

The next stages of Nordic Innovation and Cooperation for sustainable mobility and transport



Foreword

By the end of the decade our region is to become a world champion in sustainability and regional integration, as defined by the joint Nordic Vision 2030. Making the Nordic region a pioneering region in green mobility is one of three innovation missions rooted in the vision. There is no lack of mobility initiatives or projects, and at Nordic Innovation we contribute with our own portfolio of innovative projects under the Nordic Smart Mobility and Connectivity programme and green mobility initiatives.

However, we are not moving with enough speed to reach the 2030 goals, and priorities are not aligned. Collaboration is a driver of innovation and sustainability and our traditions for doing so has given us a head start, but how can we optimise our chances of remaining at the forefront of sustainable mobility? What actions are needed to enable us to create enough impact in time? «The Next stages of Nordic Innovation and Cooperation for sustainable mobility and transport» is a project aiming to chart the next stages of Nordic cooperation in mobility. The project includes an analysis of the current Nordic mobility ecosystem, assessing ongoing and completed projects for their impact, sustainability, and added Nordic value, and identifying regional strengths and competitive advantages. Based on this analysis, strategic recommendations for future collaboration in mobility are proposed to enable both public and private entities to make smart, impactful decisions. The findings, analysis, and recommendations are compiled in this report.

Hopefully, the conclusions and recommendations will provide guidance and inspire both mobility stakeholders and decision-makers in their prioritisation efforts. You will read it in the report, but I will highlight one of the conclusions also here: Collaboration will be key.

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Executive Summary

The Nordic region's commitment to innovation and sustainability, is poised to redefine the future of mobility and transport. This report offers an overview of the current landscape, the challenges faced, and the potential pathways forward, ensuring that the region remains at the forefront of sustainable mobility.

A recurring theme in this report are references to "new mobility". This isn't just a fleeting trend but a fundamental shift in how we perceive and approach transportation. It's about creating systems that are not only efficient and user-centric but also environmentally responsible. As the world grapples with the challenges of climate change and urbanisation, the Nordic region's emphasis on sustainable mobility becomes even more pertinent.

Several elements are propelling this transformation in the Nordics. Changing behaviors and preferences of the populace, technological advancements, and strategic operations are all converging to shape the future of mobility. Additionally, the broader global context, especially directives from the European Union, plays an instrumental role. The European Green Deal provides both a challenge and a blueprint, pushing the region to adopt greener and more sustainable transport solutions.

While the Nordic region has made significant strides, challenges remain. The report delves into the intricacies of implementing new mobility solutions, the hurdles of scaling innovations, and the complexities of navigating a rapidly changing global landscape. However, with challenges come opportunities. The Nordics, with their collaborative nature, technological prowess, and commitment to sustainability, are uniquely positioned to turn these challenges into avenues for growth and innovation.

One of the core components of the report is the set of strategic recommendations provided. These insights, derived from research and industry interviews, are designed to guide stakeholders in the region. Whether it's policymakers or industry leaders, the recommendations offer a roadmap to ensure that initiatives in the mobility sector are aligned, impactful, sustainable, and in line with the broader vision of the Nordic region.

The concluding sections of the report stake out a course for the future in transport and mobility. As the Nordic region works towards more sustainable mobility, collaboration will be key. The report emphasises the importance of regional cooperation, knowledge sharing, and leveraging collective strengths. By doing so, the Nordics can not only address their unique challenges but also set global benchmarks in sustainable transportation.

In essence, this report serves as both a reflection and suggested path forward. It captures the current state of mobility in the Nordics, the challenges faced, and the immense potential that lies ahead. As policymakers, and stakeholders navigate the complexities of the transport sector, this document aims to offer clarity, direction, and a vision for a sustainable and interconnected Nordic region within mobility.

The recommended impactful areas in mobility for the Nordics are:

The Transition to Green Aviation: Recognising the environmental implications of aviation, the Nordics are pioneering efforts to shift towards more sustainable aviation practices, focusing on cleaner fuels, efficiency, and reduced emissions.

A Sustainable and Automated Maritime

Sector: The maritime sector is undergoing a significant transformation. The emphasis is on sustainable fuel alternatives, harnessing automation for enhanced efficiency and integrating sustainable practices to minimise ecological impact.

Infrastructure and Services Supporting

Electrification: With the global push towards electrification, the Nordics are investing in robust infrastructure, from charging stations to grid enhancements, ensuring a seamless transition to electric transportation.

Intermodal and Smart Mobility Solutions:

The future lies in integrated transport solutions. By promoting intermodality, the region aims to offer a seamless, efficient, and user-friendly transportation experience.

Circular Economy in Transportation: Moving beyond linear models, the focus is on creating transportation solutions that are regenerative by design, emphasising reuse, recycling, and reduced waste.

Climate Resilient Infrastructure: As the effects of climate change become increasingly palpable, there's a concerted effort to develop infrastructure that can withstand and adapt to changing climatic conditions.

Unified and Progressive Policy and

Regulation: To steer the sector towards sustainable practices, the Nordics are working on policies and regulations that are not only progressive but also harmonised across the region, ensuring consistency and clarity.

Integral to the realisation and evaluation of projects in these domains is the following proposed criteria:

1. Effect towards climate goals: Projects must demonstrate significant contributions to climate objectives, emphasising carbon emissions reduction and adaptive capacities to climate alterations.
2. Resilience to global challenges: Projects that bolster the Nordic region's resilience against an array of global challenges, be it environmental, economic, or social, hold priority.
3. Competitive advantage: Projects should leverage unique Nordic strengths, such as technological innovation or maritime legacy, resulting in globally competitive outcomes.
4. Path to industrialisation: Emphasis on projects that have a clear trajectory from concept to tangible outputs, underscoring a commitment to green growth and regional competitiveness.
5. Potential for cooperation: Projects showcasing extensive collaborative potential, transcending borders, companies, and sectors, align with the vision of a cohesive Nordic region.
6. Productivity: Projects focused on enhancing the efficiency of transporting people and goods, leading to reduced emissions, enhanced user experiences, and economic growth.



Nordic Smart Mobility and Connectivity

Vision 2030

As stated in the Nordic Vision 2030, endorsed by the five Nordic governments: *The Nordic region will become the most sustainable and integrated region in the world in 2030.*¹ In order to realise the vision, the Nordic Council of Ministers will prioritise three areas in the next four years: a green Nordic region, a competitive Nordic region and a socially sustainable Nordic region

Nordic Innovation will work towards the Nordic Vision 2030 through three innovation missions:

- A waste-free Nordic region.
- Leading within smart and sustainable growth.
- A pioneering region for green mobility.

A pioneering region for green mobility

The Nordic region aspires to be a beacon of integrated mobility by 2030. The sustainable vision is deeply rooted in the region's rich natural heritage. However, the urgency to act has never been more pronounced. Climate change, pollution, threats to biodiversity, and other global challenges demand immediate and concrete action.

It requires a holistic approach that encompasses sustainable energy production, green transport, and a circular economy. A new, green economy, driven by innovation, not only promises environmental benefits but also job creation and enhanced competitiveness.

The Nordic countries have a long history, thriving through collaboration. Their shared values, underpinned by culture and language, have fostered a sense of unity and purpose. Education, innovation, research, mobility, and integration form the bedrock of the respective societies, ensuring resilience even in the face of significant challenges.

For mobility the objectives specifically has been co-created in close dialogue with the mobility stakeholders across the region:

- Changing the way people and goods move
- Speeding up the transition to more sustainable mobility
- Seamless, integrated and people-centric mobility (individuals)
- Decarbonised and energy-efficient mobility (society)
- Quality of life

Projects in the programme

Nordic Innovation is championing a shift in the Nordic region, aiming to support the needed transition in the transportation of people and goods. The goal is to accelerate the move towards a sustainable future characterised by efficient mobility and connectivity solutions for the region's citizens. These solutions include the intricate web of movement and connections between people, places (spanning the rural and urban areas in the region), goods, services, and data, with "smart" emphasising aspects like sustainability, security, and digitalisation.

