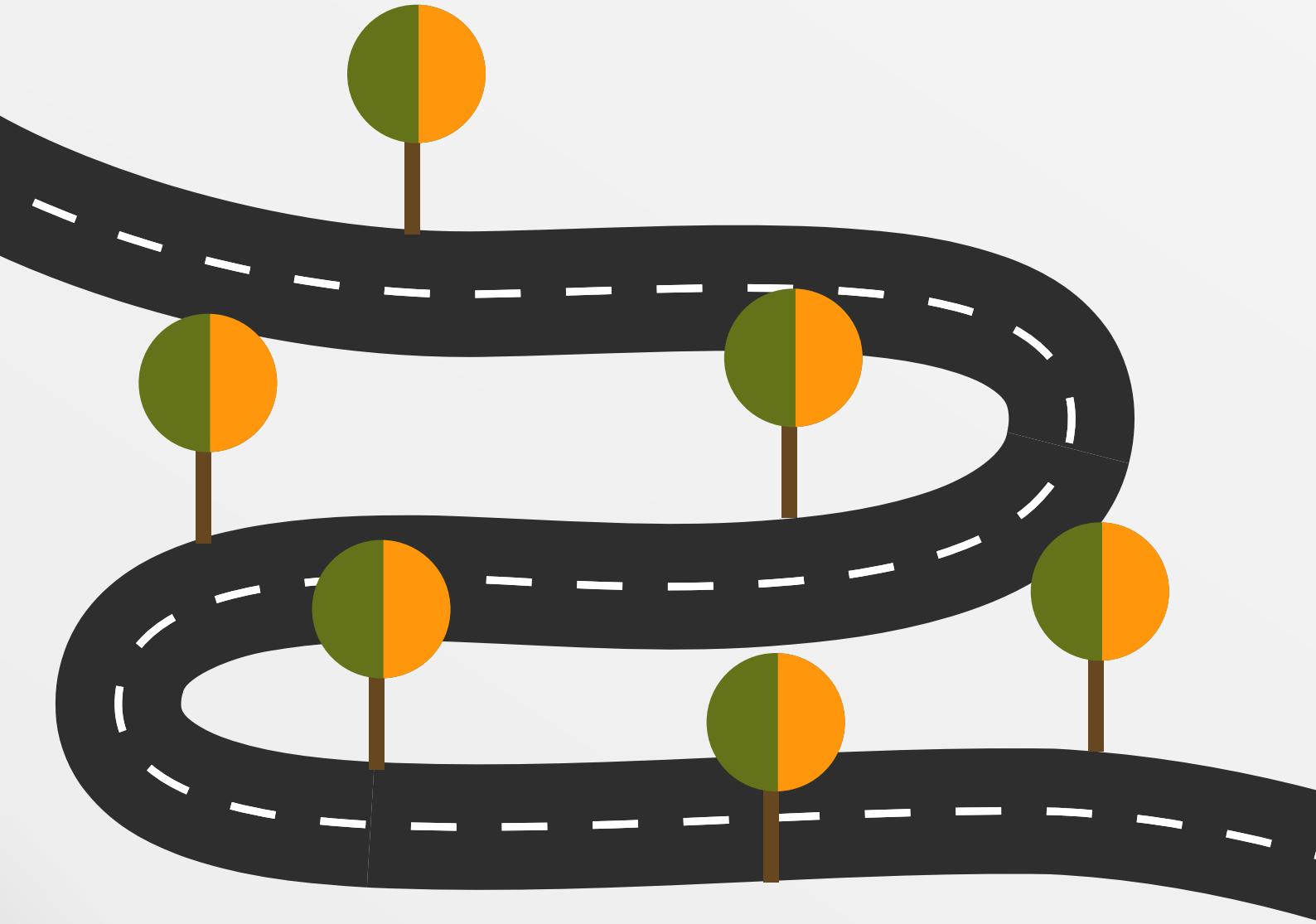
ROADMAP TOWARDS OIL-FREE AND LOW-CARBON NORTH KARELIA BY 2040



Summary

Long version


Pohjois-Karjalan
MAAKUNTALIITTO

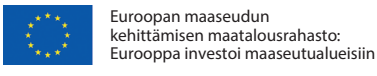

SYKE


Karelia


Elinkeino-, liikenne- ja
ympäristökeskus


European Union
European Regional
Development Fund


Leverage from
the EU
2014–2020


Euroopan maaseudun
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Eurooppa investoi maaseutualueisiin


