

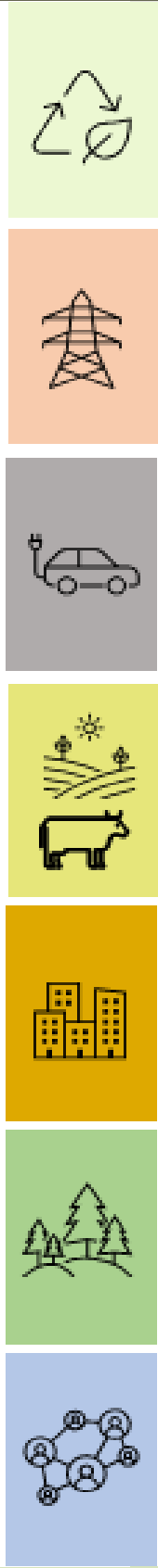


Northern Ostrobothnia Climate Roadmap 2021–2030

Towards a carbon neutral Northern Ostrobothnia

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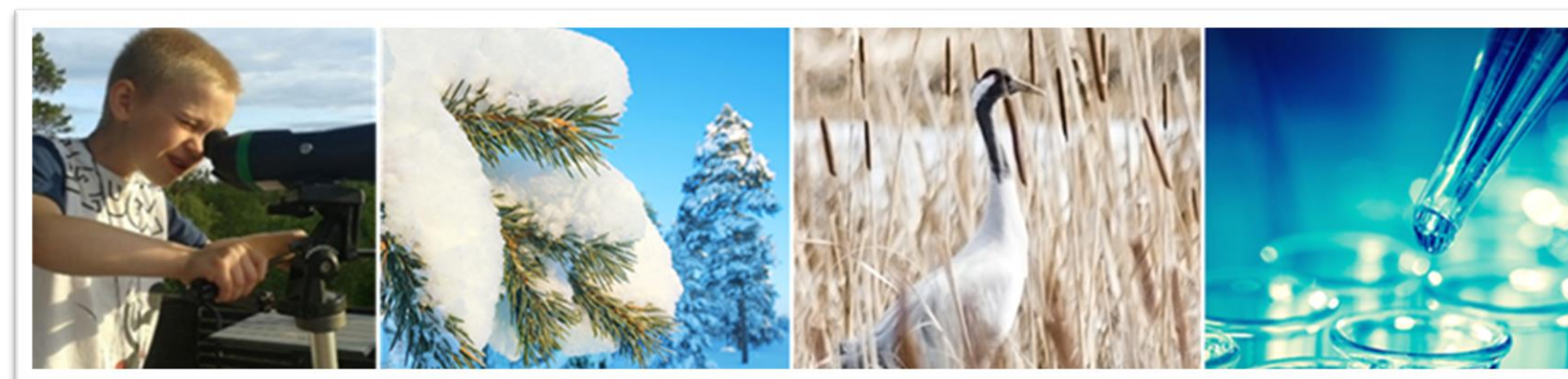
Introduction

In January 2019, the Board of the Regional Council decided that the climate and energy strategies from 2010 and 2012 would be updated into a joint climate roadmap defining the climate objectives and measures. The region's climate objectives are based on researched data and extensive cooperation with actors. The Council of Oulu Region coordinates the roadmap process with its POPilmasto (Northern Ostrobothnia Climate) project. The POPilmasto project has received ERDF funding from the Centre for Economic Development, Transport and the Environment (ELY Centre). The work has been carried out in close cooperation with the Canemure project (Towards Carbon Neutral Municipalities and Regions), for which the Oulu University of Applied Sciences has regional responsibility.

An Advisory Council was set up to guide the region's climate action. The council includes trustees appointed by the Board of the Regional Council and representatives of a wide range of stakeholders, taking into account companies, the RDI and public sector as well as non-profit organisations. In cooperation with the Canemure Regional Cooperation Group, the Advisory Council has advised on the definition of climate objectives and the consideration of the specific features of the region. The willingness and commitment of the operators is reflected in the end result of the roadmap.

The inaugural meeting of the steering groups of climate action in Northern Ostrobothnia on 16 May 2019 agreed on the following:

- ✓ Climate action is expected to have a positive spirit of solidarity and cooperation, not confrontation; common, ambitious yet realistic and achievable targets for all sectors, not just the public sector. New ways of doing things, courage, vision and concrete measures.
- ✓ The climate objectives should include a broad range of themes from different sectors: Transport, land use, housing, community planning, construction, circular and bioeconomy, energy, local food, boglands, forests, natural resources, innovation and new technologies, biodiversity as well as consumption habits and the activation of residents.
- ✓ The setting of objectives must focus on the necessary measures that can be influenced at the regional level.



The workshops and seminars were attended by a large number of actors in the region. The roadmap, which is the result of the latest information and interaction, contains a description of the current situation, key themes with measures, more detailed information on the sectors important to the region (transport, agriculture and energy use of peat) as well as a model for the promotion and monitoring of measures. The established cooperation network will continue its activities in support of the diverse climate action in the region.

The roadmap provides guidelines for the development of the operating environment so that the sector's developer organisations can allocate their resources correctly. Companies make their own strategic decisions on the development and renewal of their business operations, taking into account the opportunities provided by the operating environment and the high level of RDI support available. Businesses are key players and guided by consumers. The achievement of climate objectives requires a strong link between business, new industries and business opportunities as well as climate action. By developing the operating environment, taking into account the environmental, economic, social and cultural impacts, climate change mitigation is both possible and an opportunity.

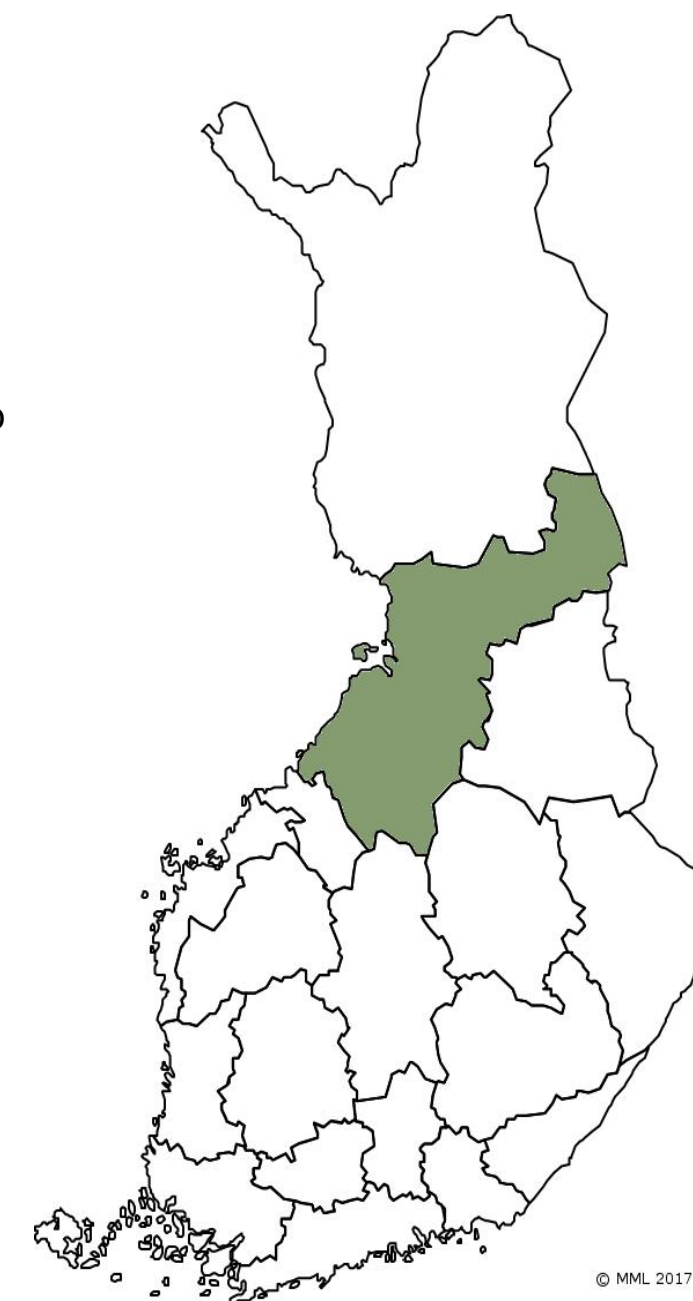
The journey made in the roadmap process has been as important as the outcome. The starting point for the work has been "finding solutions, not just someone to blame". The scope of the seven key themes and measures selected for the roadmap is intended to show that climate change affects all sectors and all of us. Our vision for a "carbon neutral Northern Ostrobothnia" will be achieved through the right decisions and concrete actions, but above all through cooperation.

Northern Ostrobothnia is contributing to reaching Finland's 2035 carbon neutrality target.

Many thanks to all those who participated in the work!

Features of Northern Ostrobothnia and its climate action

- Forest stand grows 11 Mm³ and felling drains approximately 8.63 Mm³ of trunk trees per year (National Forest Inventory 11/12 LUKE Statistics Database)
- The region has the most bogs in Finland: about 50% of forestry land has peat soil
- The country's largest producer of milk and beef
- The largest organic farming area of all regions
- The wind power region of Finland: approximately 40% of wind power is produced in Northern Ostrobothnia
- Long distances
- Enterprises – RDI – Competences
- 10 Hinku municipalities*: 21% of the residents Haapajärvi, Ii, Lumijoki, Muhos, Pyhäjärvi, Raahe, Tyrnävä, Ylivieska, Vaala and Utajärvi
*Coordinated by the Finnish Environment Institute
The network of carbon neutral municipalities (Hinku) aims to reduce emissions by 80% from 2007 to 2030.
- The City of Oulu's Environmental Programme covers 50% of the residents
- Municipal energy efficiency agreements and resource-saving activities



© MML 2017

413,000 residents, 30 municipalities

Greenhouse gas emissions in Northern Ostrobothnia in 2018, background

In the roadmap, greenhouse gas emissions in Northern Ostrobothnia are examined mainly in accordance with the Hinku limits of the regional calculation model (ALas) produced by the Finnish Environment Institute. The calculation mainly concerns emissions from the effort-sharing sector and the factors that can be influenced in municipalities. Carbon neutral municipalities (Hinku) aim to reduce emissions by 80% from 2007 to 2030.

The Hinku-limited figures in the ALas calculation model do not include:

- emissions trading for industry
- land use, land use change and forestry (LULUCF). In this case, the carbon sequestration effects of the sector are not visible and the carbon balance of the sector cannot be determined. It is important to take this into account when looking at the emissions figures for agriculture and forestry.
- total emissions from construction. Carbon footprint calculation of construction materials throughout the building's lifespan will be developed, e.g. Ministry of the Environment of Finland [low-carbon construction](#) and www.carbonneutralfinland.fi
- international shipping, icebreakers

The methods of the calculation models are constantly being developed. The emission figures for Finnish municipalities are updated annually.