By supporting collaboration among diverse stakeholders in the Nordic region, spanning both the public and private sectors across various industries, Nordic Innovation aims to strengthen sustainable growth, decrease carbon emissions, and

¹ <https://www.norden.org/en/our-vision-2030>

enhance the overall well-being and accessibility for its inhabitants.

This initiative² is built upon the legacy of the Nordic Smart Mobility and Connectivity program from 2018 to 2021, and its torch is now carried by the Nordic Green Mobility and Smart Connectivity programs for 2021-2024. Projects include: Nordic+ Mobility Ecosystem

- Nordic Network for Electric Aviation (NEA 2.0)
- Nordic Open Mobility and Digitalisation (NOMAD)
- New Offshore Wind Ports in the Nordics
- The Maritime Energy Transition (MAREN)
- Nordic Network for Electric Aviation (NEA 1.0)
- Next Wave (Next Nordic Green Transport Wave – Large Vehicles)
- Innovative Sustainable Urban Last Mile: Small Vehicles and Business Models (i-Smile)
- The Nordic Green Ammonia Powered Ships (NoGAPS)
- Sustainable Insights: Measure, Inform, Mobilise (MIM)
- CONNECTING: Control Tower for Autonomous Vehicles
- Nordic Drone Initiative
- The Connected Ship
- On Shore Power Supply in the Nordic Region
- Zero Emission Energy Distribution at Sea (ZEEDS)
- Nordic Urban Mobility 2050 – Future Cities

Examples of sustained ecosystems

The Nordic+ Mobility Ecosystem stands out in the portfolio with an ambition to create a new, permanent network for the Nordic Mobility Ecosystem. The project, active from 2023 to 2026, aspires to foster cooperation and innovation in mobility beyond 2030 and leverage Nordic expertise, stimulate cross-border collaboration, and the development of Intelligent Transportation Systems and Services, through methods such as thematic workshops, creation of a Nordic innovation arena, and concerted branding activities.

The Maritime Energy Transition (MAREN) project, operational from 2020 to 2024, is initiated under the Nordic Innovation Mobility Mission, and is mandated to cultivate a unified Nordic platform that champions the development of joint maritime energy projects, including potential EU collaborations. Through the creation of a Nordic maritime energy program, MAREN aims to consolidate the region's commitment to sustainable maritime energy transition. To reinforce the collaborative ambition is the introduction of a digital platform for cross-industrial partnerships, positioning the initiative for sustainable maritime innovation and cross-border collaboration.

Funded under the Nordic Green Mobility program, these projects involve partners from across the Nordic region, with the goal to improve traditional operations and business models through zero-emission, automation, digitalisation, and user-friendly services.

² <https://www.nordicinnovation.org/mobility>

Defining mobility

The term "mobility" refers to the movement of people and goods from one location to another. This can be on land, in the air, or at sea. It involves a variety of transport modes, including cars, bicycles, trains, airplanes, ships, and more. The domain typically also includes the infrastructure that supports these modes of transport such as roads, railways, airports, and ports.

The concept of mobility extends beyond just physical transportation to include the accessibility and efficiency of these transport systems. It concerns how easily and effectively individuals and goods can move around, taking into consideration factors such as cost, time, safety, and environmental impact. Increasingly, the term also refers to digital and smart technologies that are transforming the transportation sector, such as on-demand services, autonomous vehicles, and smart traffic management systems.

Mobility plays a fundamental role in society, shaping the way communities function, economies prosper, and individuals live their lives. It is deeply interwoven with numerous social, economic, and environmental aspects, making it a political domain of significant importance.

Economic Growth and Development Mobility ensures smooth and efficient transportation of goods and services, contributing to economic growth by supporting trade and commerce, facilitating job creation, and promoting productivity. An efficient mobility system helps businesses to expand their reach, and allows individuals to access job opportunities that may be geographically distant.

Social Inclusion Mobility supports social inclusion by providing access to essential services such as education, healthcare, and social activities. It enables people, regardless of their location, to participate fully in societal life. The equity of mobility systems – that is, whether they are accessible and affordable to all – therefore has significant implications for social justice and quality of life.

Environmental Sustainability Mobility, particularly in its current, largely fossil-fuel dependent form, has substantial implications for environmental sustainability. Transportation is one of the leading contributors to greenhouse gas emissions, and therefore a key area of focus in efforts to mitigate climate change.

Physical Planning and Infrastructure Decisions about mobility systems shape cities and rural areas alike, influencing everything from housing and land use patterns to levels of traffic congestion and air quality. Public policies on mobility can encourage the use of public transportation, cycling, or walking, leading to healthier, more livable cities and regions.

Given these broad-ranging impacts, decisions in the mobility domain are inherently political. They involve complex trade-offs between different objectives – such as efficiency and equity, or economic growth and environmental sustainability – and affect a wide range of stakeholders. The political importance of mobility is further heightened in the context of current global challenges, such as the need for climate action, the transition to a digital economy, and the pursuit of more equitable and inclusive societies.

Factors constituting new mobility

While the term “mobility” in itself refers to the general movement of people and goods from one place to another, “*new mobility*” is often used to describe the shift in the way we approach transportation. It alludes to innovative, transformative - and at times disruptive - approaches to mobility that prioritise sustainability, efficiency, and flexibility.

The development of new mobility is not solely determined by a single factor but emerges as a consequence of many interconnected elements; human behavior, technology, operations, capital, regulation and urban integration. It is key to recognise the interconnectivity of these elements and apply a holistic approach in understanding and addressing the complex challenges associated with implementing and scaling new mobility.

Human behavior

Understanding human behavior and behavior change in the context of mobility is essential for designing effective transport systems, promoting sustainable choices, improving safety and shaping policies that align with the needs and preferences of communities and individuals, for businesses and their customers.

Technology

Technological advancements continue to shape the way we move. Technological improvements are vast and involve everything from new modes of transportation to software and digital platforms. These advancements have the potential to increase efficiency, lower costs, and unlock opportunities for all segments of mobility.

Operations

Efficient and well-managed operations are essential to ensure a smooth and well-functioning mobility ecosystem. The term “*operations*” is broad and includes areas like supply-chain, fleet management, logistics infrastructure etc. and is crucial to ensure reliable mobility services.

Capital

Mobility can require significant capital investment, and while traditional forms of mobility often receive subsidies and state funding, the landscape is different for new mobility. The introduction of innovative solutions, technologies, and unconventional approaches comes with a greater risk and necessitates a different form of capital, such as venture capital.

Regulation

Regulation and policy in the mobility sector, covering user safety, technical standards, and market fairness, play a crucial role in ensuring the well-being of users and maintaining a sustainable and equitable mobility ecosystem. When done right, policy making in mobility is balancing these needs, while still promoting innovation in the field.

Physical integration

Urban integration focuses on creating seamless connections between different transportation modes and aligning transportation and planning of land use to create sustainable and well-designed urban environments. This spans from evolving of existing residential areas and commercial zones to new property and city development.

Background and assessment of status quo

The Nordic Smart Mobility and Connectivity program, launched in 2018, was based on the circumstances of its time. In the subsequent 5 years, significant events and changes have reshaped the global mobility landscape. This section lists a selection of overarching themes and how they can impact Nordic mobility in the years to come.

Macro-environmental factors

Macroeconomic factors play a significant role in shaping Nordic mobility. Global uncertainty and conditions such as inflation, interest rates, and budget allocation, impact how we cater and facilitate new mobility and pose challenges to scaling up viable solutions.

Pandemics Pandemics, like the COVID-19 outbreak, have profound implications for mobility in the Nordic region. During such events, there's a noticeable shift in transport patterns as public transportation sees reduced usage due to health concerns, and there's a rise in home-delivery and individual mobility solutions like private cars, cycling or walking. Pandemics also hinder international travel and trade, limiting the movement of goods and people. As Nordic countries rely on inter-regional and international trade and tourism, pandemics has shown to severely impact their economies, prompting a reevaluation of mobility strategies to ensure resilience in future crises.

