



CIRCULAR TURKU

A Roadmap Toward Resource Wisdom



Foreword

In 2018 the City Council of Turku unanimously approved the target that the city will become carbon neutral by 2029, in time for its 800th anniversary. On our ambitious path to carbon neutrality, it is important to address the indirect emissions that result from activities in Turku but occur elsewhere.

Almost half of the emissions in our current economic system are generated by how we make and use products and how we produce food. These emissions often occur outside the city boundaries and are therefore difficult to track.

Global carbon neutrality goals will be difficult to achieve if cities do not target indirect emissions. Turku is the first city linking circular economy to its climate plan to address greenhouse gas emissions in a systemic manner. Similarly, the city is aligning the circular economy and biodiversity protection agendas to support synergies.

The circular economy is not new in Turku. Finland's oldest city is a forerunner in circular innovations in the water, textiles and chemicals sectors among others. A vibrant community of researchers and business actors along with numerous public and private initiatives already contribute to more circularity in the Turku region.

The Circular Turku roadmap is about creating the right conditions for the circular transition in the Turku region. The city can support this transition through different levers such as local regulations, urban planning, infrastructure development and information campaigns.

Turku wants to support a fair and inclusive circular transformation of our economic systems that benefits all city residents. By boosting low-carbon and resource-wise innovations, the city attracts and enables new businesses and jobs. Integrating nature-based solutions and increasing carbon sinks in urban parks and forests enhances biodiversity and environments that support well-being.

As we learn and progress towards these goals, we hope to inspire other local governments to follow our path. We believe that this transformation will be achieved together, through active collaboration among different sectors and actors and through international cooperation with local governments around the world.

We look forward to 2029!

Mayor Minna Arve
City of Turku, Finland



Table of Contents

Setting the scene	4
What does the circular economy mean for Turku?	8
Our action plan	12
Circular energy systems	14
Circular food systems	23
Circular water systems	34
Circular buildings and construction	44
Circular transport and logistics	54
Cross-cutting enablers	64
Next steps	67



SETTING THE SCENE



Toward a resource-wise Turku in 2029

Resource wisdom means sustainable use of natural resources, zero waste and zero emissions. Achieving these goals is a prerequisite for sustainable well-being in the Turku region. The circular economy provides a framework for concrete interventions that will lead the Turku region toward resource wisdom.

Our current economy is linear. Under a linear economic model, primary resources are continually extracted, used and discarded, often after a single use. This “take, make, waste” approach contributes to the acceleration of climate change, natural resource depletion, ecosystem degradation and waste disposal challenges. In contrast, the circular economy is an operating model that promotes wiser use of resources across all stages of product and infrastructure lifecycles.

In accordance with its city strategy, Turku aims to mark its 800-year anniversary by becoming carbon neutral by 2029; resource wisdom will follow, with achievement by 2040 at the latest. Though the city’s resource wisdom goal has a longer timeline, this roadmap sets 2029 as a target year for reaching important resource wisdom milestones through the circular economy.

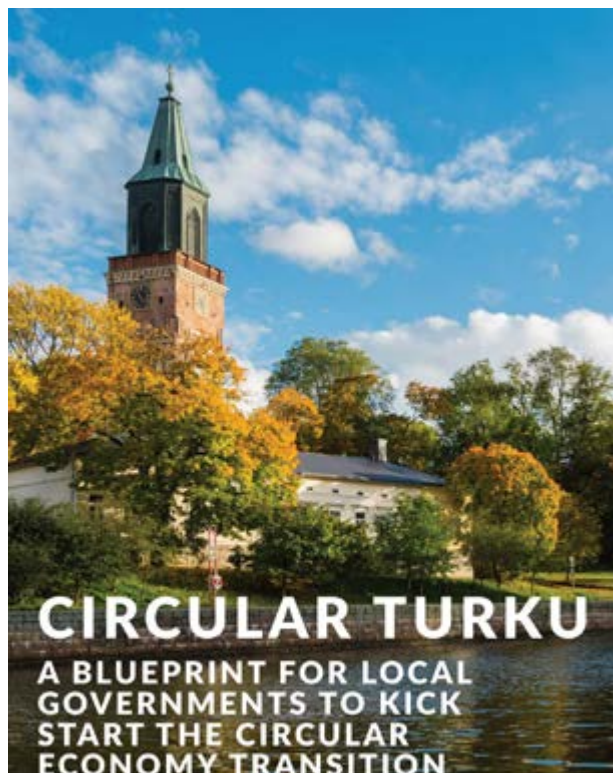
A solid foundation to build on

This roadmap builds on the following local and regional policy documents:

- Turku's City Strategy
- The Turku Climate Plan 2029
- The Action Program for Biodiversity Protection of the City of Turku
- The Environmental Program 2030 for Southwest Finland

Furthermore, this roadmap is aligned with Finland's national strategic program "New directions", which seeks to make Finland a society based on a carbon-neutral circular economy by 2035. The mayor of Turku chaired the cities and regions working group that contributed to the development of the strategic program. Accordingly, Turku and other Finnish cities are the actors that will implement the strategic program for a circular economy; they will also function as partners for the ministries in charge. In addition, the City of Turku and the Finnish government have partnered on an innovation ecosystem agreement for the period 2021-2027, which also includes strengthening the circular economy.

A baseline assessment study was conducted in preparation for this roadmap. The study identified more than 700 circular economy stakeholders, 270 of which were businesses engaged in circular economy. Many significant regional solutions that follow circular economy principles have already been implemented in energy production, water systems, waste management and industry development. They are presented in the report [Circular Turku: A blueprint for local governments to kickstart the circular economy transition](#).





Creating circular economy solutions together

The development of the circular economy is well under way in Turku and Southwest Finland and stakeholders in the region are strongly committed to taking circular economy ambitions further.

This roadmap was prepared in cooperation between the City of Turku, the University of Turku, Turku University of Applied Sciences, Turku Science Park Oy, the Centre for Economic Development, Transport and the Environment of Southwest Finland (ELY Centre), the Regional Council of Southwest Finland, the Service Centre for Sustainable Development and Energy of Southwest Finland (Valonia), the Finnish Innovation Fund Sitra and ICLEI - Local Governments for Sustainability.

Over 200 experts in public administration, business, education and research were involved in selecting priority topics and defining the interventions laid out in this roadmap.

This roadmap is also the result of global peer-learning around the circular economy and was informed by circular economy best practices developed by local governments worldwide. This reflects Turku's ambition to support international cooperation, especially among cities, on circular economy issues.



WHAT DOES THE **CIRCULAR** **ECONOMY** MEAN FOR TURKU?



Our approach to circularity

The roadmap is based on the circular economy approach and methods developed by ICLEI and other world-leading expert organizations to strengthen the systemic transformation from a linear to a circular economy. The approach covers the entire value chain of economic activity through five interconnected strategies, termed the “five R” strategies: **Rethink – Regenerate – Reduce – Reuse – Recover**.

RETHINK – Redesign the system

Lay the foundation for circular activities and enable the transition to a circular economy.

REGENERATE – Harmonize with nature

Promote infrastructure, production systems and sourcing that allow natural ecosystems to thrive.

REDUCE – Do better with less

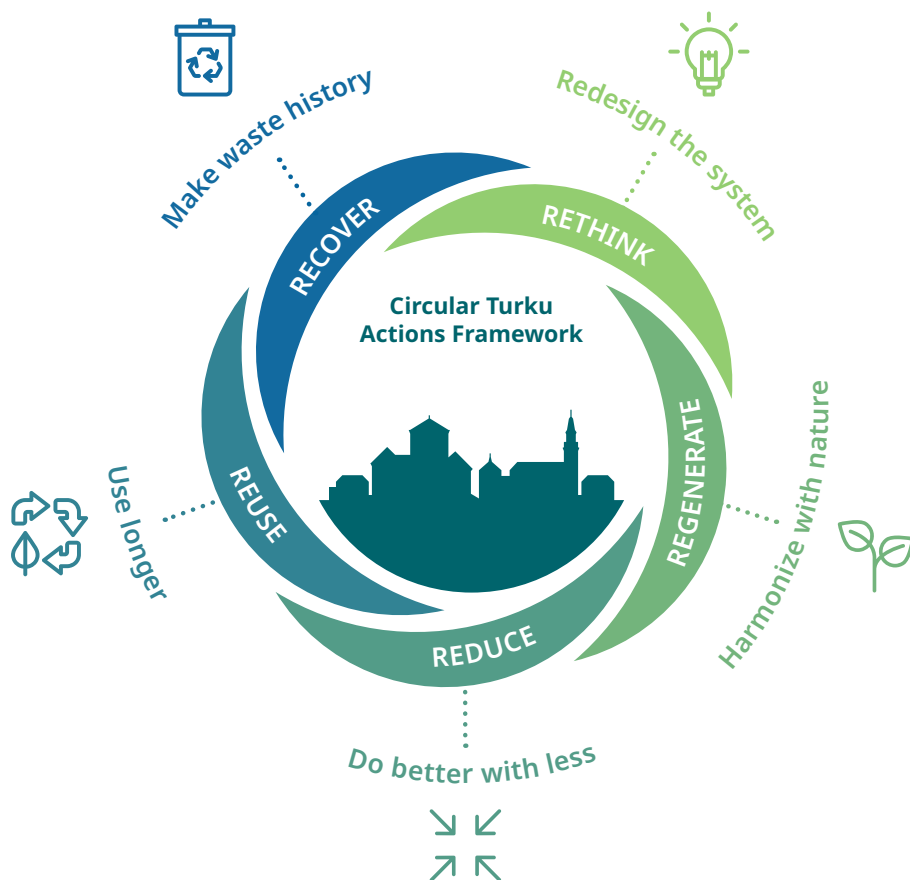
Design infrastructure, processes and products to minimize material, water and energy use and waste generation from production to end of use.

