MEMORANDUM

Carbon neutrality 2035 is a legitimate and achievable goal

13.3.2025

THE FINNISH CLIMATE CHANGE PANEL

While the transformation of forests from sinks to emission sources undoubtedly makes it more difficult to achieve the target of carbon neutrality enshrined in Finland's Climate Act, it does not make it impossible. By pursuing carbon neutrality[1] , Finland is doing its fair share to mitigate climate change and maintain its attractiveness as a country for clean investment. There is a wealth of research data available to decision-makers to help them find immediately actionable ways to achieve the carbon neutrality target.

THE CARBON NEUTRALITY TARGET HAS SOLID FOUNDATIONS

The national carbon neutrality target of 2035 and the net emission reduction pathway (emissions and sinks combined) to achieve it align with Finland's fair share of the global carbon budget to remain under the 1.5 °C maximum warming threshold. In light of the principle of fairness based on the ability of countries to pay, this is a justified objective for Finland's climate policy, based on reviews pursuant to both climate science and the Intergovernmental Panel on Climate Change (IPCC)[2].

This is a challenging but justified goal, as Finland wants to do its globally fair share to mitigate climate change.

In the Paris Agreement, nearly 200 countries, including Finland, agreed to a common goal of limiting the average global temperature increase to well below 2 °C, with the aim of keeping the increase to 1.5 °C. It also set the goal of balancing anthropogenic greenhouse gas emissions and sinks in the second half of this century.

Finland's carbon neutrality target is similar in concept to the climate neutrality target of the European Union (EU). Both include anthropogenic fossil-based and process-based greenhouse gas (GHG) emissions and anthropogenic GHG emissions and sinks from the land use sector (LULUCF).

The EU's European Climate Law requires emissions and sinks to be balanced in the EU by 2050 at the latest. However, analyses by both the the EU's European Scientific Advisory Board on Climate Change[3] and the Finnish Climate Change Panel[4] have shown that achieving climate neutrality in the EU before 2050 would be globally fair.

Under the UN climate agreements, developed countries such as Finland should reduce their emissions faster than developing countries. They should also achieve carbon neutrality earlier.

There are also grounds for the carbon neutrality target based on human rights and the rights of future generations. The European Court of Human Rights stated in its 2024 ruling on the case KlimaSeniorinnen v Switzerland[5] that the European Convention on Human Rights also requires states to define a fair national carbon neutrality target. Finland has already done so with its 2035 target.

ACHIEVING CARBON NEUTRALITY BY 2035 IS STILL POSSIBLE

Carbon neutrality requires both emission reductions and sinks. The Finnish Climate Change Panel is currently preparing an assessment of the more detailed policy options for achieving carbon neutrality, but would like to take this opportunity to highlight the key factors when it comes to achieving this goal.

Since 2011, Finland has succeeded in significantly reducing its fossil-based emissions. At the same time, however, the carbon sink provided by its forests has declined substantially. As a result, Finland's net emissions have not decreased, but have in fact increased slightly over the past 15 years.

This means that Finland's annual contribution to climate change progress has not reduced climate change at all during this period. Strengthening the net sink and reducing emissions is not an either/or situation – both are undeniably necessary to move towards carbon neutrality and the EU's 2030 effort sharing and LULUCF sector commitments.

Fossil-based and process-based emissions have fallen at almost the pace required to achieve the carbon neutrality target and are expected to fall even faster than projected in the emissions trading sector by 2035.

In the effort sharing sector[6], additional measures in areas such as the transport sector[7] could accelerate the reduction of emissions. This provides a good basis for progress towards the 2030 EU commitment and the national carbon neutrality target. Overall, the Finnish Climate Change Panel estimates that the effort sharing and emissions trading sectors have the potential to reduce emissions to well below 20 million tonnes (carbon dioxide equivalent, Mt CO_2-eq.) by 2035[8].

The challenge of the carbon neutrality target culminates in the current situation of the LULUCF sector, which is different to what was assumed it would be when the target was set. Based on the latest estimates[9], Finland's LULUCF sector is calculated to have been the source of 12 million tonnes of emissions in 2023.

In addition to its own carbon neutrality target, Finland is bound by the 2030 obligations of the EU's LULUCF Regulation. Based on current knowledge, it is estimated that the net sink of the Finnish LULUCF sector will be -3.8 million tonnes by 2030. Meeting this obligation is an important step towards carbon neutrality.

In the LULUCF sector, humans also cause emissions that are fully comparable to fossil-based emissions in terms of their effects. The annual greenhouse gas emissions from the soil of drained peatland forests and peat fields and land use change in Finland are about 25 million tonnes[10].

Although there are uncertainties regarding the development of soil emissions[11], the main actions to reduce emissions and enhance sinks in the LULUCF sector are well known[12].

There are many untapped opportunities to strengthen the carbon sink and mitigate soil emissions. The biggest immediate impact on strengthening sinks will come from a moderate reduction in logging. This would also increase forest growth and secure future forest use opportunities[13].