Reduced growth forecast and access to capital A reduced growth forecast can lead to cautious spending and investment patterns. For the Nordic mobility sector, this could mean that both public and private entities might hesitate to invest in new projects or

technologies. A pessimistic growth outlook can dampen consumer confidence, resulting in decreased demand for new vehicles or transportation services, further affecting the region's mobility dynamics.

When capital markets face liquidity issues, it can hamper investment in infrastructure, startups and general mobility projects in the Nordics. A shortage of funds might mean delayed or canceled projects, which can stifle innovation and the adoption of newer, more efficient transportation solutions. Startups and ventures in the mobility sector might face difficulties securing funding, slowing down the development of new mobility technologies and services.

Budget allocations and public spending

Public spending and budget allocations directly influence the mobility sector's development in the Nordics. A reduced allocation to transportation and mobility infrastructure can hinder the growth of efficient and sustainable transport networks. On the other hand, prioritising mobility in public spending can catalyze innovation and improve connectivity, boosting the region's economic prospects.

Trade wars and geopolitical dynamics

leading to supply chain constraints Trade wars and geopolitical tensions can disrupt the movement of goods, leading to increased costs and delays. The Nordics, with their open economies, are especially vulnerable to such disruptions. Geopolitical dynamics can also impact the availability and cost of supplies needed for mobility solutions, like resources required for electric vehicles.

The mobility sector is deeply integrated with global supply chains, from vehicle manufacturing to fuel distribution. Any disruption in these supply chains can lead to delays, increased costs, and even unavailability of essential products and services. For the Nordics, which often rely on imports for various components, supply chain constraints

can pose significant challenges, forcing a rethinking of sourcing strategies and potentially prompting a shift towards local production.

The Russia Ukraine conflict³ The conflict between Russia and Ukraine has multifaceted implications for Nordic mobility. As recently shown, it can disrupt energy supplies, given Russia's role as a significant energy exporter. It can also lead to geopolitical tensions within Europe, potentially impacting trade routes and diplomatic relations. This conflict poses challenges both to international supply chains and the movement of people, especially in terms of migration patterns, within the region.

Climate Change Climate change represents both a direct and indirect challenge to mobility in the Nordic region. Directly, through increased frequency of extreme weather events, and shifting climatic patterns that can damage transportation infrastructure and disrupt regular mobility patterns. Flooding can render transport infrastructure impassable or delay public transportation. Indirectly, as the Nordics, like many regions, strive to meet international climate commitments, there's an accelerated push to adopt sustainable mobility solutions, such as electrification, alternative fuels such as hydrogen and ammonia, and efficient public transit systems. This urgency can put pressure on existing systems and require significant investments. Changing climate conditions might necessitate the redesign of transportation networks, such as rerouting due to areas becoming prone to flooding. Climate change also acts as a catalyst, urging the Nordic mobility sector to innovate and adapt.

Need for strengthened Nordic and European partnerships

Regional partnerships become increasingly important as a reaction to fragile global cooperations and multilateralism that are increasingly under pressure. This is reflected amongst others in the intensifying trade conflicts between the US and China, the aftermath of Brexit, the ongoing war in Ukraine and the developing situation in the Middle East.

The global unrest and disruption of existing supply chains can, according to the World Trade Organisation⁴ lead to a move for re-shoring, near-shoring and for 'friend-shoring' – either making strategically important goods at home or procuring them from partners. The Nordic countries are in a good position to leverage its already close ties.

The Nordic countries combined represent the 12th largest economy in the world. Boasting the collective status of the world's 12th largest economy when combined, the Nordic countries possess substantial economic clout. This economic strength not only gives them a significant voice on the global stage but also provides a solid foundation for mutual collaboration and investment. A combined economic approach can allow these countries to pool resources, invest in shared mobility projects, and form a more resilient and self-reliant regional economy that is less susceptible to global market fluctuations.

The mobility system, expertise, and industry are complementary. In multiple areas, the individual strengths of each Nordic country in the mobility sector dovetail with one another. For instance, while one country might excel in EV-implementation, another could be a leader

³ https://www.wto.org/english/res_e/booksp_e/imparctukraine422_e.pdf

⁴ https://www.wto.org/english/res_e/booksp_e/wtr23_e/wtr23_e.pdf

in consumer facing services or ITS-based traffic management. These complementary expertise and industrial capacities mean that, when united, the Nordic region can provide holistic mobility solutions that cater to a diverse range of needs and challenges. By sharing knowledge and best practices, they can push the boundaries of what's achievable in sustainable and innovative transportation.

Combined, the region covers a large part of the needed supply chain The Nordic countries and their close neighbors, with their diverse

industries and resources, can potentially form a near-complete supply chain for mobility solutions. From material access to high-tech manufacturing and end-user services, the region has the capacity to offer end-to-end solutions. This self-sufficiency becomes particularly crucial in times of global disruptions, such as trade wars or pandemics. By leveraging this integrated supply chain, the Nordic countries can ensure more consistent, reliable, and sustainable mobility offerings for their populations, reducing dependencies on external entities.



Notable Example: Project MODI

Despite the acceleration of automated transport development, there are many obstacles that need to be overcome before a full-scale introduction of such transportation can occur. These obstacles are related to the technology's maturity, as well as regulations, data harmonisation, and social acceptance. When considering border-crossing transport, these hindrances only escalate.

The main objective of the MODI project is to understand and overcome the regulatory barriers and infrastructure shortcomings on the motorway corridor for public roads. MODI is a cross-border initiative that aims to accelerate the introduction of Connected, Cooperative, and Automated Mobility (CCAM) solutions to significantly improve logistic chains.

MODI has a total budget of approximately €28 million, covers 5 use cases, and consists of a 34-organisation public-private partnership from 8 countries to test and validate the implementation of CCAM solutions for real logistics operations.

<http://modiproject.eu>

The uprise of advanced technologies

Advanced technologies, such as IoT, AI and various automation, have emerged as transformative forces in the mobility sector. These technologies hold great potential for advancing the development of "smart" and personalised mobility solutions.

The integration of such technologies has been exemplified by frameworks like CASE (Connected, Autonomous, Shared, Electric), as significant drivers of mobility disruption. While CASE was initially focused on the car industry, it is a relevant framing and catalyst for a broader ecosystem of interconnected mobility options, both for people and goods, and across land, sea, and air.

Embracing advanced technologies will play a central role in shaping the future of Nordic mobility, enabling greater efficiency, convenience, and environmental sustainability.

Electrification. The Nordic countries have historically been at the forefront of environmental sustainability, and the transition to electric⁵ vehicles (EVs) is a testament to this commitment. Driven by both governmental incentives and a societal push towards greener alternatives, the adoption rate of EVs in the region has consistently ranked high internationally. Charging infrastructure is expanding rapidly, and deriving electricity from renewable sources is a characteristic of the region. As battery technologies improve and prices become more competitive, the Nordics are well positioned to continue to lead and inspire the global transition towards an all-electric vehicular future.

Data. Shared and standardised data will be key in unlocking the true potential of an interconnected mobility ecosystem. In the

Nordic context, the emphasis on transparency and collaboration has spurred initiatives where transportation agencies, tech firms, and service providers share data. This shared information aids in cross-region travel and enhancing user experiences. Data standards, ensure consistency and interoperability, enabling different systems to "talk" to each other,

facilitating a seamless mobility experience across different modes of transport

Shared mobility. Shared mobility services can reshape the very essence of transportation in the Nordic region. From bike-sharing initiatives in urban centers to carpooling solutions for suburban areas, these services offer a flexible and often more sustainable alternative to traditional modes of transport. The shift towards shared mobility reduces the number of vehicles on the road, leading to decreased congestion, lower emissions, and a reduced need for parking spaces. As the Nordics continue to urbanise, these shared services, enabled by digital platforms, will play a vital role in ensuring efficient, equitable, and environmentally friendly transportation options for all.

