact and to develop mitigation measures.

19. It is also important to consider other needs for land use (e.g. agriculture, settlements, infrastructure) and the opinions of local people when establishing onshore wind farms. At sea, shipping routes and flight paths must be considered.

Parties involved in the development of wind power and procedure for building wind farms

The Ministry of Climate is responsible for meeting the RE100 target

20. The Ministry of Climate (formerly the MEAC and the Ministry of the Environment, see Table 2) is responsible for the energy sector. Among other things, the Ministry is also responsible for the RE100 target.

Table 2. Breakdown of renewable energy tasks in ministries and government agencies before and after the ministerial reform in July 2023[21]

Task	Before	Now
Development of the energy sector	Ministry of Economic Affairs and Communications	Ministry of Climate
Environmental impact assessment	Ministry of the Environment, Environmental Board (under the Ministry of the Environment)	Ministry of Climate, Environmental Board (under the Ministry of Climate)
Spatial planning	Ministry of Finance	Ministry of Regional Affairs and Agriculture
Coordination of the green transition/acceleration of the development of renewable energy	Government Office*	Ministry of Climate
Identification of priority onshore development areas	Environment Agency (under the Ministry of the Environment)	Environment Agency (under the Ministry of Climate)

* The Audit of Acceleration of Renewable Energy Development was prepared at the initiative of the Government Office in 2022 and it has been the basis for accelerating the development of the sector.

Source: National Audit Office

21. The RE100 target is laid down in law.[22] No impact assessment or action plan has been prepared to meet the target. The development of the energy sector is guided by the Energy Sector Development Plan 2030 (ENMAK 2030). The Ministry of Climate is leading the preparation of the new development plan, which is expected to be adopted in 2025.[23] In response to a request from the European Commission, Estonia prepared the National Energy and Climate Action Plan (NECAP). The current plan was adopted in 2019, the Ministry of Climate is in the process of updating the plan and an updated working version was approved by the government in August 2023[24]. It does not go into detail on the impacts of reaching the RE100 target or the actions needed to achieve it.

22. It must be ensured in cooperation with the environmental authorities (in particular the Environment Board) and the authorities responsible for planning (the Ministry of Regional Affairs and Agriculture, formerly the Planning Department of the Ministry of Finance, and the local authorities) that the impact of wind farms on the environment and on people is kept to a minimum, i.e. that the most suitable sites for the generation of wind power are selected in cooperation with developers.

Procedure for building onshore wind farms

23. Onshore wind farms can be established as buildings with a significant spatial impact through the preparation of a national designated spatial plan, but wind farms can also be built based on a local authority's comprehensive spatial plan, provided that it determines the locations of the wind farms. They can also be established with a municipal designated spatial plan.

24. After the establishment of the national designated spatial plan, a building design documentation is prepared, or building design specifications are issued. The establishment of a local government comprehensive plan is followed by the preparation of a detailed spatial

[21] In this audit report, the former names of the agencies have been used for the past, and new names for current and future activities.

[22] Energy Sector Organisation Act, § 32[1].

[23] Energy Sector Development Plan 2035.

[24] Minutes of the Government of the Republic session of 10.08.2023.

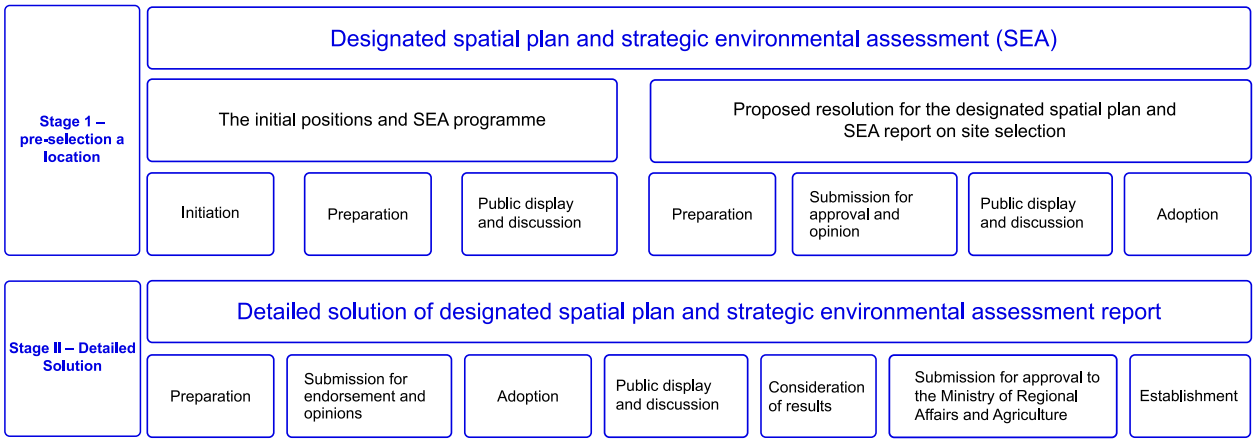
plan or the issue of building design specifications. If the location of the wind farm has not been selected in the comprehensive plan, it's possible to prepare a municipal designated spatial plan. A strategic environmental assessment is carried out at the same time when the plan is prepared. A building permit is issued after the planning procedure or the issue of the design conditions. As part of the building permit procedure, it is necessary to consider whether an additional environmental impact assessment is required.

25. Comprehensive planning procedures usually take at least three years. A detailed plan is usually prepared for areas found with the comprehensive plan and the wind farm is built. Detailed planning takes 1.5 to 3 years and depends on the speed of the environmental studies.

26. Municipal designated spatial plan is not a new planning instrument (used since 2015). They are prepared in special cases, i.e. when no areas suitable for wind farms have been selected in the comprehensive plan. Partly for this reason, and partly because of the complex procedure, no designated spatial plans have been completed in Estonia so far.

27. According to the Planning Act, which was in force until March 2023, the municipal designated spatial plan procedure was carried out in two stages – the site was pre-selected and, in general, a detailed solution was prepared. The stages of the designated spatial plan procedure are shown in Figure 4. It is estimated that the procedure will take five years. In March 2023, amendments to the Planning Act entered into force, according to which a local authority can waive the preparation of a detailed solution when preparing a designated plan for the construction of a wind farm, if all the studies that could affect the choice of location have been carried out and no significant negative impact has been identified (see point 79). As a result, the time for preparing a designated plan should be shortened by about two years in the future.

Figure 4. Stages of the municipal designated spatial plan procedure



Source: National Audit Office

Did you know that

As of 2 June 2023, 40 applications for offshore wind farm building permits with a total capacity of 52.3 GW have been submitted. As these are competing applications, the total potential capacity of wind farms is lower.

Source: Consumer Protection and Technical Regulatory Authority

Procedure for building offshore wind farms

28. The sectoral policy of offshore wind farms is shaped by the Ministry of Climate (previously the MEAC in cooperation with the Ministry of Finance and the Environment). Two marine spatial plans have been established in Estonian marine areas[25], within the framework of which a strategic environmental assessment has been carried out. Based on the plans, the possibilities of establishing offshore wind farms will be determined because of the building permit procedure and strategic environmental assessment. The procedure for a superficies licence (including auctions) are carried out by the Consumer Protection and Technical Regulatory Authority (CPTRA). After the issue of a superficies licence, a building and use permit must be requested from the CPTRA for the construction and use of the offshore wind farm, and an environmental permit for the special use of water must be requested from the Environmental Board.[26] (See also Annex B.)

Power grid and connection

29. The national TSO Elering AS is responsible for the establishment of the grid connections and substations for larger wind farms. A connection application must be submitted to connect a wind farm to the grid. A decision on the adoption of a spatial plan allowing the construction of a wind farm, the design specifications or the building permit, and a strategic environmental assessment must exist to submit an application.[27] If the wind farm is to be connected to the connection point via an overhead line, its location must be specified in the plan. (See point 82). However, if the plan is to use an underground cable for the connection, the location of the cables does not need to be specified on the plan according to the Ministry of Regional Affairs and Agriculture.

30. TSO Elering AS has three months to process the connection application, after which a connection offer will be submitted, including the cost of the necessary works. The connecting party has two months to sign the connection offer. When the connecting party signs a connection contract, the first instalment must be paid, and the TSO starts to build the connection. When the connecting party pays the second instalment, the connection will be completed. Once the necessary tests have been carried out, the grid contract can be signed, and the wind farm connected to the grid.

MVA – megavolt ampere. The unit of measurement of apparent power in the grid. Apparent power is the sum of reactive and active power. Power plants generate and consume reactive power in addition to active power, and both must be considered in grid planning.
1 MVA = 1 MW

31. According to the TSO, there are connection applicants for *ca* 4,000 MVA in total at different stages (see Table 3). Most of those who want to connect to the grid are solar and wind power generation and storage capacities.

[25] Maritime spatial planning of Estonia and Pärnu. The Hiiu maritime spatial planning does not regulate the wind power development areas. See the interactive map of maritime spatial planning.

[26] Information from the CPTRA website (30.06.2023).

[27] Grid Code on the Functioning of the Electricity System, § 19(1).

Table 3. Power grid connection applicants at different stages (as at 06.11.2023)

Capacity, MVA	Explanation
0 MVA	Connection applications and valid connection offers in the processing stage
2,950 MVA, including ▪ 1,573 MVA solar, ▪ 871 MVA storage, ▪ 260 MVA wind, ▪ 244 MVA solar/wind, ▪ 2 MVA regenerative braking energy.	Construction of connections. Connection contract signed and connection fee I paid.
1,008 MVA, including ▪ 807 MVA wind, ▪ 140 MVA hybrid power plants (solar/wind), ▪ 58 MVA solar, ▪ 2 MVA solar/cogeneration plant.	Connection points built and ready for connection to the network.

Source: Elering AS

Did you know that

1,067 MVA of wind power generation capacities have entered into power grid connection contracts (see Table 3). Most of them represent the construction of wind farms in areas covered with plans, which are located east of the eastern border of areas suitable for wind farms and where, according to Elering AS, the establishment of wind farms is unlikely due to national defence restrictions.

Did you know that

there are 3,350 MVA of production capacities with grid contracts that have been connected to the transmission system, including

- 3,060 MVA of dispatchable capacity,
- 290 MVA of wind,
- 1 MVA of solar.

There are generating capacities for 1,500 MVA among dispatchable capacities.

Source: Elering AS

32. As consumption and generation in the electricity system must be balanced at any given moment, the capacity that can be added to the grid depends on the consumption at that moment (including exports via international connections). According to Elering AS, the amount of additional generation capacities that can be connected to the Estonian grid without major reconstruction depends on the region of Estonia where the establishment of the capacity is planned. There are no free connection capacities for new producers on the islands and most of the mainland (except in north-east Estonia). There, work is needed to increase grid capacity.

Tackling the main obstacles to wind power development

33. Over the past two to three years, and especially since the 2030 renewable electricity target was set in summer 2022, the MEAC (now the Ministry of Climate), in cooperation with other authorities, has accelerated the promotion of wind power, which has the greatest potential for the transition to renewable electricity. A precondition for the accelerated development of renewable energy, including wind power, is that the state has an overview of the obstacles that slow down the development. In a context where the state's resources are limited, it's necessary to address the most important obstacles, including by involving stakeholders (developers, planners, impact assessment experts, local authorities, etc.).

34. Assuming that the promotion of wind power is of primary importance for the achievement of the RE100 target (see points 8-9), the National Audit Office examined whether the MEAC, in cooperation with the Ministry of Finance, the Ministry of the Environment and other state agencies, has

- identified, together with stakeholders, the main obstacles to the development of wind power;

- earmarked REPowerEU funds for activities that accelerate the development of renewable energy;
- taken steps to accelerate wind power projects, in particular by focusing on planning and environmental impact assessment.

Did you know that

REPowerEU support in Estonia covers

- accelerating the deployment of renewable energy (€32 million);
- increasing the capacity of the distribution network to ensure greater access to the grid for micro-producers (€38 million);
- increasing the production and use of biogas and methane (€20 million).

TOTAL: €90 million.

Not all the activities financed under the REPowerEU plan will have a direct and immediate impact on the renewable energy targets

35. To accelerate the deployment of renewable energy, including wind power, the European Union amended the Renewable Energy Directive 2018/2001[28], a directly applicable regulation for accelerated deployment of renewable energy has been established[29], the REPowerEU plan, which accelerates the transition to renewable energy,[30] has been prepared and money has been allocated to the Estonian state for its implementation[31].

36. The National Audit Office assumed that to speed up the construction of wind farms, the Ministry of Climate has identified the most important obstacles in the sector operatively and in cooperation with government agencies, wind power developers, planners, impact assessment experts and local authorities. The National Audit Office also assumed that the REPowerEU money (allocated for the achievement of the energy transition targets) will be used by the Ministry for activities that are priorities and necessary to accelerate the deployment of renewable energy and achieve the RE100 target by 2030.

Stakeholders were hardly involved in identifying obstacles

37. In 2022, the Government Office analysed the barriers to faster deployment of renewable energy and proposed solutions to overcome them.[32] The analysis focused on wind power. The issues related to planning, the strategic environmental assessment and the environmental impact assessment process, the issue of permits and the optimisation of land operations were analysed. Long and complex administrative procedures were identified as the main obstacle.

38. Unfortunately, this analysis was only carried out by public authorities. Developers and other parties (e.g. planners, environmental impact assessment experts, State Forest Management Centre) were mainly involved only after the conclusions and proposals had been made.[33] The main criticism of stakeholders[34] regarding the analysis was that there is no need to look for priority development areas also on state land (see points 51–67) and the planning and environmental impact assessment process must be made faster. Stakeholders made both more fundamental and detailed recommendations. In the opinion of the

Priority development area – areas located mainly on land owned by the state, where environmental studies are being carried out to determine their suitability for wind farms.

The studies are led by the Environment Agency and the activities are funded from the REPowerEU support. Renewables acceleration areas are later determined based on the priority development areas. See points 53, 58, 65.

Renewables acceleration areas – according to the EU Renewable Energy Directive, sites or areas on land, sea or inland body of water that a Member State has designated as the most suitable areas for the construction of renewable energy plants.

Simpler and faster authorisation procedures, including environmental impact assessments and issue of environmental permits, must be ensured in these areas.

Source: Renewable Energy Directive 2023/2413, Art 1

[28] Directive 2023/2413 of the European Parliament and of the Council.

[29] Council Regulation (EU) 2022/2577 of 22 December 2022 laying down a framework to accelerate the deployment of renewable energy.

[30] Communication from the Commission to the European Parliament, the European Council, the European Economic and Social Committee and the Committee of the Regions. REPowerEU Plan. COM(2022) 230, 18.05.2022.

[31] Implementing Decision of the Council of the European Union of 16.06.2023 on the updated recovery plan on the website of the State Shared Service Centre.

[32] Government Office, 2022. Audit of Acceleration of Renewable Energy Development.

[33] The working group on land operations also included local authorities and companies related to energy infrastructure in its work.

[34] Government Office, 2022. Audit of Acceleration of Renewable Energy Development. Annex 10: Feedback to audit.

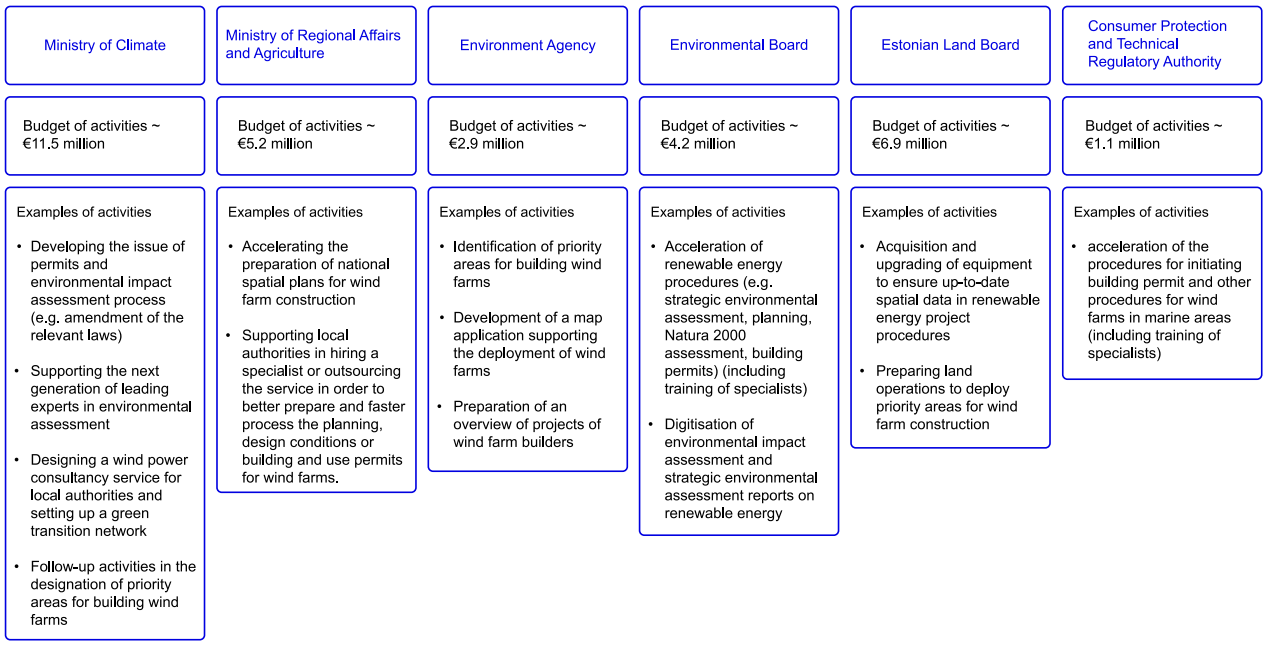
National Audit Office, proposals with a smaller impact were taken into account. For details, see points 70-84 (planning) and points 87–103 (environmental impact assessment).

39. In addition, the analysis left out a number of important areas that wind farm developers consider to be significant obstacles. For example, the audit did not address the problems related to power grids (see points 110-134) or the issue of state guarantees, which are particularly important for offshore wind farms (see points 152-169).

40. Legislative amendments have been made to remove the obstacles identified in the analysis.[35] In addition, there are plans to use EU money through the REPowerEU recovery and resilience plan, one of whose objectives is to increase the share and accelerate the deployment of renewable energy.

41. Almost €32 million has been earmarked for support. The eligibility period of the support will last until the end of the Q1 2026. The volume of the activities supported by the Ministry of Climate is *ca* €12 million, in the Land Board it's ca €7 million, in the Ministry of Regional Affairs and Agriculture *ca* €5 million, in the Environmental Board *ca* €4 million, in the Environment Agency *ca* €3 million and approximately €1 million euros will move through the budget of the Consumer Protection and Technical Regulatory Authority.[36] An overview of the activities funded on the basis of the REPowerEU plan is shown in Figure 5.

Figure 5. Activities under the Recovery and Resilience Plan (REPowerEU measure) to accelerate the development of renewable energy



Source: National Audit Office on the basis of Minister of Climate Directive No 1-2/23/483 of 22.11.2023

[35] For example, the duration of procedures has been shortened, a 'wind turbine fee' has been introduced, phantom consumers have been eliminated, and environmental permits (for offshore wind farms) have been merged.

[36] Minister of Climate Directive No 1-2/23/483 of 22.11.2023.

Use of REPowerEU funds

Did you know that

new jobs are created in the Ministry of Regional Affairs and Agriculture (in connection with planning), the Ministry of Climate, the Environmental Board (e.g. processing of permits, environmental impact assessment, coordination of planning documents, review of studies and monitoring briefs), the Land Board, the Environment Agency, the Consumer Protection and Technical Surveillance Authority.

42. There are 31 local authorities that are working on plans for wind farms (see point 73). The National Audit Office surveyed local authorities that determine areas for wind farm development in comprehensive or designated spatial plan (see methodology on pages 66–67). Two thirds of respondents found that in addition to the state's consultations and guidance in the planning process, money for hiring people to deal with the plans is needed the most. €5 million from REPowerEU will be allocated to this activity, which is enough to pay the support at the maximum rate to 20 local authorities. The support can be used to hire additional staff or to outsource expertise to an external service provider[37].

43. The Ministry of Climate plans to support local authorities in designing a wind power advisory service and setting up a green transition network. The plan is to set up a contact point that will gather feedback from developers and local authorities alike, create a network between agencies under the administration of the Ministry of Climate and solve service problems.

44. While it is necessary to advise local authorities and provide them with support for the preparation of plans, the National Audit Office finds that in order to achieve the RE100 objective, it's not necessary to support the identification of priority development areas on state land (see points 51-67) and the preparation of land operations in a situation where developers are already identifying suitable areas for wind farms and developing large-scale onshore wind farms (see points 11-12 and 55). In order to reach the RE100 target by 2030, it's essential for the state to focus on developments that are already well advanced – where conflicts are smaller – and not to use the state's resources to search for new sites.

Deforestation – logging carried out to make it possible to use land for purposes other than forest management.

Source: Forest Act, § 32

Did you know that

the intention is to use the REPowerEU funds to upgrade the aerial camera and aerial laser scanner systems and the national GNSS support station centre ESTPOS, as part of the optimisation of land operations.

45. As part of the optimisation of land operations, the Land Board is planning to create additional jobs, but it's not yet clear how many different land operations will be needed (e.g. deforestation, acquisition of private land for the state and compensation for this). There are also plans to invest in spatial data equipment so that the data can be better analysed, but this is very indirectly linked to speeding up the promotion of renewable energy (see 'Did you know that' on the left).

46. The National Audit Office asked the Ministry of Climate how the selection of support measures was carried out and whether the impact of the measures was assessed in order to give preference to activities that contribute more to acceleration and cost less. According to the Ministry of Climate, the measures were selected on the basis of the recommendations made in the audit of the Government Office. There are no written notes on the assessment of the impact of the measures. There is no specific budget for support measures.