Greenhouse gas emissions are calculated as carbon dioxide equivalents (CO₂e), which describes the global warming effect of the greenhouse gases. The contribution of other greenhouse gases is converted to reflect the contribution of carbon dioxide.

Coefficients:

CO₂ (carbon dioxide): 1 CH₄ (methane): 25 N₂O (dinitrogen oxide): 298 NF₃ (nitrogen trifluoride): 17,200 SF₆ (sulphur hexafluoride): 22,800

Greenhouse gas emissions are monitored according to the effort-sharing sector and the emissions trading sector. In the EU, emission trading regulates emission allowances. The emission allowance system covers large industrial installations, large electricity and heat production installations and intra-EU air transport.

The effort-sharing sector includes transport, part of agricultural greenhouse gas emissions, emissions from separate heating of buildings, machinery, waste management and fluorinated greenhouse gases.

According to the EU legislation, Finland must reduce its greenhouse gas emissions in the effort-sharing sector by 39% by 2030 compared to the 2005 level, and the EU is committed to reducing its greenhouse gas emissions by 55% by 2030 compared to the 1990 level.

In accordance with the [National Greenhouse Gas Emission Inventory](#), Statistics Finland reports emission figures including the effort-sharing sector and the emission trading sector and an estimate of the LULUCF figures. Statistics Finland produces emission data for the energy sector and industrial processes in the inventory. VTT produces emissions data for the energy sector for transport and machinery. The Finnish Environment Institute calculates emissions data for the waste sector and fluorinated gases.

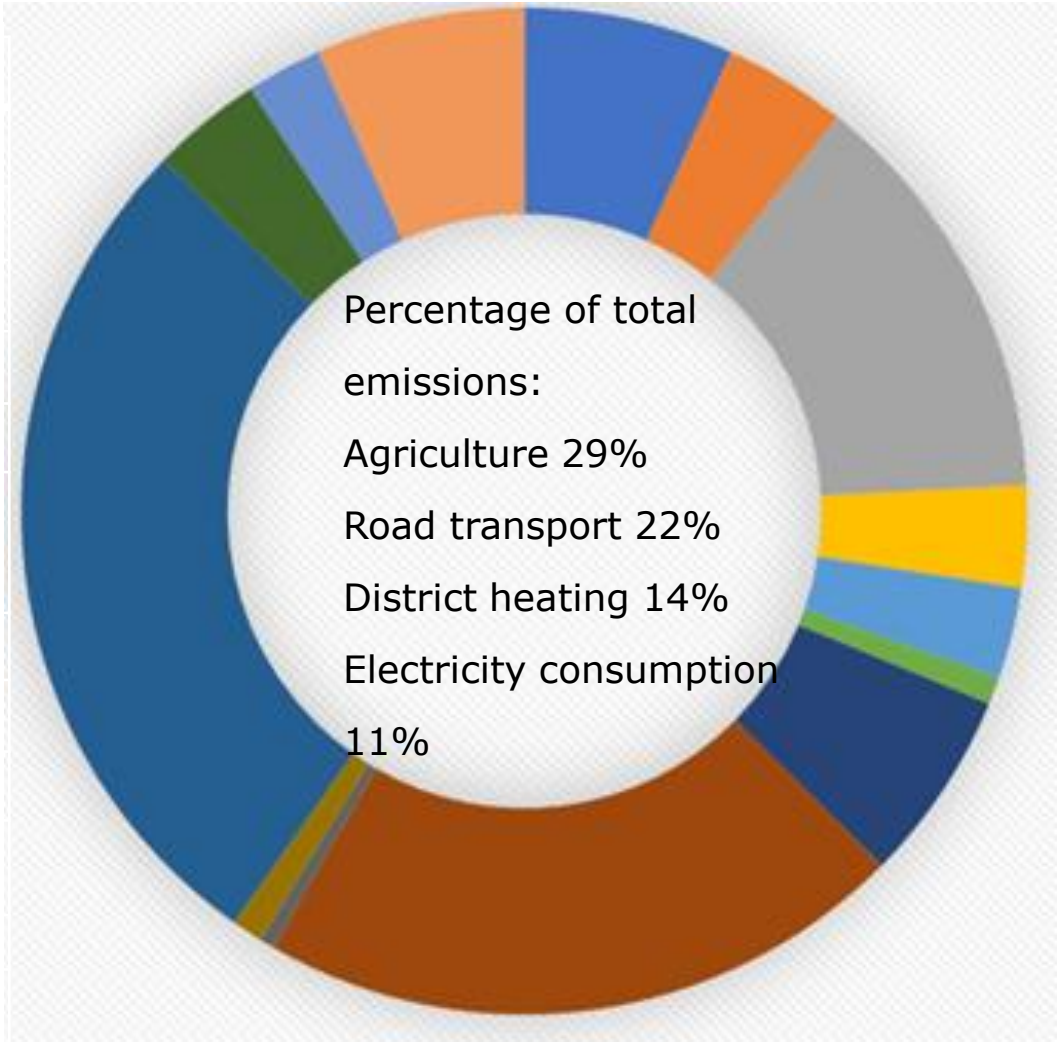
The calculation for land use, land use change and forestry (LULUCF) is the responsibility of Natural Resources Institute Finland.

From the beginning of 2021, the LULUCF sector will be included in the national reporting. According to the EU LULUCF Regulation 2018, emissions from the land use sector, which includes sinks and emissions from land use, land use change and forestry, are not to be emitted in the periods 2021–2025 and 2026–2030.

Greenhouse gas emissions in Northern Ostrobothnia in 2018

Regional calculation (ALas) with Hinku limits

kt CO ₂ e	Sector
257	Household electricity
151	Electric heating
514	District heating
125	Oil heating
112	Other heating
34	Industry
236	Work machines
797	Road transport
18	Rail transport
38	Water transport
1048	Agriculture
137	Waste management
93	F-gases
-256	Wind power



Year	ktCO ₂ e	Change 2007-2018
2007	4295	
2018	3559 3303 with wind power compensation	- 23 %
2018: 8.0 t CO ₂ e per capita		

TOTAL
3,303 kt CO₂e

- In 2018, in Northern Ostrobothnia
- greenhouse gas emissions were 3,303 kt CO₂e, including wind power compensation.
 - greenhouse gas emissions had decreased by 23% since 2007.

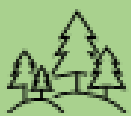
National Greenhouse Gas Inventory

In 2018, the calculated greenhouse gas emissions in Northern Ostrobothnia, including manufacturing, were 8,051 kt CO₂e.

The figure per capita is the highest in Finland: 19.5 kt CO₂e.

Nearly half of this was due to the carbon dioxide emissions of SSAB's Raahе steelworks. The plant accounts for 7% of Finland's emissions.

SSAB in cooperation with LKAB and Vattenfall are developing fossil-free steel production. The HYBRIT project for iron-ore based steelmaking is intended to replace coke with fossil-free electricity and hydrogen. The change will revolutionise steel production and contribute to the achievement of international and national climate targets.



Key themes of Northern Ostrobothnia's climate action

- Everything matters -

1. Smart bioeconomy and circular economy underpin climate action
 2. Sustainable, efficient and low-emission energy production and use
 3. Transport is low-emission
 4. Agriculture develops as a carbon sink
 5. Land use is climate-smart and conducive to circular economy
 6. Forests and bogs act as efficient carbon sinks; Sustainable use of peat
 7. Cooperation and cross-sectoral operating models create vitality and business opportunities
- Climate change adaptation as part of key themes

1. Smart bioeconomy and the circular economy underpin climate action

Our region is involved in climate change mitigation, the region's abundant natural resources are exploited sustainably and ecosystems are safeguarded. Northern Ostrobothnia is a region with a bio- and circular economy, where the operating environment supports the goals.

The bio- and circular economy are rapidly developing sectors and their operating environment is changing dramatically. Political instruments, legislation and targets for a low-carbon economy, but above all market-driven demand, which underpins profitable business, all advocate production that is based on renewable bio-based raw materials.

Major bioeconomy projects and changes in the raw material base of biorefining are under way in the region and its surrounding areas. In industrial-scale processes, side streams can provide new, profitable business for SMEs.

Increased research data and new innovations open up new processing opportunities for high added-value products, for example, and provide conditions for new low-carbon business. In regional economics, the potential for further processing is higher than the production of raw materials.

Companies, in cooperation with the RDI and public sector, are actively developing the bio- and circular economy. In addition to technology know-how, business skills and market knowledge are needed to succeed in competition. In order to put the research into practice, the financing of demo and pilot projects is essential. New investments are needed in the region and for accessing international markets.

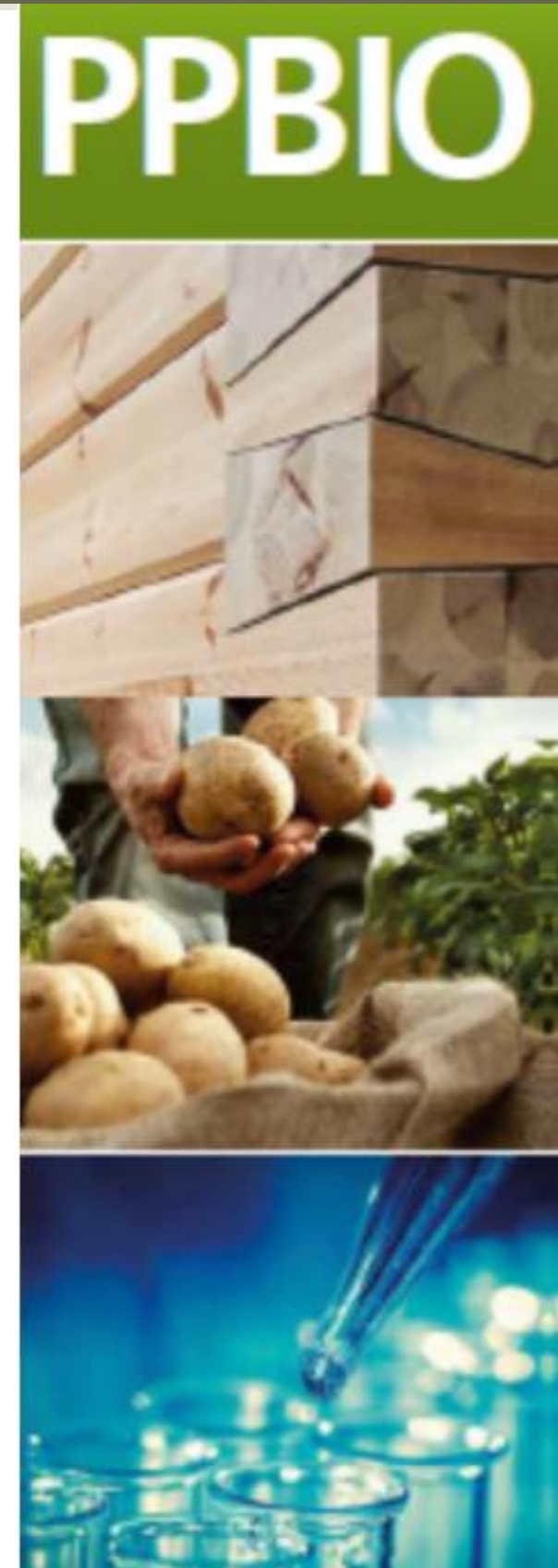
The strengths of Northern Ostrobothnia include abundant biomass reserves and related primary production, clean soil and water, the advantages of Arctic production and good transport connections. The region's companies, experts and RDI organisations' investments in the industry and cooperation create opportunities for the success of bioeconomically diversified Northern Ostrobothnia, also as a provider of global solutions.