Life
LIFE15 IPE FI 004


Northern Periphery and
Arctic Programme
2014–2020


Interreg
Baltic Sea Region


ÖLJYVAPAA
POHJOIS-KARJALA


HINKU


BIO4ECO
Interreg Europe


secure
smarter energy communities


TENTacle

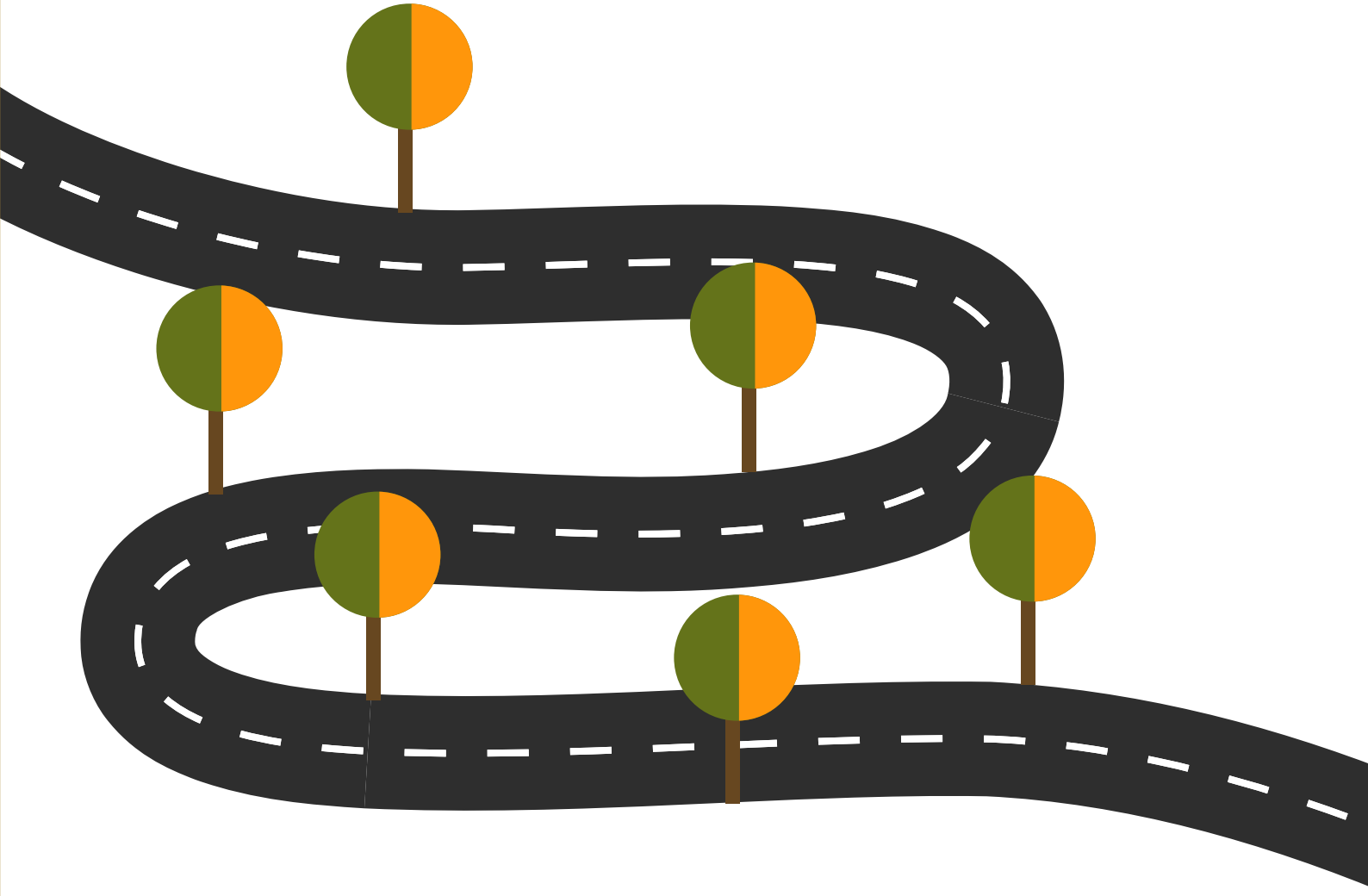

circwaste

ROADMAP TOWARDS OIL-FREE AND LOW-CARBON NORTH KARELIA BY 2040

Climate and Energy Programme of North Karelia 2020, launched in 2011, has served as a groundwork for the Roadmap Towards Oil-Free and Low-Carbon North Karelia by 2040. North Karelia has set ambitious goals for its regional climate and energy sector. It has decided to abandon fossil oil used for energy production by 2020 and in traffic by 2030, and the share of renewable energy is expected to rise from 66% (year 2014) to 100%. In addition, the region aims to reduce greenhouse gas (GHG) emissions by 80% from 2007 level to 2030 as an action of "Towards Carbon Neutral Municipalities (HINKU)" - Network.