47. The National Audit Office also points out that the REPowerEU funds can only be used until the first quarter of 2026, while the activities needed to achieve the targets will need to be carried out at least until 2030 and beyond.

48. **In the opinion of the National Audit Office,** the relevant state authorities have taken steps to identify the obstacles affecting the

[37] Measure – empowering local authorities to make green investments. Shared Service Centre of the State of Estonia.

development of wind power and to propose solutions, but the activities have been poorly planned. The obstacles encountered in real projects and the experience of developers and other stakeholders have not been considered. In addition, some of the actions have been carried out too late and meeting the targets with them by 2030 is unlikely. For example, looking for suitable sites for wind farms on public land.

49. The plan is to use part of the REPowerEU support funds for activities that are very loosely connected to the accelerated deployment of renewable energy, in particular wind power. For example, it is planned to support the purchase of equipment that collects spatial data, but this equipment is not necessary to build wind farms. The plan is to support the creation of jobs related to land operations, to compensate for the costs of deforestation, but the need for these jobs and deforestation will become clear after 2026. The support money, however, can be used until the first quarter of 2026.

50. **Recommendation of the National Audit Office to the Minister of Climate:** to use the taxpayers' money wisely for the accelerated development of renewable energy, fund only those activities that are clearly linked to achieving the RE100 target by 2030. The impact of the measures should also be assessed and, where necessary, money should be redirected from lower-impact actions to higher-impact actions.

Response of the Minister of Climate: we agree that the RRF funds must be used sensibly and for the accelerated development of renewable energy. The activities covered by the REPowerEU have been selected with this in mind.

It's unclear why the following REPowerEU activities, for example, have been excluded from the opinions given in the audit:

- preparing an overall picture of wind power developments and continuously monitoring the status of projects[38];
- streamlining environmental data and making them available, which makes it possible to save time in planning as well as in the permit-granting procedures – for example, 58 collapsed and non-sustainable nests of white-tailed eagles were archived as an activity funded by REPowerEU in 2023 and the protection regime changed on 1,395 ha; on 35 poor and unoccupied nesting sites of the black stork, the buffer was reduced from the original 4.8 km to 3 km and the protection regime was changed on 127,561 ha; on 10 non-sustainable nests of the lesser spotted eagle that had been unused for 9 years were archived, the protection regime changed on 31.40 ha; on 202 sustainable nesting sites of the lesser spotted eagle that had been unoccupied for 10 years, the buffer was reduced from 2 km to 1 km, the protection regime changed on 138,247 ha;
- the creation of training modules for lead environmental impact assessments (EIA)/strategic environment assessment (SEA) lead experts to alleviate the shortage of impact assessment experts;

[38] The overview of the developments of onshore wind farms prepared by the Environment Agency.

- supporting the commissioning of consultants, planning management expert advice and legal assistance to increase the capacity of local authorities to establish wind power plans.

REPowerEU activities have already had an impact on speeding up the procedure. For example, with the extra resources received, the Environment Agency can finalise planning and permit-granting procedures for wind power projects twice as fast as before, in 12 days on average.

The REPowerEU activities were changed at a relatively late stage of the procedure on the basis of the input provided by the National Audit Office. While one of the activities initially planned was the acquisition of private land adjacent to the sites, this activity was abandoned in the shape and on the scale originally planned (€7.8 million) after suitable sites on state land were mapped. The objective of REPowerEU is to make suitable public land available to developers as quickly as possible. The decisions on which additionally mapped sites will be made available to developers and under what conditions this will be done will be made in the first half of 2024.

Comment of the National Audit Office: the audit focused on all REPowerEU activities decided before September 2023 (the audit activities were completed in August 2023). Whilst some of the activities outlined by the Ministry have a long-term impact on accelerating renewable energy projects (e.g. training of lead experts for EIA/SEA), they may not have any impact on projects that must be completed before 2030 to achieve the renewable energy target.

Searching for public land for onshore wind turbine developments may not help to reach the RE100 target by 2030

51. A precondition for the construction of onshore wind farms is that they are built in locations with sufficient wind and minimum nuisances for the natural environment and people, any restrictions that affect development must also be considered (see point 16). This requires analysing various spatial and monitoring data, carrying out studies and determining the location of wind turbines (in plans).

Finding suitable sites for wind farms has been a task of private developers

52. Finding suitable sites for wind farms has so far been the responsibility of developers in cooperation with local authorities and all the costs of the development process and data analysis/studies have been covered by the developer. However, the state has also decided to look for sites suitable for wind farms, using the funds of REPowerEU for this (see Figure 5).

Did you know that

by a decision of the Government of the Republic, the Environment Agency / Ministry of the Environment was assigned the task in autumn 2022 to identify 700 km^2 of onshore areas (preferably on state land) by spring 2024 where wind farms can be established.

53. Government agencies (Ministry of Climate, former Department of Spatial Planning of the Ministry of Finance, Environment Agency) have emphasised that the priority is to finalise the wind farm projects that have already started, and that the identification of priority development areas is a search for additional areas. However, the identification of development areas causes confusion among developers, planners, impact assessment experts and local authorities. For example, it's unclear how the priority areas for the construction of wind farms will be selected in the third quarter of 2024, what planning procedure will be used and what is the process by which priority development areas are selected. According to

the Renewable Energy Directive, Member States must approve a plan designating the renewables acceleration areas by 21 February 2026 at the latest.[39] Spatial plans must have been established for said areas.

54. The National Audit Office assumed that the accelerated identification by the Environment Agency of sites suitable for onshore wind farms and the use of funds for this purpose is a necessary action to promote renewable energy and achieve the renewable electricity target and will not interfere with onshore wind farms already under construction, which are more likely to be completed more quickly.

The state fears that developers will not be able to cope with the construction of wind farms

55. The reason given by the state for identifying additional areas suitable for wind farms is that private developers may not be able to cope with the developments that have been started – no large new wind farms have been built in the last decade. The probability of the wind farms planned on land succeeding is 25%.[40] In the opinion of the National Audit Office, this claim is doubtful because:

- the construction of wind farms has also been held up by slow procedures, lack of interest from the state (the renewable energy targets have been met so far, it was not clear what the benefits of paying additional support would be), litigation[41], lack of interest from local authorities, opposition by local people and, most importantly, height restrictions related to national defence (see Figure 3);[42]
- The Ministry of Climate has subsequently assessed the likelihood of wind farms succeeding as higher, relying on developers in its assessment. There are plans to build 7,100 MW of capacities in the areas where spatial plans have been initiated and developers estimate[43] that 3,800 MW *(ca* 50%) of these are very likely to succeed. This is significantly more than the 25% reported when applying for REPowerEU funding.

56. However, according to the Environment Agency, the 25% success rate of new wind farms indicated in the application for REPowerEU funding is adequate, mainly because, in addition to opposition from local residents, the establishment of onshore wind farms is hampered by various restrictions, the most important of which relate to bird conservation.

57. The audit revealed that the MEAC, the Ministry of the Environment or any other government agencies knew how many of the projects already started are in areas where the development of wind farms is ruled out before they started looking for new potential onshore wind farms[44].

[39] The Renewable Energy Directive (RED III) entered into force in November 2023.

[40] Memo of the Government of the Republic session of 23.01.2023.

[41] For example, the litigation concerning Tootsi and Aidu wind farm, Saare Wind Energy offshore wind farm.

[42] Developers include some of Estonia's largest energy companies, e.g. Enefit Green, Utilitas.

[43] The information is based on a survey of developers carried out by the MEAC.

[44] Mapping of restrictions limiting the development of wind energy and identification of free sites, Environment Agency, 2022 (p 42).

Wind farm projects already underway are also eligible as the renewables acceleration areas requested by the European Union

58. Another justification for the identification of renewables acceleration areas was that the REPowerEU plan and the Renewable Energy Directive, which was a draft at the time, required new areas to be sought for wind farms. However, the Ministry of Climate admitted that the draft directive does not necessarily require these new areas to be on state land. EU Member States should work in a coordinated way to identify areas on their territory where wind farms could be built. Areas where spatial plans have already been approved and the wind farm is under construction can also be selected.

59. According to the Environment Agency, the primary aim of identifying priority development areas was to find an additional 500 km^2 of areas on state land and in low-conflict areas, as the initial analysis showed that developers operate in conflict areas and that implementing the developments is very likely to be complicated[45].

The Ministry of Climate has not decided on the type of planning for development areas

60. Local authorities have so far planned the areas suitable for wind farms with comprehensive plans and designated spatial plans for wind farms (see Figure 6). According to the MEAC, priority development areas can be planned as follows:

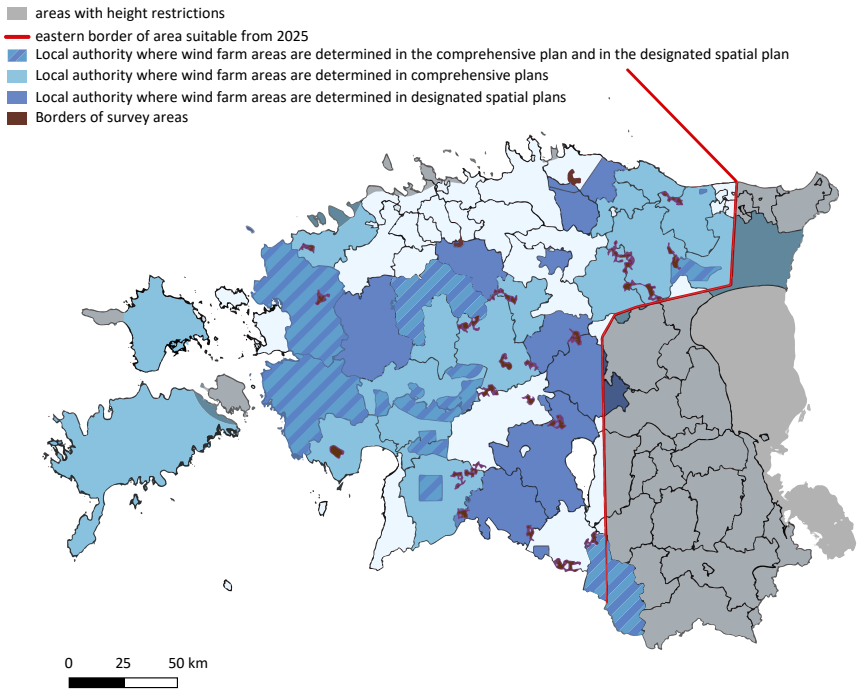
- by establishing with a national designated spatial plan;
- by changing/updating the municipal comprehensive plans;
- by initiating municipal designated spatial plans; or
- by creating a completely new (planning) instrument.

61. Priority development areas are usually located in the territory of local authorities where a municipal designated spatial plan or comprehensive plan is underway and which will determine the areas suitable for wind farms. Initiating new designated spatial plans in development areas or amending existing comprehensive plans interferes with ongoing procedures, where local authorities have already considered suitable areas and discussed them with locals.

62. The Ministry of Climate has not yet decided on which type of planning will be used for further planning of wind farms on state land. Therefore, it has not been decided whether the Ministry of Regional Affairs and Agriculture or the local authorities will start preparing the plans.

[45] The analysis was based on a comparison of the planning areas of the selection of locations for municipal designated spatial plans and an analysis of the mapping of restrictions by the Environment Agency. Several local authorities had selected the entire territory as the planning area.

Figure 6. Priority development areas mapped by the state (22) and local authorities that determine wind farm development areas in their comprehensive plans and/or designated spatial wind power plans, as at 22.11.2023



Source: National Audit Office according to the data of the Environment Agency and the Ministry of Regional Affairs and Agriculture

Survey accuracy may not be sufficient

63. In addition, there is a risk that the site pre-selection surveys will not be carried out in sufficient detail and depth to make it possible to cancel future impact assessments and proceed faster with the developments (see points 79-80). Surveys of the priority development areas identified by the state must be completed by spring 2024. The procurements for surveys were announced in spring 2023 and not all of them succeeded the first time. Even after the second procurement, no bird experts have been found for three of the 22 development areas and no forest inventory takers have been found for 10 sites.[46]

64. The Estonian Ornithological Society also found that if the preliminary surveys of priority development areas must be so thorough that no more surveys will be carried out for later plans / strategic environmental assessments, then completing a quality survey during one field work period (spring, summer and autumn of 2023) is unrealistic[47] .

Did you know that

approximately 1–2 ha of land must be deforested in order to erect one wind turbine on forest land.

65. 68% of the survey areas of priority development areas identified by the Environment Agency (455 km^2) is located on state land (309 km^2) and 85% on forest land (387 km^2). Private land (32% of the areas) is in the immediate vicinity of selected state land. Thus, to develop in the survey areas, it's necessary to use both state and private land, where land operations and transactions must be carried out before the development is commenced. It's also necessary to deforest these areas and also to deal with reforestation. However, there are restrictions on deforestation and

[46] According to the Environment Agency. The agency will carry out bird surveys themselves for four areas.

[47] Government Office, 2022. Acceleration of Renewable Energy Development, Annex 10.

the use of the timber from this, and it's necessary to find areas for reforestation and money to compensate for deforestation.[48]

66. Therefore, the National Audit Office finds that it would have been more reasonable to also include existing development areas, where land transactions and acquisition of land by the state or environmental surveys are no longer necessary, in the selection of priority development areas.

67. The fact that the state is looking for areas suitable for wind farms on its own land is positive, as most of the areas already under development (in the planning process) are on private land and the potential of state land is unused. At the same time, it's important that the selection of acceleration areas does not exclude wind farm projects already underway and likely to be completed by 2030.

Did you know that

connection offers for the priority development areas selected by the state are likely to be much more expensive than for the previous connecting parties, as they will only be able to apply for connection after plans have been established. Therefore, they will go to the end of the waiting list of connecting parties and extensive grid reconstruction works must be paid for in their case.

68. **In the opinion of the National Audit Office,** it's unlikely that the plans and impact assessments of wind farms in the areas to be identified by the state can be carried out more quickly than in the areas where plans are already underway. For the priority development areas, it has not yet been decided which planning procedure will be used to plan them further and whether this will be done by the Ministry of Regional Affairs and Agriculture or by the local authorities. The search for new areas has also led to a shortage of certain experts and confusion among the various parties as to how the final renewables acceleration areas will be selected and made available to the private sector.

69. **Recommendations of the National Audit Office to the Minister of Climate:** in order to ensure that the identification by the state of renewables acceleration areas for the development of wind farms has the greatest possible impact on the achievement of the RE100 target by 2030,

- assess the status of existing developments and use the results of the comprehensive and designated spatial plans prepared by local authorities as a basis for identifying priority development areas, and include the areas selected by local authorities as suitable for wind energy development among the renewables acceleration areas;
- inform wind farm developers, local authorities, planners, impact assessment experts of the criteria and scope for selecting the renewables acceleration areas;
- refrain from designating areas that require deforestation and land acquisition by the state as renewables acceleration areas to avoid complex procedures, additional costs for the state and further opposition to wind farms.

Response of the Minister of Climate: we agree with the assessment that all areas, including those covered by the comprehensive plans or municipal designated spatial plans, must be regarded as renewables acceleration areas, and this is the approach that the Ministry of Climate intends to take in defining renewables acceleration areas. At the same time, we consider it important to map additional areas on state land. Mapping the areas suitable for producing wind power on state lands as an

[48] Government Office, 2022. Acceleration of Renewable Energy Development. Annex 8.

activity covered by REPowerEU is an important RRF[49] performance target and, in addition to areas selected by developers, creates an opportunity to make state land available for wind power generation, if necessary.

The claim that renewables acceleration areas are later determined on the basis of the priority development areas is misleading. Areas where strategic environmental assessments (SEA) have been carried out are designated renewables acceleration areas. As the SEA is carried out as part of the planning procedure, the concept of renewables acceleration areas is linked to the decision to establish a plan.

The main part of the renewables acceleration areas for wind power are areas already related to private developments. If they reach the stage of planning for wind energy development and undergo a strategic environmental assessment, they can be deemed to be renewables acceleration areas. The priority is to support and accelerate all onshore wind projects. The most important consequence of the amendments to the Renewable Energy Directive[50] is a faster permit-granting procedure for wind farms to be built in a renewables acceleration area, which will be applied in the Estonian context to all onshore wind farm projects in the pipeline.

The selection of additional priority development areas for wind power on state land will be based on the need to minimise restrictions on the areas and to ensure that the areas can be rapidly brought into use for wind power projects. In the first half of 2024, the Environment Agency will complete the planned surveys and decisions will be made on which areas have the greatest potential and which areas will be made available to developers and under what conditions. In priority wind power development areas, as in other areas, a wind power plant must go through planning and permit-granting procedures. It's likely that the planning stage will be reached in the additionally mapped areas in consideration of the target for 2030 and these areas will also become renewables acceleration areas.

It would be misleading to claim that the introduction of a deforestation charge will prolong the process of deployment of the areas. The amendments to the deforestation charge adopted by the Riigikogu on 6 December 2023 will not delay the completion of wind power plants.[51] The originally planned land valuation and replacement was abandoned and only a deforestation charge must be paid upon deforestation.

Comment of the National Audit Office: the National Audit Office has not claimed that the deforestation charge prolongs planning procedures.

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[49] Estonia's Recovery and Resilience Facility.

[50] Directive (EU) 2023/2413 of the European Parliament and of the Council of 18 October 2023 amending Directive (EU) 2018/2001, Regulation (EU) 2018/1999 and Directive 98/70/EC as regards the promotion of energy from renewable sources, and repealing Council Directive (EU) 2015/652.

[51] The creation of the concept of a deforestation charge is set forth as a REPowerEU activity. The legal amendments were adopted on 6 December 2023. According to the amendments, the deforestation charge is applied based on the area to be deforested in order to compensate for the decrease in carbon stock and carbon sequestration capacity due to deforestation in the land use sector. The deforestation charge will be applied as of 1 July 2024.

In the case of deforestation, the idea behind the recommendation is to direct renewable energy development to areas that do not require deforestation for deployment. The Environmental Board has also considered the implementation of this principle important.

Shortening planning procedures in the present way will have limited effect

70. Based on the analysis carried out under the leadership of the Government Office, the faster construction of wind farms is mainly hindered by lengthy administrative procedures – planning and strategic environmental assessments carried out within the framework of planning.

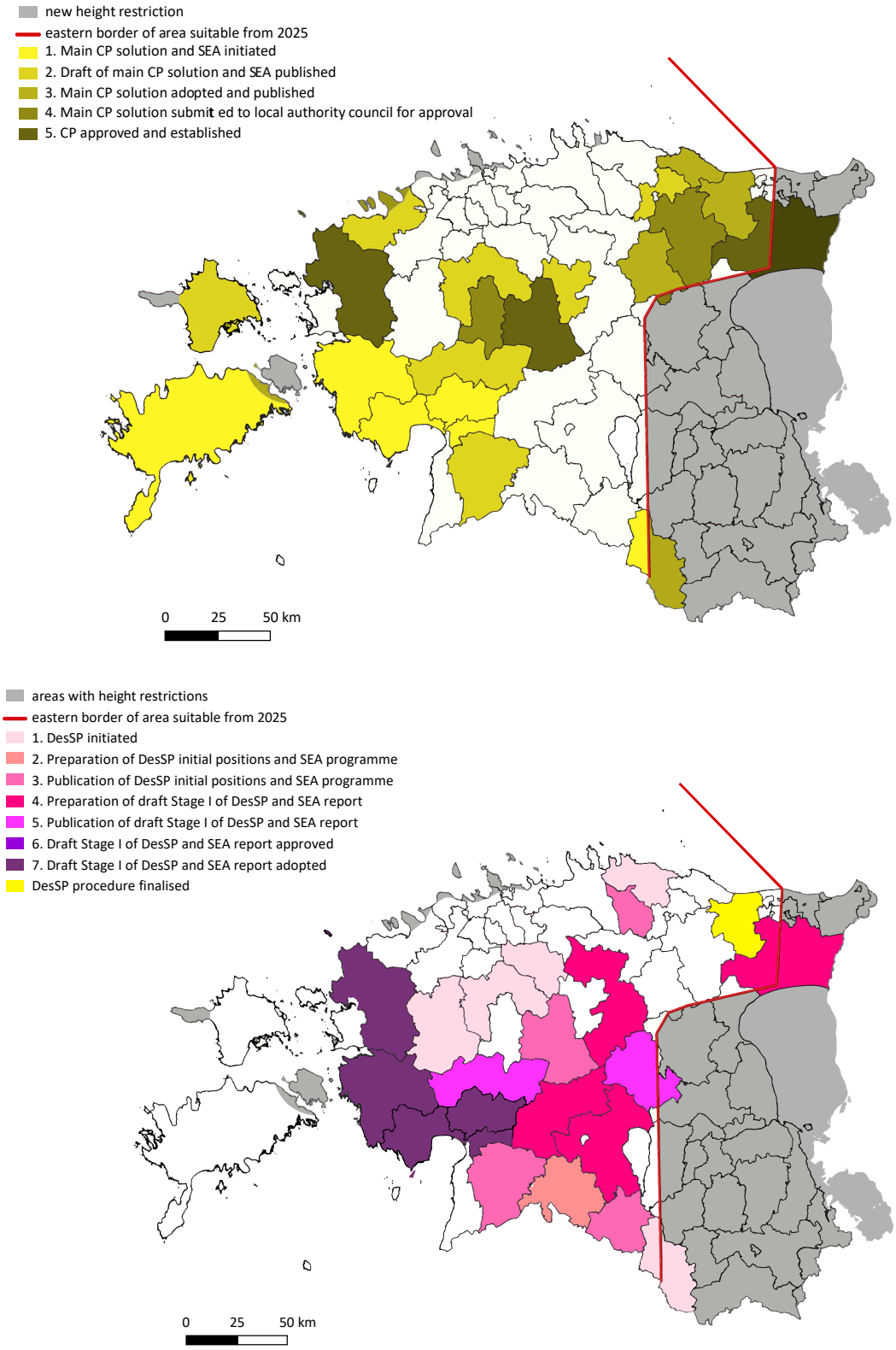
71. The National Audit Office assumed that the Ministry of Finance has taken steps to solve the problems that are causing delays in the planning processes of onshore wind farms and to speed up their implementation, including by providing clear guidance and advice to local authorities and considering the suggestions of the parties.