REUSE – Use longer

Extend and intensify use of existing resources, products, spaces and infrastructure.

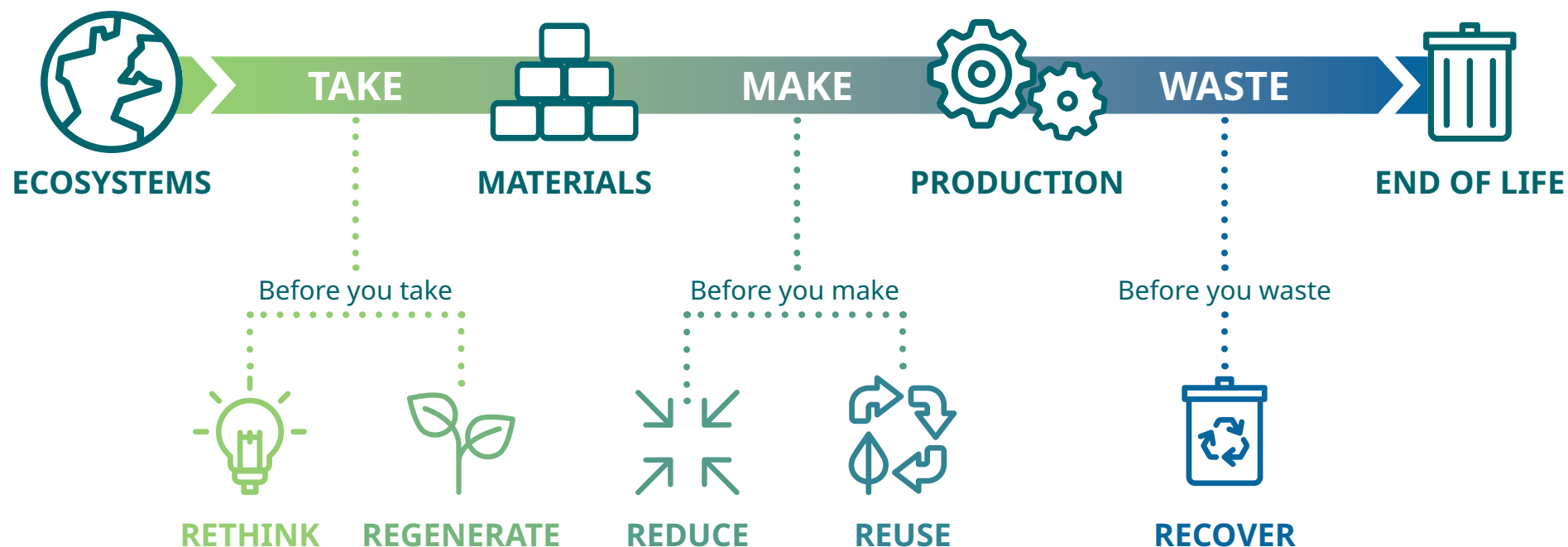
RECOVER – Make waste history

Maximize the recovery of resources at the end of the use phase and reintroduce them into production processes.





The five R model allows us to shift away from the “take, make, waste” linear model and minimize negative impacts arising across the lifespan of products and infrastructure. The goals for change set out in this roadmap are based on application of the five R strategies of ICLEI’s Circular City Actions Framework.



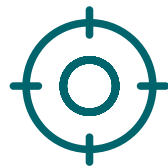
Steering change: the city's task

The City of Turku will contribute to the development of a strong regional circular economy with positive global impacts. As part of the transformation, Turku will support and encourage businesses, research organizations and residents to participate in the circular economy. In most cases, the interventions presented in this roadmap will be most successful when implemented with multi-actor collaboration. The city will steer and support the transition through different roles:



Manage

Urban planning, asset management and infrastructure development support resource wisdom.



Incentivize

Taxes, subsidies and other economic and non-economic incentives support the circular economy transition.



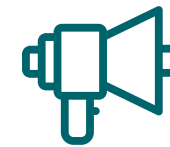
Regulate

Local regulation, including public procurement, creates the enabling conditions for the transition to a circular economy.



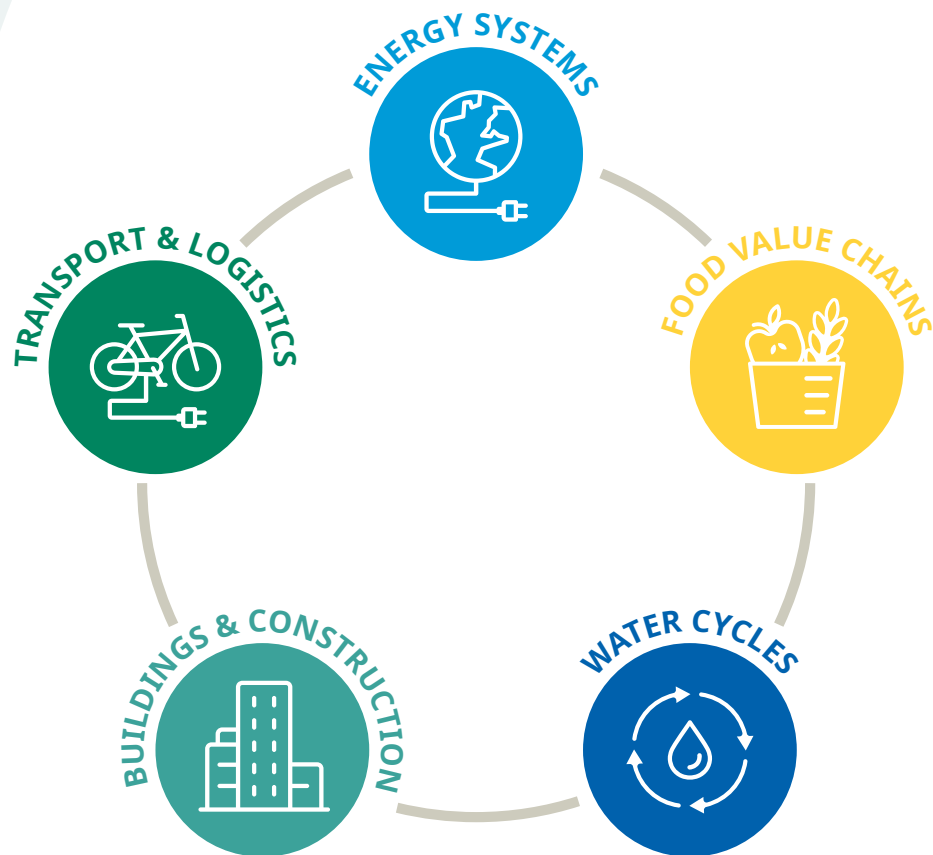
Mobilize

The city empowers and supports circular economy actors and facilitates cooperation.



Inform

Information campaigns, research and development contribute to growing the circular economy knowledge base.



The roadmap's five priority topics

The roadmap centers on five priority topics. The selected topics have high potential to promote systemic shifts toward a resource-wise society through circular economy solutions.

The priority topics were chosen on the basis of an analysis carried out by the Circular Turku project steering group in fall 2019. Ten pre-selected themes were screened according to various assessment criteria, including environmental and socio-economic impacts, level of action and readiness of regional actors, level of agency of Turku and other governance aspects, and scaling potential of future interventions both in Finland and globally.