The extent to which logging of stemwood should be moderated to meet the EU's 2030 target and the national carbon neutrality target of 2035 depends on the actions of the LULUCF sector to:

- reduce emissions in other parts of the sector, especially in peat fields and peat extraction areas
- reduce emissions from land use change, in particular deforestation
- intensify forest management to accelerate forest growth
- reduce the use of stemwood in energy production and increase the use of non-incineration-based solutions
- improve the efficiency of material use in the forest industry by focusing on higher value-added products.

The more emissions from the LULUCF sector are reduced in other areas, the less need there will be to moderate logging. If, for example, the amount of logs sent for incineration is significantly reduced, the sink will increase significantly without reducing the availability of raw materials for the forest industry. What is essential for strengthening the sink is that the reduced demand for wood achieved through the above measures does not lead to an equivalent increase in other uses of wood.

In order to be cost-effective, it is worth taking full advantage of lower-cost measures in the LULUCF sector as soon as possible.

The European Scientific Advisory Board on Climate Change estimates that the cost of sinks in the LULUCF sector is between €10 and €50 per tonne of CO_2, compared to around €100–1,000 for technological (i.e. technical) carbon sinks.[14] If technological sinks are to be implemented in significant quantities by 2035, investment planning must start no later than now. The realisation of technological sinks requires incentives[15].

In the context of carbon neutrality discourse, the idea of using carbon credits under the Paris Agreement has been raised. First, however, the climate impacts of their use, as well as the legal, fairness and economic implications, should be carefully reviewed.

By taking climate actions right here in Finland, the economic and employment impacts will benefit Finland and Finns.

CARBON NEUTRALITY IS AN INTERMEDIATE TARGET FOR WHICH THE LULUCF SECTOR HAS AN IMPORTANT ROLE TO PLAY

A carbon-neutral Finland 2035 will sequester the same amount of greenhouse gases from the atmosphere as it emits. This is an important step towards carbon negative status, which would be achieved when Finland sequesters more greenhouse gases from the atmosphere than it emits.

A global shift to carbon negativity is necessary to first halt and then reverse the rise in global average temperatures.

Carbon negativity requires that greenhouse gases already released into the atmosphere are captured and stored permanently and sufficiently out of the carbon cycle, for example through technological carbon sinks.

However, especially in the coming years, strengthening the sink of the LULUCF sector will be necessary to capture enough carbon from the atmosphere to limit the increase in the global average temperature, as technological carbon sinks are not available in significant quantities, at least for the time being. This is also underlined by the European Scientific Advisory Board on Climate Change[16].

THE CARBON NEUTRALITY TARGET IS A FAR-REACHING POLICY

Achieving carbon neutrality will make Finland an attractive investment environment for clean technology projects and bring new growth opportunities to Finland. It could also have a positive impact on profitability and public finances[17]. But if these impacts are to become a reality, coherent policy is needed to make this happen.

Many climate actions, for example in the LULUCF sector, have multiple benefits[18] – they improve not only the climate and biodiversity, waterways, soil and other environmental conditions, but also the profitability of agriculture and forestry.

A coherent pursuit of carbon neutrality will contribute to a fair and predictable transition towards a low-carbon society when operators have a clear picture of where they are heading. In any case, everyone, regardless of sector, is facing a transition.

[1] This memorandum uses an approach that is well-established in Finnish climate policy discourse, understanding carbon neutrality as a balance of the sinks and emissions of all greenhouse gases, using the greenhouse gas inventory accounting approach.

[2] Partanen et al. 2024. Suomen päästövähennyspolun tarkastelu huomioiden muiden kuin CO_2-kasvihuonekaasujen ja epäsuorien nieluvaikutusten rooli (Review of Finland's emissions reduction pathway, taking into account the role of non-CO_2 greenhouse gases and indirect sink effects). Finnish Climate Change Panel Report 2/2024. Available at: https://ilmastopaneeli.fi/hae-julkaisuja/suomen-paastovahennyspolun-tarkastelu-huomioiden-muiden-kuin-co2-kasvihuonekaasujen-ja-epasuorien-nieluvaikutusten-rooli/

[3] ESABCC 2023. Scientific advice for the determination of an EU-wide 2040 climate target and a greenhouse gas budget for 2030–2050. https://climate-advisory-board.europa.eu/reports-and-publications/scientific-advice-for-the-determination-of-an-eu-wide-2040.

[4]Finnish Climate Change Panel 2023. VN/6348/2019 Ilmastopaneelin lausunto EU:n vuoden 2040 ilmastotavoitteen asettamisesta (Statement of the Finnish Climate Change Panel on setting of the EU's 2040 climate goal). Ministry of the Environment 04 September 2023. Available at: https://ilmastopaneeli.fi/hallinta/wp-content/uploads/2024/03/Asiantuntijalausunto_Ilmastopaneeli_VN-6348-2019_EU-2040.pdf

[5] Verein KlimaSeniorinnen Schweiz and others v. Switzerland, Available at: https://hudoc.echr.coe.int/eng#{%22appno%22:[%2253600/20%22],%22itemid%22:[%22001-233206%22]}

[6] The effort sharing sector includes emissions from sectors outside the emissions trading and LULUCF sectors, such as transport, agriculture (fertilisers and animal production), individual heating of buildings, non-road machinery, waste management and F-gases. Each EU member state has set national emission reduction targets for the effort sharing sector for the period 2021–2030.