72. The National Audit Office analysed the activities of the Government Office and the Ministry of Finance in improving the efficiency of planning procedures, as well as the positions of planners and developers. The National Audit Office also analysed the procedural materials of the designated spatial plans for wind farms in five local authorities (see the methodology on pp 66–67).

73. At present, 21 local authorities have initiated designated spatial plans for wind power and 20 local authorities have initiated comprehensive plans to determine wind development areas (see Figure 7). Some local authorities have initiated both plans and the number of local authorities engaged in wind farm planning is somewhat smaller – 31.[52] As at the beginning of November 2023, detailed spatial plans for wind farms are underway in the municipalities of Türi, Tori, Põhja-Pärnumaa, Lüganuse, Lääneranna and Kehtna. Detailed spatial plans for six wind farms are currently in the pipeline.

[52] Presentation of Deputy Secretary General of the MEAC Timo Tatar of 13.06.2023. Journey to 100%.

Figure 7. Local authorities where wind farm development areas will be determined with comprehensive and/or designated spatial plans, and the stage of the procedure* (as at 09.01.2024)



CP – local government comprehensive plan, DesSP – municipal designated spatial plan for wind power, SEA – strategic environmental assessment

* No plans are currently in stage 6 of the pre-selection stage of designated spatial planning (the draft designated spatial plan and the SEA report have been approved).

Source: National Audit Office according to the Ministry of Regional Affairs and Agriculture

The stage of site pre-selection of local government designated spatial plans is long

74. The comprehensive planning procedure has been used repeatedly in practice and there are no serious problems with it. It's a different story with the municipal designated spatial plans because they haven't been finalised and the related parties have little experience with them. Therefore, the National Audit Office analysed the wind power designated spatial planning procedures of five local authorities (see methodology on pp 66–67) to see how long the procedure takes and what obstacles have been encountered. The results of the analysis are given in Table 4.

75. It turned out that when it came to selecting locations for the local government designated special plans for power, several time-consuming procedural steps have to be completed, the necessity of all of which is questionable, according to the Estonian Association of Spatial Planners. The pre-selection of a location procedure conditionally consists of seven stages, including two public presentations and discussions, as well as coordination with government agencies and requesting the opinions of persons likely to be affected.

Table 4. Analysis of the local government designated spatial planning procedures

Local authority	Duration of designated spatial planning procedure	Stage of designated spatial planning	Explanations
Lääneranna Municipality	3 years	7 of the 7 stages of stage I completed. Stage 1 of the 6 stages of stage II is ongoing. Pre-selection of a location stage completed.	It took *ca* 9 months to enter into a cooperation agreement with companies interested in developing wind farms, and to prepare the procurement for finding the person who prepared the plan and the environmental impact.
Pärnu City and Tori Municipality	A little under 3 years	7 of the 7 stages of stage I completed. Stage 1 of the 6 stages of stage II is ongoing. Pre-selection of a location stage completed.	The preparation of the detailed solution of stage II of the designated spatial plan and the procurement for EIA are ongoing in October 2023.
Kadrina Municipality	1.5 years	Stage 3 of the 7 stages of stage I is ongoing. The public presentation of the starting positions of the plan and the SEA programme is ongoing.	The designated spatial plan and SEA have been initiated. The designated spatial planning and procurement for the person to prepare the strategic assessment took 1.5 years. The local authority said that for about 7 months, they waited for the entry into force of the amendment to the Planning Act in March 2023, which was supposed to shorten the designated spatial planning procedure. The presentation of the initial positions of the plan and the SEA programme was done in December 2023.
Saarde Municipality	2 years	Stage 2 of the 7 stages of stage I is ongoing. Preparation of the starting positions of the designated spatial plan and the SEA programme	The designated spatial planning and SEA procedure was suspended in 2022 to carry out more in-depth bird surveys (duration 4 years).
Põltsamaa Municipality	1.5 years	Stage 5 of the 7 stages of stage I is ongoing. Approval of the draft designated spatial plan (planning solution) and the SEA report.	According to the local authority, the process was hampered by a lack of experience in the designated spatial planning procedure and the amendments to the Planning Act of March 2023, which necessitated a change in the working process. The decision on Phase I of the designated spatial plan is expected to be approved in February 2024.

Source: National Audit Office

76. An analysis of the municipal designated spatial planning procedures showed that the pre-selection stage of the procedures in the sample lasted three years or even longer. According to Lääneranna Municipality, the duration of the procedure was affected by the fact that they were the first municipality to start carrying out a designated spatial plan. The municipality brought in a lawyer who advised it on the preparation of the cooperation agreement and the procurement documents. According to them, the next local authorities will be able to benefit from the experience gained in the first designated spatial planning procedures and will therefore be able complete the procedure faster.

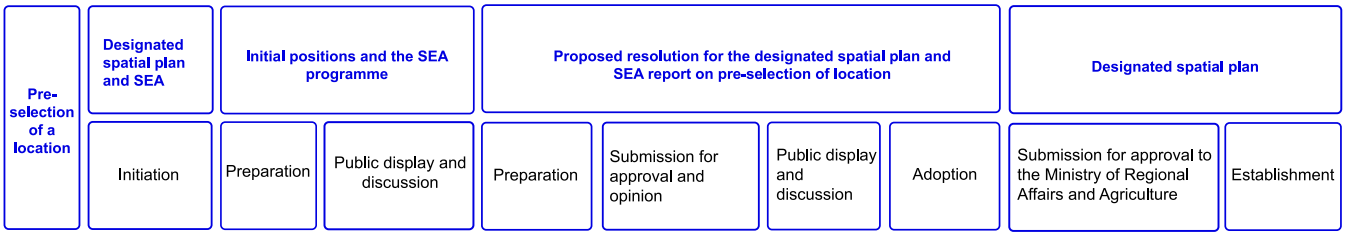
Problems with the designated spatial planning procedure have been repeatedly highlighted

77. The Estonian Association of Spatial Planners has repeatedly drawn the attention of ministries to the problems related to the designated spatial planning procedure of wind farms and made proposals to speed up the procedure. The first time the association did this was in 2020, when it recommended waiving the requirement for a detailed solution of a designated spatial plan and giving local authorities the right to decide whether to proceed with a detailed plan or to issue design conditions based on a designated spatial plan.

78. In autumn 2022, the Estonian Association of Spatial Planners and the Association of Impact Assessment, in response to an analysis by the Government Office, pointed out that the municipal designated spatial planning process could be accelerated by discarding some of the procedural steps in the planning process. For example, public authorities are asked to present their positions six times within the scope of designated spatial planning, although doing it one or two times would be reasonable. According to the planners, it would be reasonable to carry out several stages of the procedure at the same time.

79. Based on the proposals made in the analysis of the Government Office, the Ministry of Finance made a proposal to the MEAC in 2022 to omit the detailed solution stage in the municipal designated spatial planning process, which followed the more general pre-selection of a location stage, and to immediately carry out the planning with sufficient detail so that design conditions can be issued for the wind farm. The respective amendments to the Planning Act entered into force in March 2023.[53] Figure 8 describes the shortened designated spatial procedure.

Figure 8. Shortening the local government designated spatial planning procedure



Source: National Audit Office

Shortening the designated spatial planning procedure will not help ongoing plans

80. Although the amendment was also extended to the designated spatial plans that have been initiated, this does not help speed up their planning procedures in practice. Sixteen of the 23 designated spatial plans for wind energy were initiated before the legal amendment entered into force in

[53] Act Amending the Electricity Market Act and Other Acts, 696 SE.

spring 2023. This means that several procedural steps have been carried out in the knowledge that a detailed solution will follow later. For example, in these 16 local authorities, a cooperation agreement has been signed with wind farm developer(s), a procurement has been carried out to find a consultant for designated spatial planning and the SEA, the decision to initiate the plan has been made public, and the preparation of the initial positions and the SEA has started.

81. For example, the developer in the designated spatial planning procedure of Lääneranna Municipality was convinced that it was possible to skip the detailed solution stage. They applied to the municipality for a selection of a location decision so that the design conditions of the wind farms could be issued. However, after consulting with the Ministry of Finance and analysing the law, the developer withdrew the application, as it would've still been necessary to repeat several procedural steps if a detailed solution had not been prepared. In other words, skipping the detailed solution would have taken more time from the developer than continuing with the preparation of the detailed solution. Also, shortening the designated spatial planning process could give rise to the problem that the environmental surveys done in the site pre-selection stage are not detailed enough and additional surveys must be carried out.

Several practical issues related to planning remain unresolved

82. According to the Estonian Association of Spatial Planners and the Association of Impact Assessment, there are several issues in the planning process in which there is no clear position and which cause confusion in local authorities and delayed procedures and allow plans to be challenged. These are, for example:

- legally clear positions on the interpretation of wind farm boundaries, e.g. whether a wind turbine blade can extend beyond the boundary of an area suitable for a wind farm. In 2022, the MEAC sent a letter,[54] where it refers to the Building Code and the General Part of the Civil Code Act, stating that a wind turbine (including the blades) must fit within the area outlined on the land plot. Despite this, developers are making proposals in plans where wind turbines are located in such a way that the blades cross the boundary of the area suitable for a wind farm;
- the minimum distance between wind farms that are located close to each other but are built at different stages. Wind farms located close to each other can cause shading losses, i.e. take wind from another farm. This issue needs to be addressed in the cumulative impact assessment in the planning process for wind farms;
- considering the facilities connecting wind farms to connection points as a structure with a significant spatial impact and the need to determine its location in comprehensive and designated spatial plans. The overhead line of a wind farm is part of a structure with a significant spatial impact and a plan must be prepared for it.[56] However, there is no planning tool suitable for this. Municipal designated spatial plans require the initiation of planning in the local

Did you know that

a wind farm, as a building with a significant spatial impact, is the only object for which the power line to the grid connection point must be determined in the plan. [55] For other sites (e.g. solar power plants, factories), the location of the power line is determined by the design conditions.

[54] Letter of the Ministry of Economic Affairs and Communications of 06.06.2022 to OÜ Utilitas Wind (No 1.15-5/2022/2988-2).

[55] List of structures with significant spatial impact.

[56] No separate plan is required for an underground cable line.

authorities along the route, which is up to the local authority to decide. However, municipal and national designated spatial planning is time-consuming procedure.

83. Failure to resolve these issues, in addition to the time required for the procedures, will bring along the possibility that the plans will be challenged in court and annulled, and the process of setting up a wind farm will go back to square one, so that they cannot be implemented more quickly.

Increasing need for spatial planning requires additional planners in local authorities

84. The Estonian Association of Spatial Planners has pointed out that the analysis of the Government Office does not address the shortage of planners as one of the important obstacles affecting the speed and quality of planning. According to the Association, the need for spatial planning is growing. At the same time, there is a shortage of professionally trained planners in many local authorities, which has an impact on the speed of processing wind farms. This is why the REPowerEU measure, which provides support to local authorities for hiring planners and/or ordering planning consultations (see point 42), may not be helpful – competent planners simply cannot be found anywhere.

85. **In the opinion of the National Audit Office**, the measures created by the Ministry of Finance to speed up the planning procedures of wind farms have not been effective, because the implementation of amendments means that some of the procedural steps must be repeated, and even more time spent in the case of previously initiated plans. The implementation of the changes is not clear in the case of new plans. In the opinion of the National Audit Office, neither the Ministry of Finance nor the Ministry of Climate has given attention to solving the practical issues in planning. These issues cause disputes during the procedures and may lead to court action and the annulment of the plan.

86. **Recommendations of the National Audit Office to the Minister of Regional Affairs:** to speed up the construction of wind farms, the processing of municipal designated spatial plans for wind power should be simplified, local governments should be supported in their planning procedures and the practical issues related to planning should be resolved. To do so:

- take steps to further shorten the municipal designated spatial planning procedure. Together with planners, analyse the need for procedural steps and look for ways to improve the efficiency of the planning procedure;
- provide planning advice and guidance to local authorities. For example, advise them on designated spatial planning procedures, as this is a little-used planning instrument in practice and local authorities therefore have little experience with it;
- give clear guidance to local authorities and planners that when wind farms are planned, the wind turbine and its blade must remain within the boundaries of the plot;
- consider the possibility of not considering wind farm connection points as structures with a significant spatial impact;

- give clear guidance to local authorities that it is important to consider distances to other wind farm development areas in planning.

Response of the Minister for Regional Affairs:

Shortening procedures – the Ministry of Regional Affairs will further analyse the possibilities of shortening planning procedures at the level of local government when drafting the Planning Act. The quality of the impact assessment must be maintained when the procedures are shortened, and involvement of the public must not be dropped. We've prepared a legislative intent for the amendment of the Planning Act, which is available in the drafting information system (Draft File No 23-0960). One of the issues identified in the legislative intent that needs to be addressed is the excessive length of time required for municipal designated spatial planning. The plan is to submit the draft for amendment of the Planning Act for approval at the end of the second quarter of 2024.

At the same time, we would like to draw the attention of the National Audit Office to the fact that in point 80 of the audit, you have explained that local authorities have initiated 23 local government designated spatial plans for the development of wind farms, and seven of these were initiated after the amendment of the Planning Act, which make it possible to abandon the preparation of a detailed solution. In the subsequent points of the report, the audit does address the impact of the amendment of the Planning Act on planning procedures initiated after the amendments were made. The audit only covers planning procedures initiated before the amendment of the Planning Act to accelerate wind farms and the positive impact cannot therefore be seen or assessed.

Advising local authorities – the Ministry of Regional Affairs and Agriculture provides day-to-day assistance to local authorities, consultants, developers and experts on how to interpret the Planning Act. We will also organise training to harmonise practices in the implementation of the Planning Act, prepare guidelines (see www.planeerimine.ee[57]) and organise field seminars on sites. To improve the effectiveness of our advice on planning wind farms, we have also signed an agreement with local authorities to meet regularly on a monthly basis. On the one hand, this gives local authorities a format for exchanging experiences. On the other hand, all the ministries and agencies involved in wind farm development will also participate in the meetings, to advise local authorities in the same format and raise awareness of the problems encountered in practice.

Placement of wind turbine blades – the Spatial Planning Department of the Ministry of Regional Affairs and Agriculture, within the composition of the Ministry of Finance, has issued a joint position with the Ministry of Economic Affairs and Communications on the issue of wind turbine blades (letter number 1.15-5/2022/2988-2 of the MEAC of 6 June 2022). The position has been presented to local authorities, consultants and developers at various wind energy roundtables and information days. We

[57] With regard to municipal designated spatial plans, the planning.ee website contains, for example, the presentations of the information day on renewable energy held in 2022 and the webinar introducing the amendments to the Planning Act that entered into force in March 2023, as well as various official letters offering interpretations of the Act.

have also subsequently provided further written clarifications. We will continue to share information to clarify this complex issue.

Regarding connection points as structures with a significant spatial impact – using the planning procedure to plan overhead line connections to the connection points is necessary for the plan to be feasible, as the purpose of the wind farm is to transmit power to the transmission grid and without ensuring this, the planning process becomes meaningless. The preparation of a plan is terminated if circumstances arise which preclude its implementation in the future.

In addition, §2(19) of Government of the Republic Regulation No 184 'Grid Code' of 26.06.2003 stipulates that a wind farm is a power plant consisting of several wind turbines and the equipment, structures and facilities connecting the wind turbines to each other and to the connection point. The Ministry of Regional Affairs and Agriculture has previously analysed this proposal and, based on the above, found that connecting wind farms to overhead lines is an activity with a significant spatial impact. For example, overhead lines with higher capacity require significant deforestation, restrictions on land use, etc. Therefore, we don't consider it possible that the overhead lines connecting wind farms to the connection points will not be designed with spatial plans.

However, we note that if the plan is to connect a wind farm to the grid with an underground cable, the Ministry of Regional Affairs and Agriculture does not consider it necessary to specify the location of the underground cable to the connection point in the plan, as the underground cable is not expected to have significant spatial impact and significant environmental impact compared to the overhead line.

Consideration of the distance between wind farms in planning – pursuant to § 75(4) and § 95(5) of the Planning Act, a strategic environmental assessment (SEA) is mandatory when preparing a comprehensive plan and a municipal designated spatial plan. Pursuant to § 3(4) of the Planning Act, if an SEA is carried out in the planning procedure, the SEA report is an annex to the plan. Pursuant to § 40(4)(6) of the Environmental Impact Assessment and Environmental Management System Act, the SEA report must, based on the approved SEA programme, include, inter alia, an assessment of the expected significant cumulative effects on the environment. Cumulative impacts mean the assessment of the impacts expected to result from a proposed activity in combination with other projects in the area of impact, including the wind farms that are being planned or have already been built. Therefore, if another wind farm is planned or has already been built in a region, the cumulative impacts of wind farms must be identified in the planning procedure and, if necessary, the planning solution must be adjusted so that the implementation of the activity does not have a significant environmental impact within the meaning of the Environmental Impact Assessment and Environmental Management System Act. As the local authority is the organiser of planning activities in its own administrative territory, it may also (justifiably) prescribe a minimum distance between wind farms, which is not aimed at avoiding significant environmental impacts.

In view of the fact that, pursuant to the aforementioned provisions of the Planning Act and the Environmental Impact Assessment and Environmental Management System Act, a local authority is obliged to

consider the distances between the wind farm and the development areas of other wind farms when organising its planning activities, the Ministry of Regional Affairs and Agriculture is of the opinion that the local authorities are aware of this requirement and that it's not necessary to issue further guidance in this regard.

Comment of the National Audit Office: the audit showed that the parties still lack clarity on how to implement the amendments made to the Planning Act in practice to accelerate the municipal designated spatial planning process, which is why the Ministry of Regional Affairs and Agriculture needs to step up its explanatory work and help solve the practical problems pointed out by the parties.

The audit showed that the current practice of regarding connection points as structures with a significant spatial impact leads to time-consuming planning procedures. The National Audit Office finds that in the case of wind farms, design conditions could be used to determine the locations of power lines leading to the connection point, as is done in the case of other structures with a significant spatial impact. However, this requires amendment of the definition of wind farms in the Government of the Republic Regulation No 102 of 1 October 2015 (List of buildings with significant spatial impact).

No substantive acceleration of the environmental impact assessment has been achieved

Environmental impact assessment takes a long time because surveys need to be done

87. Strategic environmental assessment is also carried out as part of the planning process of wind farms, allowing the most environmentally appropriate planning solution to be developed. The long time needed for environmental impact assessment due to the performance of time-consuming surveys, particularly in the case of onshore wind farms, has been highlighted as a major problem.

88. The National Audit Office assumed that the Ministry of the Environment (Ministry of Climate) and the Environmental Board would themselves look for ways to speed up the environmental impact assessment of wind farms, and take into account the proposals of other parties (impact assessment experts, planners, developers, local authorities) to improve the efficiency of the impact assessment. This includes the analysis and follow-up evaluation of existing EIAs, as well as the relaxation of the requirements for an assessment licence, the training of assessment experts and the development of a standard impact assessment programme (agreement on the significant impacts associated with wind farms).

The Ministry of Climate has analysed ways to improve impact assessments

89. To analyse the EIA process and options of making it more effective, the Ministry of the Environment has carried out two surveys in recent years[58], where proposals on how to improve the assessment process have been made. Among other things, it has been pointed out in these surveys that the procedure for municipal designated spatial planning and strategic

[58] Stockholm Environment Institute, Estonian Environmental Law Centre. 2019. Study of Environmental Impact Assessment; Lemma OÜ. 2020. Analysis of Proposals for Improvements to the Environmental Impact Assessment System.

environmental assessment is very time-consuming and that the requirements concerning the process should be clarified[59].

90. In addition, the Environmental Impact Assessment and Environmental Management System Act was amended and an exemption for shorter environmental impact assessments was created for onshore wind farms. The recommendation of the impact assessment experts to relax the requirements for SEA and EIA lead experts, which should bring in more licensed experts, which are currently in short supply, has also been taken into account. The Planning Act was amended on the initiative of the Ministry of Finance and the procedure of the programme for strategic environmental assessment of the municipal designated spatial plans was shortened.

91. However, the impact of the changes made according to the proposals of the Ministry of the Environment in March 2023 is limited and short-lived. The EIA exemption for onshore wind farms has not been used so far. The time saved because of the changes, which concern the programme for strategic environmental impact assessment of the municipal designated spatial plans, is approximately 1–2 months. The time saved by abandoning the detailed solution stage is still not clear, as according to the impact assessment experts, it's uncertain whether it can be implemented in practice.

Environmental status data are incomplete

92. According to environmental impact assessment experts, relaxing the requirements for EIA experts will bring temporary relief to the shortage of experts, but will not solve the long-term problem. It will not bring to the market many experienced experts who can lead the impact assessment of wind farms. To ensure the addition of new experts, environmental impact assessment experts believe that the volume and funding of training in impact assessment should be increased.