The aim of this roadmap is to define the steps to achieve the above mentioned regional goals. The main sectors of the roadmap are: 1) energy & climate, 2) transportation, 3) land-use & housing, 4) circular economy, 5) natural resources & bioeconomy and 6) innovations & know-how. The actions of the roadmap are classified as short-, medium- and long-term steps.

Representatives of over 50 organizations and several private persons participated in the roadmap work. The roadmap team included the Regional Council of North Karelia, Finnish Environment Institute SYKE and Karelia University of Applied Sciences through the following projects: North Karelia Towards Oil Free and Low Carbon Region, Power from biomass, SECURE, BIO4ECO, TENTacle and CIRCWASTE.



ENERGY AND CLIMATE

Situation now:

- Ambitious regional energy and climate targets.
- Oil-free and low-carbon North Karelia as a target – HINKU-region. The share of energy production and consumption (incl. transportation) of Finland's GHG emissions is 80%.
- According to the Paris Agreement, the rise in global average temperature should be less than 1.5 degrees Celsius by 2050 and the total rise should not exceed 2 degrees Celsius.
- Finland's long-term goal is to be a carbon-neutral society and to reduce GHG emissions at least 80% by 2050. The aims are, e.g. to increase the share of renewable energy over 50%, abandon the use of coal, halve the use of exported heating oil and increase the share of renewable transportation fuels up to 40%.
- North Karelia has set e.g. the following targets: abandoning the use of fossil oil in energy production by 2020 and in transportation by 2030, and to increase the share of renewable energy from 66% (year 2014) to 100%. In addition, the region aims to reduce GHG emissions by 80% as an action towards the HINKU ("Towards Carbon Neutral Municipalities") -network, into which nine out of North Karelia's thirteen municipalities have committed to (Ilomantsi, Joensuu, Kitee, Lieksa, Liperi, Nurmes, Outokumpu, Tohmajärvi and Valtimo).
- 80% of Finland's GHG emissions are mainly from energy production and consumption (including transportation). In North Karelia the proportion of energy production and consumption from GHG emissions is 71% (incl. transportation 28%).

Aims by 2040:

- North Karelia is a carbon neutral region where fossil fuels are not utilized for energy production.
- Total energy consumption in the region decreases as the energy efficiency increases.
- Energy system is energy-, resource- and cost-efficient and utilizes renewable energy diversely.
- Energy storages and demand-side responses are prerequisites for energy security and flexibility.

Energy production and self-sufficiency

Short term steps:

- Piloting decentralized energy production and creating new references for circular and bioeconomy solutions.
- Developing novel financing and operational models for decentralized solutions (e.g. crowdfunding, cooperatives, leasing).

Medium term steps:

- Improving the cost-effectiveness of mid-sized CHP-plants by hybrid energy systems and heat pumps, which can also be utilized to even out the peak loads.
- No investments in fossil fuels in the region.

Long term steps:

- Bio-based oil and other renewable energy sources will replace fossil oil.
- Significance of both small and large scale solar energy solutions and advanced battery technology will be raised with respect to other renewable energy systems.

Distribution of energy and security of supply

Short term steps:

- Influencing on legislation in order to enable two-way electricity sales, island systems and piloting of e.g. energy supply from household to household.
- Influencing on support systems in order to enable cost-effective and feasible farm-based renewable energy production.
- Piloting of demand-side response.

Medium term steps:

- Developing and modernizing the district heating distribution infrastructure in order to extend the network and minimize heat losses.
- Development opportunities of the underground electrical distribution systems are studied and innovative experiments are carried out.
- Prerequisites for cost-effective decentralized energy production will be enhanced through wide adoption of smart grids, which e.g. enable the utilization of two-way transfer and demand-side response.
- Utilization of battery technology to even out peaks and troughs in demand. Electric vehicle batteries as storage form a part of the electricity security.