The bioeconomy is a significant part of Northern Ostrobothnia's business. The production and processing of renewable natural resources accounts for nearly 20% of the private sector turnover: primary production, processing of bioproducts, energy products and waste treatment. When we include tourism, recreational use of nature and ecosystem services with their intangible benefits, the significance increases further.

In Northern Ostrobothnia, the bioeconomy benefits the region in a variety of ways, both in growth centres and rural areas.

The most important sectors in the region are agriculture and forestry, chemical wood manufacturing industry, mechanical forest industry and the food industry.

The key actions identified in the roadmap work regarding the bio- and circular economy are in line with the bioeconomy development strategy updated in 2019.



1. Smart bioeconomy and circular economy underpin climate action

1. The production and use of biogas will be promoted taking into account the nutrient cycle and environmental impacts

- Promotion of biogasification of biowaste and sludge
- Liquefaction of biogas on farms
- Biogas plant sludge recycling in the field and monitoring of harmful substances

Y, L, O, OV, KK, E, G, C, ELY, PPL

4. The use of soil, rock and recycled materials will be coordinated and they will be utilised in accordance with the circular economy

- Use of MARA and MASA (Government Decree on the Recovery of Certain Wastes in Earth Construction)
- Contaminated soil, *in situ* rehabilitation
- Coordination through a system/data platform

Y, O, OY, KK, RV, ELY, PPL

2. Natural resources – development of sustainable products and business

- Renewal of the value chain of wood production and processing and comprehensive utilisation of wood. Combustion of fractions from which the valuables have been removed.
- Utilisation of side streams from the pulp industry
- Development of carbon-binding products
- Berries and mushrooms: support for SMEs, processing of higher value-added products.
- Exploiting food processing side streams more effectively
- Tourism and ecosystem services

Y, L, O, OY, MK, ELY, KE, S, PPL

5. Utilisation of ICT expertise

- New business models for the circular economy: building ecosystems, platform economy, servitisation
- Making use of big data

Y, O, OY, ELY, KE, PPL

3. Wood construction promoted – as part of climate-friendly construction

- Pilots
- Utilising multidisciplinary RDI activities
- Hybrid and renovation construction
- Modularity

Y, OY, O, MK, RV, KE, PPL

6. Waste and side streams will be recycled and recovered

- Promoting the ash fertilisation of forests
- Side streams of industrial activity used as raw material for new products
- Creating new industrial and other symbiosis

Y, L, O, OY, KK, E, MK, C, ELY, KE, S, PPL

Parties responsible: Y: Companies such as OV: Oulun Vesi waterworks, KK: Kiertokaari, E: Energy companies, G: Gasum; RDI organisations (L: Natural Resources Institute Finland, O: Oulu UAS, OY: University of Oulu, C: Centria, S: Finnish Environment Institute, MK: Finnish Forest Centre), public sector (RV: Building supervision authority, ELY: ELY Centre, KE: Municipal enterprises, PPL: Council of Oulu Region)



2. Sustainable, efficient and low-emission energy production and use

In Northern Ostrobothnia, 14% of greenhouse gas emissions were caused by district heat production and 11% by electricity consumption. Emissions decreased by 23% between 2007 and 2018. Emissions from the consumption of district heat, oil and electricity decreased most.

Northern Ostrobothnia will continue to be a region of renewable and low-emission energy. The region develops and increases the production of fossil-free energy, intelligent energy systems and energy efficiency. Northern Ostrobothnia is strongly involved in the development of future energy sources and in solving the challenges caused by the transformation of the energy economy.

Transformation of the energy economy

- Northern Ostrobothnia is the leading wind power producer in Finland. Nearly 40% (950 MW) of the country's wind power is produced here. Production capacity will continue to increase. The total capacity of the continental wind power projects currently under planning, zoning or EIA processes exceeds 7,000 MW. Due to the rapid growth of wind power, the region has launched the TUULI project, the aim of which is to promote the sustainable development of the sector. Offshore wind offers plenty of additional potential for energy production. The potential of offshore wind power in the Bay of Bothnia has been examined in the approved Maritime Spatial Plan and there are valid offshore wind power master plans in the coastal area.

- The importance of peat in energy production is decreasing. The socially just transition of peat production and security of energy supply are key issues to be resolved. In energy production based on combustion, peat is mainly replaced by wood. The estimated reduction in greenhouse gas emissions by 2035 is 700 kt CO₂e.⁽¹⁾

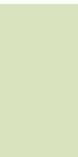
- The SSAB steel plant in Raahé, Northern Ostrobothnia, is part of the HYBRIT project based on hydrogen technology. If implemented, fossil-free steel production would reduce Finland's greenhouse gas emissions by 7%.

- The Hanhikivi nuclear power plant is being planned for Pyhäjoki in Northern Ostrobothnia. If completed, it would generate approximately 9 TWh of electricity per year, i.e. approximately 10% of Finland's total electricity consumption in 2018. The Hanhikivi nuclear power plant is expected to be completed in 2028 and to reduce greenhouse gas emissions from electricity generation.

- Biogas production offers the strong agricultural region new opportunities for both the regional economy and the reduction of greenhouse gas emissions.⁽²⁾

1) Development of peat energy use and effects on the wood supply chain and greenhouse gas emissions in Northern Ostrobothnia (AFRY Management Consulting)

2) Sustainable utilisation of agricultural biofractions and side streams, and impact of measures in Northern Ostrobothnia, a scenario review (Ramboll Finland Oy)



2. Sustainable, efficient and low-emission energy production and use

Energy issues relate to all other key themes of the climate roadmap.

1. Renewable energy production replacing fossil energy will be promoted based on the region's strengths

- Wind power (onshore and offshore)
- Geothermal energy
- Solar energy
- Biogas
- Production of renewable transport fuels
- New forms of fossil-free energy production
- Heat pumps
- Bioenergy
- Pump plants

2. Developing a low-emission, efficient and flexible energy system

- Decentralised production of renewable energy
- Solutions relating to energy storage
- Utilising waste energies
- Flexibility of electricity consumption and related ICT solutions
- Electrification of energy use
- Hydrogen economy
- Smart inter-sectoral cooperation
- Energy measurement made visible

3. Supporting energy efficiency and low emissions

- Discontinuation of oil heating
- Promoting energy efficiency in buildings and housing (information, guidance, intelligent solutions, financing, taking into account social equality)
- Arctic energy efficient construction ecosystems
 - Reducing the use of energy peat as planned, taking into account energy security and socially just transition



Parties responsible: Municipalities, Regional Council, energy companies, wind farm owners, companies, RDI organisations, educational institutes, consumers



3. Transport is low-emission

Finland is committed to reducing CO₂ emissions from transport by 50% by 2030 compared to the 2005 levels.

According to the national forecast, CO₂ emissions from transport will decrease by 37% over the period considered. This decrease is mainly due to the impact of the biofuel distribution obligation and EU legislation on car manufacturers. In terms of the missing 1.65 Mt CO₂ reduction, the national toolbox includes not only measures to accelerate the change in propulsion power, but also the measures to improve the efficiency of the transport system and reduce fossil fuels.

The regional implementation of national emission reduction commitments for transport will focus on creating the conditions for a shift to low-emission means of transport and the implementation of the cross-cutting climate objective in knowledge-based transport system planning. In addition to the Northern Ostrobothnia climate roadmap work, a climate impact assessment method based on the Oulu region's transport model has been developed as well as an emission forecast model that identifies the split between different propulsion powers (propulsion split) and output of transport.

In reducing emissions from transport, the emphasis is on cooperation between different sectors and the coordination of different measures.

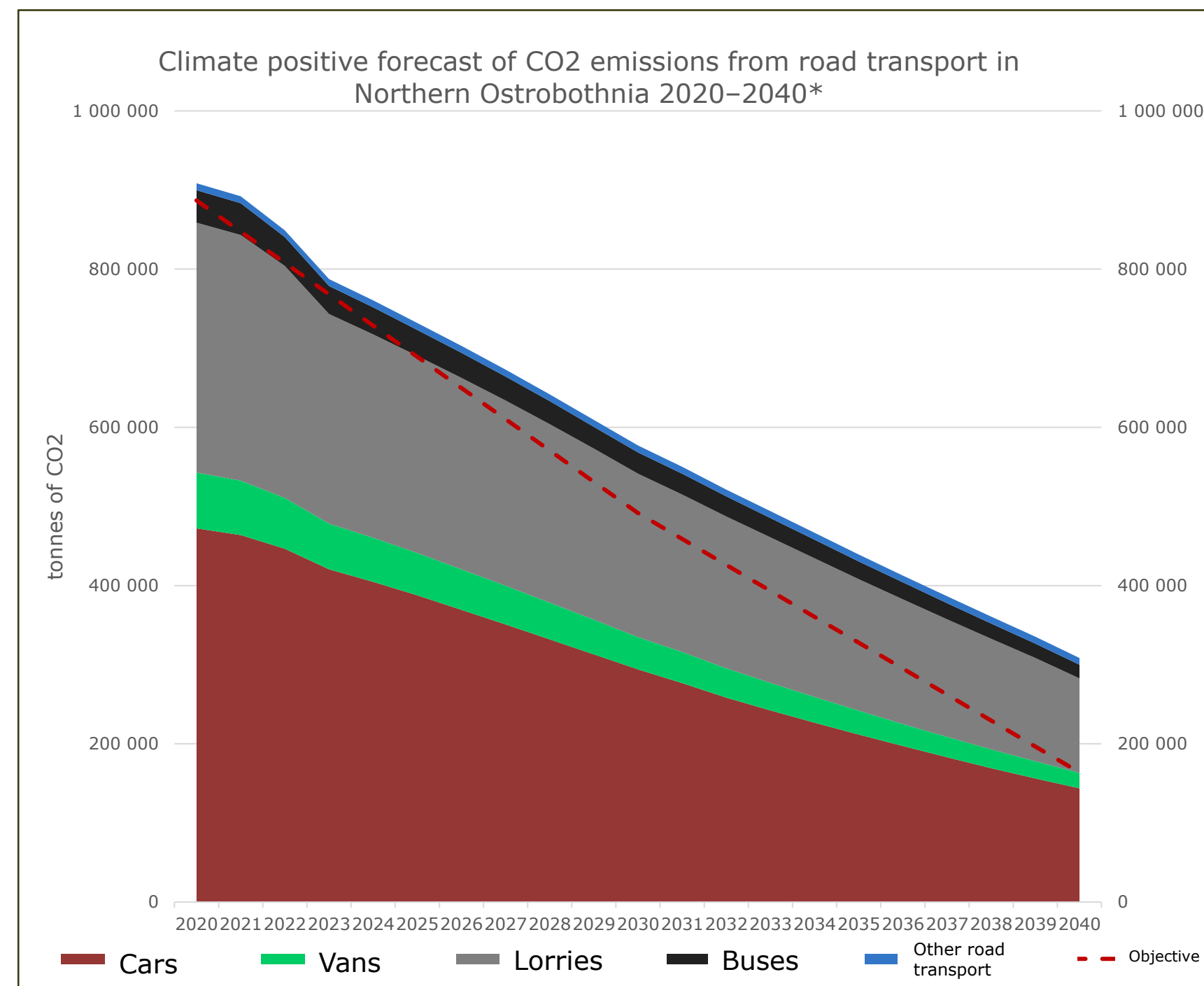
Reducing CO₂ emissions also creates opportunities, mainly through the development of regional biofuel production.