Explore the priority topics of the Circular Turku roadmap by clicking on the icons on the left side:

- ☐ Energy systems
- ☐ Food value chains
- ☐ Water cycles
- ☐ Transport and logistics
- ☐ Buildings and construction

Towards the circular economy: a fair transition

The Turku Climate Plan 2029 underlines that every Turku resident should have the opportunity to shape and contribute to a carbon-neutral Turku. To make this vision a reality, it is vital that the city take steps to ensure that the circular economy transition is fair, inclusive and that all residents benefit from living in a resource-wise city.

We have worked with ICLEI - Local governments for Sustainability to map the social equity impacts of the interventions presented in this roadmap. To do this, we broke down the concept of equity into three simple dimensions¹. This aids in communication about social equity with different stakeholders, furthers mainstreaming of equity thinking and ensures future projects are designed to increase equity across the city. The following three dimensions were used:



ACCESS

How to support equitable access to public services and infrastructure for all residents—independent of factors like age, neighborhood, income, social group or language—through circular economy interventions?



PARTICIPATION


How to ensure that circular economy interventions are designed with rather than for residents? How to include all voices across the city and involve those affected early on to ensure the interventions align with local needs and realities?



OPPORTUNITIES

How to improve access to quality education for all and increase the diversity of local employment opportunities through circular economy interventions?

¹ ICLEI (2020) Urban Transitions Alliance equity framework: 3 dimensions to advance social equity in sustainability planning



RESOURCE-WISE ENERGY SYSTEMS



Why circular energy systems?

Turku's energy system is the city's largest single source of emissions. Since energy systems play an integral role in the majority of societal activities — and thus are strongly linked to all topics on the roadmap — achieving resource wisdom in this sector is critical.

Turku has committed to becoming carbon neutral by 2029 and climate positive from 2029 onwards. This requires substantial rethinking of energy systems that goes beyond the switch to renewable energy. The circular energy system of the future is resource-wise, cost-effective, multi-directional, flexible and smart. A circular economy approach to energy systems (which covers production, storage, distribution and use) will include reducing overall energy demand, facilitating waste heat capture and sustainable recovery of energy from waste streams.

Achieving resource-wise energy systems in Turku would also contribute to at least five Sustainable Development Goals.





Current situation and existing achievements

Turku's energy systems have benefited from investments of approximately 300 million euro in bioenergy, solar, wind and hydropower by the Turku City Group and affiliated companies over the period 2014-2018. As a result of these investments, renewable energy accounted for about 80 percent of Turku's energy mix in 2020.

Most of the heat production in the Turku region comes from the Naantali multi-fuel power plant, which has a predominant share of biofuel, including forest residues and industrial by-products. District heating sources include wastewater from the Kakolanmäki wastewater treatment plant and two bioheat plants. Plans have also been made to meet 10 percent of district heating needs with geothermal sources.

Smart solutions in the district heating network offer opportunities for circular economy action within Turku's energy systems. Two-way heat trading (allowing generators to sell excess energy), waste heat recovery, thermal storage in soil and heat storage are already being piloted and used by Turku Energia. Academic partners, such as the Turku University of Applied Sciences, along with various businesses in the region are also exploring these solutions.

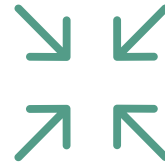
Additionally, new models for circular energy systems at the district level are currently being planned. One example is the Turku Student Village Foundation, a new housing project that includes a geothermal heating system and wastewater heat recovery from nearly thirty neighboring buildings in the student village. The project has also made significant investments in solar power.

The integration of new, decentralized energy production, storage and distribution into the city's heating system and electrical grid is progressing but further work is needed. Comprehensive sectoral integration—which would entail flexible control and coordination of different types of power generators and energy production and consumption—is still lacking. The energy transition will also require increased involvement of communities in the region. Residents will need to understand the implications and opportunities inherent in their own energy choices and play an active role in local energy production.



Overview of interventions

Turku's main resource-wise energy system targets for 2029 include improving flexibility of energy storage and consumption, increasing efficiency of collection and use of waste heat, and facilitating cooperation with companies and citizens to optimize energy use.



RETHINK & REDUCE

Ensuring the smart management and optimization of energy systems

Situation in 2029

Comprehensive energy system integration has increased the availability of renewable energy, distribution flexibility and end-consumption efficiency. Energy systems are managed in their entirety by leveraging cooperation among actors in the field. Smart optimization and control enable energy efficiency across sectoral boundaries. Multidirectionality, storing of energy and energy demand elasticities support better management of variabilities over time and across sectors.

Actions needed

- **Mobilize:** Convening multi-stakeholder networks and enabling the set up of an expert energy competence network to strengthen regional expertise on energy systems
- **Manage:** Conducting an extensive survey of available energy-related data in the Turku region including emissions-related data and prioritizing actions based on the findings
- **Manage:** Developing services that support demand elasticity and energy efficiency
- **Manage:** Piloting demand-side management for electricity at a city-wide/regional scale to test technical and market feasibility



REUSE

Utilizing waste heat regionally

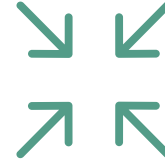


Situation in 2029

Waste heat is systematically recovered and reused to increase the efficiency of energy systems in Turku and reduce the need for additional thermal energy production. Heating networks have been diversified (low temperature, multidirectional, intelligent), making it easier to use waste heat. Thermal energy is stored locally and automation supports the smooth utilization of heat as quickly as possible and close to the source.

Actions needed

- **Manage:** Accounting for the utilization of waste heat in long-term planning processes such as land use planning and infrastructure construction
- **Inform:** Mapping potential sources and applications of waste heat
- **Manage:** Supporting the transition to fourth-generation district heating networks, which are flexible, multi-directional and accommodating of different fuel types (such as waste heat)
- **Incentivize:** Supporting development of new business models where the benefits and costs are shared fairly among various parties and supporting cooperation between the city and companies



RETHINK & REDUCE

Ensuring the smart management and optimization of energy systems



Situation in 2029

Residents and communities in the Turku region have a better understanding of how their choices affect energy consumption. Communities play an active role in saving energy and investing in renewable energy solutions. Residents are offered comprehensive services and assistance to support this shift, from advisory services to equipment delivery, maintenance and financing.

Actions needed

- **Regulate:** Developing a dedicated strategy for a community-level transition with regional energy actors
- **Incentivize:** Activating and enhancing financial incentives for energy saving and household-level renewable energy production
- **Mobilize:** Developing and testing different types of collaboration and business models to facilitate access to diverse funding opportunities
- **Inform:** Raising awareness of accessible investment opportunities for local renewable energy production and energy saving measures
- **Inform:** Increasing local competencies by recruiting and training “energy managers” within local corporations (such as housing associations)



Ensuring a fair and inclusive transition of Turku's energy systems

Circular energy system interventions support energy security and resilience in the region while promoting sustainable employment opportunities. These interventions provide opportunities to advance local social equity when potential risks are managed and enabling factors are identified.

Access to clean, affordable energy options

Investments and regulations that support resource-efficient energy systems (intervention #1 and #2) as well as community production (intervention #3) have the potential to reduce end-user costs.

However, these benefits may be unequally distributed in the Turku region, with savings primarily going to homeowners, leaving low-income tenants behind.

Social equity actions:

- Monitor distribution of infrastructure across neighborhoods and within the city to ensure equitable access to benefits and avoid unduly burdening marginalized communities.
- Support circular energy system installation and maintenance by offering substantial support to low-income communities and other end-users, including by offering subsidies, organizational and technical assistance.

Participation in the circular energy system transition

Community production (intervention #3) builds local ownership of the transition to resource-wise energy systems. It also ensures that both infrastructure and initiatives, e.g. innovation support and training opportunities, meet the needs of their target groups.

However, since energy systems are often planned, implemented and governed from a top-down perspective, there is a risk that residents may be excluded from planning and decision-making processes and that the voices of those affected by proposals may not be heard. This can lead to strong opposition and NIMBYism ("not in my backyard") from residents living close to new energy infrastructure which may be regarded as an unsightly burden. Additionally, infrastructure like wind farms and solar fields are often more space-intensive than fossil-fuel plants, and may occupy space communities wish to allocate to other uses or within/around their own homes.

Social equity actions:

- Allow participation in large-scale regional governance processes by e.g. creating a residents advisory panel or reserving a certain number of seats for residents, especially those living close to the rollout area.
- Explore community (co-)ownership models for local renewable energy assets.

Opportunities for local labor force development through circular opportunities

Construction and management of resource-wise energy infrastructure (intervention #1) as well as waste heat recovery facilities (intervention #2) can open up job opportunities in sustainable industries while also building a foundation of local expertise. Yet new infrastructure, technology and digital innovation also demand new competencies which might not be readily available in the Turku region.