Long term steps:

- Energy-efficient and modern energy distribution network enables agile experiments e.g. in the field of IoT by utilizing smart grids.
- Smart and flexible energy markets where demand-side response is utilized extensively.

End use and energy efficiency

Short term steps:

- In order to reduce the total energy consumption in the region, end users' awareness and conservation behavior in their energy consumption will be enhanced by highlighting inspiring example cases and by providing objective energy guidance.
- Energy efficiency of buildings is improved by the building regulations.
- Waste heat is utilized directly in the buildings generating it or as a part of the growing open district heating network through two-way heat exchangers.

Medium term steps:

- Life cycle costs and environmental impacts are taken into account as, and form a part of, procurements' selection criteria.
- Fossil oil heating in state-owned buildings will be abandoned by 2025 and the rest of the public sector is encouraged to follow this example.

Long term steps:

- Electrification of industrial processes.
- Smart energy systems generate information for energy sector operators about their energy consumption and production hence enabling them to make the best use of innovative flexibility options in the novel multifaceted energy system.
- Energy markets are regulated by the availability of energy sources and real estates' smart systems adapt their operating principles accordingly.

TRANSPORTATION

Situation now:

- North Karelia is characterized by decentralized community structures and long distances, which is seen as increased use of passenger cars, and which sets challenges for increasing the rate of pedestrian and bicycle traffic and public transport.
- Transportation of goods and passengers is carried mainly through road transport.
- North Karelia's vehicle fleet's average age is over 13 years and it modernizes slowly.
- Currently there are few alternative fuel vehicles in North Karelia. There are few public charge points for electric vehicles in the region but no biogas production for transportation fuel or refueling stations exist.
- Transportation accounts for 28% of the GHG emissions in the whole region.
- In Joensuu at least 32% of all daily travels are made on bicycle and the share of cycling as a mode of travel is more than triple compared to the country average. The percentage of pedestrians is significant, 14%. In Central Karelia, walking and cycling make total of 10%. In Pielinen Karelia, 16% of the trips are done by foot and 15% by cycling.

Aims by 2040:

- North Karelia's transportation and logistics sectors are intelligent and use renewable fuels widely.
- Region has low emission vehicle fleet.
- Comprehensive electric vehicle charging and biogas refueling station networks, based on a multi-stakeholder implementation and financing model, have been implemented in the region. First hydrogen refueling stations have also been set up.
- Different transportation modes and mobility practices are interlinked enabling uninterrupted travel and transport chains.
- Shared cars and bicycles along with mobility related services have become more common.
- Introduction of autonomous vehicles is supported by proactive communications network and road maintenance related operations and land use planning.
- Number of bicycle lanes and walkways have increased and traffic safety has improved. In population centers, cycling and walking conditions are top class in Finland.

Operational environment

Short term steps:

- Novel financing and implementation models will be explored in order to accelerate the production and distribution of alternative fuels.

Medium term steps:

- Region-wide electric vehicle charging and gas refueling station networks will be established through a multi-stakeholder model, e.g. by taking into account the potential of on-farm biogas production.

Long term steps:

- Service platforms, digital applications and mobility services generate new business opportunities for transportation sector.
- Automated and smart mobility services and logistics enhance passenger and freight traffic and enable bringing services out to customers (e.g. freight-drones).

Transportation system

Short term steps:

- Opening of the logistics sector's interfaces are explored e.g. in order to enable the development of transportation combinations and novel business opportunities.
- Developing conditions for walking and cycling especially in Joensuu's inner city areas, with the overall aim being the increase of the share of walking and cycling as a mode of travel also in the region's other population centers.

Medium term steps:

- Smart technologies and applications based on the use of open data enable flexible transportation combinations.
- Sharing economy platforms are utilized, shared cars and bicycles being examples.

Long term steps:

- In freight transportation, rail and waterway transports are preferred over road haulage.

Technologies and solutions

Short term steps:

- Emissions generated by North Karelia's old vehicle fleet will be lowered in the first phase by replacing petroleum fuels for liquid and gaseous biofuels and by installing vehicle conversion kits, which will initially create markets for alternative fuels.

Medium term steps:

- In urban traffic, there will be a shift towards low emission buses, and vehicle fleet size will be adjusted to the passenger volume.
- Public transport is also enhanced by more efficient route planning and linked trips, and by ensuring the development of, and supply of services for feeders and park-and-ride systems.

