

# Barents Region Transport and Logistics

## Case Studies



**Kolarctic CBC**   
EU FINLAND NORWAY RUSSIA SWEDEN

 **korkia**

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Chapter 1

# Background





# MAIN GOALS OF THE STUDY

The objective for the study is to promote the development of logistics competitiveness in the Barents region. Utilization of opportunities in the business environment is an important approach. The study offers measures to meet climate and environmental challenges. As a result this study leads to a concrete road map for smart and carbon neutral transport system development in the Barents Region.

The future of the economy, industrial structures and logistics depends on the accessibility of the Barents Region. Accessibility consist of physical accessibility and connectivity to diverse markets and regions. In addition its sensitive nature and culture demands sustainability as a fundamental mindset. The five themes in this case study relates to improving connectivity and increasing sustainability of the Barents Region.

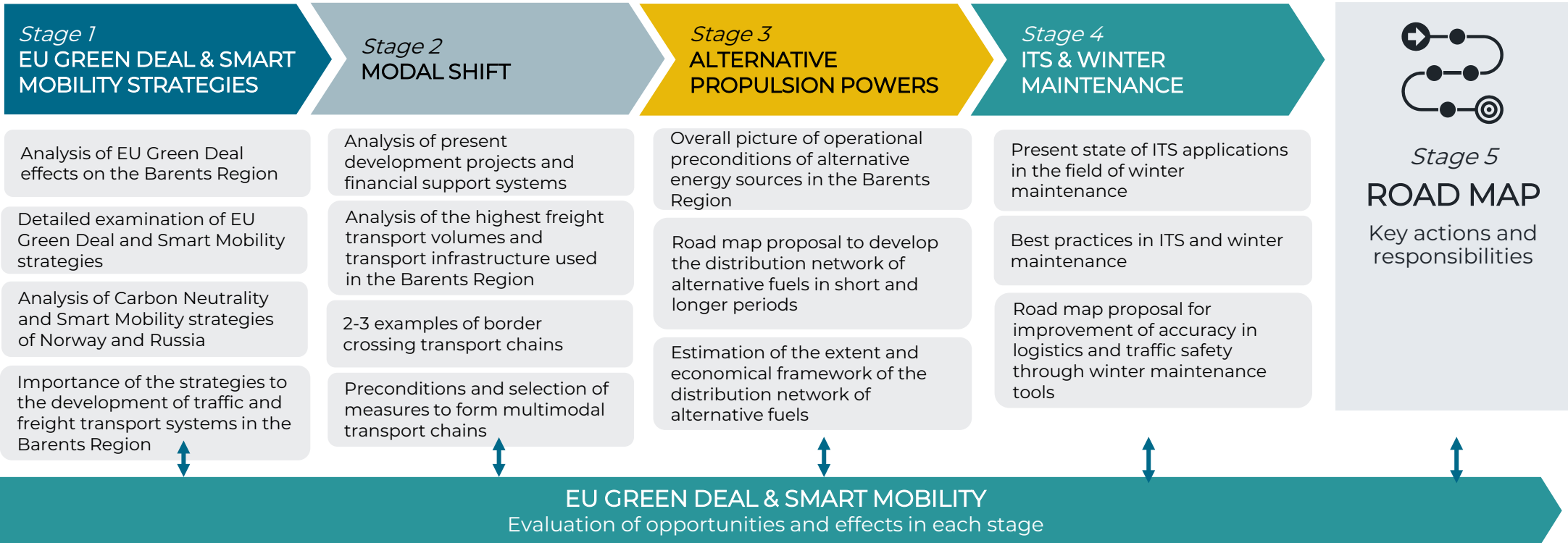
## Objectives by themes

<b>EU Green Deal and Smart Mobility</b>	Evaluation of impacts and opportunities of EU Green Deal and Smart Mobility strategies and correspondent strategies in Norway and Russia to the future of the Barents Region.
<b>Modal shift</b>	Examination of possibilities to construct multimodal transport chains in the Barents Region and therefore to find alternative transport solutions instead of long distance road transport.
<b>Promotion of alternative energy sources in the transport system</b>	Creation of an operational overview of the supply network development of alternative energy sources. The coverage of the supply network will take into account the main road network, connected regions and border crossing traffic and transport chains.
<b>ITS and winter maintenance of transport infrastructure</b>	Identifying the measures of smart mobility to rationalize logistics system. Focus is on data gathering, refining and sharing. This leads to more predictable processes and better service level of transport infrastructure in diverse user groups.
<b>Road map for promotion of smart and carbon neutral transport system in the Barents Region</b>	Creation of a road map to promote smart and carbon neutral transport system in the Barents Region based on previous stages of the study.





# THE FRAMEWORK











## KEY EVENTS DURING THE PROJECT

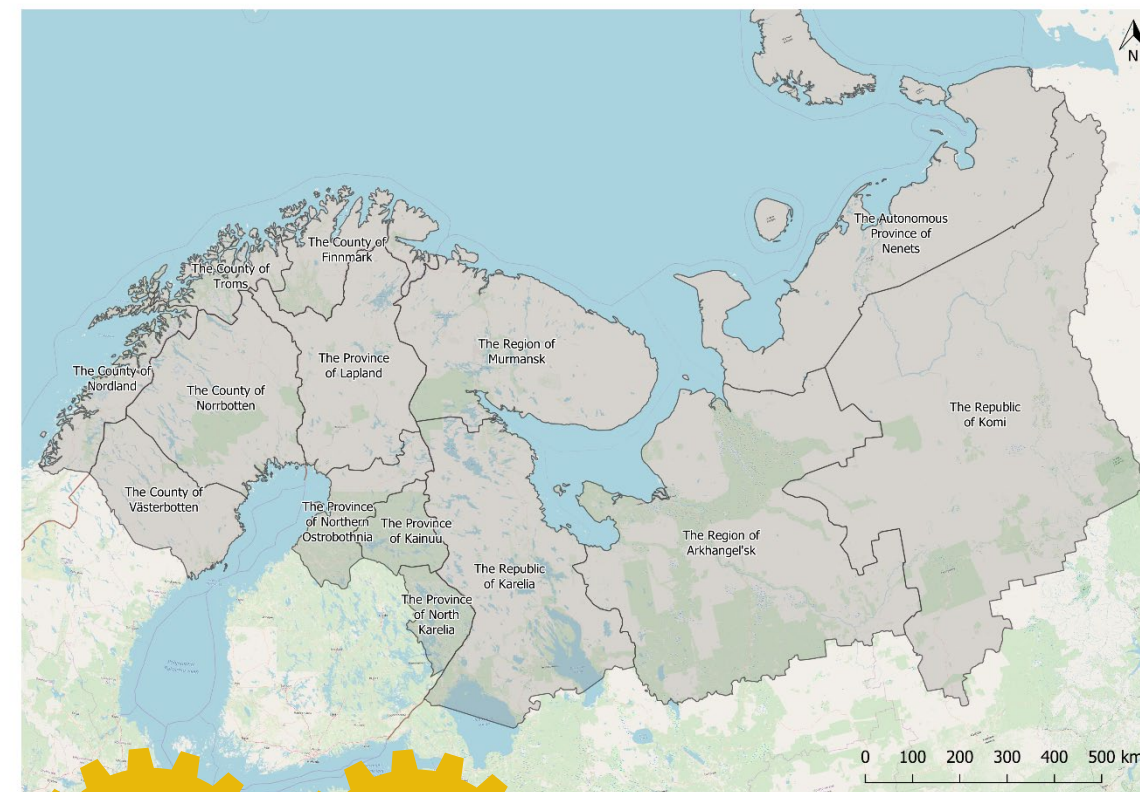




# BARENTS REGION TRANSPORT AND LOGISTICS

## - SYSTEM OVERVIEW

	GLOBAL COMPETITIVENESS & VITALITY	<ul style="list-style-type: none"> <li>All the layers create competitiveness for the Barents region</li> </ul>	<i>Transport system goals</i>
	BUSINESS LIFE AND TOURISM	<ul style="list-style-type: none"> <li>Transport and mobility needs of business and tourism</li> </ul>	<i>Demand</i>
	POPULATION	<ul style="list-style-type: none"> <li>Residents of Barents – demand for mobility services</li> </ul>	
	CLIMATE & ENVIRONMENT	<ul style="list-style-type: none"> <li>Transport emissions and supporting infrastructure</li> </ul>	<i>Preconditions</i>
	SAFETY	<ul style="list-style-type: none"> <li>Safety of different transport modes</li> </ul>	
	MOBILITY & TRANSPORT AND DATA SERVICES	<ul style="list-style-type: none"> <li>Goods</li> <li>People</li> </ul>	<i>Services</i>
	PROPULSION POWERS & NETWORK	<ul style="list-style-type: none"> <li>From fossil fuels to alternative fuels and their respective distribution networks</li> </ul>	<i>Enablers</i>
	TRANSPORT INFRASTRUCTURE	<ul style="list-style-type: none"> <li>Road, rail, sea, air networks</li> <li>Transshipment facilities</li> </ul>	



This study examines the **Barents transport system from three key perspectives**: modal shift, alternative propulsion powers and ITS in winter maintenance cases. The cases are based on previous studies carried out in the BRTL project on world logistics market, green logistics and ITS. EU Green Deal and Smart Mobility strategies are cross-section examinations in this study.



## Chapter 2

# EU Green Deal & Smart Mobility strategies





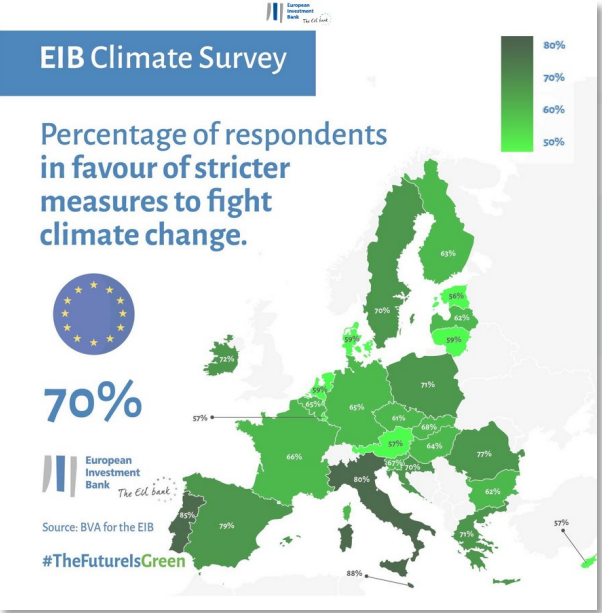
# BACKGROUND OF THE EU GREEN DEAL

## Sustainability challenges are behind the EU Green Deal

In the EU, climate change and environmental problems are increasingly seen as key challenges for the development and safety of the union. EU citizens, as well as private companies and public institutions have been pushing EU and national governments to response to increasing environmental risks, both physical and transformational. Due to the increasing stakeholder pressure, EU has been forced to create an ambitious plan to develop EU towards climate neutrality and to protect and restore the biodiversity.