Autonomy. The advent of autonomous vehicles has the potential to transform the landscape of transportation in the Nordic region. While autonomous cars, shuttles and busses hold promise for reducing traffic accidents and increasing transportation efficiency, autonomous trucks, drones and ships might reshape the logistics and delivery sectors. The Nordics, known for their progressive approach to technology, could become pioneers in integrating autonomous systems, ensuring safer and more streamlined transportation of both people and goods. As regulations evolve, the region might foster an increased interplay of autonomous systems.

⁵ <https://www.nordicenergy.org/wordpress/wp-content/uploads/2021/05/Nordic-EV-barometer-2021-ENG-1.pdf>

AI. Artificial Intelligence (AI) is changing the mobility sector by facilitating predictive analytics, personalisation, and enhanced user experiences. In the Nordics, AI-driven algorithms are already aiding in traffic flow optimisation, and predicting maintenance needs for public transportation systems. AI-

Change in user behavior

A notable shift in user behavior is ongoing as conscious consumer groups increasingly seek personalised and sustainable mobility solutions. These individuals now expect on-demand services tailored to their specific needs and offering continuous accessibility, surpassing traditional pre-scheduled offerings.

The rise of on-demand mobility services is in turn also changing the transportation landscape, transforming the way we perceive the movement of people and goods. Startups, scaleups, and public transport authorities have responded by developing comprehensive mobility platforms that gradually unite various transportation options within a single app. In some regions users can seamlessly plan and access public transit, bike-sharing, car-sharing and micro-mobility in a unified service or have goods delivered as a unified order across various suppliers. This integrated approach empowers consumers with the freedom to select the most suitable mode of transport for their journeys, eliminating the inconvenience of managing multiple apps or services.

Interest and willingness to change In 2022 consulting firm McKinsey conducted a study on the future of mobility in 2035⁶ and found significant interest in mode change with 30 percent intending to increase their use of shared mobility or micromobility (e-bikes and

powered apps and services, improve customer service, providing real-time updates, route suggestions, and travel advisories tailored to individual preferences. The use of AI not only enhances efficiency but also helps in creating more dynamic and adaptable mobility networks.

e-scooters). Nearly half of the respondents (46 percent) were open to replacing their private vehicles with other modes of transport. And a majority (70 percent) were willing to use a shared autonomous shuttle with up to three other people.

Shifting focus to sustainability and circularity

The global mobility sector is undergoing a profound transformation, with sustainability and circularity emerging as central tenets of this evolution. As the world grapples with the pressing challenges of climate change, urban congestion, and resource depletion, the traditional paradigms of production, operation and transportation are being re-evaluated and reshaped.

Sustainability in mobility is no longer just an aspirational goal; it's a necessity. It touches a broad spectrum of initiatives, from the development of electric vehicles and the promotion of public transport to the integration of renewable energy sources and the reduction of carbon footprints. The focus on sustainability and circularity in mobility is not just a trend but a reflection of a deeper global realisation. But it's not just about reducing emissions or conserving energy. True sustainable mobility also considers social and economic dimensions, ensuring that transportation solutions are accessible, affordable, and beneficial for all members of society.

⁶ <https://www.mckinsey.com/industries/automotive-and-assembly/our-insights/the-future-of-mobility-mobility-evolves>

Regional drivers and characteristics in Nordic Mobility



EU laws, strategies and initiatives

The European Union's directives and sustainability goals significantly influence the Nordic region's mobility and transport initiatives. These EU initiatives and guidelines⁷ provide a clear roadmap for the Nordics, setting standards and targets that align with broader European objectives. While they offer direction, they also challenge the region to innovate and adapt, given the Nordics' reputation for progressive policies.

EU's focus on sustainability and digital transformation aligns well with the Nordic vision. These shared goals act as catalysts, speeding up change and encouraging collaboration both within the Nordic countries and across Europe.

In short, the Nordic region's mobility initiatives are deeply connected to EU directives. This bond ensures that, while the Nordics maintain their unique identity, they also move in harmony with Europe's broader sustainable mobility objectives.

EU programs relevant to Nordic mobility include:

The European Green Deal The EU's roadmap for making its economy sustainable involves turning climate and environmental challenges into opportunities. This directly impacts Nordic Innovation's focus on green mobility, as it encompasses a comprehensive transport strategy for a cleaner, smarter, and more innovative sector.

Sustainable and Smart Mobility Strategy This initiative aims to make European transport smart and sustainable. The Strategy promotes the shift to sustainable and smart mobility, reliable services, and the deployment of modern infrastructure.

EU Climate Law The law proposes a legally binding target of net-zero greenhouse gas emissions by 2050. This goal directly aligns with Nordic Innovation's commitment to carbon neutrality and climate adaptation.

European Data Act Proposed by the European Commission, this legislation aims to regulate data access and use across sectors and among various actors, ensuring that data can be

utilised to fuel innovation and growth in the digital single market. It is particularly relevant to Nordic Innovation's smart mobility and intermodal solutions, where data sharing is crucial for efficiency and seamless operation.

Horizon Europe The EU's key funding programme for research and innovation, Horizon Europe, supports initiatives that align with Nordic Innovation's focus areas, such as digitalisation and innovation in mobility.

NextGenerationEU This temporary recovery instrument aims to repair the immediate economic and social damage brought about by the coronavirus pandemic, and kick-start the journey towards a greener, more digital, and more resilient Europe. It has a direct impact on innovation and sustainability in mobility.

European Battery Alliance The alliance aims to create a competitive and sustainable battery value chain in Europe. This initiative is crucial for the electrification of the transport sector, which is a key area of focus for Nordic Innovation.

⁷ <https://ec.europa.eu/eurostat/documents/3217494/11478276/KS-DK-20-001-EN-N.pdf/06ddaf8d-1745-76b5-838e-013524781340?t=1605526083000>

Circular Economy Action Plan As part of the European Green Deal, the new Circular Economy Action Plan presents measures to make sustainable products the norm in the EU. It aligns with Nordic Innovation's focus on sustainable production and consumption.

Nature Restoration Law The European Commission through the Nature Restoration Law has a goal of improving 20% of Europe's

habitats by 2030. Since many of these natural areas are deteriorating, the plan could greatly influence transportation planning. Healthy ecosystems mean stable transport infrastructures, urging Europe to think about alternative use of land and greener mobility solutions.

National Transport Plans and priorities

National transport plans in the Nordic countries play a instrumental role in shaping the future of mobility and infrastructure within the region. These plans, often developed with a long-term perspective, outline the strategic priorities, investments, and initiatives aimed at creating an efficient, sustainable, and interconnected transportation system.

They consider the unique geographical, climatic, and socio-economic challenges of the Nordics, ensuring that transportation solutions are tailored to meet the specific needs of the populace and local markets.

These plans emphasise collaboration between different modes of transport, integration of green technologies, and enhancement of regional connectivity, reflecting the Nordic commitment to sustainability, innovation, and cohesive regional development.

Examples of Transportation Plans:

- Norway: National Transport Plan 2022–2033
- Sweden: Proposal national plan for transport infrastructure 2022–2033
- Denmark: Denmark Forward 2035
- Finland: The National Transport System Plan for 2021–2032
- Iceland: The Transport Policy Plan (does not follow the same structure as other Nordic countries).

traffic and improve safety across all modes of transport.

Efficiency and Infrastructure Development:

The plans highlight the need for efficient and well-functioning transport systems. They focus on improving existing infrastructure and developing new infrastructure to support the competitiveness of businesses and the well-being of individuals.

There is a shared vision among the Nordic countries for a safe, efficient, sustainable, and customer-oriented transportation system that supports both economic growth and environmental sustainability.

Digitalisation: The role of digitalisation in improving transportation systems is recognised across the plans. They aim to promote digital solutions in transport and logistics, improve the availability and interoperability of data, and leverage technology to enhance transportation systems.

Similarities and alignment across the National Transportation Plans in the Nordics include:

Sustainability and Environment: All five countries emphasise the importance of sustainable development and environmental considerations in their transportation plans. They aim to reduce greenhouse gas emissions, promote the use of renewable energy, and transition towards more sustainable modes of transport.

Accessibility and Equality: The plans emphasise the importance of maintaining a comprehensive transport network that serves all regions of the country, ensuring regional equality and accessibility.