Long term steps:

- As hydrogen vehicles become more common, regional hydrogen production is increased and distribution infrastructure is expanded.
- Autonomous vehicles are available, and for streamlining the traffic and increasing the security of autonomous transportation, vehicles are interconnected by means of communications network.

LAND-USE AND HOUSING

Situation now:

- General guidance for land use planning is based on the Land Use and Building Act. Regional and municipal planning (including plans and planning decisions) are directed by the national land use guidelines.
- Planning solutions and how community structure will be implemented have long-term effects affecting also on GHG emissions.
- In recent decades population in Finland has been centralized into cities and village centers of rural districts. Energy production solutions in the residential areas together with mobility needs and options affect the GHG emissions generated in the area.
- The region of North Karelia covers over 21 500 km2 and has about 165 000 inhabitants who live across the 13 municipalities. North Karelia is challenged by the vast land area, population fragmentation and the need for mobility due to these factors.

Aims by 2040:

- The region has become a vital living environment.
- Households, farms, businesses, communities and the public sector act both energy producers and sellers.
- Sharing economy is widely used for various goods.
- Cost-effective and sustainable community structure with healthy, comfortable and energy-efficient building stock.
- Wood is used in new and repair construction.

Planning and construction

Short term steps:

- Urban planning as a tool for reducing the need for mobility e.g. by paying attention to the placement and accessibility of different activities hence enabling the use of novel modes of transportation and the development of bicycle and pedestrian traffic.
- Energy and material efficiency will be increased in new and repair construction e.g. by building ordinances and, where possible, by promoting the construction of ultra-low and zero energy buildings.

Medium term steps:

- Promoting the use of wood in new and repair construction and utilizing technological advances such as digitalization in construction projects.
- Abandoning the use of fossil fuels as the main heat source in buildings' separate heating systems by latest when renewing the systems.

Long term steps:

- When designing and constructing real estates, premises and their flexible modifiability for different end uses during their entire life cycle is taken into consideration.
- Energy efficiency of buildings is ensured by utilizing ecologically and economically sustainable solutions both for materials, energy and systems and using products that have positive carbon handprints.

Housing, services and employment

Short term steps:

- Ensuring the availability of functioning communications network across the region and promoting opportunities for teleworking e.g. by region-wide remote hotspots and agile leasing experiments.

Medium term steps:

- Investments in circular and bioeconomy enable job creation, which will improve the employment rate and create vitality throughout the region.

Long term steps:

- Public transport is a flexible digitized service entity where different modes of transportation interoperate seamlessly and where ticketing practices are uniform.
- Smart housing technology enables flexible and multi-site residency and housing.

Community structure and living environment

Short term steps:

- Microclimate and recreational and wellness services provided by the nearby nature are taken into account in sustainable land use planning, especially in the cities.
- Making sure that sustainable use of natural resources is maintained as part of the emerging bioeconomy sector. Novel financing models for the rehabilitation and protection of habitats and watercourses will also be developed.

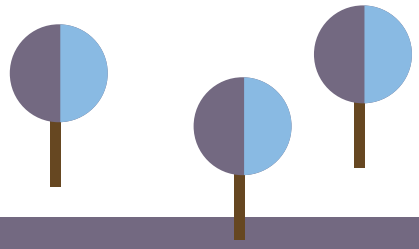
Medium term steps:

- Participating in national and international cooperation forums and projects in order to find common ways for mitigating and adapting to climate change and for preventing the negative effects of climate change on ecosystems and society.
- In the agriculture and forestry sector GHG emissions reduction methods, such as multiannual grass cultivation of organic crops and afforestation of organic soils, will be utilized whenever possible.

Long term steps:

- Good water system status is achieved and maintained and the positive image gained from this achievement accrues also to region's blue bioeconomy.

CIRCULAR ECONOMY



Situation now:

- The EU has set a long-term goal to create a circular society, where the amount of waste is minimized and the generated waste is recycled.
- Despite the expectations, Finland's total amount of waste has not reduced, and it is mainly due to the increased amount of waste from extractive industries. The share of municipal waste is only 3% of the total amount of waste generated in Finland.
- Even according to the cautious estimates, the annual value potential of circular economy in Finland is 2–3 billion euros by 2030.
- In North Karelia, several actors are involved in the Life IP "CIRCWASTE - Towards Circular Economy" -project administered by the Finnish Environment Institute SYKE. The project aims to implement the nationwide waste management plan regionally and to carry out various experiments and pilots in the region.
- According to the studies, the intensity of raw material usage in North Karelia is above the average in Finland, thus entailing that there exists opportunities for improving resource efficiency.