### CLIMATE

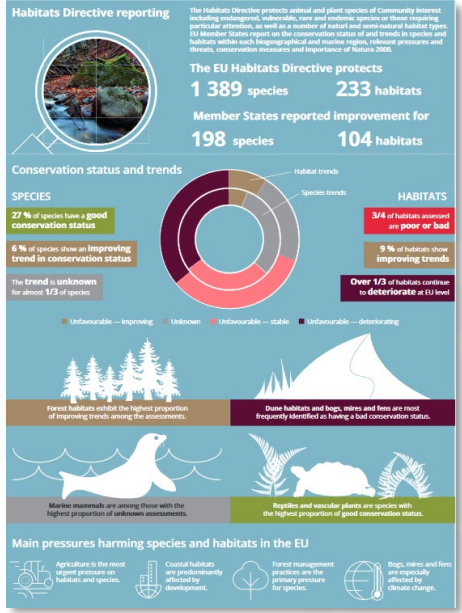
Existence of the climate crisis in no longer topic for political debate and majority of EU citizens are favouring stricter climate measures



EIB Climate Survey 2020

### BIODIVERSITY

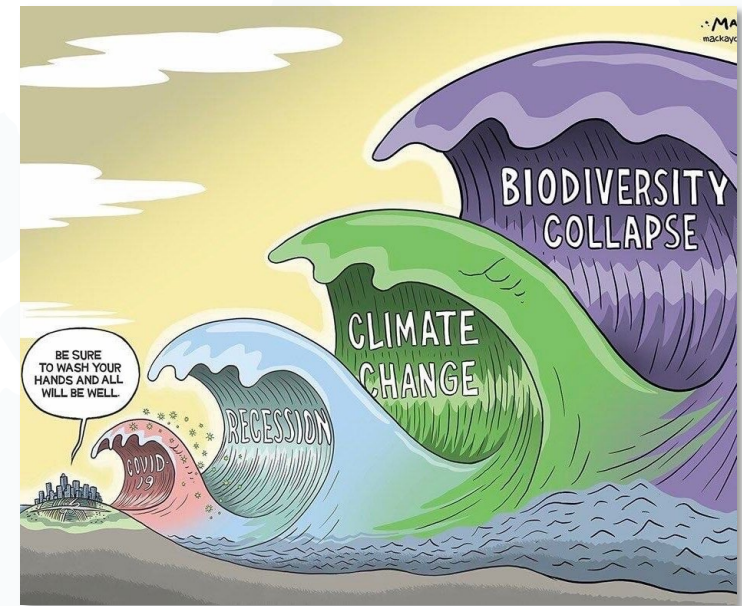
Within the past few years, the urgency to stop and even reverse the loss of biodiversity has emerged on a strategic EU level



State of Nature in EU 2013-2018 Report

### COVID 19 < CLIMATE < BIODIVERSITY

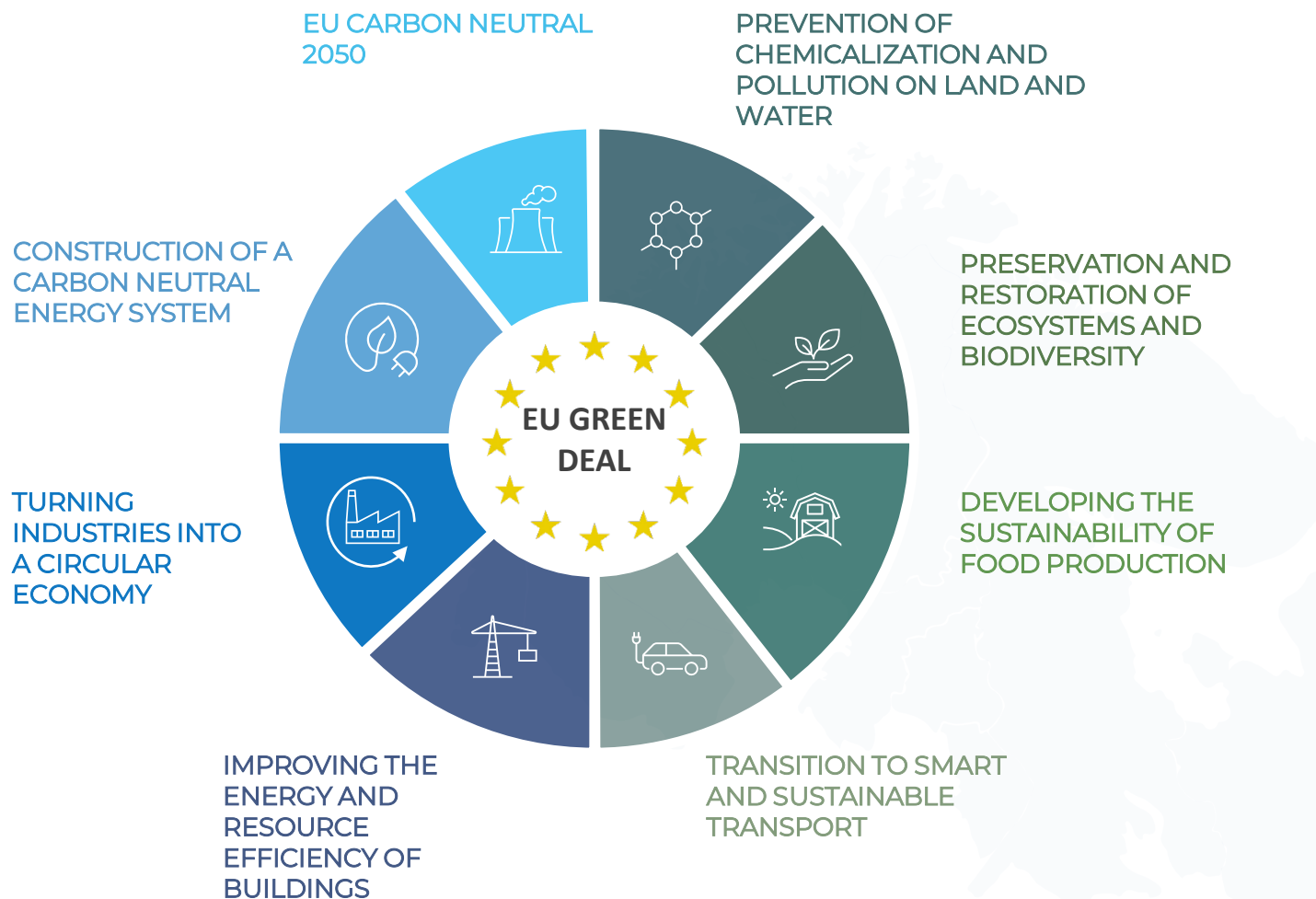
Impacts of Covid 19 has been devastating, but the worsening climate change and the biodiversity collapse would have even more severe impacts





# EU GREEN DEAL AND MAIN THEMATIC AREAS

EU Green Deal is the EU's strategic growth agenda for 2021-2027 - the most significant reconstruction program since World War II. The program includes eight thematic areas including several sub areas and targets. The action program includes regulative changes, financing initiatives and reforms of the main EU's steering mechanism.



## KEY EU GREEN DEAL ACTIONS

- 1000 BN EUR OF NEW FUNDING FROM THE UNION
- SECTOR SPECIFIC REGULATORY CHANGES
- DEVELOPMENT OF EU STEERING MECHANISMS
- NATIONAL BINDING CLIMATE AND ENVIRONMENTAL LAWS



*Because of the covid-19 EU Green Deal has not received much attention in the media, but eu has been preparing the program all the time*

*The program started in january 2021 and first implications will become visible during this summer*



# EU GREEN DEAL COMPARED TO THE PREVIOUS EU'S ENVIRONMENTAL PROGRAMS

## EU Green Deal and difference compared to the past environmental programs

EU has always been driving further the environmental matters, but EU Green Deal differs greatly from the past programs.



In the past, climate and environmental issues have been part of the EU's strategic growth agenda, now the Green Deal is the driving force behind everything EU plans and executes – **EU'S POLITICAL PRIORITY #1**



Climate change is advancing and stakeholder pressure on the EU is growing. The targets are more ambitious than ever before and the target level is constantly being raised – **CONTINUOUS NEED TO DEVELOP AND TIGHTEN TARGETS**



Through the EU Green Deal, EU itself is allocating significantly more funding to green actions and research. At the same time, private equity market is facing significant changes in investment priorities – **SIGNIFICANT CAPITAL RE - ALLOCATION**



The EU Green Deal is a tremendous opportunity for cleantech industries and know-how. The need for green solutions will increase significantly and the EU will provide significant amounts of funding for this - **OPPORTUNITY**



THE EU GREEN DEAL IS NOT A TEMPORARY POLITICAL AGENDA OR WILL. EU GREEN DEAL IS A SOCIETY-WIDE RECONSTRUCTION PROGRAM, WHICH STRENGTHENING, NOT WEAKENING, IMPACTS ARE DRIVING