Safety: Each country prioritises safety in their transportation systems. They aim to reduce the number of deaths and serious injuries in road

Customer Orientation: The plans aim to improve the customer orientation of the transport system, developing services that meet the needs and expectations of different user groups.

Opportunities and competitive advantage

The Nordic region stands out in the global mobility landscape due to a unique blend of regional drivers and characteristics. Systemic and political stability across these countries has laid a foundation for long-term planning and investment in infrastructure and innovation.

This stability has to a certain degree fostered a favorable business environment, attracting both domestic and international stakeholders to develop, test and implement new mobility solutions. Consistent policies are potentially making it easier for innovations to be tested and scaled regionally, giving the Nordic countries a competitive edge in bringing solutions to market more swiftly.

The Nordic region's access to a well-educated and skilled human capital pool may serve as a catalyst for its mobility advancements. Coupled with a culture of collaboration and innovation, this can help position the Nordic region in not only address its unique mobility challenges, but also to lead and set benchmarks in global mobility solutions. To achieve scale the region can however not solely rely on talent resources from within the region and will depend on strategies for attracting international talents.

The Nordic Brand

Sustainability: The Nordic countries have a strong commitment to sustainability and environmental topics. They are known for implementing progressive policies and initiatives to address climate change, promote renewable energy sources, and achieve carbon neutrality.

Trustworthiness: The Nordic countries are widely recognised for their integrity, transparency, and adherence to ethical practices. This fosters trust among international partners and investors, making the region a reliable and credible destination for collaboration and business opportunities.

Design and Innovation: The Nordic region represents an identity rooted in a legacy of design and innovation with an emphasis on functionality and user-centricity. A combination of user focused design, technology, pioneering urban planning, and ambitious sustainable practices contributes to the hallmark of the Nordic brand within mobility.

Existing mobility and transport industry

The existing mobility and transport industry already displays complementary synergies among the countries, each contributing distinct strengths to a collective vision of sustainable transport. Finland is renowned for its digital connectivity solutions, Sweden boasts a legacy in consumer facing services vehicle production, Norway leads in transport electrification, Denmark is notable for urban mobility and cycling infrastructure, and Iceland stands out for its pioneering role in transitioning to green energy sources

The collaborative landscape is enriched by industry-academia partnerships, marked by real-world testbeds and pilot programs, aiming for innovations to meet practical deployment needs. The region's collaborations between regulatory bodies, public transport agencies, and industry clusters works towards a goal of Nordic mobility remaining at the forefront of sustainable and innovative transportation solutions.

A culture open to change

The Nordic region's mobility ecosystem thrives in a culture that is inherently open to change. A highly educated populace, coupled with a longstanding tradition of embracing innovation, positions the region as a hotbed for pioneering developments in the mobility and transport sector.

The rise of new behavior such as remote work and digital nomads, facilitated by an robust digital infrastructure, exemplifies this mindset. A robust digital foundation not only supports remote work but also propels advancements in smart transportation solutions, reflecting the region's readiness to adapt and evolve with the times.

Stable and ambitious political systems

In regards to mobility, the Nordic countries stand out due to their stable and ambitious political frameworks. These nations, characterised by enduring democratic traditions and minimal corruption, have a history of methodical long-term planning and the development of sustainable mobility strategies. The accessible governance structures bridge the gap between industry stakeholders, policymakers, and regulators, fostering efficient communication and transparent decision-making processes. And while navigating bureaucratic systems is a universal challenge, the Nordic bureaucratic framework is often viewed as streamlined and more straightforward compared to other global regions, further simplifying the path for innovations in the transport sector.

Diverse geography and climate

Geographic and environmental conditions in the region further refine its approach to mobility. Given the vast landscapes, varying

terrains, and challenging weather conditions, there's an inherent demand for resilient and adaptable mobility solutions. The strong societal emphasis on sustainability and environmental stewardship pushes the demand for greener, more efficient transportation methods. These conditions have spurred innovations in electric vehicle technologies, efficient public transportation systems, and sustainable urban planning, leveraging the region's natural resources and commitment to reducing its carbon footprint.

Challenges and barriers

The Nordic region also represents some distinct cultural and market-related challenges. The dynamics of these challenges does to a certain degree stem from the inherent characteristics of the region.

The demographic configuration, with its limited populations across countries, might inherently curtail the vast expansion potential of emerging solutions. Despite being at the forefront of technological and sustainable advancements in some areas, the region often finds itself navigating financial and structural constraints that can hinder rapid innovation.

The ingrained value of consensus in Nordic cultures, while promoting collective harmony and collaboration, occasionally means that rapid and bold decision-making can be a protracted affair, especially in larger institutions. It's essential to consider some of these nuances to effectively engage with and navigate the Nordic mobility eco-system.

Scale and market size: The relatively small populations of the Nordic countries when not acting as a unified market, can pose challenges in terms of scaling innovative ideas and products, limiting the potential market reach and growth opportunities.

Lack of regional, industry specific venture capital: The Nordic region, despite its innovative initiatives within sustainable mobility and transport, faces a scaling challenge in the form of a lack of regional and industry specific venture capital. This shortfall not only hampers the scaling of pioneering ideas but also limits the potential market reach and growth opportunities for startups and established businesses alike. Without adequate venture capital, many promising mobility solutions struggle to transition from conceptual stages to full-scale implementation. This gap in funding can stifle innovation, hinder the region's global competitiveness, and slow down the pace of its green transition in the mobility sector.

Consensus Driven Decision-Making: Nordic societies and businesses value consensus and collaboration. While this is also considered a quality, it can also slow down decision-making processes. The emphasis on involving multiple stakeholders and ensuring broad consensus can lead to longer timelines for implementing innovative ideas specifically especially in public sectors or large organisations.

Pilots without clear next steps: Pilots are often valuable and necessary steps towards commercialisation and industrialisation. Yet, the Nordic countries have a tendency to initiate multiple small-scale pilots without clearly defined next steps nor budget for next phases, thus hindering the progression towards full-scale implementation.

The Ecosystem Surrounding Nordic Innovation

Being a pan-nordic constellation, Nordic Innovation cover a wide range spanning different organisations and companies

focusing - broadly speaking - on the same goals and efforts.

Being able to stimulate and support stakeholders navigate within its own national borders, as well as across the Nordic borders, help lowering the barriers for cooperation and should be viewed as a competitive advantage for cooperation for sustainable mobility and transport in the Nordics.

Nordic Innovation acts as a catalyst and enabler of Nordic arenas for cooperation and ecosystems and may contribute financially to Nordic projects through various instruments as a means of alleviating risk. Below is a non-exhaustive list ment to illustrate representative companies and organisations part of, and adjacent to, the Nordic Innovation Ecosystem:

Governmental innovation agencies:

Operating under the aegis of national governments, they provide financial support, strategic direction, and international networking opportunities to startups, research institutions, and corporations. By allocating resources and setting priority areas, they play an important role in determining the trajectory of research and development efforts in the respective countries. Their influence aims to support innovations in the sector and align with broader national goals, such as sustainability, economic growth, and infrastructural development.

Examples: Vinnova (SE), Business Finland (FI), Innovation Norway (NO)

Membership organisations: Serving as collaborative platforms, these organisations foster interaction between industry leaders and sometimes academics, and policymakers. They function as networking hubs, where members exchange insights, best practices, and pioneering ideas. By providing a structured

platform for dialogue and collaboration, they ensure that the diverse stakeholders in the mobility sector move cohesively towards shared objectives and collaborate on strengthening their position in the market.

Examples: Drive Sweden (SE), ITS-Finland (FI), ITS-Norway (NO)

Startup incubators: These incubators help transform ideas into tangible business ventures. By providing startups with mentorship, funding opportunities, and operational guidance, they ensure that nascent ideas in the mobility space receive the support and nurturing they need to thrive. They play a critical role in ensuring a continuous flow of innovation, risk-taking, and entrepreneurial vigor within the Nordic mobility ecosystem.