93. In their feedback to the audit of the Government Office, the environmental impact assessment experts pointed out that the construction of wind farms takes a long time due incomplete environmental status data. As there is generally no high quality and up-to-date information on the environmental conditions of the locations of wind farm planning areas, extensive studies (e.g. on birds, bats, vegetation, marine life) have become part of every impact assessment.

Environmental status data – data describing the status of the environment and its changes. For example, national environmental monitoring data and analysis results, monitoring work and surveys, data of follow-up wind farm monitoring

There is no overview of surveys and monitoring related to wind farms

94. In the opinion of the National Audit Office, the Ministry of Climate should focus on resolving urgent and less costly obstacles in ensuring the environmental status data. For example, environmental impact assessment experts have pointed out the lack of an overview of environmental surveys in Estonia as an important problem. In the case of wind farms, this means that impact assessment experts do not know whether surveys have been carried out on other wind farms, what has been surveyed and what methodology has been used. Providing an overview of the surveys will provide an opportunity to ask other wind farm developers for information and make it easier to assess the impact of the next wind farms (by reducing the volume of new surveys, shortening the impact assessment, and harmonising the assessment methodology).

[59] Lemma OÜ. 2020. Analysis of Proposals for Improvements to the Environmental Impact Assessment System. Page 73.

95. Also, the results of the monitoring carried out after the completion of wind farms (mostly bat and bird monitoring) are currently not consolidated in a single database. If impact assessment experts could use the follow-up monitoring data of other wind farms and the results of their analysis, this would allow them to increase their knowledge, assess the cumulative impact of wind farms and reduce the volume of surveys. This will help reduce the impact of new wind farms on bats and birds and speed up the impact assessment process.

96. However, according to the environmental impact assessment experts, the current follow-up monitoring of wind farms may not be effective. The impact assessment experts highlighted a case where the required monitoring was not carried out. The Environmental Board acknowledged that there have been cases where the required follow-up monitoring has not been carried out or monitoring reports have not been submitted to the Environmental Board. Follow-up monitoring and analysis of its results also makes it possible to determine the impacts of a wind farm and make subsequent assessments easier.

97. The Environmental Board also admitted that they have had difficulties in using wind farm survey data. Developers have admitted that the raw data collected during the surveys is a trade secret and refuse to disclose it to the Environmental Board when necessary. For example, when environmental impact assessment experts need to assess the cumulative impact of adjacent wind farms, it's important to obtain the survey data of other wind farms earlier than at the time of the publication of the strategic environmental assessment report. According to the Environmental Board and the Ministry of Climate, this problem could be solved by amending the legislation, which would clearly stipulate that survey data, including data intended for internal use, would still be available to limited users.

There is no agreement on the significant impacts of wind farms

98. As a major problem increasing the volume of and time needed for the environmental impact of wind farms, the impact assessment experts identified the lack of agreement on the significant impacts associated with wind farms. Experts have said that a lot of time is spent on impacts that are not significant. For example, according to the impact assessment experts, proposals have been put forward during the procedure to assess the impact of air pollution from the wind farm's roads and the impact of peat dust in the vicinity of peat mines on the ignition risk of the turbines, and to carry out an inventory of all birds of prey within a 5 km radius.

99. According to the environmental impact assessment experts, the experience of assessing the impacts of wind farms in other countries is so extensive that it's possible to identify the most important impacts that need to be assessed. It's also possible to agree on accepted assessment methodologies and impact levels (e.g. noise and shading) for all impact areas by public authorities. This problem could be solved by the proposal made by the Ministry of the Environment to develop a standardised environmental impact assessment programme. According to the Ministry of Climate, the sample programme will be completed by late 2023.

The acceptable impact of wind farms needs to be agreed

100. Wind turbines and wind farms have certain environmental impacts that cannot be completely avoided (see points 13-15). There are very few areas in Estonia without significant negative environmental impacts. For

Did you know that

The MEAC has made a calculation according to which *ca* 500 km^2 of land is required for 1 GW, i.e. 166 wind turbines (6 MW each). 1,000 km^2 is required for the 2 GW needed to meet the RE100 target.

The area needed for the 1 GW offshore wind farm of 100 wind turbines planned near Saaremaa is *ca* 200 km^2. 400 km^2 is required for a 2 GW offshore wind farm.

Environmental impact assessment is hindered by shortage of experts

example, an analysis carried out by the Environment Agency in 2022[60] revealed that there were 82 km^2 of areas in Estonia where there were no known restrictions related to the construction of wind farms. These areas were also located in relatively small pieces all over Estonia. It is not possible to build enough wind turbines in such areas (assuming that the required wind farm capacity is 1,000 MW) to reach the RE100 target by 2030.

101. Building onshore wind farms even at a very small-scale requires that they be in areas where there are restrictions and impacts on protected species.

102. The construction of wind farms has become much more active in recent years, and this has led to an increased demand for environmental surveys. The most common surveys concern birds and bats. However, there are a limited number of experts in these fields in Estonia, and the number of bat experts is particularly small (3–4 people). As there are many projects, but few experts, this slows down the performance of environmental impact assessments.

103. A further problem in the availability of experts was brought along by the analysis of priority development areas of wind farms carried out by the Environment Agency in 2023, which included large-scale bird and bat surveys in selected areas. According to environmental impact assessment experts and developers, these surveys had a significant impact on the involvement of experts in the ongoing impact assessments of wind farms. For example, bat experts could not carry out surveys for private developers.

104. **In the opinion of the National Audit Office,** the Ministry of Climate has taken a few steps to speed up the process of environmental impact assessment, but these have only had a limited impact. They either provide a temporary solution to problems or the activities do not benefit wind farms in more advanced development stages.

105. At the same time, the question of what the significant impacts of wind farms are remains unanswered. As a result, analysing impacts and carrying our surveys on topics that are less important is required during assessment. In the opinion of the National Audit Office, the Ministry of Climate has failed to develop a common position among state authorities on which environmental impacts of wind farms are accepted. As a result, the planning and environmental impact assessment procedures of wind farms take way too long or wind farm developments and studies in areas with favourable wind conditions are not initiated.

106. In the opinion of the National Audit Office, the Ministry of Climate has also failed to ensure the availability of the necessary environmental status and monitoring data of the wind farm planning areas. There is no overview of environmental surveys and no aggregated data on the follow-up monitoring of wind farms. Therefore, time-consuming surveys are still required.

[60] Mapping of restrictions limiting the development of wind energy and identification of free sites. Environment Agency, 2022 (p 42).

107. According to the National Audit Office, it's important that the Environmental Board, which is responsible for the protection of natural values, sets environmental protection requirements in planning procedures. However, the Environmental Board could take a more standardised approach to wind farm developments and apply the same principles, including agree on which impacts are acceptable and to what extent, and what are the more important impacts that must be assessed.

108. Recommendations of the National Audit Office to the Minister of Climate: in order to make the environmental impact assessment of wind farms more efficient and quicker and to avoid wasting time on less important issues,

- initiate legislative changes to improve public access to baseline inventories and monitoring data (according to the principle of public access to environmental information);
- create an environmental survey information system where the information of the surveys carried out and the environmental monitoring data of the companies (wind farms) are collected. The data of the follow-up monitoring of wind farms must be analysed and the results made available to environmental impact assessment experts;
- develop a sample programme for the strategic environmental assessment of wind farms. Among other things, the programme should identify the most important impacts of wind farms to be assessed, their assessment methodologies and acceptable impact levels;
- create in-service training for wildlife experts to introduce the construction and work of wind farms.

Response of the Minister of Climate: we agree that in certain cases it's possible to agree on significant impacts with the parties. At the same time, it must be considered that significant environmental impacts depend on the specific planned activity, location and environmental status and restrictions (e.g. the location of protected natural sites).

It's already planned to develop a sample EIA programme for the assessment of the environmental impact of onshore wind power plant projects and it will be completed in early 2024. In cooperation with the Ministry of Climate, the Environmental Board has offered to organise data sharing events for developers, where developers share their environmental impact data, and they are entered into the register.

The obligation to share data in a situation where surveys have been prepared with the funding of developers needs to be further analysed and we are inclined not to consider such an obligation to be expedient.

To improve the quality of the EIA and speed up the process, the Ministry of Climate has launched a reform of the EIA system, where we'll review the whole process, the roles of the parties involved and make the assessment digital and more transparent. As a result of the reform, environmental impact assessment will become easier, faster, and clearer for all parties involved in the impact assessment (developer, decision-

maker, expert, relevant authorities, wider public). The time- and resource intensity of the EIA process will decrease. The digitalisation of the process will include the development of baseline data (e.g. improving the availability of data from surveys carried out), service design (preparation of a roadmap, review of legislation) and the development of tools (automated notifications, modelling tools for EIA pre-assessment and programming, etc.).

Comment of the National Audit Office: it is pointed out in point 97 of the audit that even the Environmental Board has in certain cases not had access to the data of the surveys carried out during the environmental impact assessment of wind farms. Access of planning and environmental impact experts to data must also be improved (list of environmental surveys and methodologies, wind farm monitoring data and follow-up monitoring analysis). Therefore, the National Audit Office recommended improving the availability of baseline inventories and monitoring data.

109. **Recommendation of the National Audit Office to the Minister of Climate and the Director General of the Environmental Board:** agree, in cooperation with environmental impact assessment experts, wind farm developers, environmental protection associations and other parties, what will be considered acceptable impacts of wind farms on protected species. Also, agree on how to mitigate, including to compensate for, the impacts of wind farms.

Response of the Minister of Climate: the draft concerning the requirements for the use of mitigation and compensation measures to compensate for potential damage caused to plant and animal species has been submitted to the Government of the Republic for approval, will be approved by the Government in the coming weeks and will then proceed to the Riigikogu.

Response of the Director General of the Environmental Board: Based on the statutory objectives and responsibilities of the Environmental Board, the Environmental Board cannot lead the development of acceptable rates of damage to protected biota. However, the Environmental Board is already actively (deadline Q1 2024) engaged in reviewing the latest scientific literature, research data and other materials and proposing policy approaches on how to define acceptable impacts. The Environmental Board must also ensure that the impact assessment is based on the best and most relevant information available, which is also communicated to all parties in the planning and impact assessment processes.

The draft audit does not indicate that the National Audit Office has also taken into account the already prepared draft legislation when assessing the activities of the state. In this context, the Draft Act Amending the Energy Sector Organisation Act (https://eelnoud.valitsus.ee/main/mount/docList/9f10c969-870d-4b83-94d2-57f1faf5ed88), which among other things provides for the regulation of the implementation of mitigation and compensation measures in renewable energy projects, should be taken into account. In addition to the aforementioned draft, the Draft Act Amending the Building Code and Other Acts (acceleration of the deployment of renewable energy) is also in the legislative proceedings of the Riigikogu: Draft – Riigikogu. The purpose of these drafts is to speed up procedures

(e.g. speeding up the EIA process, building permits for offshore wind farms instead of three permits), the possibility to apply compensation measures in renewable energy projects, etc. These should also be taken into account when assessing the state's performance.

Comment of the National Audit Office: every activity has an environmental impact, and so does the construction of a wind farm. The Environmental Board already determines the acceptable environmental impact when granting any environmental permit. A similar approach should be applied to the environmental impact assessment procedures for wind farms and common principles should be agreed.

Ensuring the power grid required for renewable energy generation

110. At the same time as large-scale renewable electricity capacities are being developed, it's important to develop the grids so that producers can feed their output into the grid, and it reaches consumers.

111. The National Audit Office examined the steps taken by the Ministry of Climate and the network operators Elering (transmission system operator) and Elektrilevi (distribution system operator) to ensure that new renewable electricity capacity can be connected to the grid in the volume needed to meet the RE100 target and the steps taken by the Ministry of Climate:

- to ensure that capacity is available on the grid or to release capacity reserved on the network (e.g. by eliminating phantom connections or unused connections);
- to strengthen the power grid to allow new producers of renewable electricity to join.

The high cost of grid connection is an obstacle to renewable electricity development

112. According to the transmission system operator Elering, the available connection capacity in the transmission system is essentially exhausted.[61] Connecting new capacity requires reinforcing the grid, i.e. increasing its capacity, and this can cost from several million to tens or hundreds of millions of euros (in the case of offshore wind farms), depending on the location and capacity of the equipment. Some renewable energy developers and the Estonian Wind Power Association have mentioned that the complexity of connecting to the grid, namely the cost of the necessary reinforcements and the long duration of the planning process, is one of the obstacles to the construction of wind farms.

The effectiveness of resolving the problem of phantom connections is unclear

113. As can be seen, the volume of capacities seeking to connect to the network exceeds the capacity needed to reach the RE100 target almost twice (see point 31). At the same time, there are many developers who say that the connection conditions are unfavourable for them. The explanation given for this contradiction is that at the beginning of the waiting list of those wishing to connect to the grid, there are many parties

[61] Elering's map of available connection options.

Phantoms – according to Elering AS and the Ministry of Climate, a phantom is a person who has the capacity to connect to the grid and start generation but does not do so.

Renewable energy developers have different perceptions of the nature and severity of the problem. There are operators who say that phantoms are not a problem, because capacities haven't been built. They say that getting rid of phantoms means taking away the right to connect from solar producers and giving it to wind producers.

https://majandus.postimees.ee/7722339/suur-konflikt-fantoomliitujate-likvideerimisel

who do not actually have an interest in building capacity and wish to sell it on. Such connecting parties are called phantoms.

114. The Ministry of Climate has been working on creating free connection capacities for onshore renewable electricity producers (getting rid of phantom connections). The Draft Electricity Sector Organisation Act and other acts adopted in spring 2023[62] set out several requirements that should help to free up capacities connected to the grid in the case of which there is no intention to start using them.

115. Unfortunately, neither the Ministry of Climate nor Elering AS can estimate how much connection capacity will be freed up by the elimination of phantom connections and how much this will solve the situation of connecting parties. According to Elering, the volume of new applications, valid connection offers, and pending connection contracts had decreased by *ca* 1,800 MW by early November when compared to mid-April.

116. According to the MEAC, no new connection offers will be made to the remaining connecting parties, but additional recalculations will be carried out to assess the necessity of network reinforcement works. If the volume of necessary network reinforcements decreases because of the calculations, a proposal will be made to the connecting parties to amend their connection contracts. Due to the reduced capacity, the next connection contracts to be drawn up will also have a smaller volume of grid reinforcements, but this will depend on the specific location of the connection.

117. Considering the total amount of renewable energy capacities that would be available for connection and the volume of wind farms that are still under development, and the lack of available connection capacity in the grid, the National Audit Office does not find it likely that the freed up capacity will have a significant impact on the connection conditions (e.g. the amount of the connection fee) of the remaining connection applicants.

The impact of the regulation of phantom connections is unclear

Did you know that

information on the order of connection applications was not public in Estonia for a long time. As of summer 2023, it's public on the website of Elering.

Making connection applications public will allow other developers to find out which producers have applied for connection, to what extent and in which regions.

The need to establish renewable electricity capacities is not taken into account in the development of the power grid

118. Connecting renewable electricity generation capacities to the grid can also be facilitated by reinforcing the grid and increasing generation-oriented connection capacity. The Ministry of Climate and the network operators can draw up network development plans, prepare plans for network construction or investments to increase network capacity, and set the principles for calculating the cost of connecting to the network. It's thereby important to find a solution for financing the investments, whether from the connection fee or from the network charge.

119. The need for strategic network development has been emphasised by the European Network of Transmission System Operators for Electricity ENTSO-E[63] as well as by several countries committed to a full transition

[62] Act Amending the Electricity Market Act and Other Acts, 696 SE.

[63] A Power System for a Carbon Neutral Europe. ENTSO-E, 2022.

to renewable electricity. Germany[64], the UK[65] and Sweden[66] all have drawn up long-term strategies and action plans for grid development to meet the renewable electricity needs, in which the network operators play an important role.

The Ministry of Climate does not have a long-term strategy for network development

120. In Estonia, the network for renewable electricity capacities is currently built where the projects of developers are located. Developers also pay for increasing the capacity of the grid needed for connection. This means that the construction of a new network depends on the choice of developers, but this is not coordinated by the Ministry of Climate, and they don't have a long-term strategy for network development.

121. If the Ministry of Climate were to deal with the planning of the power grid, it would be much more efficient, because then the whole grid would be planned in a way that would be more beneficial to society. The necessary grid reinforcements are currently made when the first connecting party appears. For the next connecting party, the work already completed must be redone, and the work done for the first connecting party was partly or entirely in vain.

Green Tiger – a cooperative platform bringing together businesses, the public sector, the third sector and individuals. Their goal is to draw up a plan for a balanced economy and promote it in society.

https://rohetiiger.ee/

122. A long-term network development plan will give both producers and consumers clarity on where something can be done and where it's unlikely to be possible or very difficult/costly. The plan also ensures efficient use of the infrastructure and a faster, more secure, and safer transition to renewable energy. The Green Tiger has advised in its energy roadmap[67] to create a mechanism that would allow Elering AS to make investments in the reinforcement of the grid, so that renewable energy producers can be connected. The connecting parties will later pay back the investments. This would avoid subsequent connecting parties having to pay a very high connection fee.

123. According to the Ministry of Climate, discussions are currently underway with Elering and Elektrilevi to discuss the introduction of fixed-fee connection conditions or, in the case of planned projects, the introduction of an obligation for the network operator to develop the network in advance. This draft required for the changes is scheduled to be completed in early 2024.

124. The development of the grid should be led by the Ministry of Climate, but they acknowledged that they don't have a separate strategy for grid development, also in view of the renewable electricity target. According to the Ministry of Climate, the development of networks is the responsibility of the network operators and the guidelines for development are set out in the Electricity Sector Organisation Act.[68]

[64] Overview of the Easter Package. Federal Ministry for Economic Affairs and Climate Action, 2022.

[65] British energy security strategy. British Government, 2022.

[66] Action plan for phasing out fossil fuels in the electricity sector (in Swedish). Fossilfritt Sverige, 2020.

[67] Energy Roadmap Update – Roadmap 2023. Green Tiger (chapter 9, page 37).

[68] Electricity Market Act, § 66.

Elering and Elektrilevi have not been required to take the need for renewable energy into account when making investments

125. The Electricity Market Act outlines the obligation of network operators to prepare a ten-year development plan in very general terms. The act stipulates that the development plan must describe the investments to be made in the grid, but there are no specific requirements for planning activities related to the development of renewable energy.

126. So far, Elering AS and Elektrilevi OÜ have not had separate development plans, and the obligation to prepare development plans only came into force in 2022. The development plan of Elektrilevi OÜ should be completed in 2023, and the company says that making the necessary investments for the distribution of renewable energy is one of the objectives of the network development.

127. According to Elering AS, the network development plan is part of the security of supply report. This report mentions the investments made from the funds of the EU Recovery and Resilience Facility in connection with the connection of renewable energy capacities to strengthen the networks of Western Estonia and the islands and increase the connection capacity. According to Elering AS, the remaining investments in the investment plan[69] will increase the capacity of the grid in general and thereby also improve the capacity to connect renewable energy.

128. The National Audit Office did not assess the adequacy of the investment plan of Elering AS for meeting the RE100 target. However, as the investment plan was approved before the RE100 target was set, the National Audit Office believes that the Ministry of Climate and Elering AS should analyse whether the planned investments will help to ensure that the RE100 target will be met and what additional investments are needed.

Connecting to the grid is a major obstacle for offshore wind farms

Did you know that

in several countries, the state has supported the construction of the network for offshore wind farms. For example, in Finland, Germany and the Netherlands, the government supports the construction/reinforcement of the electricity grid for renewable electricity production. In Denmark, the state itself builds the connections for offshore wind farms and later reclaims the cost from developers. These states give certainty to offshore wind farms by supporting the construction of the network.

129. According to offshore farm developers, one of the biggest challenges they face is connecting to the electricity grid, because building the necessary connections (submarine cable and overhead lines) is expensive and the planning procedure is long. For example, offshore wind farm developments in the Gulf of Riga must build connections to a 330 kV substation on the mainland (50–80 km away). A new 330 kV power line from Lihula substation through Saaremaa (distance about 150 km) is necessary for the construction of the offshore wind farms to be developed west of Saaremaa (including the Elwind wind farm planned in cooperation between the Estonian and Latvian governments[70]).

130. According to both onshore and offshore wind farm developers, it is currently unclear which planning procedure can be used to plan the networks. Elering AS is of the opinion that according to the Planning Act, a national designated spatial plan must be used for network planning.[71] However, this procedure has not been used in practice in the past and its duration is therefore difficult to estimate. According to the Ministry of Regional Affairs and Agriculture, it is possible to prepare a state

[69] Elering website – Investments 2023–2032.

[70] Elwind project website.

[71] Larger wind farms will be connected to the grid by 110 kV or 330 kV high-voltage lines. § 27(1) of the Planning Act lays down the conditions for the preparation of a state designated spatial plan, including the construction of a high-voltage line of 110 kV or more.

designated spatial plan in about 3 years, but planners estimate that it will take 5–7 years.

131. Although the state funding the construction of the network is one way to provide certainty to offshore wind farms (see points 152-169), the developers say that it would also be helpful for them if the implementation of network planning procedures was supported. The sooner the electricity grid plan necessary for the wind farm is established, the confirmation of the grid connection is received, and the cost of the connection is known, the sooner developers can make the final investment decision and enter into the necessary contracts (with wind turbine manufacturers, for the hire of the necessary vessels, etc.).

There is competition between states in the development of offshore wind farms

132. Estonian wind farm projects (both onshore and offshore) must compete with other producers in the region. Developers of offshore wind farms have said that if the cost of building the grid is so high and the state does not provide other forms of security, the output of the wind farm will not be competitive with neighbouring countries and offshore wind farms will not be built.