Aims by 2040:

- Region's potentials lie in the efficient utilization of the side streams of forestry, extractive and refining/processing industries, pioneering in nutrient and raw material recycling, and in active research and development in the area of circular and bioeconomy.
- Regional actors have developed partnership and cooperation networks that have enabled the introduction of novel business models and improved cost-efficiency of the business operations (technology, materials, energy, logistics and services).
- The amount of disposable waste in the region is minimized. Recycled materials have replaced non-renewable and virgin raw materials.
- North Karelia offers circular economy's technological solutions for export.
- Circular and bioeconomy employ significant amount of people in the region.
- In addition to the objectives of carbon neutrality, nutrition neutrality is also pursued in agricultural-intensive municipalities.

Consumption and recycling

Short term steps:

- Increasing the recycling rate of municipal waste by directing separately collected items to reuse instead of energy production.
- Transitioning from disposable products to durable ones and improving the reparability of equipment and machines, and reducing products' economic and environmental impacts throughout their lifecycle.

Medium term steps:

- Increasing textile recycling rate by searching novel applications for textile waste and fibers.
- Offering experiment and development platforms for innovations and reference subjects for novel products/technologies/applications through public procurement.

Long term steps:

- Sharing economy's service platforms enable communal ownership of various goods and create vitality for the region's service sector.

Material efficiency and life cycle approach

Short term steps:

- Utilizing the opportunities offered by ecodesign (including maintenance, repair, updating, remanufacturing and recycling and material choices) in product design and reducing products' life cycle impacts.
- Developing and implementing a model for the life cycle impact assessment (LCIA) of circular processes and products.
- Novel technology enabling more efficient and cost-effective utilization of waste and side streams of the industry is developed.

Medium term steps:

- Non-renewable and virgin raw materials are replaced by recycled materials. Reuse and product development of recycled materials is conducted at all sectors hence creating novel business opportunities and new jobs for the growing circular economy sector.
- Especially in the infrastructure construction, recycled materials are utilized whenever possible.

Long term steps:

- Material flows are utilized and recycled efficiently, taking into account their life cycle impacts. Sustainability is incorporated into material handling and production processes.

Industrial symbioses and nutrient cycle

Short term steps:

- Establishing a partnership and cooperation network in order to develop novel business opportunities and circular ecosystems for the region while simultaneously shifting from sub-optimization into systems thinking.

Medium term steps:

- Ash will be utilized more actively in fertilization and road construction.
- Investing in nutrient recycling in agriculture, e.g. by soil management measures.
- Recovery and utilization of nutrients leached to waterways from arable land.

Long term steps:

- Supporting the development of new 3D printing businesses e.g. in machine and component production hence enabling the reduction of material consumption.
- IoT and open data are widely used at interfaces between circular economy companies. IoT and open data are used for identifying suitable raw materials, products and equipment and for optimizing their utilization rate, monitoring their condition and obtaining information on their life cycle impacts.

NATURAL RESOURCES AND BIOECONOMY

Situation now:

- Finland's most important renewable natural resources are freshwater and biomasses from forests, soil, water systems and sea. Ecosystem services include services provided by the nature, e.g. carbon sequestration and recreational aspects.
- The main principle of bioeconomy is that natural resources are not to be wasted, instead they should be used and recycled efficiently.
- Circular and bioeconomy together with renewable energy production and cleantech solutions are vital in the fight against climate change.
- Bioeconomy has a significant role in replacing the fossil energy sources and materials with renewable ones.
- North Karelia has strong bioeconomy operators and due to solid expertise and large raw material potential, the region can act as a forerunner in bioeconomy. Investments increase bioeconomy sector's export potential and the need for skilled employees in the region. Half of North Karelia's bioeconomy sector is forest-based and its annual turnover is almost 2 billion euros. The aim is to reach 2.7 billion euros by 2025.
- There are about 500 forest bioeconomy companies in North Karelia, which provide employment for roughly 6 000 people.