Examples: Startuplab Mobility (NO), MobilityXlab (SE), Antler (DK)

Research institutions: These institutions provide foundational and applied research being used across the private and public sector. Their research not only shapes industrial applications but also informs governmental policy and regulatory standards.

Examples: RISE (SE), VTT (FI), Institute of Transport Economics (NO)

Regulatory bodies: These entities ensure that all innovations in the mobility sector meet stringent safety, environmental, and operational standards. By setting and enforcing regulations, they provide a clear framework within which both public and private players in mobility operate. Their role is crucial to ensure that technological advancements go hand in hand with public safety, environmental stewardship, and infrastructural integrity.

Examples: Trafikverket (SE), Norwegian road authority (NO), Trafikstyrelsen (DK)

Public transport organisations: Acting as the primary operators and beneficiaries of innovations in the mobility sector, these organisations implement and mainstream novel solutions in real-world settings. They ensure that advancements in transportation and mobility are not just technically sound but also practically viable, user-friendly, inclusive and accessible to the public at large.

Examples: Kollektivtrafikforeningen (NO), K2 (SE), Finnish Public Transport Association (FI)

Industry clusters and public-private partnerships: These clusters represent consortiums of companies, often from related industries, working together to address common challenges and opportunities. By pooling resources, knowledge, and expertise, they drive synergistic innovations, ensuring that the Nordic mobility ecosystem benefits from multi-disciplinary insights and solutions.

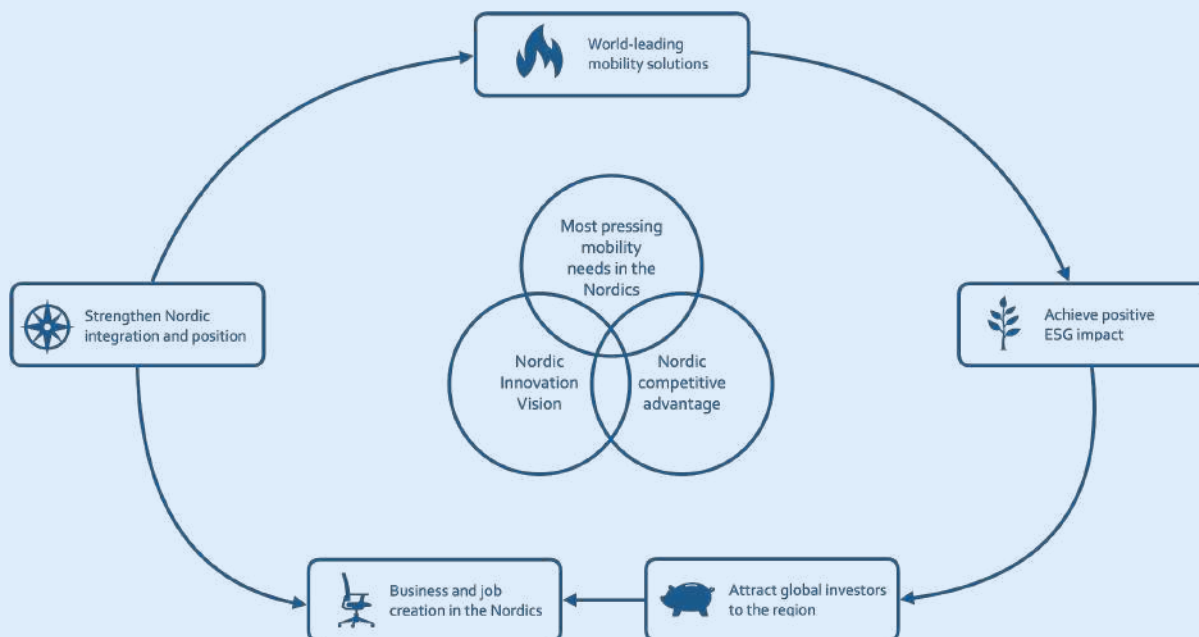
Examples: Energy Cluster Denmark (DK), VIA-cluster (NO), Icelandic New Energy (IS)

Test-arenas: Critical to the iterative process of innovation, these test arenas function as real-world laboratories. They offer innovators in the Nordic mobility space a controlled environment to prototype, test, and refine their solutions. By simulating real-world conditions, these arenas ensure that an innovation, be it a novel transport mechanism or a sophisticated software solution, is robust, efficient, and ready for widespread deployment.

Examples: Green Flyway (NO), TESTSITErd (NO), Testbed Helsinki (FI)

Recommendations: Impactful areas in Mobility for the Nordics





A framework for the next stage(s)

Prioritising initiatives supporting cooperation for sustainable mobility and transport in the Nordics requires a strategic framework of interconnected goals. Above is a suggested model for how this could be structured and operationalised.

The convergence of the three elements shown in the center of the figure above forms the central task and opportunities at hand, emphasising that effective solutions will address immediate needs, align with the broader vision, and leverage the region's inherent strengths

Most pressing mobility needs in the Nordics:

This represents the immediate challenges and requirements that the Nordic region faces in terms of transportation and mobility.

Nordic Vision 2030: This encapsulates the long-term aspirations and goals that the Nordic governments has set for the region in terms of technological advancements, sustainability, and regional cooperation.

Nordic competitive advantage: This highlights the unique strengths and capabilities that the Nordic region possesses, setting it apart from other global players in the mobility sector.

The surrounding, virtuous circle emphasises that each goal feeds into the next, creating a continuous loop of improvement and growth. The model integrates immediate needs with long-term vision and inherent strengths, ensuring a comprehensive and holistic approach to problem-solving. It is not limited to addressing current challenges but is geared towards future opportunities, ensuring the Nordic region remains at the forefront of sustainable mobility and transport innovation.

The framework underscores the importance of regional cooperation and integration, essential for addressing shared challenges and leveraging collective strengths. By focusing on ESG impact the model aligns with EU/FN goals and priorities.

The bottom of the model represents the desired economic prosperity expressed through business and job creation as well as attracting global investors and capital to the region.

Impactful areas in Mobility for the Nordics

In the evolving landscape of sustainable mobility, it's imperative for the Nordic region to strategically focus on select impactful areas. By honing in on specific domains, the region can leverage its unique strengths, align with the Nordic Vision, and address the most pressing mobility needs.

This targeted approach ensures that efforts are not spread thin but are concentrated where they can yield the most significant results. Drawing from the model core, the intersection of immediate needs, long-term vision, and inherent strengths forms the foundation for and improves the chances of success.

By prioritising areas that resonate with these three core elements, the Nordic region can position itself as a global leader in sustainable mobility, driving innovation, fostering collaboration, and achieving meaningful, lasting impact.

The synthesis from aligning input from industry interviews with local strengths and prerequisites within the high level goals set at a European, regional and national level, points to a selection of areas that balance impact and opportunity in the next 10-15 years.

1. The transition to green aviation
2. A sustainable and automated maritime sector
3. Infrastructure and services supporting electrification
4. Intermodal and Smart Mobility Solutions
5. Circular Economy in Transportation
6. Climate Resilient Infrastructure
7. Unified and Progressive Policy and Regulation



The transition to green aviation

Air travel is the main way that frequent travelers contribute to climate change. However, aviation itself only produces 2.5% of all carbon dioxide (CO₂) emissions worldwide (2018)⁸. This is due to the fact that there are significant differences in the amount of flying that people do - many people do not or cannot afford to fly at all. Still, it remains a significant challenge with global export potential.

The Nordic countries are known for their unique characteristics such as low population density and diverse landscapes encompassing fjords, lakes, and mountains, along with a high reliance on sustainable energy sources, the concept of green aviation emerges as a potent solution. This approach has the potential to enhance the sustainability of the region's transportation sector and effectively address regional development and accessibility challenges, particularly in remote and rural areas. The adoption of green aviation technologies, seamlessly integrated into the local transport networks, holds the promise of significantly mitigating greenhouse gas emissions and air pollution, yielding multifaceted advantages.