133. At the meeting with the National Audit Office in May 2023, the MEAC confirmed that it would also analyse whether and to what extent the state should support or provide guarantees to producers (especially for offshore wind farms). In October 2023, the Cabinet was presented with three measures that will help speed up the construction of new renewable energy capacities. However, it's not clear on what basis these measures were chosen, what their expected impact is, how much they will cost and what their schedule will be like (see also point 164).

134. Although the Ministry of Climate has taken steps to create free connection capacities, these steps have not solved the problems of developers when joining the network. For example, the effectiveness of measures to get rid of phantom connections is unclear – to what extent and how quickly their effects will be felt by developers planning wind farms. Neither the Ministry of Climate nor the network operators Elering AS and Elektrilevi OÜ have a strategy and action plan to increase the grid capacity needed to connect renewable electricity generation capacities to the grid. The Ministry of Climate has not coordinated the development of the networks, and this does not allow for the plans necessary for the network to be prepared faster. All in all, this means higher costs for society.

135. **Recommendations of the National Audit Office to the Minister of Climate:** to create better opportunities for renewable electricity generators to connect to the grid, grid development should be guided and the possibilities for supporting grid development should be analysed:

- to entrust the TSO Elering AS with the task of developing a long-term strategy for the development of electricity grids and an action plan for its implementation. The strategy should include, among other things, the network developments needed to meet the RE100 target;
- to provide guidance to transmission and distribution system operators on network development principles, including the actions needed to achieve the RE100 target;

- to analyse whether it's appropriate to continue with the current principles for charging for connection to the electricity grid in order to reach the RE100 target. If it's decided to provide additional financial support for the development of the transmission and distribution networks, analyse the sources from which this support can be provided.

Response of the Minister of Climate: we agree that network development activities are important. At the same time, we would like to point out that the preparation of a network development plan every two years is a statutory obligation of Elering AS (Electricity Market Act, § 66(8)). Elering AS is already working on a long-term strategy for the power grid and is preparing a development plan for the Estonian electricity transmission system 2024–2033[72].

We agree that the development of the grid needs to be accelerated in line with the growth in renewable energy production and deployment. Therefore, the Ministry of Climate has been analysing the possibility of changing the principles of connection to the transmission system from summer 2023. Accelerating the development of the grid with a view to meeting the 2030 targets and increasing the speed of grid connection thereafter will require building the grid in advance and including the necessary development obligations in the network charges. In October, the Minister of Climate received a mandate from the Government of the Republic to draft the necessary amendment. The plan is to submit the draft to the Government of the Republic in the first half of 2024.

More than €85 million has been allocated from both the national budget and the RRF[73] to the distribution and transmission network to increase the capacity of the electricity grids to receive renewable electricity and make the grid more climate resilient.

The terms and conditions of connecting to the electricity grid for producers have been amended and a charge has been introduced for not using the connection resource of the developed network. Approximately 4,400 MW of generation capacity has been released in the grid as a result of this decision.

The REPowerEU activities will provide fast-track funding for the planning of the Paide-Lihula-Saaremaa route for building the Estonia-Latvia 4th connection and the route for the electricity connection to the offshore wind farm in the Gulf of Riga.

Comment of the National Audit Office: speaking of the freeing up of generation-oriented resources, the National Audit Office points out that the data on the freed up network resources (1,800 MVA) given in point 115 are based on the estimates of Elering AS. The impact of the legislative amendment on the freeing up connection capacities was assessed based on the connection capacities of those wishing to connect to the power grid on 1 April 2023 compared to 6 November 2023. According to Elering, the active cancellation of connection contracts

[72] Development Plan for the Estonian Power Transmission System 2024–2033.

[73] Estonia's Recovery and Resilience Facility.

started after the regulation on the elimination of phantom capacities entered into force on 17 March 2023.

136. **Recommendations of the National Audit Office to the Minister of Regional Affairs:** to speed up the establishment of both offshore and onshore wind farms and achieve an increase in wind power generation,

- to consider clarifying and simplifying power grid planning procedures. For example, to make changes to legislation, where necessary, to change the requirements for a construction work with a significant spatial impact;
- to provide support to local authorities in carrying out wind power designated spatial planning and grid construction planning procedures.

Response of the Minister of Regional Affairs: we also clarify that the amendments to the Planning Act, which entered into force in March 2023, apply to the planning of the power grid, make it possible to waive the preparation of a detailed solution in the case of both a national designated spatial plan and a municipal designated spatial plan. In doing so, we have created the possibility for much faster planning of power lines.

Motivation for building wind farms

137. The state has imposed several restrictions on the construction of wind farms, which are necessary to minimise and mitigate their environmental impacts and nuisances. At the same time, the state has an interest in freeing itself from dependence on fossil fuels and meeting the 100% renewable electricity target by 2030. This means that the state, led by the Ministry of Climate, must include, and motivate local authorities and residents in a way that has a positive impact on the acceptance and establishment of wind farms.

138. The National Audit Office examined whether:

- the MEAC has clearly described the role of local authorities in achieving renewable electricity targets;
- the compensation for the environmental nuisance caused by onshore and offshore wind farms aimed at local authorities and residents is linked to the actual charge for compensation for environmental nuisances and whether it is motivating for the target group;
- the MEAC has clearly expressed its desire to develop offshore wind farms, including to meet the RE100 target, and has assessed the need and ways to develop them to provide certainty.

The wind farm charge is not linked to compensation for actual nuisance tolerated

Involving local authorities is essential to promote renewable electricity

139. To meet the renewable electricity target, it's important to involve local authorities and citizens. This is primarily because the construction of onshore wind farms is carried out through local government planning,

and both onshore and offshore wind turbines can disrupt the lives of local residents.

140. The National Audit Office assumed that the responsible state authorities (Ministry of Climate, formerly the MEAC; Ministry of Regional Affairs and Agriculture, formerly Ministry of Finance) have explained to the local authorities their role in achieving the renewable electricity target by 2030 and have supported and motivated them to establish wind farms on their territories with both advice and financial subsidies/charges.

141. In the survey conducted by the National Audit Office (see methodology on pp 66–67), local authorities found that the MEAC has not expressed with sufficient clarity what the role of local authorities is in achieving the 2030 renewable electricity target. Local authorities themselves see that their main role is to promote dispersed and small-scale production of electricity from renewable sources in their territory, and a third of the respondents found that at least the same amount of renewable electricity should be produced in their territory as is consumed.

142. Many local authorities also see the successful and swift preparation of plans related to onshore wind farms as their role. The MEAC has also seen this as their role, but specific steps were only taken from 2019–2021, when the Government of the Republic made the decisions to mitigate the height restrictions related to national defence on land (see Figure 3).

Did you know that

before the decision Government of the Republic of November 2019, only 14% of the Estonian mainland was suitable for the development of wind farms due to height restrictions related to national defence (see also Figure 3).

Developers will start paying charges to tolerate wind farm nuisances

Did you know that

in the case of onshore wind farms, the estimated size of the target group of the wind turbine charge is estimated at 50 local authorities, in the case of offshore wind farms in the inland and territorial sea – seven.

Source: Explanatory Memorandum of the Act for Amendment of the Environmental Charges Act, 27.05.2022

143. As there has been strong opposition from local residents to the establishment of wind farms, the MEAC also started developing a local benefits instrument for both onshore and offshore wind farms in 2021. The amendment to the Environmental Charges Act was adopted in summer 2022 and the requirement to pay the charge started to apply to wind farms built from 1 July 2023 onwards[74].

144. As the developed instrument is not a charge for the use of the environment in its nature and is not paid for environmental pollution or resource use, the charge to produce electricity from wind energy is called the *charge for compensation for environmental nuisances.* In essence, developers pay money to local authorities and residents for accepting wind farms in their territory and so they would receive a share of the revenue.

External costs – the negative impact of the activities of one group of people on another group of people, without the causing party considering or compensating for this.

Source: Sustainable development glossary of the SEI

145. The calculation of the charge is linked to the actual output or the capacity of the wind farm, and to the electricity exchange prices, and not to the compensation of the actual costs (external costs) of the nuisances (see Annex B for the basis of the calculation of the charge and the sample calculations).

146. However, both local authorities and developers have a positive attitude towards the charge, as it allows local authorities to share in the revenues of the company operating in their territory, and developers have a clear idea of the future costs they will have to bear.

[74] Environmental Charges Act, Chapter 3[1]: Charge for compensation for environmental nuisances.

The wind turbine charge is small in the case of low electricity prices

147. Local authorities are concerned about the potential increase in the administrative burden for the payment of the charge to residents living in the area affected by onshore wind farms, where it will be necessary to inform residents, process applications, pay the charge, carry out annual residence checks, pay the charge to residents in the neighbouring area, etc.

148. The establishment of the obligation to pay a charge by law may create an attitude among wind farm developers that, in addition to the tolerance charge, they do not have to contribute more to local life or compensate for nuisances (e.g. if infrastructure improvements are needed in connection with the construction of a wind farm) or involve and motivate local authorities and local residents (e.g. by enabling the acquisition of shares).

149. According to local authorities, the instrument of local benefits is not enough to get local people to accept wind farms. Residents need to be involved and their opinion considered. Local authorities believe that they would also be motivated to accept wind farms if wind farm developers offered the local authorities and residents in the area of influence more favourable electricity prices, created direct electricity connections, improved access roads or contributed otherwise to local life.

150. **In the opinion of the National Audit Office,** the introduction of a charge for compensation for environmental nuisances is a positive step towards the acceptance of wind farms by local authorities and local residents, but as it's not related to the actual costs of the disturbance caused, it is more a payment of support to local authorities and residents. With low electricity prices, the charge received for wind farms of conventional size is relatively low, especially in the construction stage, where the nuisance can be the greatest. Thus, local authorities find that the charge for the environmental nuisance caused by wind turbines is not a strong incentive and may not accelerate the deployment of wind energy.

151. **Recommendation of the National Audit Office to the Minister of Climate:** in order to ensure that the environmental nuisance compensation charge does not significantly increase the administrative burden on local authorities in processing the charge, to develop (IT) solutions in cooperation with interested local authorities to identify the owners of affected properties and to organise the procedure/communication with them.

Response of the Minister of Climate: IT solutions for the wind turbine fee are in place. Local authorities can use the EVALD platform as a tool to get an overview of affected properties and to establish first contact. In addition to EVALD, information is available in the KOTKAS database of environmental decisions, which indicates the area of impact and height of each wind turbine.

Did you know that

for a **40 MW** onshore wind farm, the local authority/residents would receive a charge for compensation for environmental nuisances (assuming that the electricity price is 7.6 s/kWh) of **€44,688 – €63, 840 pear year.** Up to 50% of this would be distributed to residents, the remainder would be retained by the local authority.

During the construction stage of the wind farm, 10% of this charge will be paid to the municipality, i.e. **€4,468– €6,384 per year**.

See the sample calculations in Annex C.

The Ministry of Climate has no clarity on the role of offshore wind farms in promoting renewable energy

152. To promote renewable energy, including wind power, the state should send clear messages to developers on how to achieve its targets and, where necessary, contribute to this. At the same time, the state should not

provide financial support for activities that do not need support (e.g. where capacity is being built anyway).

153. As it's impossible to achieve the renewable electricity target without wind power (see point 9), the National Audit Office looked at the support/guarantees the state has implemented or plans to implement to ensure faster completion and economic viability of wind power projects and whether the state sees a need to promote offshore wind power.

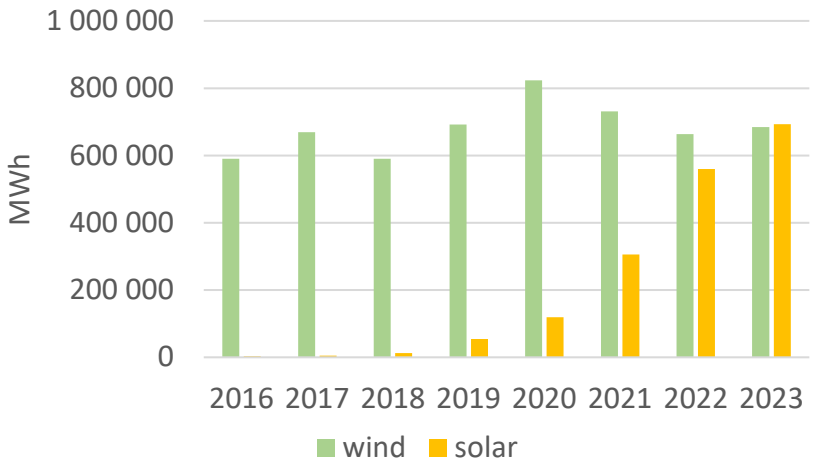
The state's reverse auctions have led to a boom in solar power

154. From 2019–2021, the state organised four reverse auctions for renewable electricity, because of which 555 GWh of renewable electricity will be brought to the market per calendar year.[75] The MEAC has wanted to be technology-neutral (i.e. it has not named the source from which power should be produced). This has led to a big boom in solar farms, as they are faster and cheaper to build (see Figure 9).

Reverse auction for renewable electricity – the state's order for renewable electricity production where support for new production capacity is paid if the electricity exchange price is below the agreed rate.

See Elering reverse auction for renewable energy

Figure 9. Wind and solar power production 2016–2022



Source: National Audit Office according to Eesti Energia AS

Did you know that

more information on the importance of storage in promoting renewable energy can be found in the 2023 annual energy report of the National Audit Office:

https://aruanded.riigikontroll.ee/RVKS2023
(Points 86–95)

155. However, the generation of solar power is considerably less efficient than generation from wind (see Table 1), and the lack of storage possibilities has led to situations where electricity prices are zero/negative on sunny days, but electricity is scarce in the evening and prices can soar. The first is not good for solar power producers, as there is no revenue, the second for (domestic) consumers, as the price is too high.

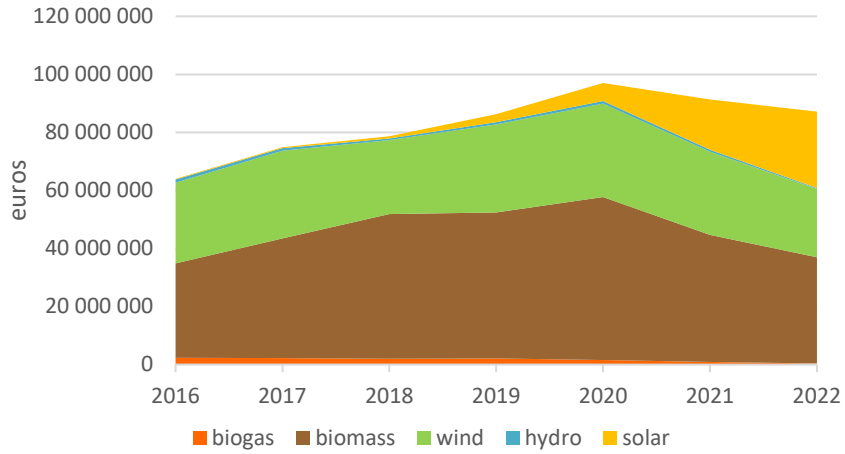
The Ministry of Climate finds that onshore wind farms do not need support, but has announced a reverse auction aimed at them

156. So far, most of the renewable energy subsidy has gone to the production of electricity from biomass, with a fair amount also going to onshore wind power production. However, in recent years, the renewable energy subsidy for solar power has increased significantly (see Figure 10). The Ministry of Climate has said that they would prefer it if new renewable electricity capacities came to the market without subsidy and that onshore wind turbines no longer need subsidy[76].

[75] MEAC, 26.01.2023. The state launches the largest reverse auction for renewable electricity

[76] Document sent by the Ministry of Climate – Analysis of the Achievement of 100% RE 2030

Figure 10. Renewable energy subsidy by energy source 2016–2022



Source: National Audit Office according to Eesti Energia AS (support paid out)

Did you know that

The following was produced in Q1 and Q4 2022:

- **18%** of total annual solar power
- **64%** of total annual wind power

Source: Elering live: production and consumption

157. At the same time, the MEAC announced a reverse auction (with a deadline of 5 September 2023), which will bring at least 650 GWh of renewable electricity to the market with state support.[77] This was clearly aimed at onshore wind farms or their hybrid solutions with solar, as the terms of the auction include the obligation to generate 50% of the electricity in the first and fourth quarters of the year (which is unlikely in the case of solar farms) and offshore wind farms will not be ready by 1 July 2027, when the obligation to generate power starts.

158. Thus, the actions of the Ministry of Climate are contradictory, as it has admitted supporting onshore wind farms is no longer necessary, but at the same time announces yet another reverse auction, specifically targeting onshore wind farms or solar-wind hybrid solutions. At the same time, developers of onshore wind farms have highlighted the uncertainty of financiers due to low electricity prices as one of the risks affecting developments.

Differences between offshore and onshore wind farms

159. The development of both onshore and offshore wind farms is beneficial for the state – in addition to meeting renewable electricity targets, they generate revenue for the state in the form of fees for building rights[78], jobs, tax revenue, industries that valorise green electricity (hydrogen, energy-intensive industries), etc., as well as promoting local life. However, the state as a whole has not assessed the benefits and impacts of wind power development (see point 163).

Levelised cost of electricity – the costs of a production unit throughout its lifetime. These costs are related to the production of the respective energy type and divided by the amount of energy produced over the lifetime of the unit. It includes initial capital, discount rate and costs for ongoing operations, fuel and maintenance.

Source: KPMG, 2022. Methodology for the model analysis of solar power support

160. The levelised cost of energy (LCOE) of onshore wind farms is lower than that of offshore wind farms because offshore wind farms are more expensive to build, especially the foundations and cabling, and logistics and maintenance cost more as well. On the other hand, the LCOE of

[77] Reverse auction notice of the MEAC (02.03.2023) and the results of the reverse auction of 2023 (07.09.2023). Reverse auctions for renewable energy are also planned for 2024 (500 GWh) and 2025 (500 GWh).

[78] The starting price of the building right on auction is €15,000/km^2. See the CPTRA website.

offshore wind farms has fallen by 59% between 2010 and 2022.[79] See Annex A for a comparison of the different aspects of onshore and offshore wind turbines.

161. A significant advantage of offshore wind farms over onshore wind farms is that offshore wind is much stronger and more persistent. Therefore, the efficiency of offshore wind farms (i.e. the hours when they are in maximum use and thus generate more electricity) is higher than that of onshore wind farms (see Table 1).[80] As a result, onshore wind farms need more controllable power generation capacity and/or storage to balance.

Production costs of different technologies LCOE (€/MWh):

- onshore wind farm 30–45,
- solar power plant 30–50,
- offshore wind farm 60–80,
- biomass cogeneration plant 70–150,
- nuclear power plant 50-100,
- gas or oil shale power plant 150+

Source: Presentation of the MEAC at the Government of the Republic on 26.01.2023. See also IRENA, 2022. Renewable Power Generation Costs in 2021

162. Offshore wind turbines are also more powerful and fewer of them should be built to produce the same amount of electricity. For example, 400 onshore wind turbines (with a capacity of 5 MW) or 100 offshore wind turbines (with a capacity of 15 MW[81]) would have to be installed to generate 6 TWh of power. As a rule, offshore wind turbines don't compete with other purposes of land use (agriculture, forestry, infrastructure, settlement, etc.) or with national defence restrictions[82], their impact on wildlife and visual and noise nuisance for people is smaller than in the case of onshore wind turbines[83]. However, offshore wind turbines may have some impact on, for example, fishing and the wintering and feeding areas of birds. Also, offshore wind turbines have less risks related to people's activities.[84]

163. Offshore wind farms may need public support/guarantees, because financial institutions that fund development projects need to be reassured that these projects are economically sustainable. The experience of other countries that have supported the development of offshore wind farms in one way or other points to the need for state support/guarantees[85].

The state analysed ways to contribute to the construction of offshore wind farms

164. In 2023, the Ministry of Climate analysed whether and how to contribute to the construction of offshore wind farms in such a manner that the taxpayers' money is used as sparingly as possible. In October, three measures to speed up renewable energy were presented to the Cabinet: increasing the number of local authority staff, which would allow faster processing of plans. Secondly, the Ministry of Climate would require Elering to develop the grid for the planned generation capacity and thirdly, it would create advantages for large consumers of renewable electricity. The Ministry of Climate has not explained why these

[79] Data of the International Renewable Energy Agency (Renewable Power Generation Costs in 2022). The average LCOE of offshore wind farms in 2022 (€74 MWh).

[80] IRENA (2019), Future of wind: Deployment, investment, technology, grid integration and socio-economic aspects

[81] The most powerful offshore wind turbines in operation are 16 MW. Wikipedia: List of most powerful wind turbines.

[82] Despite the fact that height restrictions related to national defence will disappear from most areas of Estonia in the coming years, all developments must be coordinated with the Ministry of Defence and restrictions may be imposed on their establishment.

[83] Brunel, 2021. The pros and cons of onshore & offshore wind.

[84] For example, the impact on real estate prices, hunting, communication, water levels in wells; the risks of forest fires and peat dust ignition, etc. have been discussed at the renewable energy round table in relation to onshore wind farms.

[85] Value proposition of the Estonian Wind Power Association to the Ministry of Climate. September 2023.

measures were chosen, what their expected impact is, how much they will cost and what their schedule will be like. According to the Ministry, the measures were analysed, but no written results were submitted to the National Audit Office.

165. The Ministry of Climate fears that if electricity prices become too low on the market in the future, the state, i.e. the taxpayer, will have to pay too much for wind power by implementing price guarantees.[86] Therefore, the Ministry of Climate has asked offshore wind farm developers to provide information (value propositions) on the benefits of offshore wind energy for Estonia.

Did you know that

In 2022, electricity consumption in Estonia was ten times bigger than in Estonia – 81.7 TWh.