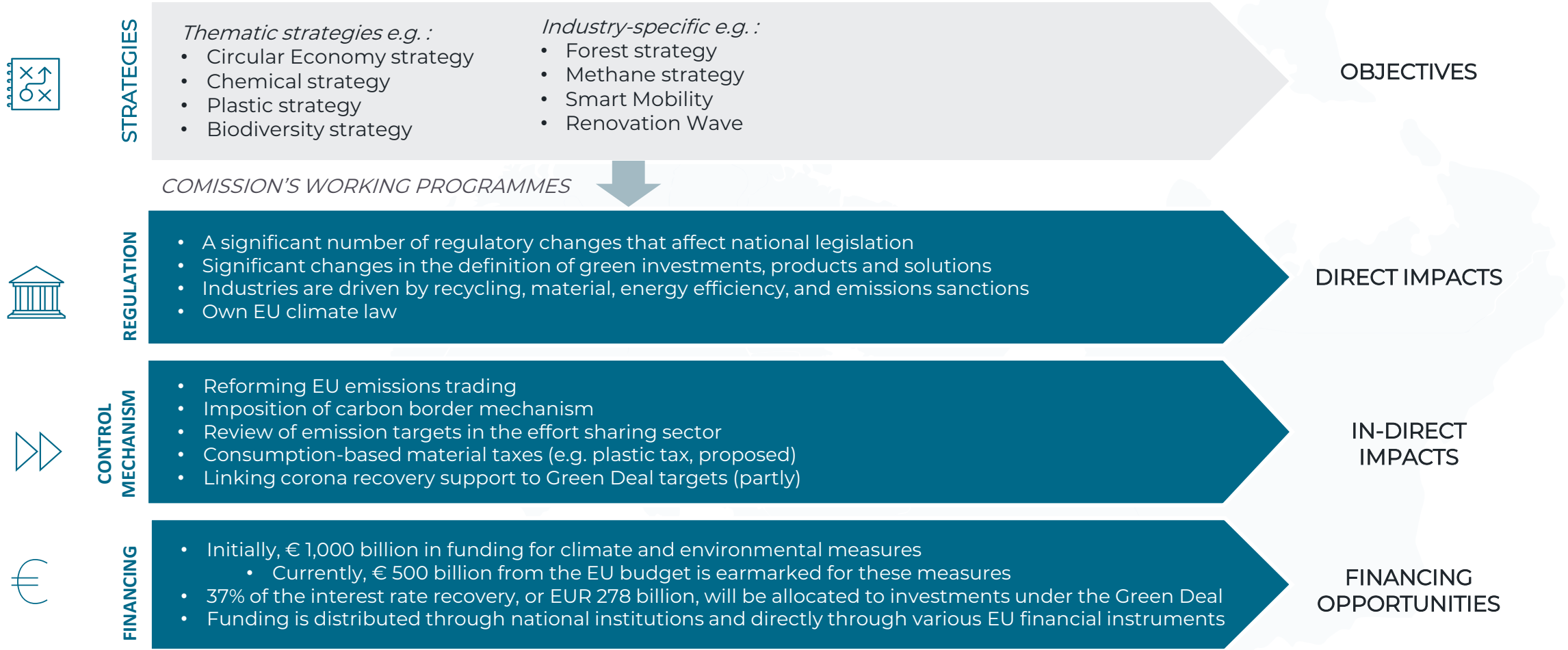


# EU GREEN DEAL AND ITS PREPATION PROCESS

## How to follow and analyse EU Green Deal?

EU has been preparing several sub strategies under the umbrella of EU Green Deal during the past year. The sub strategies sets the targets for more concrete measures will be planned and executed during the forthcoming years. To understand the EU Green Deal and predict further implications, relevant for the Barents region and its mobility development, close attention must be paid for the strategic initiatives and renewed regulations and directives.

### HOW TO READ THE EU GREEN DEAL?



# EU GREEN DEAL AND FORTHCOMING IMPLICATIONS

## EU Green Deal in 2021

Commission publishes proposal for first EU Green Deal action package in summer 2021, including large reform package Fit For 55 in which EU sets and reforms key measures to meet 2030 climate milestones. Fit For 55 package includes reforms of main steering elements, such as Emission Trading System. In addition, Commission will present their plan for Carbon Border Adjustment Mechanism among many other reforms

### EU GREEN DEAL PACKAGE

#### FIT FOR 55 PACKAGE

1. REVISION OF THE EU EMISSIONS TRADING SYSTEM (ETS)
2. CARBON BORDER ADJUSTMENT MECHANISM (CBAM)
3. AMENDMENT TO THE RENEWABLE ENERGY DIRECTIVE
4. REVISION OF THE REGULATION ON THE INCLUSION OF GREENHOUSE GAS EMISSIONS AND REMOVALS FROM LAND USE, LAND USE CHANGE AND FORESTRY (LULUCF)
5. REVISION OF THE ENERGY TAX DIRECTIVE

ALTOGETHER 12 DIFFERENT INITIATIVES IN FIT FOR 55

#### CIRCULAR ECONOMY PACKAGE

#### BIODIVERSITY AND TOXIC-FREE ENVIRONMENT PACKAGE

#### SUSTAINABLE AND SMART MOBILITY

- REDUCTION OF EMISSIONS ALLOWANCES
- INCLUSION OF SHIP AND LONG DISTANCE FLIGHTS IN THE EMISSIONS TRADING SCHEME
- IN DISCUSSIONS: TO MOVE BUILDING HEATING AND WASTE INCINERATION UNDER ETS



- Allowance prices are projected to rise sharply compared to the long-term average (approx. 7€/CO2t.) Already now the markets have anticipated forthcoming changes and the price is on the rise (35€/CO2t).
- ETS is expanding to other industries and areas of our societies. Production costs will rise in many industries
- Production prices of energy and emission intensive industry goods will rise



- Stronger incentive to reduce greenhouse gas emissions
- More and more money will be allocated to the development of low-carbon technologies and solutions through ETS
- The level of profitability of emission-reducing solutions and technology will increase significantly!





# EU GREEN DEAL AND FORTHCOMING IMPLICATIONS

## EU Green Deal in 2021

One of the packages that will be presented this summer is the Sustainable and Smart Mobility package which will bring concrete around the established Smart Mobility Strategy. One of the main implications is the revised TEN-T regulations which will guide EU's CEF (Connecting Europe Facility) financing instrument's allocations for further infrastructure financing rounds.



- NATIONAL AND EU INVESTMENT IN TRANSPORT INFRASTRUCTURE
- TARGETED FUNDING UNDER THE CONNECTING EUROPE FACILITY AND OTHER RELEVANT EU SCHEMES.



- EU will invest in different infrastructure investments around the Europe to develop the network, but simultaneously national governments are expected to invest in the development initiatives as well.
- As a result, EU aims to have 2030 fully integrated *core* TEN-T network in place which will significantly reduce logistics costs and ease businesses to transfer their goods around the Europe but also from and into Europe.
- Passenger safety and usability and connectivity of different transport methods will improve

1. REVISION OF THE DIRECTIVE ON INTELLIGENT TRANSPORT SYSTEMS, INCLUDING A MULTIMODAL TICKETING INITIATIVE
2. REVISION OF THE REGULATION ON THE TRANS-EUROPEAN TRANSPORT NETWORK (TEN-T)
3. EU 2021 RAIL CORRIDOR INITIATIVE, INCLUDING THE REVISION OF THE RAIL FREIGHT CORRIDOR REGULATION AND ACTIONS TO BOOST PASSENGER RAIL
4. DEVELOPMENT OF POST-EURO 6/VI EMISSION STANDARDS FOR CARS, VANS, LORRIES AND BUSES

# EU GREEN DEAL AND SMART MOBILITY

EU published ambitious Smart Mobility strategy in the winter 2020-2021. The strategy sets high level targets for the development of the mobility sector. EU has communicated that transportation is one of the key development areas in EU including significant investment packages

## MAIN OBJECTIVES

- BY 2030**
  - at least 30 million zero-emission cars will be in operation on European roads
  - 100 European cities will be climate neutral
  - high-speed rail traffic will double across Europe
  - scheduled collective travel for journeys under 500 km should be carbon neutral
  - automated mobility will be deployed at large scale
  - zero-emission marine vessels will be market-ready
- BY 2035**
  - zero-emission large aircraft will be market-ready
- BY 2050**
  - nearly all cars, vans, buses as well as new heavy-duty vehicles will be zero-emission.
  - rail freight traffic will double
  - a fully operational, multimodal Trans-European Transport Network (TEN-T) for sustainable and smart transport with high speed connectivity.

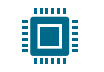
## ACTION AREAS



Three main action groups each including several sub-actions groups:

### SUSTAINABLE

- Boosting the uptake of zero-emission vehicles, vessels and aeroplanes, renewable & low-carbon fuels
- Creating zero-emission airports and ports
- Making interurban and urban mobility healthy and sustainable
- Greening freight transport



### SMART

- Making connected and automated multimodal mobility a reality
- Boosting innovation and the use of data and artificial intelligence



### RESILIENT

- Reinforce the Single Market (TEN-T)
- Make mobility fair and just for all





# EU GREEN DEAL IN THE BARENTS REGION - MOBILITY

Most of the EU Green Deal implications are currently unknown, however some implications can be predicted already today, although uncertainty remains high until final regulative proposal from the Commissions are published.

EU GREEN DEAL  
FIT FOR 55

### TEN-T NETWORK

- TEN-T network development initiatives will also improve logistis networks in the Nordic region
  - Crucial time to be active and jointly seek for cross-border development initiatives!

### REVISION OF THE EU EMISSIONS TRADING SYSTEM (ETS)

- EU is reducing emission allowances faster than anticipated before increasing manufacturing costs of carbon intensive production
- ETS will be most likely expanded to the maritime sector increasing the logistics costs
- 10% less allowances are given for air traffic, increasing logistics costs
- Road transport may be moved under the ETS

### CARBON BORDER ADJUSTMENT MECHANISM (CBAM)

- Carbon border would affect on especially steel and mining industry, lashing an additional cost for goods brought from countries where production do not meet EU's carbon requirements
- In the short-run this can affect import and export transport volumes between EU and Russia

### DEVELOPMENT OF POST-EURO 6/VI EMISSION STANDARDS FOR CARS, VANS, LORRIES AND BUSES

- The commission is set to launch new emission standards in Q4/2021.
- New standards will speed up the commercialization of next gen low-emission vehicles, helping the industry to cut down emission and logistics costs



• EU GREEN DEAL WILL BRING MORE REGULATION AND COST PRESSURE ON LOGISTICS SECTOR

• SIMULTANEOUSLY EU GREEN DEAL OFFERS SIGNIFICANT FINANCIAL OPPORTUNITIES TO DEVELOP LOGISTIC NETWORKS



# MOBILITY

# EU GREEN DEAL IN THE BARENTS REGION - MINING

The role of the mining industry in the EU's Green Deal is significant. Electrification of the society, including transportation, require substantial amounts of new metal minerals. EU is boosting the growth of the EU's mining industry and the circularity at the same time, securing the demand for industrial manufacturing purposes while reducing dependency on imported raw materials.