Greenhouse gas emissions from transport in Northern Ostrobothnia in 2018 were 797 kt CO₂e. Road transport accounted for 22% of the region's emissions.

The Council of Oulu Region commissioned from Taloustutkimus a study on the conditions of combined transport between Helsinki and Oulu and between Turku and Oulu: Emissions from transport can be effectively reduced by shifting road transport and transport output to the railways. Combined transport is economically viable from the point of view of both VR (rail transport) and road transport if there are at least 20 combinations in both directions on weekdays. If a train had 25 combinations, the reduction in CO₂ emissions would be more than 9,000 tonnes per year, corresponding to the annual emissions of 3,000 cars.

Graph on the right: * Northern Ostrobothnia's climate-positive forecast shows less transport growth compared to the base forecast, rapid electrification of car transport and a shift to low-emission vehicles in heavy transport after the mid-2020s.

Reducing emissions from transport at national level is central to the National Transport System Plan. The roadmap for fossil-free transport examines ways to halve greenhouse gas emissions from transport by 2030 compared to 2005 levels.



* The climate-positive forecast shows less transport growth, rapid electrification of car transport and a shift to low-emission vehicles in heavy transport after the mid-2020s.

Appendix: A propulsion-based calculation model for road transport emissions and the potential for propulsion changes (Sitowise Oy)



3. Transport is low-emission

- 1. Low emission means of transport &
- 2. Renewable fuels

Regional renewable fuels programme

Increasing the use of renewable fuels requires good availability of the fuels as well as vehicles that use them. The preparation of a development programme for the use, production and distribution of products that goes well beyond sectoral boundaries is a prerequisite for taking this forward.

Accessibility of electric car transport

A regional roadmap will be drawn up for the high-speed charging station network along the main and tourist roads, which plays a key role in the accessibility of electricity charging for electric transport, in conjunction with other roadside services as well as the basic charging possibilities for municipal centres, tourist centres and national parks.

Low-emission means of public transport

The public sector’s own vehicles and outsourced transport services have an emission reduction potential of approximately 2% of the region’s total transport emissions. In addition to absolute emission reductions, the state and municipal vehicle choices also have a significant image and exemplary effect.

- 3. Sustainable mobility &
- 4. Efficient freight transport

Transport system planning based on the latest information

The cross-cutting objective of transport system planning is to reduce emissions in accordance with the commitments. Constant planning based on the latest information is being carried out in Northern Ostrobothnia and more specifically in the Oulu region. Assessment methods that take climate considerations into account are being developed and used for the production of data.

Sustainable mobility infrastructure and services

Sustainable long- and short-distance mobility also requires infrastructure and services for the smooth and competitive mobility of passengers and goods. The development of sustainable infrastructure is a key priority in planning and influencing the transport system. Municipalities are becoming active in making effective use of the state aid for sustainable mobility infrastructure.

Routes and terminals for transporting the bio- and circular economy masses

Efficient logistics are key to the viability of the bio- and circular economy sectors. The prioritisation of road maintenance and development will be prepared from the point of view of the above-mentioned industries and other industries using the lower-level road network.

- 5. Reducing mobility needs through cross-sectoral cooperation

Land use and service structure

Land-use planning and the placement of housing, services and jobs can best reduce the need for mobility and contribute to achieving sustainable mobility. This is made possible by a dense community structure in the centres, strong consideration of the need for mobility and accessibility in land-use and service-network planning and decision-making. Northern conditions impose special requirements on the year-round functionality of the community structure and the road network.

Remote services and location-independent work

Reliable and high-speed broadband enables access to services and equal and equal participation in society, regardless of location and social status. Telecommunications connections make it possible to reduce the need for mobility, for example, by remote working and remote services.

Northern Ostrobothnia Transport System Plan 2040		Reducing transport emissions is at the heart of the key projects and measures supporting them	
Cross-cutting development objectives: <ul style="list-style-type: none">- Promoting Finland’s competitiveness- Responding to emission reduction targets- Improving connectivity and accessibility		Priorities:	<ul style="list-style-type: none">- Reinforced Northern integration into the European transport network- The transport system supports the competitiveness of the industry and a balanced regional structure- The transport system encourages sustainable mobility- Travelling in Northern Ostrobothnia is smooth and safe



4. Agriculture develops as a carbon sink

Northern Ostrobothnia is a nationally important agricultural region. The main production lines are beef and milk production. In crop cultivation, potato cultivation is characteristic of the region. Organic farms are some of the largest in the country and their number is rising. The goal in the region is clean food, well-being of animals, producers and the environment. It is also in the farmers’ own interest to try to reduce greenhouse gas emissions from agriculture.

Agriculture already plays an essential role in climate change mitigation as a carbon sink. Agriculture will become an increasingly important carbon sink in the future.

When examining the climate impact of agriculture, it is important to take into account the following:

Agriculture produces the majority of human food and binds atmospheric carbon	Assessment and calculation of carbon sequestration of greenhouse gas emissions	Northern Ostrobothnia bogs and peatlands	New business opportunities
<p>Consumers’ dietary choices, food intake and food waste are directly linked to the level of greenhouse gas emissions from agriculture.</p> <p>Agriculture sequesters atmospheric carbon to produce food for humans.</p>	<p>There is still a great deal of uncertainty in the calculation and assessment of greenhouse gas emissions and carbon sequestration, particularly in agriculture, land use, land use change and forestry (LULUCF).</p> <p>Resources are needed for research, refinement and verification of emissions and carbon sequestration in order to make a reliable estimation of actual emissions across sectors.</p>	<p>In Northern Ostrobothnia, bogs are a significant part of the landscape.</p> <p>The area’s arable land is 30.5% organic soil, 17.7% humus soil and 12.8% peat soil (Luke 17/2018).</p>	<p>Agriculture plays an important role and involves important opportunities for climate change mitigation.</p> <p>The development of agriculture as a carbon sink and producer of renewable energy will create new business opportunities for agriculture in the region.</p>
<p>Greenhouse gas emissions from agriculture in Northern Ostrobothnia in 2018 were 1,048 kt CO₂e. Northern Ostrobothnia accounted for 16% of CO₂ emissions from agriculture in the whole country. The figures do not take into account the carbon sequestration of agriculture.</p>			

4. Agriculture develops as a carbon sink

1. Growing new crops for new diets, new sources of protein

- New sources of protein in the coming decades
 - Developing the environmental and climate action of livestock production
 - Protein self-sufficient production
 - Increasing plant protein crop production
 - Mushroom production
 - Insect production
 - Crop rotation
 - Nitrogen self-sufficiency
- MY, P, L, O, OS, S

2. Promoting resource efficiency in agriculture

- Appropriate use of fields
 - Cooperation between farms
 - Digital development and utilisation
 - Prevention of nutrient leakage
 - More efficient land use
 - Biogas plants and nutrient cycle
 - Renewable energy on farms
 - Strategic planning of the premises
 - Use of drones
- MY, P, L, O, OS, OY, C, M, S, ELY, PPL

3. Strengthening soil carbon sinks and carbon farming

- Ensuring vegetation cover on mineral soils
 - Addition of organic matter to the soil
 - Development of grassland farming, - commercialisation of crops
 - Biogas plants, decentralised energy production, cultivation of feed on peatlands
 - Soil fertility
 - Reducing tillage
 - Growing/favouring perennial carbon sequestration plants
 - Agroforestry
 - Forestation of idle lands
 - Strengthening organic production
- MY, P, L, O, OS, MK, S

4. Sustainable use of biofractions and side streams

- Agroecological models applied to the area
 - Energy crop cultivation possibilities are investigated in decommissioned peat bogs
 - Utilisation of food industry side streams
 - Fractionation of manure and biogas plant reject
 - Improving security of supply; reducing the use of fossil fuels in work machines
 - New business models for manure spreading and for minimising spreading losses
- MY, P, L, O, OY, C, M, MK, S, ELY, PPL

5. Making peatland cultivation more environmentally friendly

- Adjustment drainage, its maintenance and automation and other means of water level control
 - Long-term grass
 - Perennial crop species suitable for peat soil and vegetation cover or direct sowing on annual crops
 - Rational use of existing arable land so that new peatlands do not have to be cleared
 - Arrangement of long-term monitoring
 - Regular redefinition of the organic soils
- M, Y, P, L, O, OS, S

Parties responsible: MY Rural entrepreneurs, P ProAgria, L Natural Resources Institute Finland, O Oulu UAS, OS OSAO, OY University of Oulu, C Centria, M MTK, MK Forest Centre, S Finnish Environment Institute, ELY: ELY Centre, PPL: Council of Oulu Region



4. Agriculture develops as a carbon sink

In addition to the impact of agricultural climate action, the study* examined the regional economic impact of utilising agricultural side streams in terms of the transport biogas potential of animal manure on farms in Northern Ostrobothnia.

The value of methane from manure in transport use was approximately €50 million in 2018 and approximately €48 million in 2030.

In addition, manure has value as a fertiliser.

Biogas is also used in the production of heat and electricity.

*Sustainable utilisation of agricultural biofractions and side streams, and impact of measures in Northern Ostrobothnia, a scenario review (Ramboll Finland Oy)

Development of greenhouse gas emissions from agriculture in Northern Ostrobothnia in different scenarios: change compared to 2018.