Source: Statistics Finland

166. To encourage the construction of wind farms in Estonia, the Ministry of Climate hopes that, similar to Finland, Estonia will be able to conclude more long-term fixed price power purchase agreements (PPAs) between renewable electricity producers (wind farms) and (large) consumers. At the same time, electricity consumption in Estonia is 10 times lower than in Finland and the potential for entering PPAs in Estonia is low and would require the concentration of smaller electricity consumers. PPAs have been signed by Estonian wind developers[87], but the Ministry of Climate does not have an overview of the PPAs that have been entered into and the parties who could potentially enter them. The state's own joint procurement of renewable electricity for public authorities[88] failed.

167. For example, Estonia's largest electricity consumer AS Estonian Cell has not signed a long-term contract, saying that it has not received an offer that would be in line with future prices in the region.[89] The company estimates that entering a long-term contract could be financially disadvantageous for them if electricity prices fall in the future.

Did you know that

several large international energy companies have given up on the development of offshore wind farms in Estonia[90].

168. In such a situation, it's important that the state sends a clear message to developers and financial institutions as to whether offshore wind developments are necessary and important in Estonia and whether, to what extent and in what way the Ministry is willing to contribute to the completion of offshore wind farms. Now, the Ministry of Climate is of the opinion that Estonia can meet its renewable electricity needs with electricity from biomass, solar and onshore wind.

169. The National Audit Office points out that the opinion of the Ministry of Climate that onshore wind farms can meet the RE100 target by 2030 is based on the developers' own estimates. The Ministry of Climate does not have an actual, objective overview of the status of the developments that are likely to be carried out, except for the construction of at least 315 MW of wind turbines between 2023 and 2025, the construction of which is certain (see point 10).

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[86] Document sent by the Ministry of Climate – Analysis of the Achievement of 100% RE 2030.

[87] Postimees, 31.05.2022 Enefit Green builds its largest solar farm next to Purtse wind turbines

[88] RKAS website (03.08.2023). The intent was to procure long-term electricity to the extent of 100 GWh/y.

[89] EPL, 11.07.2023. Three times lower future electricity prices await decision.

[90] Information from the document register of the CPTRA (see TotalEnergies Renewables, RWE Renewables Estonia OÜ).

170. **Overall,** the messages of the MEAC have been contradictory regarding the need for onshore and/or offshore wind power development, for example by supporting the construction of capacities that does not actually need support anymore, or by giving unclear messages on offshore wind development. Indecisiveness can hinder the development of offshore wind farms.

171. **Recommendation of the National Audit Office to the Minister of Climate:** to take a clear position on whether offshore wind farm developments are important for Estonia (both in terms of meeting the renewable electricity target and exports). If they are important, it should be assessed whether and how the state can contribute to the construction of offshore wind farms and appropriate measures taken.

Response of the Minister of Climate: In the future, wind farms developed on land and at sea can both contribute to the achievement of Estonia's renewable energy targets. To meet these targets, it's necessary, above all, to take advantage of the potential for onshore renewable electricity generation on a scale that will ensure a lower cost of electricity, lower system costs and greater energy security, but offshore wind farms will also play a crucial role in securing generation capacities in a context of increasing energy consumption.

According to a recent analysis by the Environment Agency, Estonia's renewable energy target for 2030 is also achievable with onshore wind farms. Offshore farms will provide clean electricity to the Estonian economy after 2030 in the context of growing electricity demand and will allow to increase the availability of clean and affordable renewable energy, as offshore farms generate electricity at a time when onshore farms and solar farms do not due to weather conditions. Estonia's high potential for onshore and offshore renewable electricity generation, and the wind energy developments that will already be sufficient in the coming years, make it possible to introduce Estonia internationally as a favourable location for future-proof industries with high energy consumption.

As offshore wind farms have been considered in the picture of the future is also illustrated by the fact that the Riigikogu is currently considering draft 308 SE[91], which will create a joint permit for offshore wind farms that will speed up and simplify the permit-granting procedure for offshore wind farms. In 2024, 12 building permit procedures for marine areas will be launched to allow developers to use the sites. Plans for the construction of two routes enabling the connection of offshore wind farms to the grid will be fast-tracked.

Comment of the National Audit Office: The National Audit Office doesn't agree with the conclusions made in the analysis of the Ministry of Climate and the Environment Agency, which in the opinion of the National Audit Office are too optimistic. The Environment Agency analysed building right contracts signed by developers. It must be considered that it is not possible to erect wind turbines on all the properties covered by contracts. For example, wind turbines cannot be built on properties very close to each other (wind turbines have a certain

[91] Act Amending the Building Code and Other Acts (acceleration of the deployment of renewable energy) 308 SE.

minimal spacing). Some of the properties with contracts are not even in planning areas. According to wind power developers, the experience of Scandinavian countries shows that wind turbines are built on up to 10% of land with a building right contract. It's often impossible to build wind farms at the originally planned capacity.

The above report identifies several problems that hinder the development of onshore wind farms and call the achievement of the 2030 target into question. For example, the length of planning and environmental impact assessment proceedings and problems with connection to the grid. Unless these problems are quickly solved, the 2030 target will not be met.

/digitally signed/

Ines Metsalu-Nurminen
Director of Audit, Audit Department

Recommendations made by National Audit Office and responses of the auditees

Based on the audit, the National Audit Office made several recommendations to the Ministry of Climate and Regional Affairs, and the Environmental Board. The Director General of the Environment Board sent his response to the recommendations of the National Audit Office on 18 December 2023, the Minister of Regional Affairs on 21 December 2023 and the Minister of Climate on 29 December 2023.

General comments of the auditees on the audit report

The Minister of Climate: the Minister of Climate agrees with many of the observations and recommendations made in the audit. However, we find that the conclusion made in the audit that Estonia may not meet the 2030 renewable electricity target is not based on the audit analysis or the current situation. The audit highlights several shortcomings from the previous period that are no longer relevant and do not consider the impact of decisions made by the Ministry of Climate and other changes that have taken place.

The National Audit Office has not considered the impact of height restrictions on the volume of renewable electricity projects in Estonia. As highlighted in the audit, around 70% of Estonia's territory will be freed from height restrictions between 2024 and 2027, which increases the size of the areas where wind farms can be built. The impact of this change has not been assessed in the audit. The removal of restrictions means that most wind farm developments have started in the last few years. Investment decisions have already been made on a scale that, together with the farms in operation, corresponds to 50% of the target. The positive effects that will emerge because of REPowerEU activities have also not been considered in the audit.

The assessment of the activities undertaken to free up network capacity is incorrect. Changing the conditions of grid connection for producers and charging for not using the connection resource of the grid that has been built has added *ca* 4,400 MW of generation-oriented capacity to the grid, not 1,400 MW as the audit erroneously states.

Also, the reverse auctions planned by the Ministry of Climate will have a positive impact on further investment decisions. Although market distortion through support must remain a last resort, paying limited support is justified to bring renewable electricity investment to Estonia faster. The Ministry of Climate has opened a debate on how to give price certainty to projects that are necessary to meet the 2030 renewable electricity target. It is expected that the Government of the Republic will make the relevant decisions in early 2024.

The Environment Agency estimates that, considering all the planned developments and initiated plans, the total capacity of onshore wind farms under development and due to be completed before 2030 alone is at least 2,400 MW[92]. This capacity is sufficient to meet Estonia's 2030 renewable electricity target.

The wind turbine charge was developed based on the concept according to which the wind turbine charge is first and foremost an environmental charge.

In the Environmental Charges Act, the purpose of the wind turbine charge is to compensate for the effects of a completed wind turbine that are unique to wind turbines. While the impact of different types of construction activities can be significant, it is always temporary. The purpose of the wind turbine charge is to compensate for long-term nuisance caused by the work of an operational wind turbine.

The distribution of the money from the charge for compensation for environmental nuisances is based on the principle that the parties most affected and closest to the nuisance may be compensated. The concept of the charge does not require that compensation should cover the entire nuisance. The financial assessment of a specific nuisance is costly and subjective and cannot be carried out in a reasonable way and at a reasonable cost. Therefore, the chosen charge is based on an amount pre-agreed with stakeholders, with a percentage that can be varied by the local authority according to local circumstances.

Similarly, payment in full is justified if the person liable to pay has a source of income. During the period when the wind farm is being set up, the developer of the wind farm is not yet earning the full income from which payment could be made. Earlier calculation of the charge at the maximum rate may mean that the company must take out a loan in order to pay the tax. This in turn would put companies in unequal starting positions. Those who already have either an operational wind farm or another source of revenue would have an advantage in setting up a new wind farm.

The wind turbine charge was introduced from 1 July 2023. The first payment of the wind charge was made in early October 2023 and five developers are already paying the wind turbine charge. Looking at the number of initiated planning applications, it can be seen that local authorities are receptive to wind farm development, and this is linked to the wind turbine charge. For the development of wind power, 21 municipal designated spatial plans have been initiated in 25 areas. Wind power is addressed in the comprehensive plans of 19 municipalities.

Minister of Regional Affairs: we draw attention to the inaccuracies in the audit report.

It is written in point 24 of the audit that the establishment of a national designated spatial plan and local government comprehensive plan is followed by the preparation of a detailed spatial plan or the issue of design conditions. We would like to point out that pursuant to subsection 10 of § 27 of the Planning Act, the national designated spatial plan is the basis for the preparation of a construction design or, if the provisions of § 27-1 of the Planning Act are applied, the basis for the issue of design conditions. However, in no case does a detailed spatial plan have to be established for the construction of a wind farm in an area after the preparation of the national designated spatial plan.

It is written in point 28 of the audit that two marine spatial plans have been established in Estonian marine areas, within the framework of which a strategic environmental assessment has been carried out. We would like to point out that three plans have been established in the Estonian maritime area and a strategic environmental assessment has been carried out for all of them (https://www.riigiplaneering.ee/). However, two of the three plans include wind farm development areas.

[92] The overview of the developments of onshore wind farms prepared by the Environment Agency.

Director General of the Environmental Board: 1) in paragraphs 108 and 109 of the draft report, it remains unclear what is expected of the Environment Board in addition to the recommendation to the Minister of Climate, which is to prepare a model SEA programme, or whether the same programme is meant. It is written in point 99 of the audit report that according to the Ministry of Climate, the sample programme will be completed by late 2023. The Ministry of Climate has confirmed that it will involve the Environment Board in this (the draft of the sample programme has not been received yet). The assignment Analysis of wind farm planning and SEA (to the accuracy of EIA) (Skepast & Puhkim OÜ, 2022) commissioned by the Ministry of Finance was completed in 2022, but the draft of the report of the National Audit Office contained no reference to this guidance material. The impact assessment section of the guidance material identifies the impact areas and surveys that typically need to be considered in practice during the planning process and provides explanations to help the organiser of planning to screen out important issues in each location at the outset of the process. The prepared guidance material has been developed for the preparation of a detailed spatial plan initiated based on a comprehensive plan.

It is important to consider that the impacts associated with wind farms are highly site-specific, depending on the specific activity proposed, the planning area and its surroundings. The following is stated in point 98 of the audit: “As a major problem increasing the volume of and time needed for the EIA of wind farms, the impact assessment experts identified the lack of agreement on the significant impacts associated with wind farms. Environmental impact assessment experts have said that a lot of time is spent on impacts that are not significant. For example, according to the impact assessment experts, proposals have been put forward during the procedure to assess the impact of air pollution from the wind farm’s roads and the impact of peat dust in the vicinity of peat mines on the ignition risk of the turbines, and to carry out an inventory of all birds of prey within a 5 km radius.” The Environment Agency is not in a position to respond to this claim, as the draft audit report does not make it clear which environmental impact (strategic) assessment process has been kept in mind and why it is not relevant in this particular case. For example, it has been necessary to address the issue of ignition risk in the region of peat production areas.

2) The Environment Board clearly recognises that due to the widespread presence of natural values in Estonia, it’s not possible to build wind farms without environmental impacts, and certain compromises are unavoidable. There is no doubt that new values will also be found when natural values are mapped and surveyed in connection with wind farm planning. Thus, a situation may arise where development areas initially considered suitable turn out to be rather unsuitable because of their natural values. It is therefore essential to define at national level those values the protection of which cannot be compromised (e.g. habitats of the black stork and the Eurasian eagle-owl, which are in a good condition, and their contact zone). At the same time, the planning and environmental impact assessment of developments must be based on the obligations laid down in legislation. For example, it must be ensured that an adverse impact on the conservation objectives of Natura 2000 sites is excluded, the obligations of the Nature Conservation Act concerning the protection of species are complied with, etc.

In the EU, the protection of certain species/groups of species is very strictly regulated. For example, section 2.2.4. of the Commission notice C(2020) “Guidance document on wind energy developments and EU nature legislation” states that the provisions on the protection of species are very important from the viewpoint of wind power developments. Their objective is, for example, to ensure that new development projects do not destroy the breeding or resting sites of any of the species listed in Annex IV to the Habitats Directive and do not kill or injure any wild birds, unless a competent authority has granted an exemption in accordance with the Directives. Thus, at national level, despite the fact that renewable energy developments have also been designated as being of overriding public interest in terms of species protection, it’s often very difficult to agree on acceptable levels of bird mortality that are difficult to reconcile with the objectives of the Directives.

Exceptions must be granted by legislation, i.e. the Draft Act Amending the Energy Sector Organisation Act has been prepared, which among other things provides for the regulation of the implementation of mitigation and compensation measures in renewable energy projects. All significant impacts must be assessed during the environmental impact assessment and appropriate mitigation measures and monitoring recommendations must be developed.

The Environmental Board is involved in the process of assessing plans and their environmental impact, to which it contributes within the limits of its competence and information. For this purpose, the Environment Board has appointed specialists to work on renewable energy developments, and has recruited them with the support of the renewable energy acceleration funding to boost its competence.

The Environment Board has already developed its own recommendations on how to plan wind farms in a way that is sustainable for wildlife (including birds and bats), and has also contributed to the implementation of a similar analysis commissioned by the Ministry of Environment (e.g. special considerations for nests of certain species that have not been occupied for a longer period of time, with a focus on those located in more protected areas or natural values associated with them). These implementation principles have also been repeatedly presented at various events related to renewable energy. The main specialists in the field of renewable energy at Environmental Board advise local governments, developers, environmental impact assessment experts, as well as those conducting baseline research and inventories on a daily basis. In the current year, more than 130 meetings, consultations and other relevant events have taken place.

The Environment Board has already submitted its proposals and justifications to the Ministry of Climate on how to correct the extent of the zones that exclude the development of wind farms, for example, around settlements and roads and on agricultural land. The Environment Board is of the opinion that, when choosing the location of wind farms, maximum preference should be given to areas that are already under strong human influence, and potential negative environmental impacts should be avoided by planning wind farms in natural areas of good environmental status. Thus, the additional impact of wind turbines on the environment is, for example, many times smaller on agricultural landscapes than on forest landscapes. According to the practice of the rest of the world, the restrictions on planning around settlements and roads and on agricultural land that are often applied in Estonia at the moment are not justified. The fewer conflicts there with the objectives of environmental protection, the easier it is to find solutions and compromises for the conservation of species and communities, and the need for inventories and surveys of natural values is thereby also smaller and they are easier to carry out, as animal movements and habitat use are easier to identify. Therefore, the Environment Board agrees with the proposal of the National Audit Office (point 66) to refrain from designating areas that require deforestation and land acquisition by the state as renewables acceleration areas to avoid complex procedures, additional costs for the state and further opposition to wind farms. The same principle should be followed in other development areas as well.

To summarise the above two points, the Environment Board is already working on (references to the activities are also above) and plans to continue the following in 2024:

1) streamlining the data of the species entered in the Estonian Nature Information System (essentially a continuous process; for example, 58 collapsed and non-sustainable nests of white-tailed eagles were archived in 2023 and the protection regime

changed on 1,395 ha; on 35 poor and unoccupied nesting sites of the black stork, the buffer was reduced from the original 4.8 km to 3 km and the protection regime was changed on 127,561 ha; on 10 non-sustainable nests of the lesser spotted eagle that had been unused for 9 years were archived, the protection regime changed on 31.40 ha; on 202 sustainable nesting sites of the lesser spotted eagle that had been unoccupied for 10 years, the buffer was reduced from 2 km to 1 km, the protection regime changed on 138,247 ha);

2) archiving the data on the species most affected by renewable energy and the adjustment of the habitat definition principles based on the best available information (including the conclusion of agreements with various stakeholders based on the best scientific information);

3) compilation a dataset of negative impact mitigation measures related to different groups of species and the preparation of recommendations on Estonian conditions, as well as the development of the principles of compensation for potential damage to species based on the draft of the Energy Sector Organisation Act (deadline Q1 2024);

4) improvement communication and clarification of the requirements as to which environmental aspects are to be assessed, surveyed, inventoried and which risks are to be avoided in the pre-selection of areas;

5) organisation of advice and training, presentation and clarification of the positions of the Environmental Board at renewable energy roundtables and customer meetings (over 130 such events in 2023);

6) contributing to the transposition of the EU Renewable Energy Directive and other relevant legislation;

7) improving the competence of the specialists of the Environmental Board through a systematic training programme with the support of the renewable energy acceleration funding;

8) contributing to the renewable energy database managed by the Environment Agency (e.g. a vision for the terms of reference of the database submitted in 2023), both in terms of data and knowledge.

Point 22 of the audit of the National Audit Office – *It must be ensured in cooperation with the environmental authorities (in particular the Environment Board) and the authorities responsible for planning (the Ministry of Regional Affairs and Agriculture, formerly the Planning Department of the Ministry of Finance, and the local authorities) that the impact of wind farms on the environment and on people is kept to a minimum, i.e. that the most suitable sites for the generation of wind power are selected in cooperation with developers.*

The Environmental Board works towards this goal every day. For example (see list of actions in point 2) and tries to avoid the situation where the negative impacts of wind developments would primarily be borne by the environment and not by people. As environmental surveys are usually time-consuming and complex, and often give rise to disagreement among experts, but farmland, for example, is much easier to survey, directing development to areas already affected by human activities would also allow the time needed for the procedures to be significantly reduced (this obstacle is also mentioned in points 56, 64, 68 of the draft audit report). At present, nearly 85% of the planned development areas are on forest land (point 65), which could mean, at worst, significant deforestation and the permanent loss of forest bird habitat in a situation where forest bird populations have deteriorated in recent decades.

Points 94, 95, 97, 106 and 108 of the audit of the National Audit Office – *The results of surveys should be public for all, this would simplify and speed up the procedure for areas with similar conditions*.

The Environment Agency supports this recommendation and considers the free availability of environmental data to be of the utmost importance for high quality planning and environmental impact assessment, in particular for the assessment of cumulative impacts.

Points 19 and 162 of the audit of the National Audit Office – *It is pointed out in the draft that it is also important to take into account other needs for land use (e.g. agriculture, settlements, infrastructure) and the opinions of local people when establishing onshore wind farms. At sea, shipping routes and flight paths must be considered (point 20). Offshore wind turbines generally don't compete with other purposes of land use (agriculture, forestry, infrastructure, settlement, etc.) or with national defence restrictions, their impact on wildlife and visual and noise nuisance for people is smaller than in the case of onshore wind turbines (point 162).*

However, the Environment Board emphasises that there are still many aspects of offshore wind farms that need to be considered. These are addressed in the Estonian maritime spatial planning, among other things. In addition to shipping routes and flight paths, marine deposits, trawling areas, dumping areas, national defence restrictions, objects of cultural value and natural values, including habitats and biota, must be considered. The basis on which the comparison was prepared is not highlighted in Annex A "Comparison of onshore and offshore wind farms". Offshore wind farms not only affect bird migration routes, but also feeding and stopping areas as well as nesting areas (in regions of cables), fish spawning grounds. The source cited in the report (Brunel, 2021. The pros and cons of onshore & offshore wind) does not suggest that offshore wind farms in any way entail lower risks associated with human activities, but on the contrary, it points out that the disadvantage of offshore wind farms is, among other things, the impact of underwater noise on wildlife. It has also been recognised that wind farms, when visible from the coast, still have a visual impact on people. The wind farms currently planned in the Estonian offshore area are visible from the coast.

Point 164 of the audit of the National Audit Office – *It is stated in the draft that in 2023, the Ministry of Climate analysed whether and how to contribute to the construction of offshore wind farms in such a manner that the taxpayers' money is used as sparingly as possible.*

The Environment Board points out that the so-called first wave of offshore wind farm developments are being promoted in different regions (e.g. one on the western coast of Saaremaa, two developments in the Gulf of Riga are, and the permit for special use of water of the North-West Estonian offshore wind farm is still in the EIA stage). Such a development logic requires the simultaneous development of a significantly more powerful onshore electricity network in different directions. It would be possible to achieve savings by developing one area first.

Comment of the National Audit Office: The National Audit Office has amended the text of the report based on the responses of the Minister of Regional Affairs and the Director General of the Environmental Board.