Aims by 2040:

- North Karelia is renowned for being an oil-free, low-carbon and resource-efficient region where smart circular and bioeconomy have enabled the replacement of fossil fuels and materials with renewable ones.
- The region is a forerunner in wood construction and produces a wide range of high value-added bioproducts and highly refined natural products for domestic and export markets. Technological solutions for bioeconomy developed in the region have also been utilized globally, e.g. to meet the challenges of climate change. Service sector plays an important part in the region's circular and bioeconomy.
- Bioeconomy cluster in the region provides employment for the whole bioeconomy value chain.
- Sufficiency of ecosystem services and natural resources is taken into account in bioeconomy activities, where efficient utilization of side streams and reduction of negative environmental impacts is emphasized.

Use of natural resources

Short term steps:

- The growing demand of wood caused by the planned biorefinery investments are taken into account and sufficiency of domestic wood will be secured.
- Ensuring the competitiveness of the regional wood e.g. by quality and sustainability certificates as well as by good maintenance of the infrastructure (lower road network, railways, waterways).
- Applying of good forest management practices is continued, and nature management in commercial forests is taken care of.
- Promoting versatile wood construction e.g. in public real estates, different sized residential real estates, infrastructure and furniture industry while simultaneously creating durable carbon storages.
- Ensuring the availability of natural resources by raising awareness of their sustainable use and finding novel ways for diversifying their utilization.

Medium term steps:

- Utilization and processing of new field-based fiber plants (including hemp), pulse and oil plants. Replacing exported soybean with domestic products such as broad beans.
- Developing new business models in the field of water cultivation and utilizing biological resources of water ecosystems (e.g. algae and water plants).
- Possibilities created by digitalization are utilized broadly in agriculture and forestry.

Long term steps:

- Developing circular and bioeconomy sectors as an entity (circular bioeconomy) and ensuring the circulation of nutrients, water, energy, side streams and raw materials by minimizing losses and maximizing benefits.
- Introducing and developing novel technologies to meet the challenges of climate change.

New bioproducts and innovations

Short term steps:

- Aiming to commercialize innovations, internationalize companies and attract diverse production and product design investments.
- Securing also SMEs' RD&I innovation activities with low-threshold services and financial solutions.
- Developing photonics sector together with forest bioeconomy e.g. by utilizing remote sensing, machine vision and fine optics.
- Developing business opportunities related to forest-based products (e.g. wood extracts, berries, herbs).
- Developing novel business on the interfaces of nature tourism and health promotion. Strengthening the importance of services, especially in the food industry's earnings logic.

Medium term steps:

- Establishing region-wide reference and innovation platforms for bioproducts where next generation's resource-efficient solutions for renewable energy, waste and water management and ecologically sustainable modes of transportation can be developed and trialed.
- Bioeconomy is developed from producer oriented way (mainly technological solutions) towards consumer and market oriented outlook where bioeconomy's anticipation and scenario system together with national and international cooperation networks are utilized.

Long term steps:

- Replacing exported goods with the help of 3D printing. Region-wide development of novel expertise and business opportunities related to 3D printing for service sector markets and e.g. for the production of renewable (e.g. cellulose-based) 3D printing materials.
- Product design enables novel business opportunities and perspectives for the bioeconomy sector.

Regional economic impacts

Short term steps:

- Versatile entrepreneurship in the rural areas strengthens region's self-sufficiency, employment and regional economy especially when the focus is geared towards developing the strengths of the region: decentralized biorefining and energy production, multiple use of forests, tourism and ecosystem services, versatile refining of food and natural products, creative sector and third sector service solutions.
- Increasing the value-added processing chain in bioenergy production, wood construction, multiple use of forests, ecosystem services and the interfaces of different fields, and by high value added products at various production and manufacturing phases.

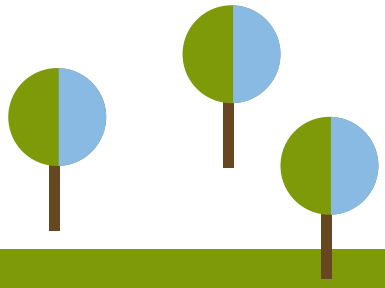
Medium term steps:

- Enabling operation and expansion of biorefineries and attracting new investments into the region.
- Developing infrastructure to meet the needs of logistics (e.g. comprehensive terminal and intermediate storage network).
- Creating jobs to the whole bioeconomy value chain (incl. RD&I activities).

Long term steps:

- Replacement of imported energy and goods with local alternatives has positive impact on regional economy.
- Bioeconomy products and solutions developed in the region enable growth in export revenues.