EU GREEN DEAL

FIT FOR 55

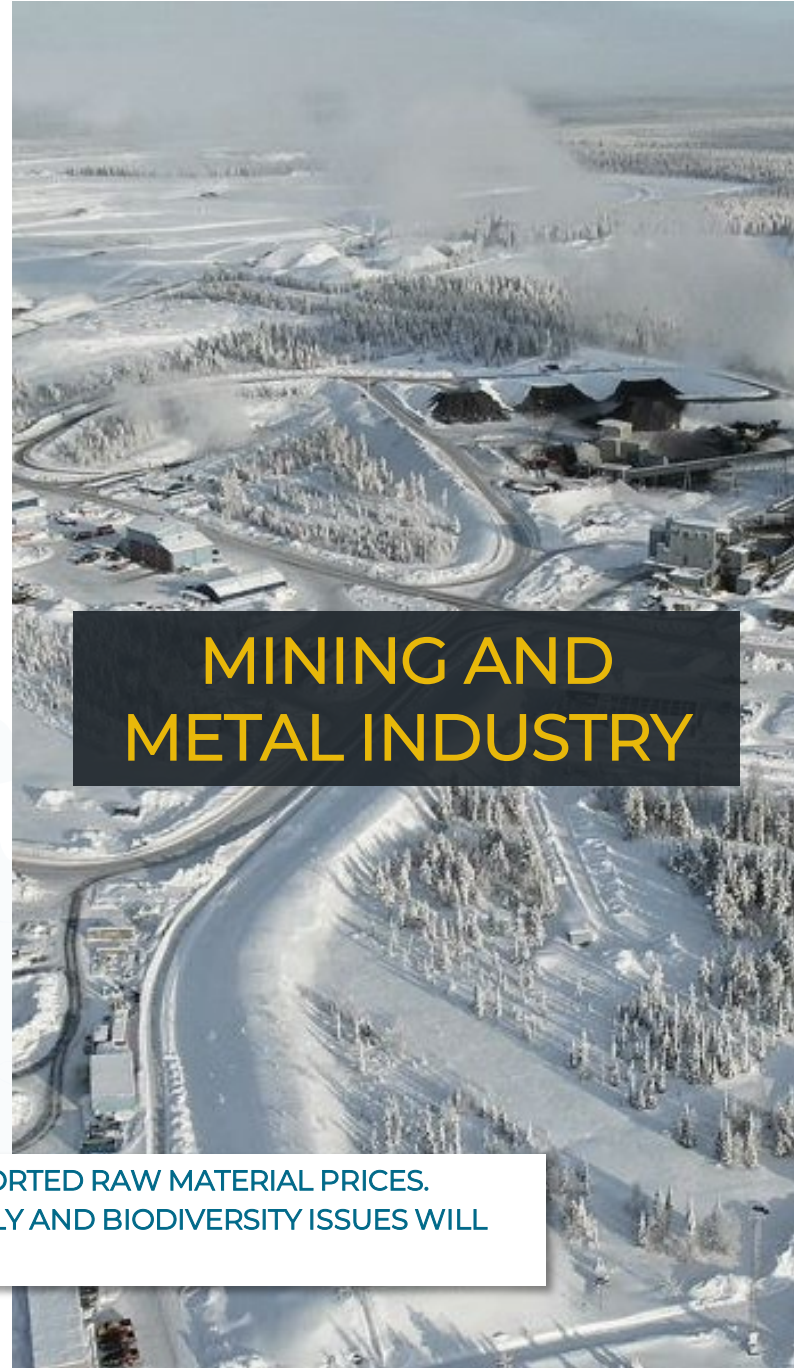
IN PREPARATION

- **REDUCING EMISSIONS FROM TRANSPORT – ELECTRIFICATION IN THE CENTER**
  - The need for minerals to be used in batteries is growing significantly
  - The need for the development of battery technology is growing significantly
  - Low-carbon production is becoming an even more important competitive advantage
- **REFORM OF THE EMISSIONS TRADING SYSTEM**
  - Prices of fossil energy sources will increase
  - Raw material prices imported from low-cost countries will rise (carbon border mechanism)
- **THE PROTECTION OF BIODIVERSITY IS EMPHASIZED**
  - The need to develop mining methods which reduce land use and impact on the environment
  - Europe and global scale demand growth for new methods
- **RECYCLING REQUIREMENTS FOR CRITICAL MINERALS AND RAW MATERIALS**
  - The recycling of battery minerals will become a significantly larger industry



• EU GREEN DEAL WILL FURTHER STRENGTHEN DEMAND FOR BATTERY MINERALS, AND RAISE IMPORTED RAW MATERIAL PRICES.

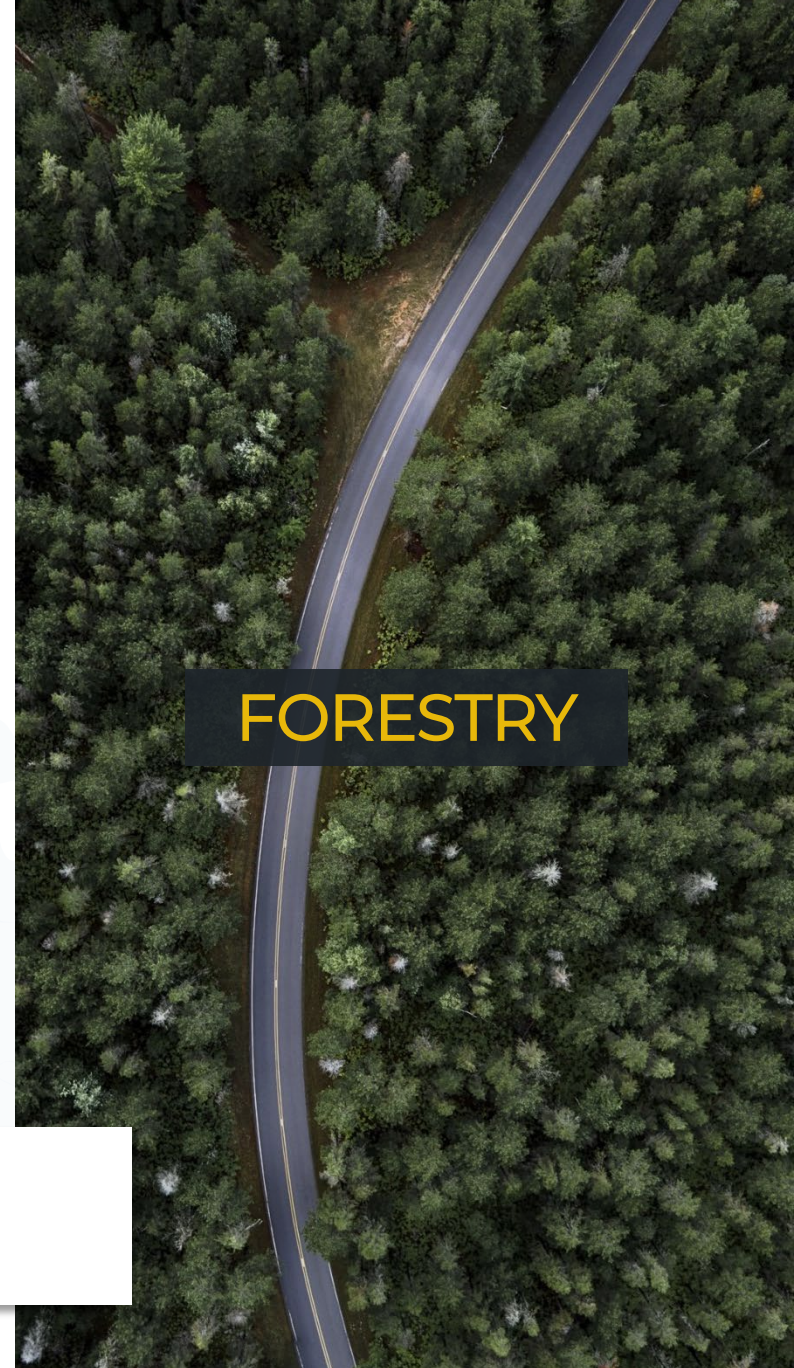
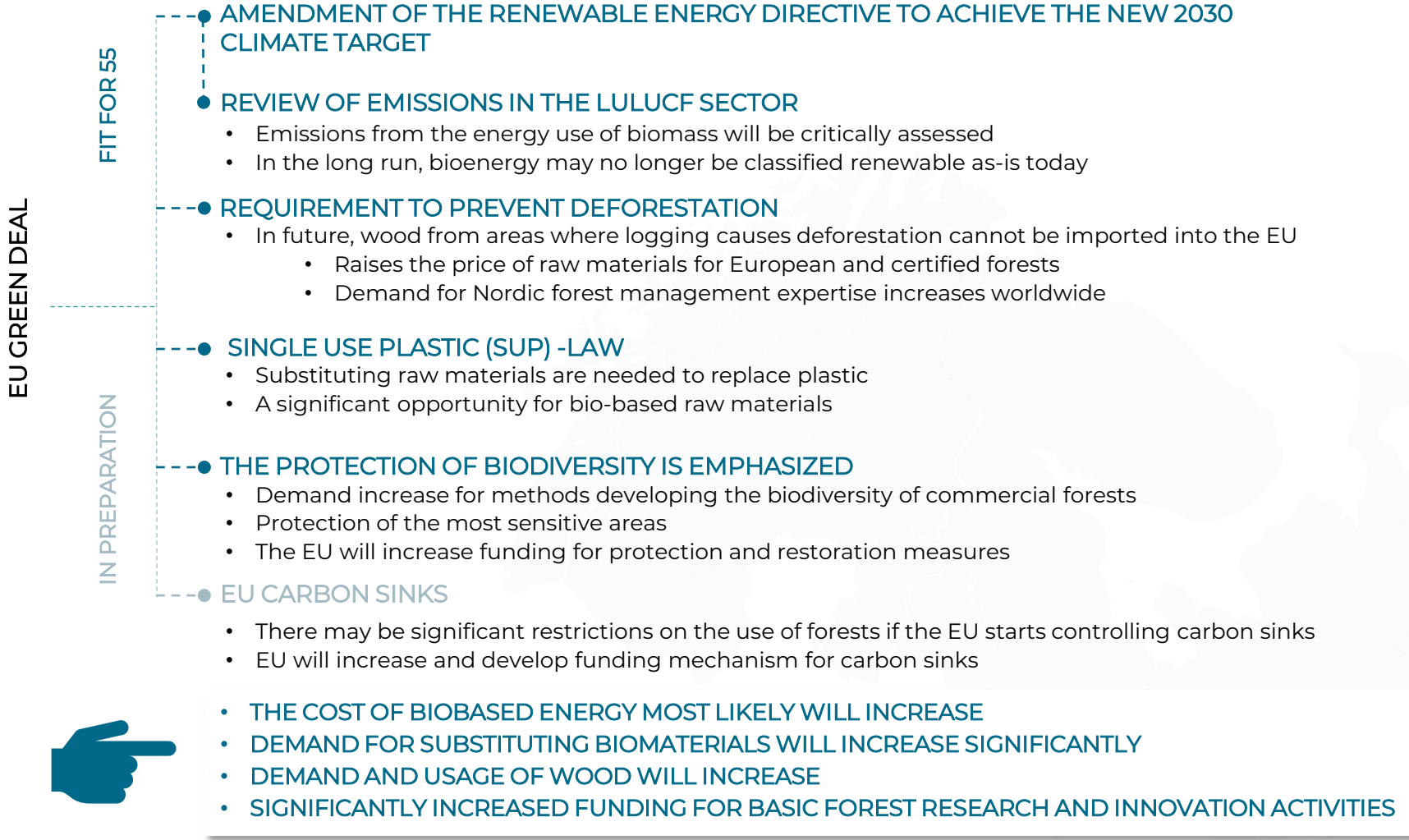
• SIMULTANEOUSLY, ENVIRONMENTAL IMPACTS FROM MINING WILL BE EXAMINED MORE CRITICALLY AND BIODIVERSITY ISSUES WILL BECOME VITAL IN THE PERMIT PROCESSES AND IN THE LICENSE TO OPERATE





# EU GREEN DEAL IN THE BARENTS REGION - FORESTRY

From the broader economic perspective, the forestry's role in the EU Green Deal is creating concerns in the Barents region. In the future EU may take much stronger control on forest usage and national policies, while converting the industry towards climate neutrality and maximization of carbon sinks





# SMART MOBILITY AND CARBON NEUTRALITY STRATEGIES AND GOALS IN NORWAY

## CLIMATE ACTION PLAN 2021-2030

Climate action plan describes actions on how Norway will achieve its climate target and at the same time create green growth.