- 1. Baseline, as a continuation of current policies: -7.3%
- 2. In line with national developments, significant efforts are made to reduce greenhouse gas emissions: -23.1%
- 3. Emission trends that take into account the specific features of Northern Ostrobothnia: -45.2%

The course of action is clear. The more strongly they are implemented, the greater their impact on agricultural greenhouse gas emissions.

Identified scenario-based actions, to which Northern Ostrobothnia has the ability and facilities to respond, were found in roadmap workshops. The actions will be carried out in such a way that Northern Ostrobothnia’s agriculture as a livelihood remains viable.

For the scenario analysis, greenhouse gas emissions from Northern Ostrobothnia’s agriculture were calculated according to the Resource Flow Model, so the LULUCF sector and energy consumption were also taken into account.

Greenhouse gas emissions from agriculture in Northern Ostrobothnia in accordance with the Resource Flow Model were 1,512 kt CO₂e.



5. Land use is climate-smart and conducive to the circular economy

Proactive and prudent land-use planning contributes significantly to the reduction of greenhouse gas emissions in all emission sectors.

The cross-cutting theme of the ongoing comprehensive reform of the Land Use and Building Act is climate change and combating it.

Renewable energy plays an essential role in climate change mitigation. Ensuring biodiversity requires cooperation at the municipal and regional borders. Regional plans should make use of existing infrastructure and other structures and focus planning only on issues of regional relevance. A public circulation for comments on the reform will be held in summer 2021. The aim is to have the Government's proposal submitted to the Parliament for consideration by summer 2022. *)

Land use planning must contribute to climate change mitigation by:

- 1) strengthening the integrity of the community structure and making sustainable use of existing infrastructure;
- 2) supporting resource-efficient community development and creating the conditions for a low-carbon and sustainable transport system;
- 3) creating the conditions for the exploitation of renewable and low-carbon energy sources;

Land use planning and construction must anticipate the increasing extreme weather phenomena and other changes and risks caused by climate change and ensure the preservation of ecological links. New construction must be located outside the flood risk areas, or flood risk management must otherwise be ensured.

*) Preliminary draft sections of the Land Use and Building Act (MRL) and explanatory memorandum from the Ministry of the Environment's Built Environment and Energy Negotiation Days 25–26 November 2020, Antti Irjala (Land Use Division) and Kirsi Martinkauppi (Building Division)

Construction plays an important role in combating climate change. Half of the world's raw materials are used in the construction sector. In building management, climate change is combatted by low-carbon construction and by extending the lifespan of buildings. The design of buildings requires the calculation of the carbon footprint and the determination of the target technical service life of the building, but that depends on the use and maintenance of the building. Promoting a circular economy facilitates the reuse and recycling of construction products.

Phasing in to low-carbon construction: CO₂ limits are set by building type. The CO₂ inspection boundaries of the building and the construction site and the potential influence of planning are defined separately: the potential influence of construction planning does not extend to the foundations, as the site is defined in land use planning, i.e. zoning, based on the community structure and functions.

Openings by the Digitalisation Division related to the digitalisation of the Land Use and Building Act reform (e.g. data model-based construction and land use planning and machine readability) will enable more precise control and monitoring of new construction in particular in the future.

Key changes in construction control: Essential technical requirements concerning the lifespan and low carbon content of buildings are needed to combat climate change. Construction and siting permit. Organisation of building supervision at the usual or demanding level. "Responsibility for the implementation of the construction is laid down for the main contractor". Planned use and maintenance of the building, target technical service life of the buildings.

<https://ym.fi/en/land-use-and-building-act> > <https://mrluudistus.fi/> and RYHTI project, <https://ym.fi/rakennetunymparistontietojarjestelma>

The regional programme drawn up by the Council of Oulu Region together with the member municipalities guides the development and use of the regional planning areas.

In land use, the main aims are to support a coherent and ecologically sustainable community and regional structure and the sustainable use of natural resources.

The regional plan directs, for example, wind power, peat production, the location of renewable energy and bio- and circular economy areas.

Resources for the region will come from low-carbon financing.

[Tools for planning and building a sustainable built environment, Green Building Council Finland's \(GBC Finland\) open and updated portal](#)

[Real estate association RAKLI low-carbon roadmap](#)
[Kestavakaupunki.fi](#) of the Ministry of the Environment presents concrete sustainable development actions, provides general information on the various facets of sustainable development and offers an open partnership network.

Increasing the use of wood in construction contributes to the climate objectives of the national energy and climate strategy. Ministry of the Environment [Wood Building Programme \(2016–2022\)](#).

5. Land use is climate-smart and conducive to circular economy

1. Regional reserves for renewable energy production with carbon sinks

The wind power potential of the land areas of Northern Ostrobothnia will be determined in [the TUULI project](#) (August 2020–August 2022) taking into account the sustainability of the green structure and sustainable and economical electricity transmission.

The Maritime Spatial Plan has identified potential areas for the development of offshore wind power in Finland’s territorial waters and the exclusive economic zone > the construction of offshore wind power requires more detailed studies, technological development and statutory municipal planning as well as separate reviews of the exclusive economic zone. A joint Government research project (TEAS) on wind power (> August 2021) is also under way.

2. Land use conditions for low-carbon mobility

Improving the integrity of the community structure and infill development

Reliance on existing infrastructure and its sustainable use at all levels of planning. Bicycle and pedestrian transport and local services in and between centres and sub-centres.

Development image 2030+ of the Oulu city region will be drawn up as part of the MAL agreement on land use, housing and transport. An interface for low-carbon mobility, including opportunities for rail transport, especially local train transport, in land use development.

3. Climate objectives and biodiversity at the heart of member municipalities’ land policy

As part of the TUULI project, the regional survey on the green structure and ecosystem services creates the conditions for preserving climate benefits and carbon sinks as part of land use planning.

Green and climate coefficients in municipal plans. Development image 2030+ of the Oulu city region will be drawn up as part of the MAL agreement on land use, housing and transport. Interfaces for agriculture and forestry and municipal project planning.

4. Climate-smart and low-carbon construction – the right material in the right place

Further development of regional expertise and dialogue in ecological and renovation construction, establishing a link between traditional and modern construction and building sustainably. Consider the entire lifespan of the building from land-use planning onwards. Creating better conditions for the sector to operate with public steering and support (public procurement, education, increasing knowledge/architecture and industry). Let us be proud of our expertise and take care of our positive image!

The reform of the Land Use and Building Act takes a position on low carbon emissions, life cycle characteristics and technical requirements in building management. The design of buildings requires the calculation of the carbon footprint and the determination of the target technical service life of the building; promoting the circular economy facilitates the reuse and recycling of construction products.

5. Identification of cross-sectoral opportunities and symbiosis and the circular economy

Development of soil management and mass economy at the regional and city level (such as the Northern Ostrobothnia regional resource flows project, POSKI sub-project and the City of Oulu as part of the CircVol project).

New innovations and pilot projects will be stimulated by financial engineering and multisectoral RDI activities. Hybrid construction and modularity. Development of renovation construction on the terms of old building methods (changes coming through the reform of the Land Use and Building Act).

6. Minimising the decline of forestry land when implementing transport, construction and energy production solutions

Forestry land will be used carefully when building new construction, as the carbon sink effect of forests will only increase in a growing forest.

Parties responsible:
municipalities (planning, land policy, building control), the Council of Oulu Region (regional planning, transport system planning, financing), ELY, ministries, construction industry, RAKLI, R&D/university and educational institutes, energy and electricity transmission companies



6. Forests and bogs act as efficient carbon sinks; Peat is used sustainably

The Northern Ostrobothnia Regional Forest Programme (AMO) 2021–2025 provides guidelines for the management and protection of the region’s forests, wood use and further processing as well as other use of forests. The aim is to make full and sustainable use of the growing potential of the forests of Northern Ostrobothnia.

The three strategic priorities of the programme are:

- to promote forest growth, carbon sequestration and the improvement of natural and water management status through forest sector solutions and measures
- to use the region’s forests and their products and ecosystem services in an active, economically, ecologically, socially and culturally sustainable way
- to seek new information for the forest sector through research and new methods through development and to strengthen the forest competence of professionals, forest owners and young people

Climate sustainable forestry is one of the ten development themes of the regional forest programme:

- In wood production, opportunities and methods to increase carbon sequestration and reduce carbon release are identified and utilised
- The conservation of forest carbon stocks and biodiversity is supported through nature management measures
- Wood replaces fossil raw materials in the manufacture, construction and energy production of products.
- Utilisation of long-lived wood products

Northern Ostrobothnia:

- The forest stand grows 11 Mm3 and felling drains approximately 8.63 Mm3 of trunk trees per year.
- The region has the most bogs in Finland: about 50% of forestry land has peat soil
- Forestry and the forest industry are a major employer in the region – carbon sinks, long-term carbon sequestration products for the region and for export, regional energy.
- Properly exploited forests are a versatile resource.

Northern Ostrobothnia forests									
Time period	2016-2025			2026-2035			2036-2045		
Scenario	NT	SY	TH	NT	SY	TH	NT	SY	TH
Greenhouse gas balance Mt CO ₂ e/year	1.0	-2.0	-4.9	0.7	-1.3	-6.0	2.2	-1.1	-6.8
- Emission									
- Carbon sink									

NT: maximum net yield harvesting potential;
SY: maximum sustainably maintained logging outturn of merchantable and energy wood;
TH: felling at the current levels
KHK greenhouse gas

VMI12 (2014–2018) MELA Group 12 February 2020



6. Forests and bogs act as efficient carbon sinks; Peat is used sustainably

1. Forest management in the context of climate change mitigation and adaptation and long-lived wood products

- National forest management recommendations and regional forest programme guidelines for climate-friendly forestry are taken into account
- Preservation of forest carbon stocks and biodiversity
- Wood as a substitute for fossil raw materials
- Long-lived wood products
- Forest water management on peatlands

2. Increasing forest carbon sinks – new technologies

- Application of artificial intelligence in the calculation of forest carbon balance in wood supply chains (RDI and companies in the development of a wood monitoring system)
- Development and utilisation of soil analytics for growth optimisation (ash fertilisation development, sawdust as fertiliser; needle imaging)
- the Yoda tool
- Coverage and aggregation of forest, nature, soil and water data from remote sounding

Parties responsible:

Rural entrepreneurs, ProAgria, Finnish Environment Institute, Natural Resources Institute Finland, Oulu UAS, OSAO, University of Oulu, MTK, Forest Centre, companies

3. Restoration of bogs and increase of carbon sink effects of bogs – based on needs and impact assessment

- Suitability of bogs for restoration based on information (water system, climate, nutrients, diversity; Yoda tool)
- Experiments with new technologies/pilots for water balance management

4. Alternative and new uses of peat and active influencing

- Promoting technological development, piloting and new business required to raise the level of processing:

Recommending the use of peat moss in bogs that have lost their natural state, taking into account the principles of the regional plan: as a growing medium, in the textile industry, as insulation, as health and welfare products

5. Future use of peat-producing areas

- Mapping of abandoned and idle areas, nutrient economy analysis and identification of the most potential uses (cost-efficiency)
- Forestation of idle areas

In 2018, the forests of Northern Ostrobothnia sequestered 1.8 million t CO₂e of greenhouse gas emissions.