[7] Seppälä et al. 2024. Tieliikenteen päästövähennystoimet ja niiden vaikutukset (Road transport emission reduction measures and their impacts). Finnish Climate Change Panel Report 1/2024. Available at: https://ilmastopaneeli.fi/hae-julkaisuja/tieliikenteen-paastovahennystoimet-ja-niiden-vaikutukset/

[8] The estimate of the potential is based on previous analyses by the Finnish Climate Change Panel, scenario work from the KEITO project, and research literature. See Koljonen 2025. KEITO-laskelmien alustavia tuloksia (Preliminary results of KEITO calculations). https://hiilineutraalisuomi.fi/download/noname/%7BC794092B-E341-498F-9F1F-1B242088EAA6%7D/183460

[9] Luke, 2025. Kasvihuonekaasuinventaarion ennakkotiedot 2023 (Preliminary greenhouse gas inventory data 2023). (15.1.2025)

[10] Statistics Finland, Greenhouse gas inventory. National Inventory Submissions under the United Nations Framework Convention on Climate Change (UNFCCC).

[11] Lehtonen, A. & Heikkinen, J. 2016. Uncertainty of upland soil carbon sink estimate for Finland. Canadian Journal of Forest Research. 46(3): 310-322. https://doi.org/10.1139/cjfr-2015-0171.

[12] Lehtonen et al. 2021. Maankäyttösektorin ilmastotoimenpiteet: Arvio päästövähennysmahdollisuuksista (Climate measures in the LULUCF sector: an assessment of the potential for emission reductions). Luonnonvara- ja biotalouden tutkimus 7/2021. Natural Resources Institute Finland. Helsinki. p. 121.

[13] Kalliokoski et al. 2019. Skenaarioanalyysi metsien kehitystä kuvaavien mallien ennusteiden yhtäläisyyksistä ja eroista (Scenario analysis of the similarities and differences between the predictions of forest development models). Finnish Climate Change Panel. Report 2/2019. Available from: https://ilmastopaneeli.fi/hae-julkaisuja/skenaarioanalyysi-metsien-kehitysta-kuvaavien-mallien-ennusteiden-yhtalaisyyksista-ja-eroista/; Koljonen et al. 2024. Perusskenaariot energia- ja ilmastotoimien kokonaisuudelle kohti päästöttömyyttä (PEIKKO) (Baseline scenarios for the energy and climate policy mix for aiming for zero emissions (PEIKKO)); Hynynen et al. 2023. Metsälain ilmastovaikutusten arviointi (Climate impact assessment of the Forest Act.). Luonnonvara- ja biotalouden tutkimus 49/2023. Natural Resources Institute Finland.

[14] ESABCC. 2025. Scaling up carbon dioxide removals - Recommendations for navigating opportunities and risks in the EU. Available at: https://climate-advisory-board.europa.eu/news/new-report-from-the-eus-climate-advisory-board-outlines-recommendations-to-scale-up-carbon-dioxide-removals-while-addressing-opportunities-and-risks

[15] Kujanpää et al. 2023. Teknologisten hiilinielujen mahdollisuudet ja niiden edistäminen Suomessa (The potential of technological carbon sinks and their promotion in Finland). Finnish Climate Change Panel Report 5/2023. Available at: https://ilmastopaneeli.fi/hae-julkaisuja/teknologisten-hiilinielujen-mahdollisuudet-ja-niiden-edistaminen-suomessa/

[16] ESABCC. 2025). Scaling up carbon dioxide removals - Recommendations for navigating opportunities and risks in the EU. Available at: https://climate-advisory-board.europa.eu/news/new-report-from-the-eus-climate-advisory-board-outlines-recommendations-to-scale-up-carbon-dioxide-removals-while-addressing-opportunities-and-risks

[17] See, for example, Karjunen et al. 2022. South-East Finland Hydrogen Valley. LUT Scientific and Expertise Publications Tutkimusraportit - Research Reports 144.; See for example Karjunen et al. 2023. Value creation by converting pulp mill flue gas streams to green fuels. TAPPI Journal, 22(3), 193–205. https://doi.org/10.32964/TJ22.3.193; see, for example, Sillman et al. 2024. Meta-analysis of climate impact reduction potential of hydrogen usage in 9 Power-to-X pathways. Applied Energy, vol 359.

[18] See, for example, Jokinen et al. 2024. The effects of improved subsurface drainage on runoff and nitrogen leaching from a clayey field section. Available at: http://urn.fi/URN:NBN:fi-fe2024050225004; See, for example, Heikkinen et a;. 2024. Mitigation of Greenhouse Gas Emissions by Optimizing Groundwater Level in Boreal Cultivated Peatland. Available at http://urn.fi/URN:NBN:fi-fe2024070960933; see, for example, Wejberg et al. 2024. Vesienhallinnan taloudelliset edellytykset turvepelloilla (The economic conditions for water management in peat fields). Available at: http://urn.fi/URN:ISBN:978-952-380-967-3