Social equity actions:

- Offer educational opportunities related to resource-wise energy system innovation and maintenance to strengthen regional skills in the sector.
- Partner with social organizations to develop tailored skill training and raise awareness of opportunities amongst those with barriers to employment (e.g. migrants, recent graduates and the long-term unemployed).
- Develop local expertise by offering training and technical advisory services to businesses and entrepreneurs, and by creating innovation opportunities (e.g. tenders, contests) specifically for local actors.



CIRCULAR FOOD SYSTEMS



Why circular food systems?

Southwest Finland is often called “Finland’s food basket” as it holds a central position in Finnish food production, from agriculture to the food processing industry. Therefore, Turku’s location means that it has a key role to play in supporting the country’s transition to more resource-wise food systems. Agriculture is responsible for 10 percent of Finland’s greenhouse gas emissions. Looking at the entire food value chain — which means taking land use, transport, processing and waste into account — it is clear that food is responsible for considerable emissions and pollution.

The task is therefore to increase resource wisdom at every stage of the food value chain, “from farm to fork”, through circular solutions. In circular food systems, food is produced in a way that protects and enhances ecosystems, makes optimal use of resources, supports soil health and avoids loss and waste. Consumers prioritize low-impact options and food chains are localized to reduce food miles traveled. Waste and side streams are reused and revalorised efficiently and at their highest value. The entire food system benefits from circular economy solutions as they create added value and improve profitability.

Achieving resource-wise food systems in Turku would also contribute to at least eight Sustainable Development Goals.





Current situation and existing achievements

The Turku region is home to a high number of farms that cultivate a variety of plants and cereals, invest in plant-based protein production and work to improve soil health and sequester carbon. Turku is also a center of food innovation research. For example, the food service provider Arkea, which belongs to the Turku Group, has introduced food carbon footprint calculation and piloted low-carbon recipes. The Flavoria Center at the University of Turku conducts research on food consumption and food waste through digital platforms.

The Finnish government has been working on a climate food program since early 2020 to support the goal of a carbon-neutral Finland by 2035. Under this program, regional research actors (such as the Brahea Center of the University of Turku and the Functional Foods Forum) are developing projects on local fish breeding and new plant-based protein sources. National actors (such as the Finnish Environment Institute, the Natural Resources Institute, the Central Union of Agricultural Producers and Forest Owners and the Centre for Economic Development, Transport and the Environment) are cooperating with regional businesses and public actors to make nutrient management more circular.

While several initiatives exist to make food systems in Turku more circular, many are still in their nascent stage and substantial challenges remain.





Overview of interventions

Turku's goal for 2029 is to improve the resource wisdom of food systems "from farm to fork" in collaboration with different actors and consumers. Primary objectives include balancing and closing nutrient cycles, strengthening markets for resource-wise food and shortening value chains. Ultimately, the city aims to reconnect consumers to food production in various ways, including through educational institutions and urban farms.



RETHINK & REGENERATE

Growing the market for resource-wise food



Situation in 2029

The market for resource-wise food and food products receives targeted support; additionally, dialogues among food producers, consumers and other actors on resource-wise approaches are promoted. Professional kitchens and restaurants in the Turku area prioritize local, resource-wise food products, which have become economically competitive.

Actions needed

- **Mobilize:** Facilitating mutual understanding of the needs of restaurants, professional kitchens and local food producers;
- **Regulate:** Including circular criteria in food procurement;
- **Inform:** Promoting regenerative farming methods and their monitoring;
- **Incentivize:** Facilitating regenerative farming projects' access to finance.



RETHINK

Reconnecting residents to food production

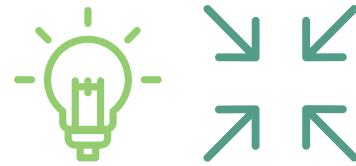


Situation in 2029

Participating in food production has become easy for Turku residents thanks to a wide range of urban agriculture possibilities and educational activities. These have improved the understanding of where food actually comes from as well as the importance of soil health and biodiversity. Increased appreciation of food has led to less food being wasted.

Actions needed

- **Manage:** Developing comprehensive urban farming programs including community gardens, green areas and cultivation on city premises;
- **Inform:** Integrating food education in school curricula as early as possible.



RETHINK & REDUCE

Reconnecting food users with food producers

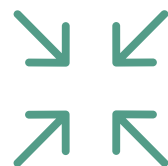


Situation in 2029

The food consumed in Turku is increasingly sourced from regional farms. Local and regional food production has been strengthened, which has increased local food sovereignty and resilience and improved local farmers' livelihoods. This has led to circular innovations in farming and production methods. Food miles have been reduced, substantially cutting consumption-based GHG emissions.

Actions needed

- **Inform:** Providing residents with information on local food suppliers and restaurants in the city;
- **Manage:** Establishing food hubs in the form of both physical spaces and digital platforms;
- **Regulate:** Including local food quotas in food service contracts;
- **Inform:** Providing business and marketing trainings to local food producers.



REDUCE

Canteens lead the circular food systems transition

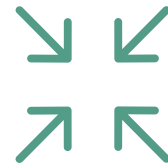
Situation in 2029

The carbon and resource footprint of menus in canteens and schools in the Turku region is closely monitored and efforts are made to reduce carbon and resource impacts. There is plenty of plant-based, resource-wise and tasty food on public menus and food waste has been minimized. Canteens also function as places of education and research; by helping to increase acceptance and popularity of resource-wise food, they also contribute to understanding of the environmental impact of food among consumers and food service providers alike.

Actions needed

- **Manage:** Further developing GHG and food waste monitoring tools for food products in public canteens;
- **Mobilize:** Facilitating mutual learning in canteens;
- **Inform:** Developing high-quality communication materials that inform professional kitchens about the steps involved in promoting circular food systems;
- **Regulate:** Supporting cooperation to influence national school meal regulations e.g. on meat quantities for public menus.





REDUCE & RECOVER

Diversifying and increasing food value



Situation in 2029

Raw materials and side streams are processed in a multi-faceted, efficient (toward 100% utilization) and innovative way at the regional level. Focus has also been placed on the development of more resource-wise products across the value chain, including in packaging materials, textile fibers, organic artificial leather, cosmetics and recycled fertilizers.

Actions needed

- **Manage:** Investing in the processing of raw materials and by-products into easily usable products locally;
- **Mobilize:** Facilitating cooperation between a variety of food actors at the regional level to facilitate resource sharing;
- **Incentivize:** Enabling the development of new food products and innovations based on side streams;
- **Inform:** Communicate about existing food innovations in Turku to consumers.



Ensuring a fair and inclusive transition of Turku's food systems

Circular interventions in Turku's food systems have the potential to deliver health, well-being and socio-economic benefits to all Turku residents, provided a number of factors are taken into account.

Access to healthy and sustainable food

Supporting regional food production promotes access to food for all and increases the resilience of food systems in Turku (intervention #2 and #3). Focusing on circular options in public canteens (intervention #4) guarantees circular options to all as a public service. Food sharing also creates opportunities to increase access to healthy food for low-income residents.

However, investments and innovations in food systems to support circularity (e.g. support of regenerative agriculture, data platforms) may increase costs for consumers. Health benefits can be an indirect impact of investments in circular food systems but need to be appropriately planned for.

Social equity actions:

- Incorporating health criteria alongside circular criteria for food services;
- Monitoring the affordability of circular food options for consumers and tracking access to healthy food products for low-income households;
- Facilitating the engagement of communities in food sharing platforms and initiatives.



Participation in food production and more transparent consumer choices

Shorter, more transparent value chains allow consumers to make more informed food choices (intervention #2 and #3). Shorter value chains also have the potential to support fair incomes for local producers. The systematic utilization of vacant properties and creation of incentives for urban farming (intervention #3) would allow Turku residents to participate in their city's food system.

Opportunities to participate in local production initiatives may be unequally distributed; some neighbourhoods may be left out. Change in menus may meet resistance from professional kitchens and public canteens if they are not involved in the early stages of the planning process.

Social equity actions:

- Allowing for the direct involvement of citizens (e.g. via participatory budgets, selection of projects for urban development) in the city's urban agriculture projects;
- Supporting alternative ownership models, such as urban food commons (land or space managed and owned by the community);
- Ensuring food service staff are closely involved in menu planning.

Opportunity for innovations and jobs in local food value chains

Increasing the value of raw materials across their lifecycle (intervention #1) offers opportunities for local innovations. Direct links between producers and consumers supports fair livelihoods for farmers (intervention #1 and #2).

However, farmers and food service providers may lack know-how and practical tools to deliver circular economy solutions. As food services incorporate digitalization, they may exclude low-skilled workers.

Social equity actions:

- Incorporating criteria in tenders to ensure fair revenue for farmers;
- Partnering with universities, training centers and social organizations to provide upskilling opportunities to farmers and food service workers;
- Partnering with social organizations to develop tailored skill trainings and raise awareness of opportunities amongst those with barriers to employment (e.g. migrants, recent graduates and the long-term unemployed).