Norway has published an action plan which will enable to exceed assigned target from the EU for non-ETS emissions, which is to reduce **non-ETS emissions by 40 % by 2030**

Main policy instruments are: taxation of greenhouse gas emissions, regulatory measures, climate-related requirements in public procurement process, information on climate-friendly options, financial support to develop new technologies and initiatives to promote research and innovation.

Some highlights from the plan:

- **Green tax shift:** Gradually increase the taxes on greenhouse gas emissions to about NOK 2000 per tonne CO<sub>2</sub> equivalent by 2030 (current level about NOK 590).
- **Phasing in low- and zero-emission technology:** Introduce requirements that ensure zero emissions in public purchases, for example, of cars and smaller vans from 2022. Government will also facilitate rapid development of **charging infrastructure**.
- **Biofuels:** As a minimum hold on the current turnover volume of biofuels. Biofuel quotas for off-road diesel and fuel for shipping from 2022.

*Norway's Climate Action Plan (Meld. St. 13 (2020-2021))*

## THE NATIONAL TRANSPORT PLAN 2018-2029

**Next update of the National Transport Plan 2022-2031 is to be published in 2021.**

*"A transport system that is safe, enhances value creation and contributes to a low-carbon society"*

Transport plan sets forth transport goals and strategies in a long-term perspective and presents, for example, the main investment projects.

In the plan the Government has established multiple steps in order to reduce CO<sub>2</sub>-emissions from transport:

- By 2025 all new passenger cars and light vans sold shall be zero-emission vehicles.
- By 2025 all new urban buses shall be zero-emission vehicles or use biogas.
- By 2030 all new heavy duty vehicles, 75 % of new long distance coaches and 50 % of new trucks shall be zero-emission vehicles.
- Furthermore, the distribution of freight in the largest urban centers shall have almost zero emissions by 2030.

Norway will also introduce a blend-in requirement for sustainable biofuel in aviation, target is 30 %.

*National Transport Plan 2018-2029 (Meld. St. 33 (2016-2017)).*



## GOVERNMENT'S ACTION PLAN FOR GREEN SHIPPING

*"Norway's maritime industry is a world leader in the development of low- and zero-emission solutions"*

This action plan presents Norway's policy to:

- Cut domestic greenhouse gas emissions,
- Strengthen the Norwegian maritime industry, and
- Play a part in the global technological developments needed for the world to achieve the targets of the Paris Agreement.

Norway targets to **reduce emissions from domestic shipping and fisheries by half by 2030**. Ambition is to promote development of low- and zero-emission solutions in all vessel categories.

- Aim is to have Norwegian ports, wherever feasible, to be emission-free by 2030.
- Norway will also facilitate the rapid development of charging infrastructure to keep pace with the expanding use of electric modes of transport.

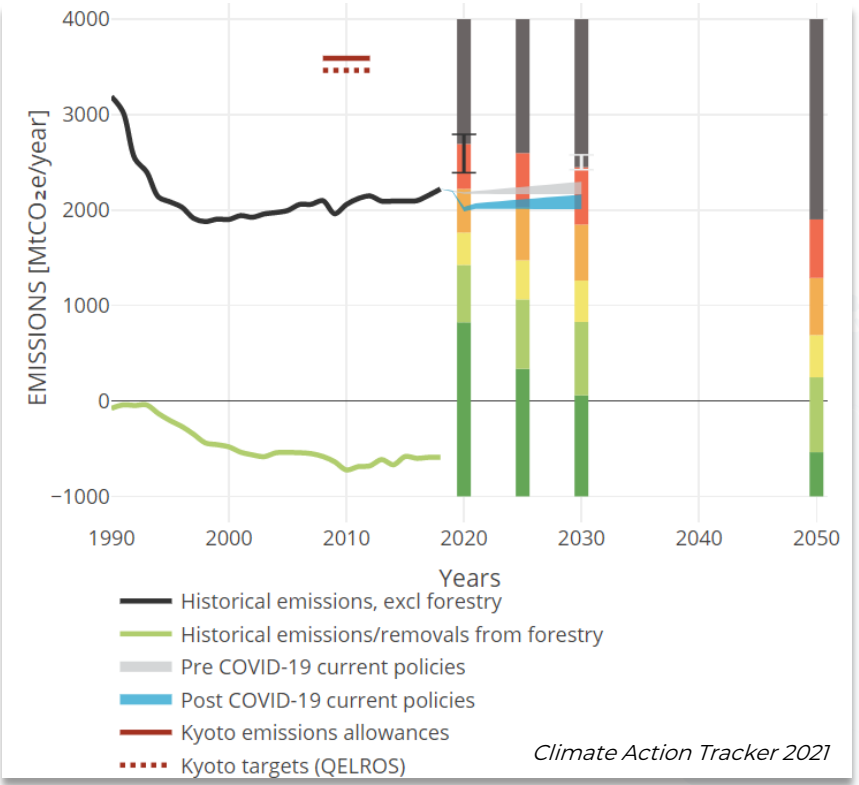
Also, the possibility to introduce a biofuel quota for shipping is being reviewed.

*The Government's action plan for green shipping (2019)*



# SMART MOBILITY AND CARBON NEUTRALITY STRATEGIES AND GOALS IN RUSSIA

Russia has signed the Paris Agreement and is targeting 30% reduce in emissions from 1990 levels to 2030, yet the overall actions towards this goal are still to be seen.



Russia has concentrated the post-COVID-19 recovery, in tax cuts, credit holidays, direct subsidies for businesses and income support for citizens.

In the newest Energy Strategy to 2035, Russia is continuing to develop the oil and gas industries with a strong emphasis on expanding natural gas exports.

Russia's Audit Chamber, which is responsible for monitoring the Russian budget and analyzing government spending warned in January that climate change could knock up to 3% of Russia's GDP per year by 2030 and expressed their concerns on the inability to prioritize the environmental actions in the National Projects' execution.

CAT 2021, The Moscow Times (2020)

CAT rates Russia's current 2030 emissions target (25-30% below 1990 levels) as "Critically Insufficient". If Russia were to adopt its proposed updated 2030 target of a 33% reduction below 1990 levels, this would improve Russia's rating to "Highly Insufficient". According to CAT, in order to be contributing its fair share to limiting global warming to 1.5 °C the emission targets of Russia should be more ambitious.

### GASIFICATION

The Ministry of Energy is running an investment project to support building LNG fueling infrastructure and also the creation of small capacity LNG plants. The aim of the projects is to stimulate the demand for LNG and the attractiveness to invest in int. The related federal authorities are also building interdepartmental coordination to coordinate the activities related to gazification.

In 2020 the Ministry of Energy created a roadmp that defines measures to remove existing obstacles in accelarated gasification.

Safe and High-Quality Roads National Project aims to renew the passanger traffic fleet in urban areas. During the past year 654 units of passanger fleet were replaced with modern ones. The new fleet is mainly using compressed natural gas.

RUSSIAN GOVERNMENT IS OVERALL INTERESTED IN SUPPORTING THE EFFICIENCY OF TRANSPORTATION. THE LACK OF GOVERNMENT-LEVEL AMBITIOUS STRATEGIES ON GREEN TRANSITION DOESN'T RESTRICT THE POSSIBILITIES FOR COLLABORATION.



# SMART MOBILITY AND CARBON NEUTRALITY STRATEGIES AND GOALS IN RUSSIA

The Russian National Projects are the main development plans of the Russian Government. The focus of the National projects is on economic growth and technological development. The main focus in terms of mobility, is the urge to develop the main infrastructure and support the digital transformation



## DIGITAL TRANSPORT SYSTEM

When it comes to digital solutions in transportation, **Russia is willing to invest in order to create more efficiency and speed in transportation.**

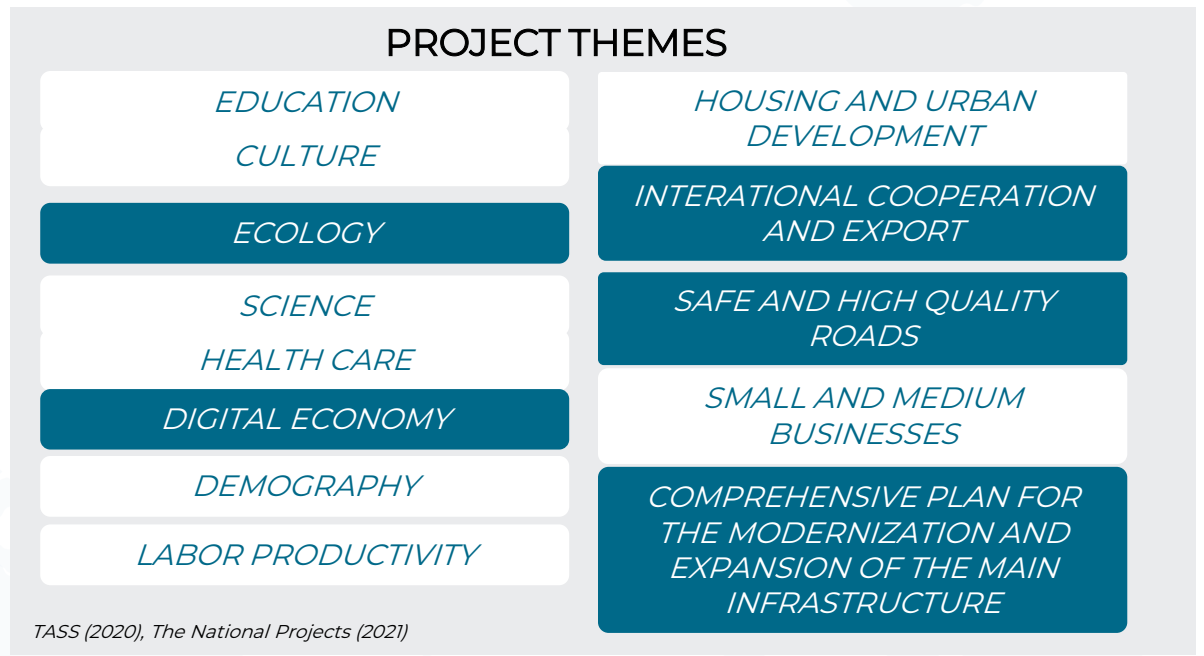
The Ministry of Transportation has been issued in February to prepare a plan for digital transformation in the transportation industry. Although such plan doesn't currently exist, both the national government and local governments have invested in digitalization and creating more smart mobility solutions.