By pursuing green aviation and embracing innovations on electric aircrafts and required technical infrastructure, the Nordic region can make significant progress in reducing its carbon footprint and moving towards a more environmentally conscious future. Additionally, the region's rich history of regional aviation initiatives, as well as national airport operators, positions it uniquely to gain a competitive edge, driving the growth of knowledge and technological advancements in the field.



There are currently several companies and projects that work on the transition of the nordics into green aviation. Examples include Widerøe, Heart Aerospace, and the Elfly group.

⁸ <https://ourworldindata.org/co2-emissions-from-aviation>



A sustainable and automated maritime sector

The Nordic states heavily rely on sea transportation for importing and exporting goods and commodities. In Sweden, maritime ports handle approximately 90 percent of the country's international trade, amounting to around 171 million metric tons in 2021. Norway and Denmark are ranked as the fourth and tenth largest shipping nations in terms of value⁹.

The Nordic countries are well-positioned to lead the way in developing a sustainable and automated maritime sector. They have a geographical advantage with direct access to major maritime trade routes, making them an integral part of the world's logistics network. Furthermore, the Nordic nations boast a rich maritime heritage. This legacy has cultivated a skilled workforce and engendered a profound understanding of maritime operations, vessel design, and navigation. The maritime traditions have laid the groundwork for maritime clusters that bring together corporations, startups, research, and government to foster the development of cutting-edge solutions.

In today's interconnected world, the efficient movement of people and goods is essential. A seamless and efficient connection between land, terminals/ports and sea is important to ensure an unhindered flow of trade and travel, which is a key aspect for economic competitiveness.



There are several examples of maritime companies targeting different areas of maritime autonomy. These include the autonomous container vessel Yara Birkeland, autonomous urban water mobility with Zeabuz, and AI for optimising port operations with awake.ai.

⁹ <https://www.rederi.no/globalassets/dokumenter/alle/rapporter/ref-konjunkturrapport23-eng-web.pdf>



Infrastructure and services supporting electrification

Motorised transport on land, at sea, and in air still heavily relies on fossil fuel making the transport sector responsible for over one-third of CO₂ emissions¹⁰. While the need for transportation shows no sign of slowing down, the urgency to change the way we move people and goods only becomes more important. It is crucial to prioritise the electrification of various vehicles and establish the required infrastructure and support services to facilitate the transition towards electric mobility.

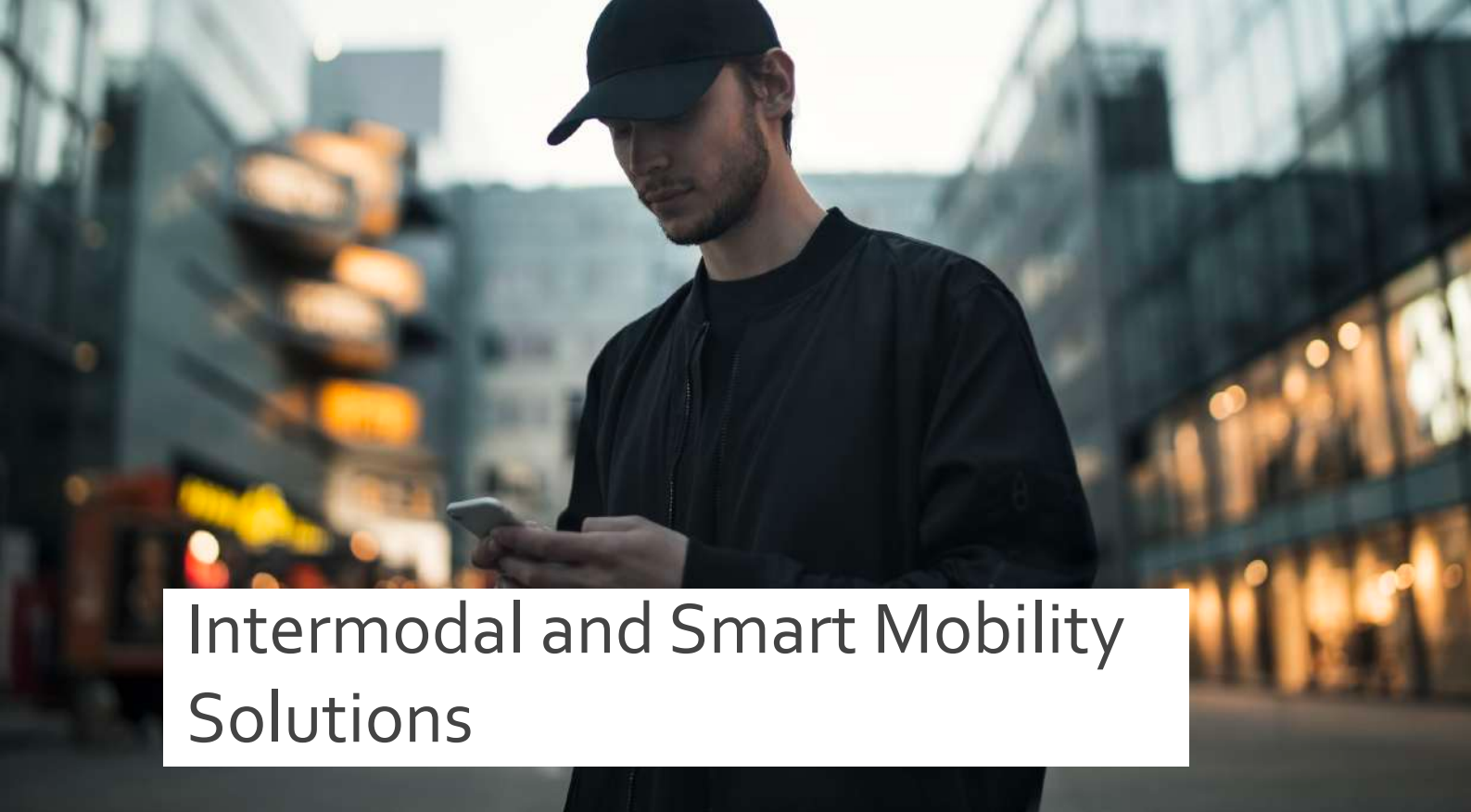
The Nordic countries collectively possess a competitive advantage in developing infrastructure and services that support electrification. The region's climate, high share of renewable energy, and robust power grid make it an ideal location for power-intensive investments. Additionally, the Nordic countries have valuable experience in early adoption, particularly with electric cars and ferries, which positions them as a testing ground for new technologies.

The Nordic countries are already making electric solutions for a wide range of different vehicles and putting them to good use. With ambitious climate goals, stable politics and available capital the Nordic countries can not only lead the charge in reducing emissions from the transport sector but also seize economic opportunities and demonstrate their commitment to a sustainable future on the global stage.



Selected companies within electric infrastructure and support services: Norvolt battery production (SE), Wärtsilä inductive charging for marine vessels (FI), Zaptec charging solutions for EVs (NO).

¹⁰ <https://www.iea.org/energy-system/transport>



Intermodal and Smart Mobility Solutions

Cars and vans accounted for 16% of the EU's overall emissions, or 72% of the emissions from road transport (2019)¹¹. In order to decrease our reliance on cars, we need to enhance the attractiveness and competitiveness of alternative modes of transportation. For this to happen it is crucial to integrate various transportation modes into a more unified and efficient system to reduce emissions and improve accessibility and user-friendliness.

The Nordic countries have a well-functioning public transport system that can serve as a backbone for this change. The existing public transport strategies typically align with wider national and sub-national goals for economic development, land use planning, and social cohesion.¹² This, combined with a willingness to experiment with public-private partnerships and goals to make public transport more accessible within and across borders, provides the Nordic countries with a solid foundation to enhance intermodal transportation further. This will contribute to both the green and competitive aspects of the Nordic Vision.



The Nomad project aims to enable seamless mobility using several modes of transportation across the Nordics. Public Transport Agency Kolumbus have integrated their app towards private car sharing and micromobility operators (NO).