CIRCULAR WATER SYSTEMS



Why circular water systems?

Water is fundamental to meeting the basic needs of all living things. At the local level, water systems are at the foundation of various urban services and industries, including sanitation, energy and agriculture. Water systems also act as a carrier of side streams, including chemicals and nutrients, which represent both potential resources and pollutants. In a resource-wise water system, water infrastructure operates in synergy with other systems such as those for energy, food and waste. Water infrastructure is inspired by nature and protects the urban and natural environment, especially water bodies. The entry of pollutants into water is prevented as effectively as possible, water is used efficiently and reused or recycled locally. Nutrients and energy carried in water flows are recovered. Understanding the impact of our daily choices on water consumption in Turku and how the water footprint of companies and public actors can be decreased is also an important part of the discussion.

Achieving resource-wise water systems in Turku would contribute to at least nine Sustainable Development Goals.





Current situation and existing achievements

The Turku region is already a leading example on circular water management thanks to a strong research and innovation community as well as cooperation with other Baltic cities. Municipalities in the Turku region have collaborated to implement joint circular solutions in areas ranging from water extraction to resource recovery. Regional actors have developed innovative managed aquifer recharge techniques to protect groundwater.

Wastewater treatment is already very resource-wise in Turku. The Kakolanmäki wastewater treatment plant (WWTP) processes Turku's wastewater with a particularly efficient process that combines mechanical, chemical and biological treatment. The plant also features a heat pumping station that extracts enough thermal energy from wastewater to heat 15,000 households. Sludge from Kakolanmäki is processed using anaerobic digestion, which produces 30 GWh of energy per year for various regional transport needs. Nutrients from the digestate are used as fertilizers in agriculture and landscaping, which helps close the nutrient cycle.

Thanks to these internationally recognized innovations, high-quality drinking water is available in the region, and the nutrient load in the Archipelago Sea has been significantly reduced. However, challenges remain in ensuring the region is ready to face increasing stormwater levels and other climate change related risks.



Overview of interventions

Turku's resource wisdom objectives for 2029 are to strengthen regional water systems cooperation in order to improve management of urban runoff, increase water reuse and recycling, and improve nutrient management. To achieve these objectives, Turku plans to intervene along the water lifecycle and link circular water solutions to climate resilience.



RETHINK

*Regional and cross-sectoral collaboration
for resource-wise water systems*



Situation in 2029

In the Turku region, water is managed through extensive cooperation among regional actors and municipalities. A cross-sectoral operation model supports synergies among water, food and energy systems.

Actions needed

- **Mobilize:** Establishing a regional working group across municipalities in the region and agreeing on time-bound objectives;
- **Manage:** Ensuring regional land use planning supports the health of natural water bodies;
- **Regulate:** Ensuring regulatory alignment between municipalities to support regional water management;
- **Incentivize:** Supporting initiatives fostering water-food-energy synergies.



REGENERATE

Design regenerative solutions for runoff water management



Situation in 2029

Urban runoff management prioritizes nature-based solutions and innovations that enable these streams to be managed and utilized locally. Stormwater management is primarily implemented through organic landscaping and other landscape drainage solutions. These efforts reduce the need for clean water, decrease the amount of stormwater in the network and improve the condition of water bodies.

Actions needed

- **Mobilize:** Communicating about Turku's objectives, including nature-based runoff management and the co-benefits of this approach, to regional water systems actors;
- **Manage:** Identifying and implementing solutions for agricultural water management;
- **Inform:** Mapping the possibilities for regenerative, nature-based water treatment solutions in the Turku region.



REUSE

Support water reuse and recycling

Situation in 2029

Opportunities for local reuse of urban runoff and grey water are maximized, leading to a reduction in the need for clean water. The co-benefits of water reuse are demonstrated in a wide variety of ways, with the city leading by example. Water reuse and recycling solutions are implemented in a coordinated manner and with a broad range of actors, with appropriate incentives and financing mechanisms in place.

Actions needed

- **Inform:** Mapping opportunities for local reuse of urban runoff and grey water and communicating about these opportunities to relevant actors;
- **Regulate:** Demonstrating the co-benefits of reusing runoff water for the city's green areas;
- **Manage:** Implementing local, small-scale water recycling solutions to demonstrate benefits;
- **Incentivize:** Developing incentives to promote water recycling among private actors and residents.





REDUCE



Increasing efficiency and minimizing pollution through data management, outreach and monitoring

Situation in 2029

Efforts have been made to produce and make water data widely accessible, which has improved water management as a whole. Thanks to an improved knowledge base, residents and private sector actors (especially in forestry and agriculture) have a better understanding of the impact of their activities on water bodies and water supply. As a result, fewer pollutants enter wastewater and natural water bodies.

Actions needed

- **Regulate:** Including environmental responsibility in procurement criteria to reduce the amount and quantity of harmful substances ending up in water systems (in particular, flame retardant, microplastics, building materials);
- **Manage:** Establishing a comprehensive water data management system in public sector areas and allowing collected data to be accessed through open interfaces;
- **Incentivize:** Supporting water innovations that lead to efficiency and improved monitoring (e.g. by enabling piloting with city infrastructure);
- **Inform:** Communicating with consumers and residents on resource-wise behaviors;
- **Mobilize:** Working with the agriculture and forestry industries to increase efficiency in water use.





Ensuring a fair and inclusive transition of Turku's water systems

Circular water interventions support climate resilience while safeguarding the health, safety and well-being of Turku's residents. Furthermore, these interventions provide opportunities to advance local social equity when potential risks are managed and enabling factors are identified.

Access to the benefits of blue, green and grey infrastructure and technologies

Infrastructure, including stormwater management systems and rainwater retention areas (intervention #2), can reduce flooding and improve local health and well-being by providing access to pleasant natural spaces. Water recycling initiatives (intervention #3) and data-driven innovations (intervention #4) may reduce utility costs.

However, infrastructure and technologies come with high rollout and maintenance costs (interventions #2, #3 and #4) that serve to exclude those who are economically disadvantaged. The benefits of blue and green infrastructure (intervention #2) may raise housing prices and lead to gentrification.

Social equity actions:

- Monitor distribution of infrastructure across neighborhoods and within the city to ensure equitable access to benefits;
- Support circular water system design, installation and maintenance by offering subsidies and technical assistance to low-income communities and users;
- Study possible gentrifying effects and implement policies to prevent and counteract them, e.g. by constructing or incorporating criteria for low- and middle-income housing.



Participation in water infrastructure planning, rollout and implementation

Resident involvement in regional water management (intervention #1), as well as during all stages of infrastructure deployment (interventions #2 and #3), affirms the right to take part in local governance, amplifies the voices of those affected by proposals and builds community ownership of projects. It also ensures that both infrastructure and initiatives, e.g. innovation support and training opportunities (intervention #4), meet the needs of their target groups.

Since water systems are often planned, implemented and governed from a high-level, top-down perspective, there is a risk that residents may be excluded from planning and decision-making processes entirely.

Social equity actions:

- Allow participation in large-scale regional governance processes by e.g. creating a citizen advisory panel or reserving a certain number of seats for citizens;
- Create opportunities for direct involvement of residents at all stages of circular water infrastructure planning (e.g. site selection), rollout (e.g. budgeting, procurement decisions) and implementation (e.g. community tree planting);
- Make participatory processes inclusive by offering diverse opportunities, e.g. nature walks, educational events, volunteering, outreach at schools, and virtual and pre-recorded events, in addition to traditional meetings and forums.

Opportunities for local labor force development through circular water opportunities

Construction and management of green and blue infrastructure (intervention #2) as well as water recycling infrastructure (intervention #3) can create job opportunities for segments of the labor force that may be excluded from traditional opportunities. At the same time, innovations provide opportunities to develop local expertise, e.g. of businesses and entrepreneurs as well as students and professionals (intervention #4).

Yet new infrastructures and technologies (interventions #2 and #3) and data-driven innovations (intervention #4) also demand new competencies which might not be readily available in the Turku region.

Social equity actions:

- Offer educational opportunities related to circular water system innovation and maintenance (e.g. Kakolanmäki WWTP) to strengthen regional skills on circular water systems; integrate innovations into university curricula;
- Partner with social organizations to develop tailored skill trainings and raise awareness of opportunities amongst those with barriers to employment (e.g. migrants, recent graduates and the long-term unemployed);
- Develop local expertise by offering training and technical advising to businesses and entrepreneurs, and by creating innovation opportunities (e.g. tenders, contests) specifically for local actors.



CIRCULAR BUILDINGS & CONSTRUCTION



Why circular buildings & construction?