For instance, there are multiple cooperation projects between the Finnish and Russian authorities that are concentrated in developing PPP-models in more digital and efficient border-crossing practices and solutions.

Investing in digital solutions and infrastructure support also Russia's target to support the economy through more swift logistics within the vast country.

One of the main transportation routes Russia invests in is the Green Silk Road (Belt and Road Initiative) together with China. In this initiative, too, the digital and smart solutions are largely present.

*The Russian Ministry of Transportation (2021)*



## KEY TOPICS RELATED TO SMART AND GREEN MOBILITY

Ecology projects are covering waste disposal and recycling, preservation and improving the quality of water and reducing air pollution. **No significant activities related to decreasing transportation emission levels.**

Digital transformation is part of many projects. Especially Digital Economy project aims to accelerate the building of digital infrastructure that **will enable digital and smart mobility development.**

**Decreasing the transportation times throughout the Russian Federation** is the main goal of the development of the main infrastructure.

Targeting to become the main transit-hub between EU and China and attracting more logistics flows **pushes investments in technological development in the main routes.**

*TASS (2020), Meduza (2020), The Russian Ministry of Transportation (2021)*



Chapter 3

# Modal shift in the Barents region





## TOWARDS MODAL SHIFT

### - EU AND BARENTS REGION PERSPECTIVE

#### EU Sustainable and Smart Mobility Strategy 2020 – Modal shift perspectives

The European Green Deal calls for a substantial part of the 75% of inland freight carried today by road to shift to rail and inland waterways. Short-sea shipping and efficient zero-emission vehicles can also contribute to greening freight transport in Europe. Urgent action must therefore be taken given the limited progress achieved to date: by example, the modal share of rail in inland freight had dropped to 17.9% by 2018 from 18.3% in 2011.

To support the greening of cargo operations in Europe, the existing framework for intermodal transport needs a substantial revamp and must be turned into an effective tool. Options to revise the regulatory framework such as the Combined Transport Directive as well as introducing economic incentives for both operations and infrastructure should be considered.

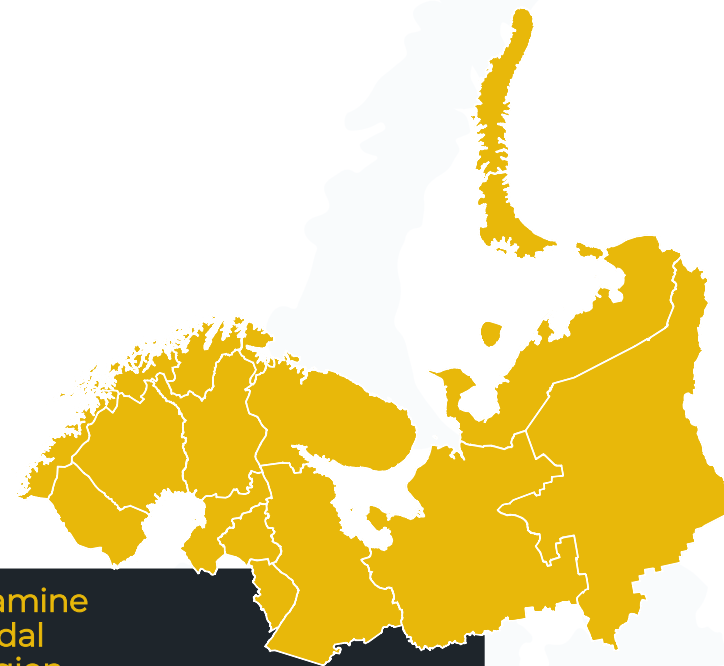
Multimodal logistics must be part of this transformation, within and beyond urban areas. The scarcity of transshipment infrastructure, and of inland multimodal terminals in particular, is pronounced in certain parts of Europe, and should be given the highest priority. Missing links in multimodal infrastructure should be closed. Moreover, the transport system should work more efficiently overall with improved transshipment technologies. The EU needs the multimodal exchange of data, plus smart traffic management systems in all modes. Ultimately all transport modes for freight must come together via multimodal terminals.

In recent years, innovative companies have demonstrated that rail freight can operate reliably and be attractive to customers. However, many domestic rules and technical barriers still hinder performance. **Rail freight needs serious boosting** through increased capacity, strengthened cross-border coordination and cooperation between rail infrastructure managers, better overall management of the rail network, and the deployment of new technologies such as digital coupling and automation.

Similarly, while successive action programmes have helped inland waterways transport to largely maintain its modal share, actions are necessary to preserve this accomplishment and seize the **untapped potential** in a sustainable way, both along TEN-T corridors and in those inner cities where inland waterways can green the last mile of city logistics.

In addition, TEN-T support for the Motorways of the Sea has succeeded seeing more cargo transported more sustainably, through short-sea shipping. The EU must now also lead by example and make European maritime areas sustainable, smart and resilient

European Commission 2020. Sustainable and Smart Mobility Strategy



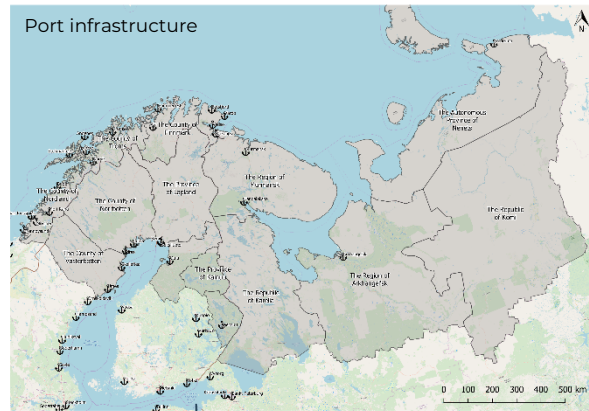
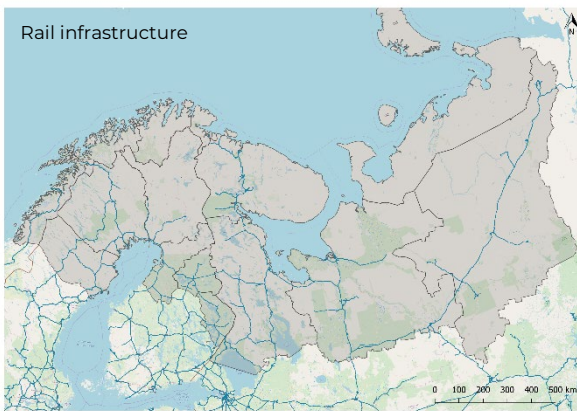
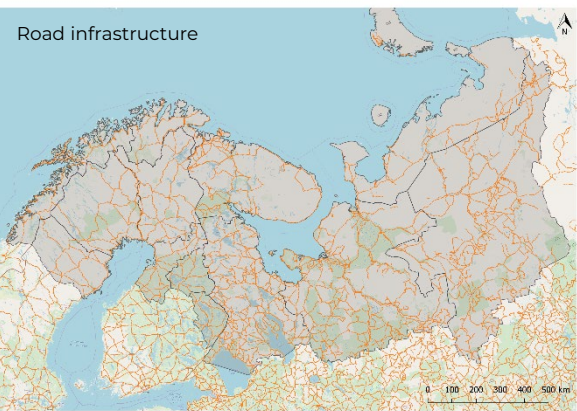
#### In this chapter, we examine the possibilities of modal shift in the Barents region

To find modal shift possibilities, it is essential to understand the preconditions for effective transport chains and the features of each transport mode. By applying this information with existing goods flows in the region, potential for modal shift can be found. The chapter also analyzes the current funding mechanisms for shift from road to rail or sea.

Through a few case studies it can be shown that certain routes have potential for modal shift. With these cases the bottlenecks and the necessary infrastructure investments can be recognized. The results can then be used to advance the search for funding from different EU sources that are described at the end of the chapter.



# FREIGHT TRANSPORT MODE FEATURES IN THE BARENTS REGION



	Road transport	Rail transport	Maritime transport	Inland waterway transport	Air cargo
<b>Capacity</b>	Dozens of tonnes	Hundreds of tonnes	Thousands or tens of thousands of tonnes	Thousands of tonnes	Dozens or hundreds of tonnes
<b>Optimal range</b>	Dozens or hundreds of kilometers	Dozens or hundreds of kilometers	Hundreds or thousands of kilometers	Hundreds or thousands of kilometers	Hundreds or thousands of kilometers
<b>Speed</b>	~70-80 km/h	Speed: ~70-80 km/h	~25 km/h	~44 km/h	450-900 km/h
<b>Description</b>	Part of nearly all transport chains. Large scale of vehicle sizes and types that are optimal for different situations. Last mile solutions are optimal for smaller vehicles and large trunk transport can be done with large and long trucks.	Optimal for factory-to-port and terminal-to-terminal transport with large volumes and relatively long distances.	Optimal for global transport with massive volumes.	Inland vessels are suitable for large volumes and factory-to-factory transport for ex. between Finland, Russia, Sweden and central Europe.	Is the most expensive mode per tonne kilometers but speed and distance are the competitive factors.
<b>Barents</b>	Road transport is used by all industries in the Barents region.	The forest, mining, energy, metal and chemical industries use rail transport in process transport and product transport. Intermodal transport is used in grocery and salmon transports	All export and import industries use shipping in global transport.	Inland shipping is used by energy technology companies and the forest industry.	Air cargo is used mainly by the technology industry in spare part and component deliveries. Also, the salmon farming industry in Norway has started to use air cargo.
<b>Example of cost per tonne-km</b>	0,115 € (tractor + container)	0,017 € (19 container train)	0,0013 € (83 000 dwt container ship)	0,023 € (large container ship, 745 tonnes)	0,18 € (full freighter 86 tonnes)



Cost's source: Panteia (2020). Cost Figures for Freight Transport – final report

# REQUIREMENTS FOR MODAL SHIFT FROM ROAD TO RAIL OR SEA

## THE NEED TO TRANSPORT GOODS FROM A TO B

- What kind of cargo?
- How much of cargo and with what kind of frequency?
- What is the transport distance?