Greenhouse gas emissions from energy use of peat in the region in 2018: 820 kt CO₂e

Due to the reduced energy use of peat, emissions will decrease by about 700 kt CO₂e by 2025.

Use of woody biomass in energy production as a result of peat substitution could grow by about 0.7–0.9 Mm³ by 2035

- The estimated maximum sustained logging outturn of forest processed chips at the end of the review period exceeds the current use of 1.7 Mm³, which would be sufficient to cover the growing demand.

However, the utilisation rate should be significantly increased from the current level and the sufficiency of harvest chains may become a challenge.

Development of peat energy use and effects on the wood supply chain and greenhouse gas emissions in Northern Ostrobothnia, report (AFRY Management Consulting)



7. Cooperation and cross-sectoral operating models create vitality and business opportunities

Comprehensive cooperation between all sectors is needed to mitigate and adapt to climate change. Technological expertise alone is not enough. New kinds of business expertise, communication, interaction and training are needed.

1. Cross-sectoral cooperation will be actively promoted

- Integrating the ICT sector into the solution of climate challenges
 - Utilising the region’s big data expertise
 - Cooperation between companies, the public sector and the third sector
- L, O, OY, C, OL, Y, MK, ELY, KE, S, PPL, K, KS

2. Active use of new sources of funding, prioritisation and steering of funding in line with the climate strategy

- Strategic portfolio construction and a support and monitoring model for strategic projects
 - Implementation of a financial designer service
 - Support for change in business operations
- O, OY, C, Y, MK, ELY, KE, PPL, K

3. Supporting the low-carbon food chain

- Reducing food waste throughout the food chain
 - Promoting the transition to low-carbon diets based on local food (more vegetarian diets, new sources of protein, security of supply and vitality of the region)
 - Optimising food chain transports
- L, O, OY, C, OL, Y, MK, ELY, KE, S, PPL, K, KS

4. The region as a development platform and promoter of climate action

- Corporate climate programme
 - Commercialisation, scaling and export promotion of low-carbon, energy- and material-saving, circular and bioeconomy-based innovations
 - Pilots and experimental projects
 - Utilising young people’s innovation capacity
- L, O, OY, C, OL, Y, MK, ELY, KE, S, PPL, K, KS, YY

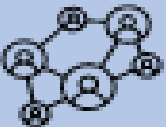
5. Promoting education, training, information and communication on the bio- and circular economy and climate issues

- Effective communication of the region’s climate strategy to all stakeholders. Connection to sector-specific networks
 - The best practices of the pioneering municipalities of Finland will be implemented as widely as possible
 - Training, counselling and competence building for different needs
 - Example projects made visible, impact communication clear, benefits and synergies highlighted
 - Civic interaction
- L, O, OY, C, OL, Y, MK, ELY, KE, S, PPL, K, KS

6. Public procurement processes will be reformed

- Environmental impact as a criterion in procurement
- L, O, OY, C, OL, Y, MK, ELY, KE, S, PPL, K, KS

Parties responsible: L: Natural Resources Institute Finland, O: Oulu UAS, OY: University of Oulu, C: Centria, OL: Educational institutes, Y: Companies, MK: Finnish Forest Centre, ELY: ELY Centre, KE: Municipal enterprises, S: Finnish Environment Institute, PPL: Council of Oulu Region, K: Municipalities, KS: Third sector, YY: Entrepreneur associations



Adaptation

Adaptation measures specifically affecting Northern Ostrobothnia

- Implementing contingency and preparedness plans for each municipality
- Improved flood and rainwater management
- Protecting energy and water distribution in extreme weather events
- Development of irrigation systems and water management in fields
- Proactive land use planning
- Utilising new opportunities in agriculture and securing food supply also outside the region
- Preventing forest fires and developing effective fire extinguishing
- Increasing vegetation cover areas
- Promoting business opportunities related to adaptation
- Investment in disease control in plants, animals and humans
- More effective communication on adaptation to climate change
- Creating adaptation networks
- Ensuring adaptation research, development and education
- Following and participating in national and international adaptation work
- Ensuring biodiversity requires cooperation at the municipal and regional level

Adaptation to climate change was already taken into account in the climate strategy prepared for Northern Ostrobothnia in 2010. Today, it is more relevant than ever. For example, the City of Oulu has prepared a comprehensive preparedness plan for adaptation to climate change.

Adaptation to climate change will prevent or mitigate the negative impacts of change and capitalise on the positive impacts of change.

National Climate Change Adaptation Plan 2022

The cross-cutting theme of the ongoing reform of the Land Use and Building Act is climate change and combatting it. Key factors for adapting to climate change in land use are: Preparing for increasing storms, heavy rainfall and urban floods and other changes and risks caused by climate change. Construction mainly outside flood risk areas. Safeguarding ecological links relevant to the migration of species. Utilising the green environment in urban planning.



Towards a carbon neutral Northern Ostrobothnia

Northern Ostrobothnia’s key climate action themes – Everything matters

1. Smart bioeconomy and the circular economy underpin climate action

1. The production and use of biogas will be promoted taking into account the nutrient cycle and environmental impacts
2. Natural resources – development of sustainable products and business
3. Wood construction promoted – as part of climate-friendly construction
4. The use of soil, rock and recycled materials will be coordinated and they will be utilised in accordance with the circular economy
5. Utilisation of ICT expertise
6. Waste and side streams are recycled and recovered

2. Sustainable, efficient and low-emission energy production and use

1. Renewable energy production replacing fossil energy will be promoted based on the region’s strengths
2. Developing a low-emission, efficient and flexible energy system
3. Supporting energy efficiency and low emissions

3. Transport is low-emission

1. Low emission means of transport & 2. Renewable fuels
Regional renewable fuels programme
Accessibility of electric car transport
Low-emission means of public transport
3. Sustainable mobility & 4. Efficient freight transport
Transport system planning based on the latest information
Sustainable mobility infrastructure and services
Routes and terminals for transporting bio- and circular economy masses
5. Reducing mobility needs through cross-sectoral cooperation
Land use and service structure
Remote services and location-independent work

Adaptation as part of key themes

4. Agriculture develops as a carbon sink

1. Cultivation of new plants for new diets, new sources of protein
2. Promoting resource efficiency in agriculture
3. Strengthening soil carbon sink and carbon farming
4. Sustainable use of biofractions and side streams
5. Making peatland cultivation more environmentally friendly

5. Land use is climate-smart and conducive to the circular economy

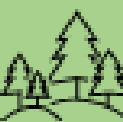
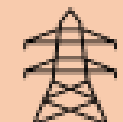
1. Regional reserves for renewable energy production with carbon sinks
2. Land-use conditions for low-carbon mobility
3. Climate objectives and biodiversity at the heart of member municipalities’ land policy
4. Climate-smart and low-carbon construction – the right material in the right place
5. Identification of cross-sectoral opportunities and symbiosis and the circular economy
6. Minimising the decline of forestry land when implementing transport, construction and energy production solutions

6. Forests and bogs act as efficient carbon sinks; Sustainable use of peat

1. Forest management in the context of climate change mitigation and adaptation and long-lived wood products
2. Increasing forest carbon sinks – new technologies
3. Restoration of bogs and increase of carbon sink effects of bogs – based on needs and impact assessment
4. Alternative and new uses of peat and active influencing
5. Future use of peat-producing areas

7. Cooperation and cross-sectoral operating models create vitality and business opportunities

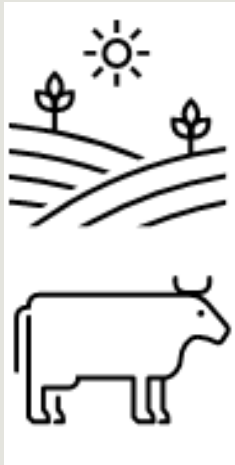
1. Cross-sectoral cooperation will be actively promoted
2. Active use of new sources of funding, prioritisation and steering of funding in line with the climate strategy
3. Supporting the low-carbon food chain
4. The region as a development platform and promoter of climate action
5. Promoting education, training, information and communication on the bio- and circular economy and climate issues
6. Public procurement processes will be reformed





TRANSPORT

34% reduction in road transport emissions by 2030 with changes in propulsion power: 300 kt CO₂e



AGRICULTURE

23% reduction in agriculture emissions by 2030, including peatland crop changes and renewable energy: about 300 kt CO₂e



PEAT

Reduced energy use of peat will result in a reduction in emissions of 700 kt CO₂e by 2035



WIND POWER

Emission compensatory effect of planned onshore wind power projects in Northern Ostrobothnia above 2,000 kt CO₂e, 3,700 kt CO₂e including projects in the preliminary survey phase

Possibility of large emission reductions

Solutions in the right direction are needed now. Emissions reductions will not happen on their own and visible effects will take decades.

The calculations are based on the scenarios of the surveys carried out in the POPilmasto project. The figures are theoretical and indicative. For agriculture, the figures have been calculated according to Ramboll’s Resource Flow Model, i.e. they are not directly comparable to the ALas-Hinku calculation. The energy use figures for peat are mainly in the emissions trading sector. Source of wind energy projects: Finnish Wind Power Association, compensation figure ALas calculation.