Buildings and construction consume half of the world's natural resources. Following construction, building operation and use is responsible for 40 percent of global energy consumption. If this figure included embedded energy — the energy that is consumed during extraction, production and construction — it would be even higher. Finland's national government is calling for a 40 percent reduction in construction emissions by 2030, and for carbon neutrality by 2050. Yet Turku's population is growing, as are local needs for housing, schools, kindergartens and care homes for the elderly. At the same time, there are opportunities to meet those needs in the form of un- and under-used space and buildings around the city.

Circular economy actions for construction, buildings and housing in Turku aim to address these challenges. Their objective is to increase the efficiency of use of infrastructure, buildings, spaces and construction materials, as well as to extend the lifespan of existing and future buildings by designing them for modularity and adaptability. Another goal is to have reuse and recycling of building materials be the rule, not the exception. Finally, circular construction in Turku will prioritize low-carbon building materials and clean construction sites that preserve ecosystems and minimize pollution.

Achieving resource-wise buildings and construction in Turku would contribute to at least seven Sustainable Development Goals.





Current situation and existing achievements

Turku has made great strides in support of energy efficient renovation and construction, as well as in the development of innovations that increase resource efficiency in buildings. For example, the Turku Student Village Foundation is involved in the RESPONSE project, which aims to develop energy-positive student housing. Through “Smart & Wise Turku”, one of the city’s spearhead projects, an intelligent knowledge management model was developed to monitor and improve efficiency of building services. The model is now ready to be utilized in new building projects.

The city is also supporting business innovations around circular construction. As part of the 6Aika national strategy, Turku is developing an innovation for the recycling of local landmasses and industrial byproducts into a locally adapted circular earthworks material. In addition, the use of regenerative materials in construction is being piloted in the Skanssi and Linnakaupunki areas. The non-profit company Turku Science Park Ltd., created by the City of Turku, facilitates the operations of the 3C-Cluster (Circular Materials and Solutions for the Construction Industry Cluster) which aims to support the construction industry’s transition from linear to circular.

Despite this progress, the construction industry is still in the early stages of its circular transition; it remains one of Turku’s least-digitized industries. Furthermore, reuse of secondary materials is still in its infancy in Turku. Going forward, these gaps represent opportunities to support resource wisdom in this industry.





Overview of interventions

Turku's 2029 resource wisdom objective is to ensure that buildings, building materials, urban space and infrastructure are used and maintained in a versatile and multifunctional manner. In addition, the city aims to ensure that sufficient resources are available to monitor the embodied carbon and resource footprint of buildings, which would help ensure new construction design supports resource wisdom across the lifecycle.



RETHINK & REUSE

Extending the lifetime of the built environment by preserving value and utility



Situation in 2029

Existing building stock is used efficiently and its lifecycle extended. The occupancy rate of buildings has increased and new types of partnerships, ownerships and tenancy models have been developed.

Actions needed

- **Manage:** Mapping facilities and spaces for adaptive reuse;
- **Inform:** Organizing awareness-raising activities that address the potential of an underused space for different city departments and regional actors;
- **Regulate:** Facilitating temporary use of vacant facilities through building permits;
- **Incentivize:** Identifying incentives and funding for the renovation and conversion of facilities.



RETHINK & REGENERATE

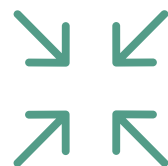
Ensuring the built environment supports resource wisdom and well-being

Situation in 2029

Nature-based solutions, energy and water conservation, and resource-wise technologies are integrated into buildings and regional infrastructure, such as schools, sports parks, green spaces and cultural sites. The implemented solutions improve building occupants' comfort, save energy and natural resources, purify the air and create an educational environment.

Actions needed

- **Manage:** Setting up a cross-sectoral governance scheme across city departments to ensure resource-wise and circular criteria are included in infrastructure and building procurement and management;
- **Incentivize:** Developing an operating model for integrating nature-based solutions and resource-wise technologies in the city's public building stock;
- **Manage:** Creating demonstration sites to test nature-based solutions and cross-sectoral solutions at the building level.



REDUCE

Designing with future usages and resource wisdom in mind

Situation in 2029

When planning for a new-built asset, the functionality and circularity of the building, infrastructure or public space (usability, accessibility, comfort and architectural quality, consumption of natural resources, embodied and operational emissions) are examined throughout its lifecycle.

Actions needed

- **Mobilize:** Creating a community of practice for circular construction and facilitating communication among different actors;
- **Inform:** Developing models for lifecycle costs for use by local actors;
- **Regulate:** Determining and setting public procurement criteria for circular design and construction in partnership with local actors;
- **Manage:** Piloting demonstration sites that support resource wisdom across the lifecycle.



RECOVER

Building with reused and recycled materials in a resource-wise manner, and ensuring maximum recovery of value and utility from deconstruction works

Situation in 2029

When buildings are demolished, materials are recovered for recirculation in accordance with the waste hierarchy (reuse first), and secondary materials are utilized as much as possible in new construction and renovation. The market for secondary building materials is structurally supported.

Actions needed

- **Regulate:** Ensuring systematic pre-demolition audits and introducing material passports;
- **Inform:** Strengthening the capacity of construction operators to reuse components and materials;
- **Mobilize:** Connecting demolition material producers with users, both through a digital platform and a recycling park for construction materials;
- **Regulate:** Stimulating demand for recycled materials through public procurement;
- **Mobilize:** Collaborating at the national level to increase availability of construction material data.





Ensuring a fair and inclusive transition to circular buildings and construction

Actions to make Turku's buildings and construction sector more circular offer a number of opportunities to promote local social equity provided that potential risks are addressed and appropriate enablers are in place.

Access to affordable housing and livable public spaces

Putting vacant spaces back in use (intervention #1) and using sharing and modularity as planning approaches (intervention #2) offer opportunities to support inclusive access to affordable housing and livable public spaces.

However, smart, resource-wise buildings (intervention #2) can become prohibitively expensive and thus exclusive of low-income actors. Reusing construction materials (intervention #4) can also prove more expensive for end users if the framework conditions are not in place to offset entry costs.

Social equity actions:

- Monitoring the affordability of circular options (buildings and materials) for end users and implementing framework conditions to favor affordability and access for marginalized groups;
- Tracking access to affordable and quality housing and public spaces for different user groups, especially low-income households;
- Prioritizing user-centered design to ensure a varied and agile stock of housing and offices fit for all residents.



Participation in the construction of the city and use of spaces

The reuse of existing buildings and spaces for different types of activities (intervention #1) offers citizens and communities the opportunity to affirm their right to participate in city life. Sharing spaces and infrastructure (intervention #2) can boost social inclusion, a greater sense of community and ownership by citizens.

However, reuse of properties may trigger conflicts between property owners and people or organizations looking for space (intervention #1). Access to shared spaces may also be unequally distributed among Turku residents.

Social equity actions:

- Allowing for the direct involvement of citizens (e.g. via participatory budgets, selection of projects for urban development, visioning exercises, etc.) in reuse projects;
- Including all stakeholders (residents, economic operators, urban planning experts, developers, decision makers) in mediation early in the project to help prevent conflicts;
- Strengthen inclusive participation and diversify building and occupancy typologies through alternative tenancy and ownership models, such as community land trusts, housing cooperatives, or cession of use permits.

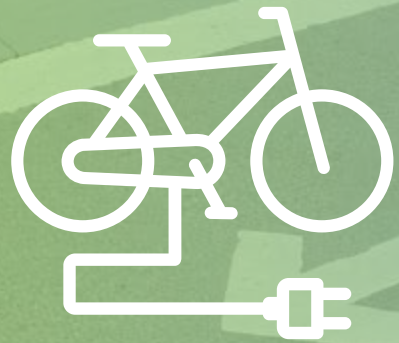
Opportunities to connect the local labor force to a modernized construction industry

Dismantling and handling of reclaimed construction materials and components from demolition and renovation sites (intervention #4) is more labor-intensive than conventional practices. Material marketplaces offer secondary materials at low prices, making them particularly accessible for small projects, which could support SME development.

Applying a circular economy lens to the construction sector requires new competencies, performance data tracking mechanisms and digital platforms (intervention #4). These demand a new set of skills which might not be readily available locally and thereby divert construction industry jobs away from the local workforce.

Social equity actions:

- Including social economy actors as main drivers of deconstruction and dismantling work, material transformation and logistics;
- Partnering with social organizations to facilitate social and economic activities in unused spaces;
- Developing curricula for new construction skills in local universities to modernize and upskill the construction industry.



CIRCULAR TRANSPORT & LOGISTICS



Why circular transport & logistics?