**Requirements for shift from road to rail or sea**

- Suitable for standardized load units
- Suitable for middle range cargo values. Low value (bulk) and high value (high tech) cargo is less suitable
- Larger volumes with frequent shipments
- The longer the distance is, the more cost-efficient large volume transport modes become

- Is there sufficient infrastructure?
  - Network capacity and logistics facilities
- Are there services available?
  - Logistics operators
  - Service level: quality and punctuality
- What are the requirements that the transport customer sets?

**Requirements for shift from road to rail or sea**

- Capacity of the respective transport networks
- Connected infrastructure facilities that enables modal shift
- Customer oriented operators: road, rail and sea transshipment and 3PL, 4PL and 5PL operators with enough capacity
- Cost efficiency, punctuality, time frames and other factors such as environmental requirements

The preconditions set by the transport modes: capacity, speed, price, safety, security and environment

The preconditions set by regulations

## CHOOSING THE OPTIMAL DOOR-TO-DOOR TRANSPORT CHAIN

### Choosing the right modes of transport

Choosing the mode of transport is influenced by the availability of services, operating models, costs, service level and various means of steering measures. Each transport mode has its own strengths and weaknesses and an optimal operating environment.

The Green Deal goals naturally lead towards the most carbon-neutral solutions possible, with the advantage that the pursuit of cost and energy efficiency both lead in the same direction.

In addition, various support instruments may guide the formation of the transport chain. However, the change or development of the transport system cannot be built mainly on financial support but is largely based on using the strengths of different modes of transport in their specific areas of application.

Transport chain is always a door-to-door solution where first or last mile in most cases must be performed by other transport modes than rail or sea transport. Evaluation of opportunities for modal shift should always include examination of the whole transport chain including all phases. Otherwise, there is a serious threat of sub-optimization.



# MODAL SHIFT BENEFITS AND COMPETITIVENESS OF DIFFERENT TRANSPORT MODES

- Logistical benefits from modal shift if the criteria on the previous page is met
- Each mode is used in their optimal operational environment respective to time and cost
  - Reduced total transport costs
  - Higher load factors and better utilization of existing capacity
  - Less empty backhauls due to modal shift and cargo consolidation
  - Added value for transport customers
  - Reduced environmental footprint and less congestion on the road network

## Driving forces and other factors behind different transport modes from modal shift perspective



- Strong political will to promote rail transport in the EU, also main target for infrastructure investments
- Bottlenecks in the infrastructure and lack of services hinder growth
- Fragmented transport flows reduce possibilities for rail transport



- Political will to promote short sea shipping
- A lot of port infrastructure available for diverse product groups



- Competitiveness has increased constantly as a result of many factors
- The dimensions and mass of vehicles has increased
  - The development of large general cargo systems with terminal structures has brought efficiency
  - Lots of operators and competition keep the prices low
  - Low salary costs of Eastern European drivers
  - Flexible and efficient transport mode, capable to react to demand fluctuations
- Threats for competitiveness
- Carbon prices might increase faster than zero emission fleet and respective infrastructure is being produced and built

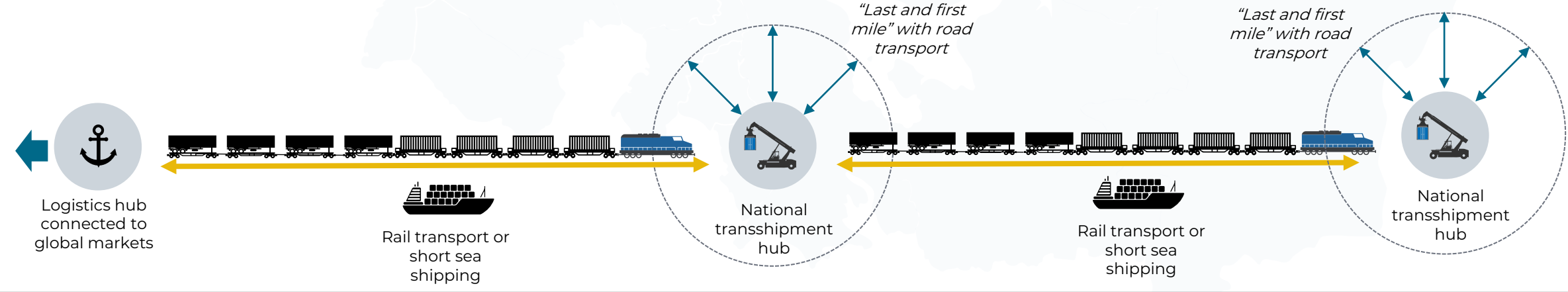


- Political will to promote inland waterway transport
- The waterways are limited to the southern part of the Barents region
- Currently year-round operations are not possible, future investments enables bigger and ice classified vessels, and longer operation period



- Many products produced in the area are not suitable for air cargo
- Difficulties in finding return cargo and lack of capacity due to the pandemic
- Air cargo mainly operated by passenger planes and thus needs decent passenger flows too

## An intermodal transport chain example



## NATIONAL TRANSPORT PLANS AND MODAL SHIFT – A SNAPSHOT OF THE GOALS AND MEASURES

### NORWAY - NATIONAL TRANSPORT PLAN 2018–2029

The cost of freight transport shall be reduced, the comparative advantages of each transport mode shall be exploited, and more freight transport should shift from road to rail and sea.

A dedicated package for investment in railways to improve the competitive conditions for freight transport includes allocating 18 billion NOK to terminals and increased capacity by building more and longer passing loops and connecting lines. To strengthen maritime transport, grants will be given to shipowners who shift freight from roads to sea, to ports that improve their efficiency and environmental performance and to cooperation among ports. These grants will amount to approximately 3.7 billion NOK during the plan period. Measures will also be taken to improve mobility on roads to accommodate more efficient transport of goods.

The government has introduced an incentive scheme for shifting freight from road to sea and will implement measures to stimulate more environmentally sound and efficient ports. The Government will furthermore stimulate the use of environmentally friendly transport technologies, alternative fuels as well as more efficient transport and logistics.

### NORWAY – UPDATE NATIONAL TRANSPORT PLAN 2022-2033

New transport plan highlights two main targets, zero carbon society by 2050 and 40 % reduction by 2030 and increasing transport safety targets. The plan indicates that share of sea transport of all the freight transport is very high in Norway. To achieve even more effective freight transport system, efficiency is key element to be increased in all the transport modes. This means heavier and longer vehicles in both rail and road transport. Investments on rail capacity is mentioned in the plan as a measure to increase the role of rail transport system and to offer increasing opportunities for modal shift to railways. Efficiency targets include also technological development and digitalization as a tool. Regarding road transport system, safety issues in cities and villages has seen main target for development.

### FINLAND – NATIONAL TRANSPORT PLAN 2021-2032

Transport services promote transport efficiency and emission reductions, e.g. through digitalisation and enabling the transition to more sustainable modes of transport. Shipping operating conditions will be developed considering the potential of inland waterway transport. In order to facilitate this, studies will be carried out on the possibilities for improving logistics efficiency and reducing emissions, promoting combined transport and assessing the impact of transit traffic in support of development measures.

Rail network maintenance and development funding will increase.

### RUSSIA – NATIONAL TRANSPORT PLANS / STRATEGIES

The Russian Federation has released Transport strategy up to 2030. It is not directly related to modal shift, which is quite natural, because almost 90 % of all the freight transport tonne-kms are already operated by rail transport. After the transport strategy, Russia has updated its manufacturing strategy, which has transport as one topic. Transport strategy is mainly focusing on increasing efficiency, speed and capacity of rail transport system. This includes investments on rail network and removing bottlenecks. Also high-speed railway investments for passenger transport is one key topic as well as investments in modern technologies and digitalization to reach targets set in the transport strategy.

### SWEDEN – NATIONAL FREIGHT STRATEGY

For freight transport to be able to take place at an increasing extent on rail and shipping, more intermodal transport is needed. A significant obstacle for intermodal transport arrangements is the cost of transshipment. Automated reloading and innovative solutions for smooth reloading can contribute to reduce costs. Carriers need incentives to dare to offer arrangements with intermodal solutions and transport buyers need incentives to choose transport by rail and shipping even if it includes transshipment.

Actions

- A national coordinator for increased domestic shipping and short sea shipping shall be appointed.
- More inland waterways. The government has commissioned by the Swedish Transport Agency to review more water areas could be classified as so-called inland waterways.
- Continued dialogue and collaboration for increased sea transport. The government has initiated a dialogue with ports, municipalities and other relevant actors about the opportunities to on different ways of working together
- Investment in intermodality with a focus on railway
- In order to increase the incentives to choose transport arrangements which includes shipping and rail the government intends to analyze the need for that and how intermodal transport can be promoted
- The state owned Jernhusen AB as a driving-force. Jernhusen AB has a key role in the work of increasing combined freight transport by rail, for example by facilitating and developing technology and business opportunities for transshipment to and from railway.
- The government intends to conduct a review of GreenCargo AB to get a clearer picture of the company's situation both in short and long term in order to create a basis for assessment and review of possible future strategic alternatives for the company's operations. Government's goal is a well-functioning freight traffic by rail and a competitive Green Cargo AB.
- Improve the information in transshipment to make it easier to plan intermodal transport operations



# CURRENT NATIONAL TRANSPORT AIDS FOR TRANSPORT

## FINLAND

### Areas eligible for transport aid

Transport aid may be granted for the transport of products processed by a small or medium-sized-enterprise when the product has been processed in the provinces of Lapland, Northern Ostrobothnia, Central Ostrobothnia, Kainuu, North Karelia, North Savo or South Savo, or in Kannonkoski, Karstula, Kinnula, Kivijärvi, Kyyjärvi, In the municipality of Pihtipudas, Saarijärvi or Viitasaari.