VISION

Towards a carbon neutral Northern Ostrobothnia

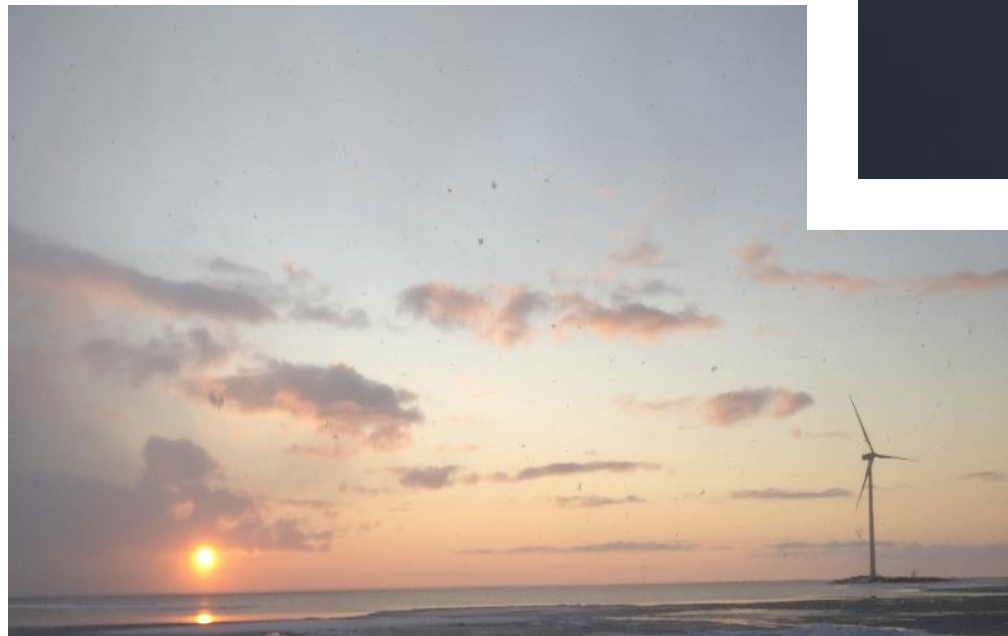
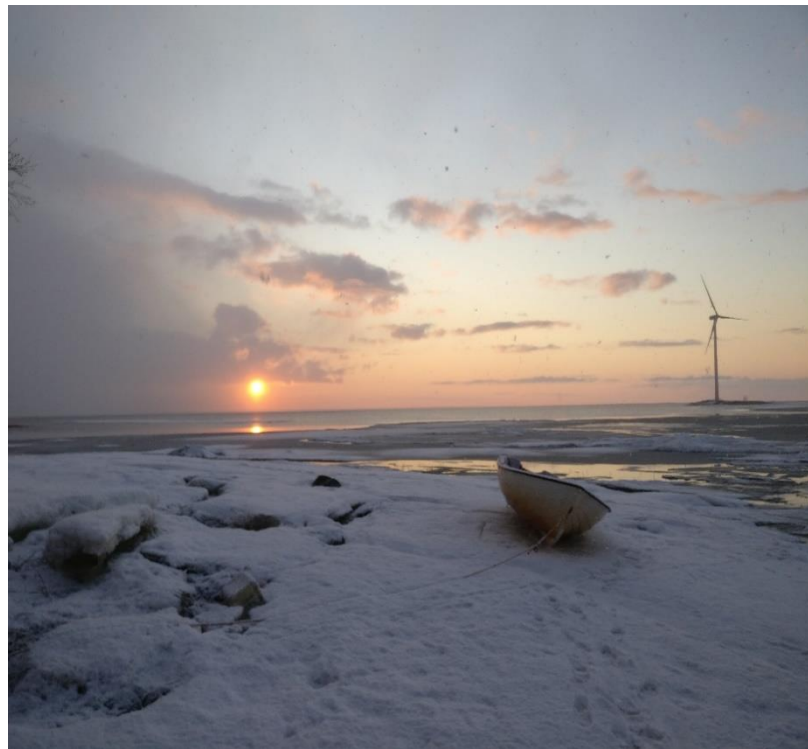
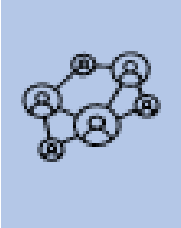
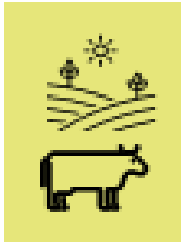
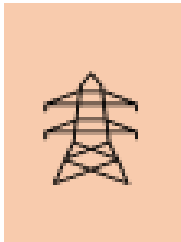
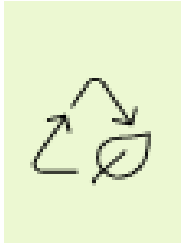


Photo: Finnish Environment Institute



Implementation and monitoring of the Northern Ostrobothnia Climate Roadmap 2021–2030

- In order to achieve the climate objectives as set out in broad cooperation, we need shared leadership, commitment and joint action by actors as well as financial resources and the full use of the resources.
- The public sector (municipalities, cities, public authorities), companies, RDI organisations, non-profit organisations and residents are all part of the climate action: promoting, supporting and implementing.
- The EU’s Green Deal, EU regional and structural policy programmes and national funding allocate significant resources to climate action.
- Climate objectives are an essential part of the development of the region and the planning of land use.
- The region’s climate objectives support not only climate mitigation, adaptation and biodiversity conservation, but also the regional economy.
- The Council of Oulu Region coordinates the meetings of the Advisory Council established by the Board of the Regional Council. Representatives of the Board of the Regional Council will be appointed for the period 2021–2024 after the municipal elections. The advisory council will convene together with the Canemure Regional Cooperation Group (the project runs until 2024) 2–3 times a year.
- In the region, climate work is active and the actors have good discourse with each other. Good practices multiply and the challenges are resolved together.
- The calculation of greenhouse gas emissions, which is updated annually by the Finnish Environment Institute, is used to assess the effectiveness of the measures.
- Canemure will update the roadmap in 2024.



The established cooperation network will continue its activities in monitoring, promoting, support and implementation of the diverse climate action in the region.



The climate roadmap has been drawn up in broad cooperation. The roadmap provides guidelines for the development of the operating environment so that the sector’s developer organisations can allocate their resources correctly. Companies make their own strategic decisions and choices on the development and renewal of their business operations, taking into account the business opportunities provided by the operating environment and the high level of RDI support available.

APPENDICES

Northern Ostrobothnia Climate Roadmap 2021–2030

Roadmap process



05/201906/202010/202012/202002/202104/2021				
CURRENT STATE	WORKSHOPS -Current State, Vision and Solutions	ADVANCED SCENARIOS - Transport, Agriculture and Peat	COMPILATION & OPERATING MODEL	TOWARDS PRACTICE
<p>CLIMATE CHANGE HERE AND ABROAD</p> <p>The POPilmasto project started in May 2019. Cooperation with the Canemure project was established. The challenges, opportunities, adaptation and preparedness brought about by climate change are a broad entity. Process constraints and overview were specified. In cooperation with the Ministry of the Environment’s Wood Building Programme, a seminar on climate-smart construction was organised on 12 December 2019.</p> <p>A survey was conducted for 30 municipalities in the region to determine the current state of climate action and the planned actions in the coming years. Greenhouse gas emission data calculated by the Finnish Environment Institute for municipalities were analysed. The EU and national operating environment were studied as the basis of the work*. The results of the phase were presented in a Current State workshop on 11 March 2020.</p>	<p>INFORMATION AND COOPERATION</p> <p><i>The Current State</i> workshop provided information on the situation and willingness of the 30 municipalities in Northern Ostrobothnia in climate action and the general operating environment in presentations and panel discussions. Challenges and opportunities were discussed. Regional programmes were represented in the working groups: forestry, agriculture, transport, land use and energy. The long-term work and experience of various parties and the opportunities for influence were utilised in the setting of climate objectives and actions. The <i>Vision</i> workshop outlined the region’s climate action and main objective. The <i>Solutions</i> workshop discussed the selected key themes in more detail. The workshops attracted 210 participants from the public sector, companies and non-profit organisations. *Solved Oy and AFRY Oy facilitated the events.</p>	<p>MORE DETAILED INFORMATION</p> <p>The Northern Ostrobothnia climate roadmap looks like the region itself. Impact studies for the different climate measures were obtained for the sectors most important in terms of climate emissions.</p> <ul style="list-style-type: none">• Low-emission transport – a propulsion-based calculation model for road transport emissions and the potential for propulsion changes (Sitowise Oy)• Sustainable utilisation of agricultural biofractions and side streams, and impact of measures in Northern Ostrobothnia, a scenario review (Ramboll Finland Oy)• Development of peat energy use in Northern Ostrobothnia, effects on the wood supply chain and greenhouse gas emissions, a report (AFRY Management Consulting)	<p>FOCUSING, MONITORING AND EVALUATION, PROMOTION AND RESPONSIBLE PARTIES</p> <p>The roadmap, based on the latest information and interaction, contains a description of the current situation, the key themes with measures as well as a model for monitoring and promotion. The established cooperation network will continue its activities in support of the diverse climate action in the region. The Council of Oulu Region, as the regional development authority, coordinates the meetings of the advisory council in cooperation with the Canemure project. The active climate work of the actors in the region is convened 2–3 times a year. The greenhouse gas emissions calculation is used in the assessment of the measures and is updated annually by the Finnish Environment Agency. Canemure project will update the roadmap in 2024.</p>	<p>FROM WORDS TO ACTION – SHARED LEADERSHIP, COMMITMENT, COLLABORATION AND RESOURCES</p> <p>The roadmap was sent for opinion of the climate steering groups in December 2020. It was approved by the Board of the Regional Council in February 2021. In order to achieve the climate objectives set out in broad cooperation, we need shared leadership, commitment and joint action by actors as well as financial resources and their full use. The EU’s Green Deal, EU regional and structural policy programmes and national funding allocate significant funding to climate action. Climate objectives are an essential part of the development of the region and the planning of land use.</p>



The photos are from the first workshop on 11 March 2020

The second and third workshops had a “digital leap” – they were held remotely due to the COVID-19 situation.

Workshops

The analysis of the operating environment on the basis of the roadmap was carried out by Solved – The Cleantech Company Oy under Janne Hietaniemi and AFRY Oy’s Mira Hulkkonen, Susanna Kiviniemi, Arto Ruotsalainen under Katri Luoma-aho, acting as facilitators and innovators of participatory workshops

[The Current State workshop](#) on 11 March 2020 provided information on the situation and willingness of the 30 municipalities in Northern Ostrobothnia in climate action and the general operating environment. The panel discussion on regional strengths in a dynamic operating environment was moderated by Santtu Hulkkonen from Solved. The panellists were Pia Erkinheimo, VAKE; Serafima Jolkkonen, student; Marjo Kolehmainen, Pohjois-Pohjanmaan Yrittäjät; Toni Krankkala, NIHAK ry; Jonas Liimatta, ELY Centre; Paula Paaanen, City of Oulu

Tanja Lepistö, East and North Finland EU Office, presented the opportunities and obligations presented by the EU in relation to climate change. Santtu Karhinen, Finnish Environment Institute, spoke about the basis of the emission calculations.

Regional programmes were represented in the groups: forestry, agriculture, transport and land use and energy. The long-term work and experience of various parties and the opportunities for influence were utilised in the setting of climate objectives.

The [Vision workshop](#) on 8 April 2020 outlined the region’s climate action and main objective. The Teams meeting was attended by nearly 80 participants from different organisations and speakers Jyri Arponen from Sitra, Sanna Söderlund from the Baltic Sea Action Group and Sanna Davidsainen from Elektrobit.

The [Solutions workshop](#) on 13 May 2020 discussed the key themes selected for the region’s climate action and their measures in more detail.

The workshops attracted 210 participants from the public sector, companies and non-profit organisations.

Seminar on climate-smart construction

Land use and housing solutions matter: housing accounts for 33% of our carbon footprint. The carbon spike caused by construction is almost a third of this: particular attention must be paid to the early stages of construction and the choice of building materials.