INNOVATIONS AND KNOW-HOW



Situation now:

- The aim of Finland's innovation policy is to build operational environment that encourages companies to make bold innovations, renew themselves and go international.
- Businesses no longer fare by their own expertise as in addition to their own competitive advantages they also need the benefits offered by strong partnerships (other companies, public administration and third sector).
- Various incubators, accelerators, and dissemination specialists have an important role in testing, developing and sharing new ideas.
- Knowledge and education are one of the key projects of the current Government Programme. The aim is to enhance the interaction between education and working life, improve the quality and effectiveness of research and innovations, increase the internationalization of research and education, and promote education.
- Schools and educational institutions are responsible for educating the kind of citizens who have the knowledge and willingness to change unsustainable practices and build a sustainable future.
- The Regional Strategic Programme of North Karelia emphasizes competence and its continuous improvement as key factors in regional success. North Karelia has strong educational expertise (e.g. University of Eastern Finland in Joensuu).
- Expertise strengthening and innovation activities will also be supported by the EU funding, e.g. through the innovation policy for smart specialization in the region.

Aims by 2040:

- North Karelia is renowned for being a successful and innovative region that utilizes innovations effectively.
- Educational organizations have shaped their educational curricula in line with the needs of working life and have novel and flexible skills development models for various purposes. Lifelong learning and continuous self-development are intrinsic to North Karelians.
- North Karelia attracts more and more telecommuters.
- Sustainable development operations models range from early childhood education to lifelong learning.
- Involvement and engaging residents into participate form the basis for various planning processes.
- As a result of active entrepreneurship education, the commercialization of innovations and the number of companies have increased considerably. Sustainable business models are widely utilized in North Karelia.
- Financial instruments that encourage experimentation and social innovations have allowed novel businesses and new jobs to emerge.
- The regional RD&I actors work and cooperate actively and transparently, enabling the success of dynamic innovation ecosystems in the region.

Sustainable development and public participation

Short term steps:

- Sustainable development is utilized by the entire educational and training community as a participatory tool.
- Local actors and community groups participate into the achievement of regional climate and energy goals, e.g. through active informing and involvement.
- Developing local level decision-making and influencing opportunities and mechanisms.
- Promoting and enabling the utilization of the culture of experimentation and encouraging the mentality of learning from failures.

Medium term steps:

- Supporting the transformation of larger systems of society (transition to decentralized energy production, shifting from fossil economy towards bioeconomy, changing consumer behavior) and changing the course towards sustainability.
- Emphasizing the importance of corporate responsibility and developing entrepreneurial activity towards social entrepreneurship.
- Creating green economic growth.

Long term steps:

- North Karelia becomes a forerunner in the development and application of sustainable business models.

From know-how to new business ideas

Short term steps:

- Linking educational and research institutions with companies and looking for innovations and novel business opportunities, especially within industry interfaces.
- Region attracts new skills to support the strong forest bioeconomy expertise.
- Investments in productization, product development and marketing know-how facilitate the commercialization of innovations.
- Supporting the pilot-to-business development phase through demonstrations.
- Promoting the growth path of new business ideas and start-up companies, e.g. through business incubators and cooperation networks.

Medium term steps:

- Developing and experimenting crowdfunding and other innovative financing models, including renewable energy investments.
- Societal challenges are increasingly addressed through social entrepreneurship and services provided by the third sector.
- Supporting especially micro and small enterprises' RD&I activities, for instance through networks, experiments and simple financial solutions.

Long term steps:

- Taking risks and developing, and experimenting with, novel solutions in a climate that allows failures. Moving towards the culture of experimentation.

Lifelong learning

Short term steps:

- Supporting grass-root level learning locally, e.g. through community colleges and peer groups, where new skills are taught for people from different age groups.
- As part of lifelong learning concept, possibilities offered by digitalization are utilized for developing learning and training practices, and options for improving knowledge irrespective of time and place are explored.
- Turning libraries into diverse entertainment and meeting places.

Medium term steps:

- Facilitating development and adoption of educational solutions that will generate multi-talented people and multi-knowledge.
- Changes in professional structures and working methods are met by developing flexible solutions for re-education and competence advancement.
- Facilitating low level influencing where everyone has a chance to participate and be active in accordance to their own abilities.

Long term steps:

- Throughout the region, emphasizing the role of active citizen and the involvement of people from different age groups in the planning processes for residential areas, properties and green areas.