Recommendations of the National Audit Office	Responses of auditees
Use of REPowerEU funds **50. Recommendation to the Minister of Climate:** to use the taxpayers' money wisely for the accelerated development of renewable energy, fund only those activities that are clearly linked to achieving the RE100 target by 2030. The impact of the measures should also be assessed and, where necessary, money should be redirected from lower-impact actions to higher-impact actions. **(Points 35-47)**	**Response of the Minister of Climate:** we agree that the RRF funds must be used sensibly and for the accelerated development of renewable energy. The activities covered by the REPowerEU have been selected with this in mind. It's unclear why the following REPowerEU activities, for example, have been excluded from the opinions given in the audit: ▪ preparing an overall picture of wind power developments and continuously monitoring the status of projects[93]; ▪ streamlining environmental data and making them available, which makes it possible to save time in planning as well as in the permit-granting procedures – for example, 58 collapsed and non-sustainable nests of white-tailed eagles were archived as an activity funded by REPowerEU in 2023 and the protection regime changed on 1,395 ha; on 35 poor and unoccupied nesting sites of the black stork, the buffer was reduced from the original 4.8 km to 3 km and the protection regime was changed on 127,561 ha; on 10 non-sustainable nests of the lesser spotted eagle that had been unused for 9 years were archived, the protection regime changed on 31.40 ha; on 202 sustainable nesting sites of the lesser spotted eagle that had been unoccupied for 10 years, the buffer was reduced from 2 km to 1 km, the protection regime changed on 138,247 ha; ▪ the creation of training modules for lead EIA/SEA lead experts to alleviate the shortage of impact assessment experts; ▪ supporting the commissioning of consultants, planning management expert advice and legal assistance to increase the capacity of local authorities to establish wind power plans. REPowerEU activities have already had an impact on speeding up the procedure. For example, with the extra resources received, the Environment Board can finalise planning and permit-granting procedures for wind power projects twice as fast as before, in 12 days on average. The REPowerEU activities were changed at a relatively late stage of the procedure based on the input provided by the National Audit Office. While one of the activities initially planned was the acquisition of private land adjacent to the sites, this activity was abandoned in the shape and on the scale originally planned (€7.8 million) after suitable sites on state land were mapped. The objective of REPowerEU is to make suitable public land available to developers as quickly as possible. The decisions on which additionally mapped sites will be made available to developers and under what conditions this will be done will be made in the first half of 2024. **Comment of the National Audit Office:** the audit focused on all REPowerEU activities decided before September 2023 (the audit activities were completed in August 2023). Whilst some of the activities outlined by the Ministry have a long-term impact on accelerating renewable energy projects (e.g. training of lead experts for EIA/SEA), they may not have any impact on projects that must be completed before 2030 to achieve the renewable energy target.
Priority development areas **69. Recommendations to the Minister of Climate:** to ensure that the identification by the state of renewables acceleration areas for the development of wind farms has the greatest possible impact on the achievement of the RE100 target by 2030, ▪ assess the status of existing developments and use the results of the comprehensive and designated spatial plans prepared by local authorities as a basis for identifying priority development areas, and include the areas selected by local authorities as suitable for wind energy development among the renewables acceleration areas; ▪ inform wind farm developers, local authorities, planners, impact assessment	**Response of the Minister of Climate:** we agree with the assessment that all areas, including those covered by the comprehensive or designated spatial plans of local authorities, must be regarded as renewables acceleration areas, and this is the approach that the Ministry of Climate intends to take in defining renewables acceleration areas. At the same time, we consider it important to map additional areas on state land. Mapping the areas suitable for producing wind power on state lands as an activity covered by REPowerEU is an important RRF performance target and, in addition to areas selected by developers, creates an opportunity to make state land available for wind power generation, if necessary. The claim that renewables acceleration areas are later determined based on the priority development areas is misleading. Areas where strategic environmental assessments have been carried out are designated renewables acceleration areas. As the SEA is carried out as part of the planning procedure, the concept of renewables acceleration areas is linked to the decision to establish a plan. The main part of the renewables acceleration areas for wind power are areas already related to private developments. If they reach the stage of planning

[93] The overview of the developments of onshore wind farms prepared by the Environment Agency.

Recommendations of the National Audit Office	Responses of auditees
experts of the criteria and scope for selecting the renewables acceleration areas; ▪ refrain from designating areas that require deforestation and land acquisition by the state as renewables acceleration areas to avoid complex procedures, additional costs for the state and further opposition to wind farms. **(Points 51–67)**	for wind energy development and undergo a strategic environmental assessment, they can be deemed to be renewables acceleration areas. The priority is to support and accelerate all onshore wind projects. The most important consequence of the amendments to the Renewable Energy Directive is a faster permit-granting procedure for wind farms to be built in a renewables acceleration area, which will be applied in the Estonian context to all onshore wind farm projects in the pipeline. The selection of additional priority development areas for wind power on public land will be based on the need to minimise restrictions on the areas and to ensure that the areas can be rapidly brought into use for wind power projects. In the first half of 2024, the Environment Agency will complete the planned surveys and decisions will be made on which areas have the greatest potential and which areas will be made available to developers and under what conditions. In priority wind power development areas, as in other areas, a wind power plant must go through planning and permit-granting procedures. It's likely that the planning stage will be reached in the additionally mapped areas in consideration of the target for 2030 and these areas will also become renewables acceleration areas. It would be misleading to claim that the introduction of a deforestation charge will prolong the process of deployment of the areas. The amendments to the deforestation charge adopted by the Riigikogu on 6 December 2023 will not delay the completion of wind power plants. The originally planned land valuation and replacement was abandoned and only a deforestation charge must be paid upon deforestation. **Comment of the National Audit Office:** the National Audit Office has not claimed that the deforestation charge prolongs planning procedures. In the case of deforestation, the idea behind the recommendation is to direct renewable energy development to areas that do not require deforestation for deployment. The Environmental Board has also considered the implementation of this principle important.
Shortening the planning process **86. Recommendations to the Minister of Regional Affairs:** to speed up the construction of wind farms, the processing of municipal designated spatial plans for wind power should be simplified, they should be supported in their planning procedures and the practical issues related to planning should be resolved. To do so: ▪ take steps to further shorten the municipal designated spatial planning procedure. Together with planners, analyse the need for procedural steps and look for ways to improve the efficiency of the planning procedure; ▪ provide planning advice and guidance to local authorities. For example, advise them on designated spatial planning procedures, as this is a little-used planning instrument in practice and local authorities therefore have little experience with it; ▪ give clear guidance to local authorities and planners that when wind farms are planned, the wind turbine and its blade must remain within the boundaries of the land plot; ▪ consider the possibility of not considering wind farm connection points as structures with a significant spatial impact; ▪ give clear guidance to local authorities that it is important to consider distances to other wind farm development areas in planning. **(Points 70–84)**	**Response of the Minister for Regional Affairs:** Shortening procedures – the Ministry of Regional Affairs and Agriculture will further analyse the possibilities of shortening planning procedures at the level of local government when drafting the Planning Act. The quality of the impact assessment must be maintained when the procedures are shortened, and involvement of the public must not be dropped. We've prepared a legislative intent for the amendment of the Planning Act, which is available in the drafting information system (Draft File No 23-0960). One of the issues identified in the legislative intent that needs to be addressed is the excessive length of time required for municipal designated spatial planning. The plan is to submit the draft for amendment of the Planning Act for approval at the end of the second quarter of 2024. At the same time, we would like to draw the attention of the National Audit Office to the fact that in point 80 of the audit, you have explained that local authorities have initiated 23 municipal designated spatial plans for the development of wind farms, and seven of these were initiated after the amendment of the Planning Act, which make it possible to abandon the preparation of a detailed solution. In the subsequent points of the report, the audit does address the impact of the amendment of the Planning Act on planning procedures initiated after the amendments were made. The audit only covers planning procedures initiated before the amendment of the Planning Act to accelerate wind farms and the positive impact cannot therefore be seen or assessed. Advising local authorities – the Ministry of Regional Affairs and Agriculture provides day-to-day assistance to local authorities, consultants, developers, and experts on how to interpret the Planning Act. We will also organise training to harmonise practices in the implementation of the Planning Act, prepare guidelines and organise field seminars on sites. To improve the effectiveness of our advice on planning wind farms, we have also signed an agreement with local authorities to meet regularly on a monthly basis. On the one hand, this gives local authorities a format for exchanging experiences. On the other hand, all the ministries and agencies involved in wind farm development will also participate in the meetings, to advise local authorities in the same format and raise awareness of the problems encountered in practice. Placement of wind turbine blades – the Spatial Planning Department of the Ministry of Regional Affairs, within the composition of the Ministry of Finance, has issued a joint position with the Ministry of Economic Affairs and

Recommendations of the National Audit Office	Responses of auditees
	Communications on the issue of wind turbine blades (letter number 1.15-5/2022/2988-2 of the MEAC of 6 June 2022). The position has been presented to local authorities, consultants and developers at various wind energy roundtables and information days. We have also subsequently provided further written clarifications. We will continue to share information to clarify this complex issue. Regarding connection points as structures with a significant spatial impact – using the planning procedure to plan overhead line connections to the connection points is necessary for the plan to be feasible, as the purpose of the wind farm is to transmit power to the transmission grid and without ensuring this, the planning process becomes meaningless. The preparation of a plan is terminated if circumstances arise which preclude its implementation in the future. In addition, §2(19) of Government of the Republic Regulation No 184 'Grid Code' of 26.06.2003 stipulates that a wind farm is a power plant consisting of several wind turbines and the equipment, structures and facilities connecting the wind turbines to each other and to the connection point. The Ministry of Regional Affairs and Agriculture has previously analysed this proposal and, based on the above, found that connecting wind farms to overhead lines is an activity with a significant spatial impact. For example, overhead lines with higher capacity require significant deforestation, restrictions on land use, etc. Therefore, we don't consider it possible that the overhead lines connecting wind farms to the connection points will not be designed with spatial plans. However, we note that if the plan is to connect a wind farm to the grid with an underground cable, the Ministry of Regional Affairs and Agriculture does not consider it necessary to specify the location of the underground cable to the connection point in the plan, as the underground cable is not expected to have significant spatial impact and significant environmental impact compared to the overhead line. Consideration of the distance between wind farms in planning – pursuant to § 75(4) and § 95(5) of the Planning Act, a strategic environmental assessment (SEA) is mandatory when preparing a comprehensive plan and a municipal designated spatial plan. Pursuant to § 3(4) of the Planning Act, if an SEA is carried out in the planning procedure, the SEA report is an annex to the plan. Pursuant to § 40(4)(6) of the Environmental Impact Assessment and Environmental Management System Act, the SEA report must, based on the approved SEA programme, include, inter alia, an assessment of the expected significant cumulative effects on the environment. Cumulative impacts mean the assessment of the impacts expected to result from a proposed activity in combination with other projects in the area of impact, including the wind farms that are being planned or have already been built. Therefore, if another wind farm is planned or has already been built in a region, the cumulative impacts of wind farms must be identified in the planning procedure and, if necessary, the planning solution must be adjusted so that the implementation of the activity does not have a significant environmental impact within the meaning of the Environmental Impact Assessment and Environmental Management System Act. As the local authority is the organiser of planning activities in its own administrative territory, it may also (justifiably) prescribe a minimum distance between wind farms, which is not aimed at avoiding significant environmental impacts. In view of the fact that, pursuant to the aforementioned provisions of the Planning Act and the Environmental Impact Assessment and Environmental Management System Act, a local authority is obliged to consider the distances between the wind farm and the development areas of other wind farms when organising its planning activities, the Ministry of Regional Affairs is of the opinion that the local authorities are aware of this requirement and that it's not necessary to issue further guidance in this regard. **Comment of the National Audit Office:** the audit showed that the parties still lack clarity on how to implement the amendments made to the Planning Act in practice so as to accelerate the municipal designated spatial planning process, which is why the Ministry of Regional Affairs and Agriculture needs to step up its explanatory work and help solve the practical problems pointed out by the parties. The audit showed that the current practice of regarding connection points as structures of significant spatial impact leads to time-consuming planning procedures. The National Audit Office finds that in the case of wind farms, design conditions could be used to determine the locations of power lines leading to the connection point, as is done in the case of other structures with a significant spatial impact. However, this requires amendment of the

Recommendations of the National Audit Office	Responses of auditees
	definition of wind farms in the Government of the Republic Regulation No 102 of 1 October 2015 (List of buildings with significant spatial impact).
Acceleration of environmental impact assessment **108. Recommendations to the Minister of Climate:** to make the environmental impact assessment of wind farms more efficient and quicker and to avoid wasting time on less important issues, ▪ initiate legislative changes to improve public access to baseline inventories and monitoring data (according to the principle of public access to environmental information); ▪ create an environmental survey information system where the information of the surveys carried out and the environmental monitoring data of the companies (wind farms) are collected. The data of the follow-up monitoring of wind farms must be analysed and the results made available to environmental impact assessment experts; ▪ develop a model programme for the strategic environmental assessment of wind farms. Among other things, the programme should identify the most important impacts of wind farms to be assessed, their assessment methodologies and acceptable impact levels; ▪ create in-service training for wildlife experts to introduce the construction and work of wind farms. **(Points 87–103)**	**Response of the Minister of Climate:** we agree that in certain cases it's possible to agree on significant impacts with the parties. At the same time, it must be taken into account that significant environmental impacts depend on the specific planned activity, location and environmental status and restrictions (e.g. the location of protected natural sites). It's already planned to develop a sample EIA programme for the assessment of the environmental impact of onshore wind power plant projects and it will be completed in early 2024. In cooperation with the Ministry of Climate, the Environmental Board has offered to organise data sharing events for developers, where developers share their environmental impact data and they are entered into the register. The obligation to share data in a situation where surveys have been prepared with the funding of developers needs to be further analysed and we are inclined not to consider such an obligation to be expedient. To improve the quality of the EIA and speed up the process, the Ministry of Climate has launched a reform of the EIA system, where we'll review the whole process, the roles of the parties involved and make the assessment digital and more transparent. As a result of the reform, environmental impact assessment will become easier, faster and clearer for all parties involved in the impact assessment (developer, decision-maker, expert, relevant authorities, wider public). The time- and resource intensity of the EIA process will decrease. The digitalisation of the process will include the development of baseline data (e.g. improving the availability of data from surveys carried out), service design (preparation of a roadmap, review of legislation) and the development of tools (automated notifications, modelling tools for EIA pre-assessment and programming, etc.). **Comment of the National Audit Office:** it is pointed out in point 97 of the audit that even the Environmental Board has in certain cases not had access to the data of the surveys carried out during the environmental impact assessment of wind farms. Access of planning and environmental impact experts to data must also be improved (list of environmental surveys and methodologies, wind farm monitoring data and follow-up monitoring analysis). Therefore, the National Audit Office recommended improving the availability of baseline inventories and monitoring data.
Acceleration of environmental impact assessment **109. Recommendation to the Minister of Climate and the Director General of the Environmental Board:** agree, in cooperation with environmental impact assessment experts, wind farm developers, environmental protection associations and other parties, what will be considered acceptable impacts of wind farms on protected species. Also, agree on how to mitigate, including to compensate for, the impacts of wind farms. **(Points 87–103)**	**Response of the Minister of Climate:** the draft concerning the requirements for the use of mitigation and compensation measures to compensate for potential damage caused to plant and animal species has been submitted to the Government of the Republic for approval, will be approved by the Government in the coming weeks and will then proceed to the Riigikogu. **Response of the Director General of the Environmental Board:** Based on the statutory objectives and responsibilities of the Environmental Board, the Environmental Board cannot lead the development of acceptable rates of damage to protected biota. However, the Environmental Board is already actively (deadline Q1 2024) engaged in reviewing the latest scientific literature, research data and other materials and proposing policy approaches on how to define acceptable impacts. The Environmental Board must also ensure that the impact assessment is based on the best and most relevant information available, which is also communicated to all parties in the planning and impact assessment processes. The draft audit does not indicate that the National Audit Office has also considered the already prepared draft legislation when assessing the activities of the state. In this context, the Draft Act Amending the Energy Sector Organisation Act (https://eelnoud.valitsus.ee/main/mount/docList/9f10c969-870d-4b83-94d2-57f1faf5ed88), which among other things provides for the regulation of the implementation of mitigation and compensation measures in renewable energy projects, should be taken into account. In addition to the aforementioned draft, the Draft Act Amending the Building Code and Other Acts (acceleration of the deployment of renewable energy) is also in the legislative proceedings of the Riigikogu: Draft – Riigikogu. The purpose of these drafts is to speed up procedures (e.g. speeding up the EIA process, building permits for offshore wind farms instead of three permits), the possibility to apply compensation measures in renewable energy projects, etc. These should also be considered when assessing the state's performance.

Recommendations of the National Audit Office	Responses of auditees
	Comment of the National Audit Office: every activity has an environmental impact, and so does the construction of a wind farm. The Environmental Board already determines the acceptable environmental impact when granting any environmental permit. A similar approach should be applied to the environmental impact assessment procedures for wind farms and common principles should be agreed.
Building a power grid for renewable energy **135. Recommendations to the Minister of Climate:** to create better opportunities for renewable electricity producers to connect to the grid, grid development should be guided and the possibilities for supporting grid development should be analysed: ▪ to entrust the TSO Elering AS with the task of developing a long-term strategy for the development of power grids and an action plan for its implementation. The strategy should include, among other things, the network developments needed to meet the RE100 target; ▪ to provide guidance to transmission and distribution system operators on network development principles, including the actions needed to achieve the RE100 target; ▪ to analyse whether it's appropriate to continue with the current principles for charging for connection to the power grid in order to reach the RE100 target. If it's decided to provide additional financial support for the development of the power transmission system and distribution network, analyse the sources from which this support can be provided. **(Points 110–134)**	**Response of the Minister of Climate:** we agree that network development activities are important. At the same time, we would like to point out that the preparation of a network development plan every two years is a statutory obligation of Elering AS (Electricity Market Act, § 66(8)). Elering AS is already working on a long-term strategy for the power grid and is preparing a development plan for the Estonian electricity transmission system 2024–2033. We agree that the development of the grid needs to be accelerated in line with the growth in renewable energy production and deployment. Therefore, the Ministry of Climate has been analysing the possibility of changing the principles of connection to the transmission system from summer 2023. Accelerating the development of the grid with a view to meeting the 2030 targets and increasing the speed of grid connection thereafter will require building the grid in advance and including the necessary development obligations in the network charges. In October, the Minister of Climate received a mandate from the Government of the Republic to draft the necessary amendment. The plan is to submit the draft to the Government of the Republic in the first half of 2024. More than €85 million has been allocated from both the national budget and the RRF to the distribution network and transmission system to increase the capacity of the power grids to receive renewable electricity and make the grid more climate resilient. The terms and conditions of connecting to the power grid for producers have been amended and a charge has been introduced for not using the connection resource of the developed network. Approximately 4,400 MW of generation capacity has been released in the grid because of this decision. The REPowerEU activities will provide fast-track funding for the planning of the Paide-Lihula-Saaremaa route for building the Estonia-Latvia 4th connection and the route for the electricity connection to the offshore wind farm in the Gulf of Riga. **Comment of the National Audit Office:** speaking of the release of generation-oriented resources, the National Audit Office points out that the data on the released network resources (1,800 MVA) given in point 113 are based on the estimates of Elering AS. The impact of the legislative amendment on the creation of free connection capacities was assessed based on the connection capacities of those wishing to connect to the power grid on 1 April 2023 compared to 6 November 2023. According to Elering, the active cancellation of connection contracts started after the regulation on the elimination of phantom capacities entered into force on 17 March 2023.
Building a power grid for renewable energy **136. Recommendations to the Minister of Regional Affairs:** to speed up the establishment of both offshore and onshore wind farms and achieve an increase in wind power generation, ▪ to consider clarifying and simplifying power grid planning procedures. For example, to make changes to legislation, where necessary, to change the requirements for a structure with a significant spatial impact; ▪ to provide support to local authorities in carrying out wind power designated spatial planning and grid construction planning procedures. **(Points 110–134)**	**Response of the Minister of Regional Affairs and Agriculture:** we also clarify that the amendments to the Planning Act, which entered into force in March 2023, apply to the planning of the power grid, make it possible to waive the preparation of a detailed solution in the case of both a national designated spatial plan and a municipal designated spatial plan. In doing so, we have created the possibility for much faster planning of power lines.
Motivation for building wind farms	**Response of the Minister of Climate:** IT solutions for the wind turbine fee are in place. Local authorities can use the EVALD platform as a tool to get an overview of affected properties and to establish first contact. In addition to

Recommendations of the National Audit Office	Responses of auditees
151. Recommendation to the Minister of Climate: in order to ensure that the environmental nuisance compensation charge does not significantly increase the administrative burden on local authorities in processing the charge, to develop (IT) solutions in cooperation with interested local authorities to identify the owners of affected properties and to organise the procedure/communication with them. **(Points 137–149)**	EVALD, information is available in the KOTKAS database of environmental decisions, which indicates the area of impact and height of each wind turbine.
Role of offshore wind farms **171. Recommendation to the Minister of Climate:** to take a clear position on whether offshore wind farm developments are important for Estonia (both in terms of meeting the renewable electricity target and exports). If they are important, the ways in which the state can contribute to the construction of offshore wind farms should be assessed and appropriate measures taken. **(Points 152–169)**	**Response of the Minister of Climate:** In the future, wind farms developed on land and at sea can both contribute to the achievement of Estonia's renewable energy targets. To meet these targets, it's necessary, above all, to take advantage of the potential for onshore renewable electricity generation on a scale that will ensure a lower cost of electricity, lower system costs and greater energy security, but offshore wind farms will also play a crucial role in securing generation capacities in a context of increasing energy consumption. According to a recent analysis by the Environment Agency, Estonia's renewable energy target for 2030 is also achievable with onshore wind farms. Offshore farms will provide clean electricity to the Estonian economy after 2030 in the context of growing electricity demand and will allow to increase the availability of clean and affordable renewable energy, as offshore farms generate electricity at a time when onshore farms and solar farms do not due to weather conditions. Estonia's high potential for onshore and offshore renewable electricity generation, and the wind energy developments that will already be sufficient in the coming years, make it possible to introduce Estonia internationally as a favourable location for future-proof industries with high energy consumption. As offshore wind farms have been considered in the picture of the future is also illustrated by the fact that the Riigikogu is currently considering draft 308 SE[94], which will create a joint permit for offshore wind farms that will speed up and simplify the permit-granting procedure for offshore wind farms. In 2024, 12 building permit procedures for marine areas will be launched to allow developers to use the sites. Plans for the construction of two routes enabling the connection of offshore wind farms to the grid will be fast-tracked. **Comment of the National Audit Office:** the National Audit Office cannot agree with the conclusions made in the analysis of the Ministry of Climate and the Environment Agency, which in the opinion of the National Audit Office are too optimistic. For example, it's not possible to erect wind turbines on properties very close to each other (wind turbines have a certain optimum spacing). Some of the properties with contracts are not even in planning areas. The analysis also assumed that wind turbines will be built on 50% of the properties with building permit contracts. According to wind power developers, the experience of Scandinavian countries shows that wind turbines are built on up to 10% of land with a building right contract. It's also impossible to build to full capacity. The above report identifies several problems that hinder the development of onshore wind farms and call the achievement of the 2030 target into question. For example, the length of planning and environmental impact assessment proceedings and problems with connection to the grid. Unless these problems are quickly solved, the 2030 target will not be met.