The outcome of [the seminar](#), organised in cooperation with the Ministry of the Environment’s Wood Building Programme on 12 December 2019, is in key theme 5. Land use is climate-smart and conducive to circular economy activities, objective 4. Climate-smart and low-carbon construction – The right material in the right place.

Expert panellists:

Antti Erola, JVR Plus Oy; Esa Heikkilä, Finnsementti; Janne Jokelainen, Municipality of Ii; Janne Pihlajaniemi, University of Oulu; Pekka Seppälä, City of Oulu

Warm thanks to everyone!

Why does Northern Ostrobothnia need its own climate roadmap and advisory council to guide the work?

What will Northern Ostrobothnia be like in 2035?

Matias Ojalehto, Chairman of the Board of the Regional Council, answers these questions and shares his vision.

[Listen to recordings of the workshop on 11 March 2020](#)

Climate action consists of both political decisions and daily choices by all of us.

The people of the region have been heard on various occasions along the way.



The photos show the steering of the climate objectives of Northern Ostrobothnia on 16 May 2019, 23 August 2019 and 24 January 2020. Remote meetings took place on 26 November 2020 and 3 February 2021.



The photos are from the Ilmastoareena ("Climate Arena") event in Ii and the Tyrnävä potato market in 2019.



2019–2020 Advisory Council composition

Representatives appointed by the Board of the Regional Council:

Chairman Matias Ojalehto, Vice Chair Jari Nahkanen in place of Tytti Tuppurainen, from 9 December 2019 Pirjo Sirviö

Kalervo Ukkola, Lyly Rajala, Mika Flöjt, Matti Pahkala, Annemari Enojärvi

ORGANISATION	REPRESENTATIVE	DEPUTY REPRESENTATIVE
Haapavesi-Siikalatva Region Joint Municipal Authority	Hannu Saarinen, from May 2020 Tarja Bäckman, Regional Director	Pauli Piilma, Mayor of Siikalatva
Oulu Chamber of Commerce	Esa Pellikainen, Assistant Managing Director	Maria Juurikka, Director of Service Sector
MTK Pohjois-Suomi ry	Matti Tyhtilä, Executive Director	Sami Nivala
Keski-Pohjanmaan Yrittäjät	Jarmo Nahkala	Antero Kujala
City of Oulu	Maarit Talvitie, Climate Specialist	Jonna Hakala, Environmental Protection Manager
Finnish Environment Institute SYKE	Teemu Ulvi, Research Engineer	Maria Kopsakangas-Savolainen, Research Professor
Northern Ostrobothnia ELY Centre	Jonas Liimatta, Director General	Timo Lehtiniemi, Head of Unit
Finnish Association for Nature Conservation, Northern Ostrobothnia chapter	Esko Saari, President	Kalle Hellström, Oulu Nature Conservation Society, Vice President
ProAgria Oulu	Risto Jokela, Specialist	Juha Sohlo, Service Manager
Pohjois-Pohjanmaan Yrittäjät	Marjo Kolehmainen, CEO	Tiina Talala, Procurement Agent, until 29 March 2020
University of Oulu	Eva Pongrácz, Professor	Arja Rautio, University of the Arctic, Vice-President, Research
Nivala-Haapajärven seutu NIHAK ry	Toni Krankkala, CEO	2nd Deputy Representative Jenni Ylä-Mella, Post-doctoral researcher
Oulunkaari Joint Municipal Authority	Ari Alatossava, Mayor of Ii Town	Henrik Kiviniemi, Mayor
Finnish Forest Centre	Eeva-Liisa Repo, Head of Economic Development	Anne Sormunen, Mayor of Utajärvi
Naturpolis Oy	Jari Hentilä, CEO	Eljas Heikkinen, from 22 Sept 2020 Anu Hilli, Forest Management Specialist
Oulu UAS	Tuomo Pesola, Head of Education and RDI	Jukka Kihlman
Ylivieska sub-region	Tapio Koistinaho, Environmental Manager	Ritva Imppola, Project Manager
Natural Resources Institute Finland	Anne Tolvanen, Professor	Timo Kiema, Regional Manager
Oulu Region/Oulu's surrounding municipalities	Ari Alatossava, Mayor of Ii Town	Oili Tarvainen, Researcher
Raahe sub-region	Seppo Sorvari, Office Secretary	Aki Heiskanen, Mayor of Hailuoto
Youth representation	appointed when the Youth Council is organised	Vesa Ojanperä, Environmental Secretary

Secretary: Ritva Isomäki

Composition of the Regional Cooperation Group

Haapavesi-Siikalatva sub-region	Hannu Saarinen	
Kalajoki renewable energy park	Not selected	
Koillismaa sub-region and Naturpolis	Jari Hentilä	
Natural Resources Institute Finland	Olli Tarvainen	Anne Tolvanen
Ii Micropolis	Leena Vuotovesi	
MTK Northern Finland	Matti Tyhtilä	
Nivala-Haapajärvi sub-region	Toni Krankkala	
Oulu University of Applied Sciences	Tuomo Pesola	
City of Oulu	Matti Matinheikki	
Educational Consortium OSAO	Kirsti Joko-Tokola	Ollipekka Huotari
Oulu sub-region and Oulunkaari sub-region	Ari Alatossava, Chairman	
University of Oulu	Eva Pongrácz	Arja Rautio
Northern Ostrobothnia ELY Centre	Jonas Liimatta	
Council of Oulu Region	Jussi Rämet	
Finnish Association for Nature Conservation,	Esko Saari	Kalle Hellström
Northern Ostrobothnia chapter	Vesa Nuolioja	Juha Sohlo
ProAgria Oulu	Seppo Sovari	Vesa Ojanperä
Raahe sub-region	Eeva-Liisa Repo, Vice	Eljas Heikkinen
Finnish Forest Centre	Chair	
Finnish Environment Institute	Raimo Ihme	
Ylivieska sub-region	Tapio Koistinaho	Timo Kiema

Members of the steering group

Council of Oulu Region:

Jussi Rämets, Planning Director; Deputy Member Tuomas Kallio, from October 2020 Erika Kylmänen, Environmental Manager

Northern Ostrobothnia ELY Centre:

Petri Keränen, Director of Business, Labour and Expertise; Timo Lehtiniemi, Deputy Member, Head of Rural and Energy Unit
Timo Mäkikyrö, Director of Transport; Heino Heikkinen, Deputy Member, Head of Transport Systems Unit

Natural Resources Institute Finland:

Virpi Alenius, Development Manager; Anne Tolvanen, Deputy Member, Professor

Oulu University of Applied Sciences Ltd:

Chairman Tuomo Pesola, Head of Education and RDI, Natural Resources; Deputy Member Ritva Imppola, Project Manager

Educational Consortium OSAO:

Ilkka Kettunen, Study Manager; Deputy Member Jussi Kangasmaa, CEO, OAKK adult education institute

University of Oulu:

Riitta Keiski, Dean, Professor; Deputy Member Eva Pongrácz, Professor

Finnish Forest Centre:

Eeva-Liisa Repo, Head of Economic Development; Deputy Member Eljas Heikkinen, Forest Management Specialist

Finnish Environment Institute:

Raimo Ihme, Key Account Manager; Deputy Member Teemu Ulvi, Research Engineer

Funder’s representative: Anne-Maaria Kurvinen, Financial Specialist, ELY Centre

Secretary: Auli Suorsa, Specialist, Council of Oulu Region

The steering group may invite other experts and representatives from the field to its meetings as appropriate.

Duration of the project: 1 May 2019–30 April 2020; Funding: ELY Centre, ERDF, EUR 260,192

Responsible director: Jussi Rämets

Project Manager: Ritva Isomäki

Low-emission transport – a propulsion-based calculation model for road transport emissions and the potential for propulsion changes

The work was carried out by Katja Kaartinen and Marko Tikkanen, Sitowise Oy. Vesa Laine and Kati Kiiskilä from Sitowise Oy have also participated in the work. The work was guided by a steering group:

Olli Kiviniemi, Council of Oulu Region
Päivi Hautaniemi, Heino Heikkinen and Soile Purola, Northern Ostrobothnia ELY Centre
Marko Mäenpää and Helena Waltari, Traficom
Saija Ränä, City of Oulu

Sustainable utilisation of agricultural biofractions and side streams, and impact of measures in Northern Ostrobothnia, a scenario review

The work was carried out by Heikki Savikko and Joonas Hokkanen, Ramboll Finland Oy. The work was guided by a steering group:
Tarja Bäckman, Haapavesi-Siikalatva Region Joint Municipal Authority
Ritva Imppola, Oulu University of Applied Sciences
Timo Lehtiniemi, Northern Ostrobothnia ELY Centre

Development of energy use of peat in Northern Ostrobothnia, impact on the wood supply chain and greenhouse gas emissions

The work was carried out by Jenni Patronen and Niklas Armila, AFRY Management Consulting.

The work was guided by a steering group:
Bioenergia ry (Hannu Salo, Regional Manager, MH)
Kanteleen Voima Oy (Juha Ollila, Procurement Manager)
Natural Resources Institute Finland (Taneli Kolström, Senior Adviser)
Oulun Energia Oy (Pertti Vanhala, Business Director)
Finnish Forest Centre (Eeva-Liisa Repo, Head of Economic Development)
Ministry of Economic Affairs and Employment (Petri Hirvonen, Specialist; Petteri Kuuva, Industrial Counsellor)

Jussi Rämets and Ritva Isomäki work in all of the steering groups for the detailed scenarios

Northern Ostrobothnia Climate Roadmap (POPilmasto) project

Snapshot workshop 11 March 2020 recordings:

Videos: Saha Prod Oy; subtitles Spoken Oy

More detailed reports:

- Low-emission transport – a propulsion-based calculation model for road transport emissions and the potential for propulsion changes (Sitowise Oy)
- Sustainable utilisation of agricultural biofractions and side streams, and impact of measures in Northern Ostrobothnia, a scenario review (Ramboll Finland Oy)
- Development of peat energy use in Northern Ostrobothnia, effects on the wood supply chain and greenhouse gas emissions, a report (AFRY Management Consulting)

Towards Carbon Neutral Municipalities and Regions (Canemure) project

Northern Ostrobothnia Transport System Plan 2040

Northern Ostrobothnia Regional Forest Programme (AMO) 2021–2025, Finnish Forest Centre

Regional forest programmes

Northern Ostrobothnia Regional Rural Development Strategy 2014–2020

-Northern Ostrobothnia energy and climate strategies 2011 and 2012

Well-being from energy. Northern Ostrobothnia Energy Strategy 2020 (Council of Oulu Region publication A:54)

Northern Ostrobothnia Climate Strategy (Council of Oulu Region publication A:51)

Northern Ostrobothnia Bioeconomy Development Strategy 2015–2020



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Thank you to all contributors and feedback providers!

Northern Ostrobothnia Climate Roadmap 2021–2030

Towards a carbon neutral Northern Ostrobothnia

Council of Oulu Region

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