¹¹ <https://www.transportenvironment.org/challenges/cars/co2-emissions/>

¹² https://www.urbantransportgroup.org/system/files/general-docs/UTG%20Scandinavian%20Transport%20Report_Final.pdf



Circular Economy in Transportation

Today, the 12 largest automotive manufacturers globally emit more greenhouse gases in a year than the entire European Union¹³. Transitioning towards a circular economy in transportation, where resources are reused and waste is minimised, directly contributes to the green transition and the sustainable use of resources. It offers a clear path to a more sustainable and circular economy.

Traditional business models thrive on maximum consumption. However, to move towards a sustainable and circular economy, we need to incentivise increased utilisation, lifespan, repair, and reuse, which will require business model innovation.

Achieving the necessary shift in how we consume transport services is likely to require incentives and regulation. It calls for ambitious targets and strong politicians who can set demands through regulation and purchasing power for Original Equipment Manufacturers (OEMs), and make the circular choice the most convenient for end consumers.



Selected nordic mobility companies within the circular economy: Evyon - repurposing EV batteries (NO), Ciklo is providing a smart energy ecosystem for urban mobility (SE).

¹³ <https://ellenmacarthurfoundation.org/climate-change-and-a-circular-economy-for-transport>



Climate Resilient Infrastructure

As climate change leads to more extreme weather conditions, the importance of resilient infrastructure becomes increasingly important. By ensuring that our transport infrastructure can withstand these changes, we not only preserve the functionality of our systems but also contribute to the sustainable adaptation to climate change.¹⁴ This helps reduce the need for building new infrastructure - often associated with significant monetary expense and supply-chain dependencies.

With its long coastlines, deep forests, mountains, meadows, and river valleys, Nordic nature is truly unique. Combined with seasonality and large temperature fluctuations, the Nordic region offers an ideal testing ground for climate resilient infrastructure.



Extreme weather conditions has made 2023 a annus horribilis in the Nordic region with grounded flights in Iceland, wildfires across Denmark, power outages in Finland, a sinkhole taking out a highway in Sweden and the storm «Hans» cutting of a main rail connection in Norway.

¹⁴ <https://www.nordforsk.org/node/1237>



Unified and Progressive Policy and Regulation

Policies and regulations play a crucial role in facilitating and supporting the transition to green and smart mobility. They can encourage sustainable practices, guide infrastructure development, and influence consumer behavior.

Based on the interviews conducted for this report, representatives from all Nordic countries expressed a largely unified perspective, highlighting similar worldviews and a high level of trust in politicians. These countries also have relatively low levels of bureaucracy and close proximity to decision makers compared to their peers.

While it is certainly not without challenges, these factors provide a good foundation for the development of progressive policies that can shape a unified and progressive policy framework for the Nordic market as a whole.



The Nordic countries' track record of progressive policies, like eco-friendly aviation tax in Sweden, Norway's incentives for electric vehicles and adapted legislation in Finland to allow for the testing of self-driving cars underlines the importance of this area.

Nordic Innovation Project Criteria

For the Nordic region to truly excel in the realm of sustainable mobility and transport, it's essential to have a clear set of criteria guiding projects and other initiatives. This section is a suggested guideline in this endeavor.

The set of criteria is not just a checklist but a reflection of the region's aspirations and commitment to a green, resilient, and competitive future. By emphasising climate goals,

resilience to global challenges, and the path to industrialisation, the criteria ensure that projects align with the broader vision of fostering a cooperative Nordic region.

The focus on projects that offer a unique competitive advantage underscores the importance of leveraging the region's inherent strengths. These criteria act as a strategic compass, guiding stakeholders towards initiatives that promise impactful change, sustainable growth, and a strengthened position on the global stage.



1. Effect towards climate goals

Acknowledging the critical importance of addressing climate change, Nordic Innovation places paramount importance on the potential of each project to contribute significantly to climate goals. Projects that directly reduce carbon emissions and augment adaptive capacities to climate alterations align with Nordic Innovation's vision to expedite the green transition and aspire towards carbon neutrality.

2. Resilience to global challenges

In an era of volatile, rapid and unprecedented change, resilience is of immense strategic value. Projects that build upon the Nordic region's resilience against a spectrum of global challenges, spanning environmental, economic, or social, should be prioritised. A resilient Nordic region stands a greater chance of successfully navigating future challenges, and maintaining its competitiveness and sustainability.

3. Competitive advantage

As Nordic Innovation aspires towards an increasingly competitive Nordic region, it is essential that projects endorsed and funded present a strong case for a unique competitive advantage. This can be achieved through the leverage of distinctive Nordic strengths, such as i.e. technological innovation or maritime legacy, leading to the development of globally competitive products or services.

4. Path to industrialisation

A clear trajectory towards successful industrialisation is a key criterion for project selection. This ensures that projects move beyond the conceptual stage to actualised, tangible outputs. This criterion reinforces Nordic Innovation's commitment towards promoting green growth predicated on innovation and knowledge, thereby augmenting the region's competitiveness.

5. Potential for cooperation

Projects that exhibit the potential for extensive collaboration – spanning borders, but also companies and sectors – multiply their impact and facilitate a more equitable distribution of benefits across the region. This is in alignment with the strategic goal of fostering an increasingly integrated Nordic region and consolidating a collective effort.

6. Productivity: Increased efficiency in moving people and goods

Projects that enhance productivity within the transportation sector plays a vital role. Improving the efficiency of moving people and goods not only reduces carbon emissions but can also enrich user experience and stimulate economic growth, thereby directly contributing to the vision of green growth.

Summary and concluding comments

The Nordic region stands at a pivotal juncture in the realm of sustainable mobility and transport. As detailed in this report, the concept of "new mobility" is not just a buzzword but a transformative approach that prioritises sustainability, efficiency, and adaptability. This approach will be shaped by a myriad of interconnected elements, from technological advancements and human behavior to regulatory frameworks and capital investments.

Since the inception of the Nordic Green Mobility initiative in 2018, the global mobility landscape has undergone significant shifts. Macroeconomic factors, geopolitical dynamics, and supply chain disruptions have all played a role in reshaping the industry. Yet, amidst these challenges, the Nordic region has showcased resilience and adaptability, leveraging its strengths and fostering collaborations to navigate the evolving terrain.

The rise of advanced technologies, presents both opportunities and challenges. While they

hold the promise of creating smarter, more efficient, and environmentally-friendly transport solutions, they also necessitate a rethinking of traditional operational models and regulatory frameworks. The changing behavior of consumers, who increasingly seek personalised, on-demand, and sustainable mobility options, further underscores the need for innovation and adaptability.

The European Green Deal, with its ambitious roadmap for a sustainable economy, will undeniably influence the Nordic mobility sector. It emphasises the importance of turning environmental challenges into opportunities, aligning with the Nordic region's aspirations for green mobility.

As the Nordic region charts its path forward, it is imperative to adopt a holistic approach, recognising the interplay of various factors and embracing collaboration at both the Nordic and European levels. The future of sustainable mobility in the Nordic region is not just about transportation but about creating a cohesive, inclusive, and environmentally-responsible ecosystem that benefits all its stakeholders.

Collaboration will be key.

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Interviews

To identify and prioritise the most promising collaboration opportunities in the Nordic region, the methodological approach has been inspired by the PESTEL framework (Political, Economic, Social, and Technological, Environmental and Legal), carried out through desktop research and a series of expert interviews.

Organisation	Country
ITS Denmark	Denmark
Global Maritime Forum	Denmark
New Energy	Iceland
ITS Iceland	Iceland
VTT	Finland
ITS Finland	Finland
Norwegian Road administration	Norway
ITS-Norway	Norway
NHO Transport	Norway
Link Capital	Norway
ITS Sweden	Sweden
Nordic Way	Sweden
Heart Areospace	Sweden
Einride	Sweden
Drive Sweden	Sweden
Business Sweden	Sweden

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About Beta Mobility

Beta Mobility is an integrated Consultancy and Startup Studio specialising in new mobility. The cross-disciplinary team brings a vast network and wide background from the European mobility industry, including the public sector, investments and having scaled startups and operations from the ground up.

Beta Mobility is based out of Oslo and Copenhagen, building on Nordic ideas and values, targeting the European mobility market.

Questions can directed at hello@betamobility.io

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