Transport and logistics include the movement of people by private and public transport as well as goods via freight services. These systems are essential for accessing employment as well as fully participating in city life. Yet transport and logistics are also major sources of GHG emissions. Too often, efforts to address transport and logistics emissions focus on what is fueling vehicles rather than on ensuring that mobility as a whole is resource-wise.

A circular economy approach to transport and logistics starts with rethinking the need to move in the first place. Redesigning the way a city and its services are planned and accessed should follow. Circular transport and logistics systems are powered by regenerative sources and prevent pollution. They facilitate shared mobility practices, optimize freight transport and tap into waste streams to power vehicles. Remanufacturing and reconditioning electric vehicles and ensuring the recyclability of individual parts is also a key aspect of circular transport and logistics systems.

Achieving resource-wise transport and logistics in Turku would contribute to at least six Sustainable Development Goals.





Current situation and existing achievements

Developing low-carbon mobility is one of the major climate change mitigation measures in Turku's Climate Plan. Under this plan, Turku is investing in redesigning its city center to make it more conducive to "soft mobility" (ie. human-powered, non-motorized mobility). Turku's public transport equipment has already been partially converted to electric alternatives, an electric tram is under development and an electric bus network is being planned. The city has already started diversifying its low-emission mobility options with a city-bike and an electric scooter sharing system.

As part of Smart and Wise Turku, one of the city's spearhead projects that combines the Smart City concept with the region's 2029 carbon neutrality goal, Turku is working on ensuring city logistics are emission free. As the transport system is developed regionally, Turku's resource-wise mobility system will also be strengthened by the implementation of the "Land Use, Housing and Transport Agreement" and the "Regional Structure Model 2035" together with neighboring municipalities and the regional council.

Yet promoting active and shared mobility in Turku remains challenging. Furthermore, freight traffic, which serves the needs of growing industries, is constantly increasing and the logistics industry remains cost-oriented and fragmented.

However, there are opportunities to make freight transport more resource-wise. Industrial sites and logistics centers are concentrated in a relatively small geographic area in the Turku region, with efficient linkages to main roads. Increasing the load factor for freight transport, optimizing routes, planning return loads, optimizing delivery networks within the city and maximizing the use of zero-emission delivery vehicles will improve the circularity of freight transport. Good practices in terms of using biogas as fuel can be expanded to ensure e-mobility alternatives are powered by sustainable sources.





Overview of interventions

Turku's transport and logistics resource-wisdom objectives for 2029 are to make active and shared mobility convenient and accessible for all, design urban services with proximity in mind and ensure urban logistics is optimized and emission free. Shared vehicles will complement walking, cycling and public transport and the city will be as walkable as possible. Additionally, tourism will be low carbon and protect local ecosystems. Achieving these objectives will decrease vehicle-kilometers travelled, fuel consumption and electricity demand as well as make city life more accessible for all.



RETHINK

Reducing the need to move and prioritizing active mobility

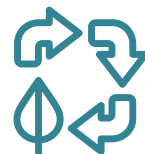


Situation in 2029

The city is designed for walkability. Public services and leisure activities can be reached through active mobility, which leads to healthier residents and a more livable city overall.

Actions needed

- **Manage:** Planning for accessible environments and safe walking and cycling routes;
- **Manage:** Reevaluating the quality and reach of the cycling network and expanding sharing options for cycling;
- **Manage:** Ensuring public services come to residents and that implementing new services goes hand in hand with the planning of walking and cycling routes;
- **Inform:** Promoting walking and cycling through public campaigns.



REUSE

Making shared mobility the new normal

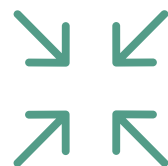
Situation in 2029

Shared vehicles complement the options available for resource-wise mobility. The transition from private to shared mobility is easy and economically attractive because high-quality, competitive options and services that combine different modes of transport are easily available to all Turku residents.

Actions needed

- **Manage:** Providing high quality and affordable multi-modal transportation options, including shared mobility;
- **Manage:** Implementing mobility-as-a-service pilots relevant to the Turku area;
- **Mobilize:** Developing an operating model that addresses the barriers to shared mobility;
- **Inform:** Capitalizing on the use of technology to provide real-time data for operations and parking;
- **Manage:** Ensuring city-owned cars are shared.





REDUCE

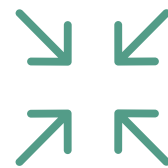
Supporting resource-wise logistics

Situation in 2029

Urban logistics have become emission free. Turku's transport procurement is emission and noise free. Buyers of logistics services prioritize low-emission and resource-wise logistics solutions. The use of new logistics transport technologies that support efficiency has become easier and more common.

Actions needed

- **Manage:** Shifting to resource-wise delivery options in vehicle procurement;
- **Manage:** Supporting the electrification of freight infrastructure;
- **Manage:** Optimizing the efficiency of delivery operations and supporting consolidation strategies;
- **Incentivize:** Supporting local innovations and digital business solutions in urban logistics;
- **Mobilize:** Promoting the resource-wise transition of maritime transport in the entire Turku area.



REDUCE

Promoting resource-wise tourism



Situation in 2029

Travel and tourism in Turku does not harm the environment. Resource wisdom has become a competitive advantage for the tourism industry and travel service providers in the Turku area. Tourism utilizes mobility as a service solutions and shared mobility.

Actions needed

- **Incentivize:** Supporting the development of car-free tourist programs;
- **Mobilize:** Facilitating cooperation between travel service providers in and around Turku;
- **Manage:** Streamlining car-free transport links to the archipelago.



Ensuring a fair and inclusive transition of transport and logistics systems

Circular interventions in Turku's transportation and logistics sectors will reduce the city's carbon emissions while expanding access to jobs and enabling participation in city life. Addressing risks and putting enabling measures in place will help promote social equity by preventing people and communities from being left behind.

Access to city services and spaces

Circular innovations expand access by bringing city services to residents (intervention #1), increasing transit options (intervention #2) and facilitating access to goods and services (intervention #3). Creating user-friendly mobility networks (interventions #2 and #4) makes city spaces more accessible to residents and tourists. Cleaner transportation and logistics systems also improve health and wellbeing by reducing noise and air pollution and offering fitness opportunities e.g. shared bikes (intervention #2).

At the same time, disadvantaged neighborhoods may be overlooked for provision of active mobility services (intervention #1), shared transit (intervention #2) and circular logistics (intervention #3). Some people may face barriers to using shared transit, e.g. due to low income or disabilities (interventions #2 and #4).

Social equity actions:

- Conduct local needs assessments and track access to city services, shared transit, walking/cycling infrastructure and logistics routes to ensure that no community is excluded;
- Monitor cost of services and, when necessary, subsize shared transit options to ensure equality of access;
- Consult community and disability advocates to ensure that transportation and logistics systems and provision of information to users meets the needs of all Turku residents.



Participation in planning of city spaces and transit systems

Integrating participatory opportunities into efforts to reimagine city spaces (intervention #1) and rollout of shared transit (intervention #2) lets residents make their voices heard in decision-making processes. Community inclusion helps ensure interventions align with local needs while increasing community buy-in and ownership of circular projects.

Limited city resources and diverging community needs may lead to conflict over siting of services (intervention #1). Shared transportation (intervention #2) and low-carbon mobility systems (intervention #4) may alter city character or cultural elements. The role of multinational companies in shared mobility and logistics systems may create regulatory issues and exclude smaller local players from the market.

Social equity actions:

- Create opportunities for residents to be directly involved in e.g. proposal review, siting decisions and budget processes, and collect information about mobility habits and preferences via open forums and surveys;
- Expand outreach by using “community ambassadors” to disseminate information and advocate for local needs. Use, for example, the Lahti City Cap lessons on active mobility incentive and reward models (e.g. entrance tickets to swimming pools, theaters);
- Develop regulatory structures to safeguard local interests, protect competition and ensure that innovations are designed with people (not profits) in mind.

Opportunities for the local labor force in use and construction of circular transport and logistics systems

Making the city more accessible via decentralization (intervention #1) and shared transit (intervention #2) facilitates access to a broader range of employment opportunities. Innovations to transit (interventions #2 and #4) and logistics systems (intervention #3) also create opportunities for public-private partnerships that efficiently and affordably meet community needs while developing local expertise and creating jobs.

Changes to transit and logistics systems may increase costs for some users, e.g. due to infrastructure expenses (interventions #2, #3 and #4) or fees for shared remote workspaces (intervention #1). Local workers and businesses may lack the capacity, e.g. organizational/technological skills, required to participate in circular logistics systems (intervention #3).

Social equity actions:

- Connect low-income residents to employment opportunities by subsidizing coworking spaces and transit passes with interoperability across “classic” public transportation and sharing services;
- Partner with universities, training centers and social organizations to provide diverse skill development opportunities;
- Facilitate innovation upscaling and creation of long-term employment opportunities by e.g. sponsoring innovation competitions and funding mobility as a service pilot projects.