[94] Act Amending the Building Code and Other Acts (acceleration of the deployment of renewable energy) 308 SE

Characteristics of audit

Purpose of audit

The goal of the audit is to assess the state's performance (in particular the Ministry of Climate) in implementing activities that support the effective achievement of renewable electricity targets.

The object of the audit are the activities of the authorities related to the achievement of the renewable electricity target, in particular the creation of the necessary conditions for the development of wind power generation capacities.

The main question of the audit: are the state's activities contributing to the faster establishment of wind farms?

Assessment criteria

- the state's reasons for the determination and development of suitable sites for wind farms (onshore priority development areas and Elwind offshore wind farm) are relevant (the requirement of the REPowerEU Directive to find new development sites, the failure of developers to accommodate existing developments, selecting the farms of private developers as priority development areas would constitute prohibited state aid), i.e. there are not enough suitable wind power developments to achieve RE100, without these activities the RE100 target is unlikely to be achieved, the performance of these activities does not hinder the implementation of the developments already started, the taxpayer's money is used reasonably / the state benefits from it, the state does not waste human resources and the state's activities do not damage competition and the equal treatment of all developers is ensured;
- the state has prioritised low-conflict areas for the construction of wind farms ('yellow', 'orange' and 'no height restriction' areas) where development is already underway;
- the MEAC, the Ministry of the Environment and the Ministry of Finance have analysed the procedures and obstacles to the development of wind farms;
- the opinions of those involved in the process (developers, planners, impact assessment experts, local authorities) are taken into account;
- changes to the planning process will help speed up / improve the efficiency of the completion of (existing) developments;
- the Ministry of Finance has taken into account the proposals made by the parties to improve the efficiency of the planning process (promote the training of planners, speed up procedures, support local authorities (e.g. in the organisation of procurements), speed up the procedure for power grid planning);
- the Ministry of the Environment/the Environment Agency has analysed the environmental impact assessments of wind farms, carried out follow-up impact assessments and analysed their results;
- proposals made by the parties (impact assessment experts, planners, developers, local authorities) to improve the impact assessment process have been taken into account (amendment of the requirements for an EIA licence, training of sectoral experts, development of a standard impact assessment programme (agreement on the significant impacts associated with wind farms), improvement of the state's environmental monitoring);
- the created measures (tolerance charge, energy plan development measure, REPowerEU funds) motivate local authorities to develop renewable electricity projects in their territory;
- local authorities are offered the help they need for (fast-tracked) development of wind projects;

- communities can (regulations allow, the state encourages) generate renewable electricity;
- the MEAC has identified whether and where there is a need to provide certainty (e.g. guarantees, sureties, long-term agreements, price floor) to producers for renewable electricity projects. The decision on state guarantees will be made in 2023.
- The state's reverse auctions support long-term/flexible solutions (and also favour wind power producers)

Scope and focus of audit

The auditees are the Ministry of Climate (formerly the Ministry of Economic Affairs and Communications (MEAC) and the Ministry of the Environment), including the Environmental Board, the Environment Agency, the Ministry of Rural Affairs and Agriculture (formerly the spatial planning sector of the Ministry of Finance).

The audit focuses on the problems in the implementation of wind farms, which have the greatest potential to contribute to the achievement of the renewable electricity targets. Other renewable electricity generation options from solar, hydro, biomass, etc. are not examined in detail.

Table 5. People who were interviewed and asked to provide information in the course of the audit

Agency	Name, position
Ministry of Climate (former Ministry of Economic Affairs and Communications (MEAC) and the Ministry of the Environment)	Rein Vaks, Director of the Energy Department of the Ministry of Climate Kristo Kaasik, Head of Renewable Energy, Ministry of Economic Affairs and Communications Irje Möldre, Head of Strategic Planning, Energy Department of the Ministry of Climate Karlis Goldstein, Head of Renewable Energy, Energy Department of the Ministry of Climate Mairika Kõlvart, Renewable Energy Specialist, Energy Department of the Ministry of Climate Ketli Lindus, Renewable Energy and Energy Efficiency Expert, Energy Department of the Ministry of Climate Nikon Vidjajev, Counsellor of Offshore Wind, Energy Department of the Ministry of Climate Sille Uusna-Rannap, Green Transition Project Manager, Energy Department of the Ministry of Climate Sigrid Soomlais, Head of Environmental Management Department, Ministry of the Environment Rainer Persidski, Environmental Management Department, Ministry of the Environment (EIA/SEA sector) Triin Nymann, Legal Department, Ministry of the Environment (EIA) Ülle Luik, Environmental Management Department, Ministry of the Environment (EIA/SEA sector) Kristi Käärid, Environmental Management Department, Ministry of the Environment (EIA/SEA sector) Maris Pärn, Department of Nature Conservation, Ministry of the Environment (renewable energy contact)
Ministry of Regional Affairs and Agriculture (former Spatial Planning Department of the Ministry of Finance)	Heddy Klasen, Head of Spatial Planning Department Eleri Kautlenbach, Head of National Designated Spatial Plans, Spatial Planning Department Kaire-Kaisa Kaljuveer, Adviser at Spatial Planning Department Kaire Luht, Head of Regional Policy Unit of the Regional Affairs Department
Ministry of Finance	Karin Reiska, State Budget Department

Environment Agency	Peep Siim, Head of Analysis and Reporting Function Bärbel Vandel, Leading Specialist at Environmental Analysis and Reporting Department Peep Jürmann, Leading Specialist in Environmental Analysis Kristi Mutli, Specialist at Environmental Analysis and Reporting Department
Environmental Board	Antero Männik, Internal Control Advisor Irma Pakkonen, Environmental Management Office (Environmental Impact Assessment and Planning) Märt Öövel, Chief Renewable Energy Specialist
Ministry of Defence	Paul Kunimägi
Government Office	Kristi Klaas Ivo Krustok
Competition Authority	Marilin Tilkson, Head of Energy Market Department Külli Haab, Head of Regulatory Division at the Competition Authority
Elering	Mirjam Pihlak, Head of Grid Services Unit Karl Kivinurm, Strategy Manager Getlyn Allikivi, Offshore Grid Development Director Erkki Sapp, Head of Energy Market Department Oleg Tsernobrovkin, Head of Energy System Planning Unit Taavi Vospert, Lawyer
Elektrilevi	Rudolf Penu, Innovation Manager
State Forest Management Centre	Andrus Lauren, Head of Real Estate Department Katrin Kivioja, Renewable Energy Development Specialist
Estonian Association of Spatial Planners	Pille Metspalu, Chairman of the Management Board Kaido Koppel, Member of the Management Board Heiki Kalberg
Estonian Association of Environmental Impact Assessment	Piret Toonpere, Member of the Management Board Jaak Järvekülg, Member of the Management Board Noela Kulm, Member of the Management Board
Roheplaan OÜ	Riin Kutsar – Environmental Impact Assessment Expert
Hendrikson & Ko OÜ	Kaile Echbaum, Environmental Expert Anni Kurisman, Environmental Expert
Estonian Wind Power Association	Terje Talv, CEO
Tallinn University of Technology, Department of Electrical Power Engineering and Mechatronics	Argo Rosin, Associate Professor in Tenure Tarmo Korõtko, Senior Researcher Hannes Agabus, Energy Sector Expert Jako Kilter, Associate Professor in Tenure
Green Tiger	Jaanus Purga, Head of the Economic Affairs Committee
Enefit Green	Lauri Ulm, Head of Wind Energy Oliver Zereen, Wind Energy Development Manager
Utilitas Wind	Rene Tammist, Member of the Management Board Kristiina Nauts, Planning and Environmental Impact Assessment Lead
Sunly OÜ	Klaus Pilar Peeter Raudsik
TMV Green OÜ	Jaanus Kivirand
Evecon	Karl Kull, Member of the Management Board

Vestman Solar OÜ	Hannu Lamp, Member of the Management Board
Saare Wind Energy	Kuido Kartau, Member of the Management Board
Estonian Cell	Siiri Lahe, CFO, Member of the Management Board
TotalEnergies	Gabriela Dan-Unterseh, Senior Offshore Wind Business Developer Wilfried Vandersippe, Offshore Wind Business Development Director – Eastern and Northern Europe
RWE	Anu Eslas
Saaremaa Municipality	Mikk Tuisk, Mayor Liis Lepik, Deputy Mayor (Development, Communication) Siim Kuusik, Head of Planning Division Kaarel Tang, Deputy Mayor (Construction, Environment, Planning) Agne Peetersoo, Comprehensive Planning Consultant of Saaremaa Municipality
Lääneranna Municipality	Margus Källe, Planning Specialist
Saarde Municipality	Martti Roden, Administrative Adviser
Pärnu City	Alice Närep, Chief Comprehensive Planning Specialist
Tori Municipality	Sigrid Kasemets, Comprehensive Planning Specialist
Põltsamaa Municipality	Kersti Paas, Head of Economic Affairs Department
Kardrina Municipality	Aivar Aruja, Construction Specialist
Luminor Eesti	Lenno Uusküla, Chief Economist
Energieföretagen (Swedenergy)	Per Holm, Senior Adviser Climate Policy

The following documents were viewed during the audit:

- sectoral legislation and explanatory memoranda, in particular the Energy Sector Organisation Act, the Electricity Market Act, the Environmental Impact Assessment Act, the Planning Act, the Environmental Charges Act;
- sectoral strategy documents, development plans and action plans (e.g. materials of the working groups of the Energy Sector Development Plan for 2030 and 2035, the National Energy and Climate Plan (NECP), the Green Transition Action Plan;
- Action Programme of the Government of the Republic 2023–2027;
- materials of Government of the Republic sessions:
- thematic surveys and analyses;
- written positions, opinions and proposals of ministries and their sub-agencies on matters relating to the development of wind power;
- opinions and proposals of participants (developers, impact assessment experts, planners, etc.) on legislation, surveys.

The following queries/analyses were made:

- an analysis of the materials for the designated spatial planning procedures of wind energy to identify the obstacles encountered in the procedures. There are a total of 19 wind energy designated spatial planning procedures, five of which were included in the sample (Lääneranna Municipality, Tori Municipality and the Pärnu City, Põltsamaa Municipality, Kadrina Municipality, Saarde

Municipality). The goal when forming the sample was to take some designated spatial plans that were further along in the process and some plans in the case of which there was information on problems related to them. In the materials of the procedures, we looked for information on the status of the planning procedures, the accuracy of the site selection assessment, the time taken for the approval of the procedure, the surveys required, etc.

- Analysis of the impact assessment materials (decisions to initiate an impact assessment, impact assessment reports, decisions to approve an impact assessment report) for existing wind farm plans or plans in the advanced development stage (preparation of the EIA/SEA report is underway). There are *ca* 20 operating wind farms, with an estimated 3–4 in an advanced development phase. Sample three EIA/SEAs. The sample included 1 procedure from wind farms completed in an earlier period (Aulepa), 1 wind farm completed in the middle of the period (Tamba) and 1 wind farm completed in the later period (Saarde).

- Online survey of local authorities (n = 29) where wind development areas have been identified/defined in the comprehensive plan and/or a municipal designated spatial plan has been initiated and which are outside the area of national defence restrictions + 3 local authorities in the vicinity of the three offshore wind farms under development, i.e. within the area of impact. Nineteen local authorities responded to the questionnaire. The survey was used to find out whether the state has involved municipalities in meeting the RE100 target and whether national measures (e.g. the so-called tolerance charge, empowering local authorities from REPowerEU funds) and legislative amendments are motivating for local authorities to promote wind farms, and what needs to be done to speed up the implementation of wind farm projects in local authorities.

- Query to the Environment Agency on renewables acceleration areas for onshore wind farms and areas already under development (map materials)

Completion date of audit:

The audit was completed in August 2023.

Audit team:

Audit Manager: Silver Jakobson, Auditor Alar Jürgenson, Senior Auditor Viire Viss.

Contact information

Further information on the audit is available from the Communication Unit of the National Audit Office: telephone: +372 640 0777; email: riigikontroll@riigikontroll.ee

An electronic copy of the audit report (PDF) is available online at www.riigikontroll.ee.

A summary of the audit report is also available in English.

The number of the audit report in the record management system of the National Audit Office is 80123.

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Previous audits of National Audit Office in the area of renewable energy

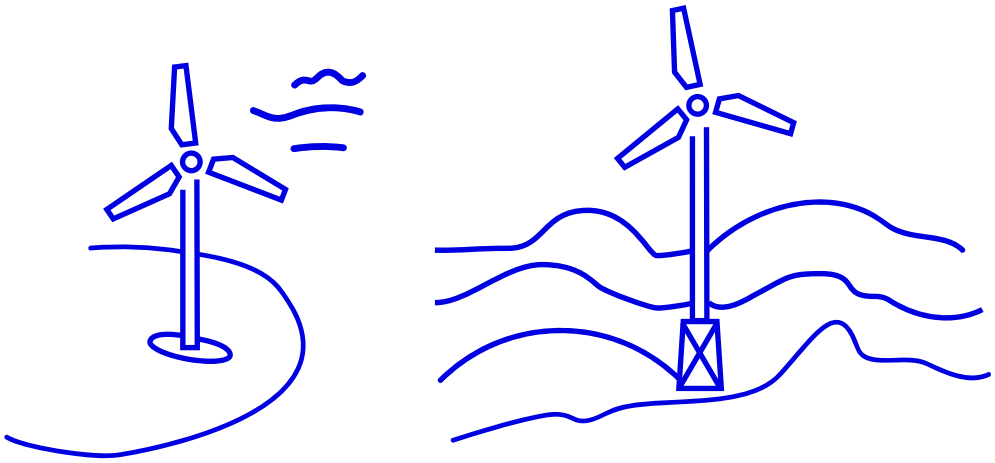
15.11.2023 – **Security of Electricity Supply in Estonia**

06.11.2023 – **Options of the Estonian Electricity System**

18.09.2012 – **Possible Options for Electricity Generation**

All reports are available on the website of the National Audit Office at www.riigikontroll.ee

Annex A. Comparison of onshore and offshore wind farms



	Onshore	Offshore
Currently built in Estonia	340 MW (150 wind turbines)	0
Number of hours when operating (efficiency)	3,070 h/y (35%)*	4,380 h/y (50%)*
6 TWh (renewable electricity deficit) needed for electricity generation	400 wind turbines 5 (6-7) MW	100 wind turbines 15 (18) MW
Levelized costs of electricity (LCOE)	€30-45 per MWh**	€60-80 per MWh**
Impact on nature	Birds, bats, vegetation, groundwater, landscape	Fish, seabed, bird, bat migration routes
Impact on people (e.g. noise, shading, building restrictions)	Larger	Smaller
Charge for production of electricity from wind energy to local authorities	€22,344 – 31,920 per year (for 40 MW farm)	€1,064,000 per year (for 100 MW farm)
Charge for production of electricity from wind energy to local residents	Max €22,344 – 31,920 per year (for 40 MW farm)	0
State subsidies	Renewable energy charge, reverse auctions	Not decided
Organiser of planning	Local authority (comprehensive plan, designated spatial plan)	State (Consumer Protection and Technical Regulatory Authority)

* Data of the Danish Energy Agency: Danish Energy Agency. Technology data – generation of electricity and district heating.

** Date of the International Renewable Energy Agency: International Renewable Energy Agency (IRENA) 2023. Renewable Power Generation Costs in 2022.

Annex B. Applications for offshore wind farm building permits

Source: X-GIS2 website of the Land Board, building permits (CPTRA) as of 27.11.2023

Annex C. Sample calculations of environmental nuisance compensation charge

Calculation assumptions:

- size of sample onshore wind farm 40 MW, offshore 1,000 MW;
- output of wind power plant: 70% of rated capacity of sample wind power plant;
- exchange price: €76 per MWh*.

* Schmitt, A., Zhou, H. 2022. EU Energy Outlook to 2060: how will power prices and revenues develop for wind, solar, gas, hydrogen + more.

Did you know that

Table 4. Arithmetic average exchange price of electricity in the next day market of the Estonian price region, 1st half of 2018-2023

Year	Exchange price (€/MWh)
2018	47.06
2019	45.85
2020	33.69
2021	86.72
2022	192.00
2023 (6 months)	85.96

Source: Elering Live, exchange prices

- 10% of the charge is paid during the construction of a wind farm (see Environmental Charges Act, § 21^5
- Estonian minimum wage in 2023: €725/month (Ministry of Social Affairs website).

A. Sample calculation: amount of environmental nuisance compensation charge of onshore wind farm

Environmental Charges Act, § 21^3 Charge for production of electricity from wind energy from onshore wind power plants

(1) The charge for production of electricity from wind energy from an onshore wind power plant is set between 0.7 and 1 per cent of the multiple of the following two figures:

1) the amount of electricity produced by the wind power plant per quarter in megawatt-hours, but not less than 70 per cent of the rated capacity of the wind power plant multiplied by 750;

2) the arithmetic mean power exchange price of the day-ahead market in the Estonian price area for the corresponding quarter.

Calculation formula: fee per quarter = MWh of wind power generated per quarter or 70% of the rated capacity of the wind farm × 750 (expected number of days of operation of the wind farm) × arithmetic average of the electricity market price for the next day of the respective quarter × 0.7–1%. The result must be multiplied by 4 to obtain the annual charge.

E.g. **40 MW onshore wind farm** (70% × 40 MW = 28 MW)

Charge to the local authorities per year upon the operation of a wind farm: 28 × 750 × 76 = €1,596,000 × 0.7–1% = €11,172 – €15,960 × 4 = **€44,688 – €63,840 per year.**

Charge to the local authorities per year during the construction stage of a wind farm (10% of the charge): **€4,468–€6,384 per year**

A maximum of 50% of the charge will be distributed to the residents (see also sample calculation c), with at least 50% of the charge remaining in the budget of the local authority, i.e. **€22,344 – €31,920 per year.**

B. Sample calculation: amount of environmental nuisance compensation charge of offshore wind farm

Environmental Charges Act, § 21[4] Charge for production of electricity from wind energy from offshore wind power plants

(2) The charge rate for production of electricity from wind energy from an offshore wind power plant is 0.5 per cent of the multiple of the following two figures:

> *1) the amount of electricity produced by the wind power plant per quarter in megawatt-hours, but not less than 70 per cent of the rated capacity of the wind power plant multiplied by 1000;*
>
> *2) the arithmetic mean power exchange price of the day-ahead market in the Estonian price area for the corresponding quarter.*

Calculation formula: charge per quarter = MWh of wind power generated per quarter or 70% of the rated capacity of the wind farm × 1000 (expected number of days of operation of the wind farm) × arithmetic average of the electricity market price for the next day of the respective quarter × 0.5%. The result must be multiplied by 4 to obtain the annual charge.

E.g. **1000 MW offshore wind farm** (70% × 1000 MW = 700 MW)

Charge to the local authorities per year upon the operation of a wind farm: 700 × 1000 × 76 = €53,200,000 × 0.5% = €266,000 × 4 = **€1,064,000 per year.**

Charge to the local authorities per year during the construction stage of a wind farm (10% of the charge): **€106,400 per year.**

C. Sample calculation: maximum charge to a natural person per dwelling (in the case of an onshore wind farm, residents do not receive a direct share of the charge for offshore wind farms)

Environmental Charges Act, § 55[3] Transfer of charge for production of electricity from wind energy by local authority to natural persons living within area of influence of onshore wind farms.

(1) The local authority pays a charge of 50 per cent of the charge for production of electricity from wind energy from an onshore wind power plant obtained by the local authority on the basis of subsection 1 of § 552 of this Act to owners of dwellings located in the area of influence of the onshore wind farm /---/.

*(3) The maximum amount of the charge for production of electricity from wind energy related to residence per dwelling is the **minimum remuneration rate in Estonia for six months of the corresponding year** per calendar year. /---/*

(5) If the total annual amount of the maximum charge for production of electricity from wind energy related to residence calculated according to subsection 3 of this section exceeds 50 per cent of the fee obtained by the local authority, 50 per cent of the obtained charge will be distributed proportionally between the owners of dwellings in the area of influence of the wind farm.

(6) If the total annual amount of the charges for production of electricity from wind energy related to residence to be paid according to subsection 1 of this section is less than 50 per cent of the charge for production of electricity from wind energy from an onshore wind power plant obtained by the local authority, the part of the obtained charge in excess of the amount paid will remain with the local authority.

Calculation formula: charge per year per dwelling = 6 × Estonian minimum wage in the relevant year.

Maximum charge for a dwelling in the wind turbine's area of influence (2023): 6 × Estonian minimum wage (01.01.2023) €725 per month = **€4,350 per dwelling per year**.