CROSS- CUTTING ENABLERS



Achieving the goals set out for each of the five priority topics will require holistic leadership, new ways of thinking, cooperation and creativity. In the process of preparing this roadmap, six cross-cutting enablers of change were identified. These enablers will play a critical role in the achievement and long-term success of Turku's circular economy ambitions.

Cross-cutting enabler 1: Circular economy businesses

Together with regional players, we will make goal-oriented efforts to ensure that circular economy markets and business activities become mainstream. We will prioritize business and industrial sectors that play an outsize role in Turku's economy and in the development of circular economy solutions, such as those involved in the reprocessing of materials. Our efforts will focus on:

- Strengthening the vision for resource wisdom in business and industry as well as encouraging its achievement.
- Investing in companies and business ecosystems in the region on a long-term and targeted basis, thereby enabling different industrial sectors to adopt circular economy practices.
- Building and supporting diverse, open business networks and strong collaborative ecosystems to support development and upscaling of circular economy innovations.

Cross-cutting enabler 2: Efficient industrial-scale resource and material cycles

Resource flows are to be used systematically and efficiently. Key areas of focus will include reprocessing and reuse of

high-volume industrial, construction, demolition and mining waste and side streams, strengthening symbiotic cooperation in industry and increasing the value of recovered materials. National cooperation must be leveraged to make material and resource flows visible, facilitate access to resources via digital solutions and platforms, and clarify the intersection of waste and product legislation. Additionally, product safety standards and trade secrets must continue to be respected.

Cross-cutting enabler 3: The city as a driver of circular economy

The city's tools and operating models must be leveraged in support of the circular economy transition. This will be accomplished by:

- Deploying effective interventions, such as Energy Efficiency Agreements, climate-conscious investing, carbon-aware public procurement and adoption of an expanded carbon footprint concept that considers lifecycle impacts.
- Improving circular economy know-how and organizational skills.
- Strengthening trust and cooperation with stakeholders across different sectors.



Cross-cutting enabler 4: Skill development and education on the circular economy

Everyone—regardless of sector, age or education—should have the opportunity to grow their circular economy knowledge and skill set. Efforts must be made to ensure that circular economy and resource wisdom are taught at all levels of education in the Turku region—from early childhood education through higher and continuing education. The city will support building up comprehensive knowledge on all aspects of the circular economy, including resource wisdom and recycling, new economic and business models and a fair and inclusive circular economy. The development of a common vision and practical materials for resource-wise education will facilitate inclusion of these topics in school instruction. Teacher training will involve professionals and organizations that have experience in circular economy education nationally or in the Turku region. These practitioners will provide teachers with guidance on resources and best practices. In addition, Turku will cooperate with national actors to ensure that curricula address resource wisdom in a cross-cutting way and that funding is provided for teacher education on these topics.

Cross-cutting enabler 5: Circular economy solutions for residents

Together with different actors, the city will work to ensure that residents of the Turku region can access circular economy solutions in their everyday lives, including sharing, leasing, re-sale and maintenance services. Existing platforms, services and successful pilot projects, such as the Turku service map or the furniture recycling model, as well as new initiatives like the concept of a circular economy store, will be developed, maintained and expanded. We will invite a wide range of actors to participate in idea development and communication. The objective is to create a variety of services that are easy to use, safe, and well-known to residents. On the provider side, services may include income-generation opportunities. The city will support both non-commercial and commercial solutions by striving to expand supply, increasing efficiency of use and improving business opportunities.

Cross-cutting enabler 6: A resource-wise and 1.5°C-compatible life – an easy-to-grasp concept

We will facilitate clear, participatory and stimulating dialogues as well as cooperation within the municipality in order to reach every resident and actor in the Turku region interested in resource wisdom and 1.5 °C lifestyles. People should understand how their own environmental footprints are determined as well as recognize how they can decrease their environmental impact by choosing circular economy solutions. Circular solutions will be developed for services that the city provides; at the same time, businesses and communities will be encouraged to offer services that will enable all residents to live resource-wise lives. Resource wisdom and circularity will become a visible and natural part of people's everyday life. We will make use of narratives on different sustainable lifestyles, talk about circular solutions, discuss the myriad ways people can make an impact and focus on personal and community empowerment.



NEXT STEPS



Going forward, the Circular Turku project will focus on five actions to ensure the implementation and scaling of the actions outlined in the roadmap.

Embedding circularity in the city's strategy

The Carbon Neutral and Resource Wise Turku is one of the key themes in the Mayor's Program highlighting the commitment to promote the transition to a circular economy. To support the goal, an action plan is being developed with the city and local stakeholders. Circular Turku interventions will be integrated in the update of Turku's City Strategy 2029 and the city's Climate Plan 2029. The roadmap will be implemented as part of the city council mandates 2021 - 2025 - 2029. Progress reports will be made at the end of each council term.

Putting the roadmap into action locally

The jump from the circular economy roadmap to concrete actions will involve unpacking the roadmap's sector-specific interventions with regional stakeholders, including businesses, community organizations and NGOs. The city will collaborate with these stakeholders to establish roles and responsibilities. Collaboration among circular businesses will be streamlined through stakeholder consultation and adoption of business sub-targets for each of the priority topics.

Actions taken under the roadmap will be featured in an online portfolio. In addition, the project will explore indicators to track how progress on the city's goals supports localization of the SDGs, emissions and waste reduction, biodiversity protection and creation of fair employment opportunities.



Ensuring a fair and inclusive Circular Turku

Attention to equity and inclusivity are key to ensuring that the Circular Turku roadmap benefits all residents. To achieve this, participation, fair employment opportunities, and inclusive access to goods and services are built into the next phase of the project. Residents and local actors will be invited to participate directly (e.g. via the online portfolio and public hearing services) as well as in “Circular Turku for all” dialogues. The city will continue to work with community organizations and youth groups, particularly in the realm of sharing initiatives. Ultimately, social equity guidelines for circular economy projects will be created and shared across ICLEI’s network.

Streamlining biodiversity and circularity efforts in Turku

Turku’s action program for protecting biodiversity, approved for further development in 2021, will present the city with an opportunity to link its circular economy and biodiversity agendas. Interventions in these two areas should be mutually reinforcing. On the circular side, the consortium will map opportunities for interventions to positively contribute to biodiversity, such as by inclusion of nature-based solutions. The mapping activity will be the foundation for guidelines on how the circular economy can protect biodiversity; the guidelines will be shared on the global stage.

Internationalization of Circular Turku learnings

Turku’s role as a change-maker on the national and international level will be strengthened by widely sharing learnings and challenges with peer cities in Finland and abroad. ICLEI will facilitate peer-learning, global mentorship and partnership opportunities for Turku via the ICLEI Circulares platform and the European Circular Cities Declaration, of which Turku is a founding member, and other global events. Turku will also have the opportunity to bring learnings from its work at the intersection of biodiversity and circular economy to the global stage at the COP 26 UN Climate Change Conference, the COP15 UN Biodiversity Conference and other events.





Resource-wise Turku: what will it be like?

As a result of concerted effort by the city and its partner, the Turku of 2029 will have a positive impact on the environment. In 2029, Turku is a climate-positive city that is well on the way to resource wisdom. This means that consumption of resources and production of waste are minimized and biodiversity is preserved.

The local economy has grown stronger and is increasingly operating in synergy with nature to regenerate natural systems. Opportunities for jobs and livelihoods in the circular economy have increased and are fairly distributed among residents, contributing to a just and inclusive city. These changes have been achieved by leveraging collective know-how, embracing new business opportunities and facilitating close cooperation among stakeholders in different sectors.

All Turku residents are able to participate in the circular economy, which offers them opportunities for meaningful and sustainable ways of living.



Working together for the future

Thank you to everyone who has already put effort into building a resource-wise Turku:

More than 200 thematic experts and business representatives in the region who participated in workshops and content creation.

The Circular Turku steering group:

The City of Turku, the University of Turku, Turku University of Applied Sciences, Turku Science Park Oy, the Centre for Economic Development, Transport and the Environment of Southwest Finland (ELY Centre), the Regional Council of Southwest Finland, the Service Centre for Sustainable Development and Energy of Southwest Finland (Valonia), Innovation Fund Sitra and ICLEI - Local Governments for Sustainability.

National organizations, among others:

ITS Finland (Intelligent Transportation Society), Ministries (Ministry of Agriculture and Forestry and Ministry of the Environment), cities (Lahti, Oulu, Tampere), Green Building Council, Smart and Clean Foundation and the CICAT 2025 research group.