### For which transports is transport aid granted?

Transport aid may be granted for the transport of products processed by small and medium-sized enterprises located in the eligible areas. The aid applies to road and rail transport beginning from the place of processing and for the part transported in Finland. In the case of abroad transport, support may be granted for the part of the transport carried in Finland.

If the product has been produced in the above-mentioned areas, transport aid may also be granted for port activities that take place in the municipality of Merikarvia or to the north in the ports of the Gulf of Bothnia or in the ports of Saimaa.

### To whom is transport aid granted?

Transport aid may be granted to an SME which has processed the products to be transported and which, as the consignor, has paid the transport fee to the carrier. There are many industries that are not eligible for the aid. The aid requires the products to be processed so for example raw materials are not included in the aid. Also, forestry, agriculture, energy production and distribution, mining, steel industry, to mention a few, are excluded.

Centre for Economic Development, Transport and the Environment 2021



## NORWAY

Transport support is paid to companies in some regions and in certain industries, which produce their own goods and ship them over 340 kilometers. The transport can take place by train, boat, plane or truck.

Regjeringen 2021

## SWEDEN

Transport aid can be granted for transport from Norrbotten, Västerbotten, Jämtland and Västernorrland counties. The aid applies to transports of goods and products that have undergone significant processing.

- The transport must be longer than 401 km.
- Transport must take place by rail, in commercial transport by road or by sea.
- The shipping cost must be reasonable and dependent on distance and weight. The cost must be stated in the invoice from the carrier or forwarder.
- If the transport distance does not amount to 401 kilometers, but the transport has partly been carried out within Finnish or Norwegian territory, the Finnish or Norwegian route may be credited. Transport aid may, however, only be paid for the part of the transport that has been performed within Swedish territory.
- The transport subsidy varies between 5-45 percent of the approved transport cost and is based on the municipality in which the company has its production operations.
- A production site can receive a maximum of SEK 15 million in transport subsidies per calendar year.

Trafikverket 2021



## RUSSIA

In Russia transport aid is connected to export. Russian manufacturers may get compensation for part of the costs actually incurred in transporting their products to foreign markets. The transport system is also quite different, when in Russia main transport flows relates to transport volumes of large-scale industries both in procurement and deliveries, and these are high-volume very efficiently operated transport flows.

Russia has directed significant funds to corridor level transport infrastructure investments. These are development programs for example regarding Northern sea route or investments to Northern industrial clusters including transport systems. These are versatile investment and development programs, which are not only directed to support transport system.



Transport distance (rail/road)	Aid percentage
266-400 km	9 %
401-600 km	13 %
601-800 km	17 %
801- km	20 %



# PRESENT FUNDING MECHANISMS FOR SHIFT FOR ROAD TO RAIL OR SHIPPING

## NORWAY

### ECO-BONUS FOR MARITIME COMPANIES

- Introduced in February 2017 as a three-year test scheme
- Beneficiaries: Shipowners
- Open to all segments of maritime transport
- Based on external cost savings on Norwegian territory
- So far (February 2021), the subsidies total NOK 175 million
- 8 shipping companies have received grants
- The aid is available also for the year 2021

### Color Line AS awarded NOK 33.8 million

The project "Road to sea" aims to establish a new ro-ro line between Oslo and Kiel. The new route differs from Color Line's existing Oslo – Kiel route, for example in that the new route will be independent of the driver on board. Thus, dangerous cargo that otherwise goes on the road can be transported by sea with the new offer. The start-up for the new route is set for 9 January 2019. A total of 1.4 million tonnes of goods can be transferred during the support period.

### ECO-BONUS FOR RAILWAY COMPANIES 2019-2021

- The support scheme is a measure to get more goods on track by strengthening the companies that operate combined transport (containers, etc.) and wagon loads. It is this type of transport that is in direct competition with heavy transport on the road.
- The scope of the subsidy scheme is estimated to be just under NOK 90 million a year for the next two years. The exact amount will be returned to the government in the current budgets.

Kystverket 2021

## SWEDEN

### ECO-BONUS FOR MARITIME COMPANIES

The eco-bonus system, which was introduced in Sweden in December 2018, aims to stimulate the transfer of freight transport from road to shipping, and to reduce emissions of air pollutants and greenhouse gases.

For the period 2018–2020, the government has calculated a budget for the support of SEK 50 million annually. The support is directed to shipowners who conduct shipping with vessels that are registered in the ship register in an EEA country and where the vessels' journeys include at least one unloading or loading of transferred goods in a Swedish port. Support may be provided to cover part of the operating costs or to finance the purchase of transshipment equipment to provide the planned transport arrangements. Support for operating costs shall be added together with other state support and may not exceed a total of 30 percent of the operating costs for the transport arrangement in question.

### The eco-bonus continues in 2021

In total, an eco-bonus of SEK 94.5 million is granted.

The four projects that receive support are:

- AB Rederi Gotland - SEK 74,222,947 for transfer of goods from road to shipping between Nynäshamn and Rostock.
- Wallenius Marine AB - SEK 6,587,253 for transfer of goods from road to shipping in Mälardalen.
- IW Line Rederi AB -12 625 999 SEK for transfer of goods from road to shipping between Norrköping and Kapellskär.
- AB Flivik Shipping - SEK 1,055,025 for the transfer of goods from road to shipping in the Kalmar / Copenhagen area.

### ENVIRONMENTAL COMPENSATION FOR RAILWAY COMPANIES 2018-2019

In June 2018, the Swedish government decided to set aside SEK 389 million for 2018 and SEK 174 million for 2019 to strengthen the railway's competitiveness and contribute to a transfer of freight transport from road to rail. Freight train operators and those who organize rail transport can apply for the support which is paid retroactively for transport work performed on railways in Sweden. The support is based on the number of transported tonne-kilometers and is paid in arrears for completed transport work.

However, a maximum of 30% of the total cost of rail transport and up to 50% of the eligible costs may be paid. A condition for receiving the aid is that the environmental compensation granted must be reflected in the price paid by the buyer of the freight transport. The Swedish Transport Administration is responsible for administering the environmental compensation.

### ENVIRONMENTAL COMPENSATION FOR RAILWAY COMPANIES 2021-2025

In order to continue to contribute to a transfer of freight transport from road to rail, the government has budgeted SEK 400 million per year during 2021–2025. The European Commission has now notified the aid.

### A PROPOSAL FOR AN EXPANDED ECO BONUS FOR INTERMODAL TRANSPORT 2019

The proposal is based on the current Swedish ecobonus system directed at maritime transport but is more specifically designed to stimulate intermodal transport solutions. Transshipment costs are found to be substantial and that they also make up a much larger share of the total cost of carriage by rail and ship than carriage by road.

Simulations show that with reduced transshipment costs of 10 %, road transport would decrease by 2 % and increase by 2.5 % for rail transport and 0.7 % for shipping calculated with current transport work. Such a transfer is estimated to reduce carbon dioxide emissions by approximately 60,000 tonnes. The total environmental benefit of reduced carbon dioxide emissions and other air pollutants, as well as effects on infrastructure, is estimated at a total of approximately SEK 100 million.

Trafikverket 2021



# FINANCIAL SUPPORT SYSTEMS FOR INTERMODAL TRANSPORTATION IN THE EU



COUNTRY	SUPPORT SYSTEM	AMOUNT OF SUPPORT	HOW IT WORKS	GOALS
<b>Belgium</b>	Aid for transshipment terminals for intermodal rail and inland waterway transport, 2019-2023	The support is paid per train or container and amounts to a total of EUR 70 million over five years (2019–2023), of which EUR 30 million is set aside for rail subsidies and EUR 40 million for shipping. For shipping, this means around EUR 8 million per year for shipping and EUR 6 million for rail. Half of the sum is paid by the Flemish region and half of the three ports included in the support program, namely the publicly owned port companies in Zeebrugge, Antwerp and Ghent.	The aid is directed to railway companies and terminal operators where the beneficiaries are selected through a procurement procedure (call for tender).	The Commission has approved the Belgian State aid scheme to reduce competitive disadvantages and reduce transshipment costs in order to efficiently combine road transport in collection terminals for rail and inland waterway transport
<b>Poland</b>	Aid for intermodal transport	The exact amount of the aid is not stated in the decision, but the aid intensity was 50% of the eligible costs	The aid aimed to modernize and extend the existing intermodal terminals that existed in ports, among other places. This would contribute to reduced delivery times, reduce the risk of damage to goods and provide users with real-time information about the location of the shipment.	Develop intermodal transport as an alternative to road transport and to increase competition for intermodal transport in Poland, thus shifting the transport of goods from road to rail.
<b>Austria</b>	Support for innovation promotion programs for intermodal freight transport, 2015-2020	30 percent of costs regarding the following: <ul style="list-style-type: none"> <li>• Procurement of technologies and systems to improve combined transport systems, such as innovative transshipment and loading technologies, logistics systems and communication systems.</li> <li>• Equipment for intermodal transport such as containers, special vehicles and cargo units, adaptations of semi-trailers.</li> </ul> Costs relating to feasibility studies and preparations for international cooperation as well as costs for related staff training can be supported by up to 50 percent. The maximum amount per project or per year is 800,000 euros. The budget for the period 2015–2020 is EUR 18 million, or EUR 3 million per year.	Transport companies such as transshipment and logistics companies, freight forwarders, port operators, shipping and railway companies can apply for the aid. In order to check that the aid is used as intended and with the expected transfer, the aid is paid out step by step and in proportion to the proven progress of the project. Use of purchased equipment must be guaranteed during the depreciation period or at least five years. If the conditions are not met, beneficiaries may be liable to repay the aid with a 4% interest.	The program aimed to transfer 5,000 million tonne-kilometers from road transport to other modes of transport during the 2015 to 2020 support period.
<b>France</b>	Transshipment aid to players in the logistics chain, 2013-2017	The budget for the support was a total of EUR 140 million between 2013-2017 with an estimated average payment of approximately EUR 28 million per year. The amount of aid is fixed and amounts to approximately EUR 15-20 per transshipped unit. The level of support is determined in annual budget decisions and formalized with each beneficiary through an agreement entered into between the state and the beneficiary.	Beneficiaries were transport companies as well as freight forwarders (with financial responsibility for the transport) from the EU and Switzerland who conduct or mediate intermodal transport by rail or by sea in France with a distance of at least 80 km.	Reduce the disadvantages of loading and unloading goods by combined transport, compared to having only truck-to-door transport. The aid was intended to stimulate intermodal transport by rail and shipping.

Trafikanalys 2019 – en breddad ecobonus



## FINANCIAL SUPPORT SYSTEMS FOR INTERMODAL TRANSPORTATION IN THE EU

COUNTRY	SUPPORT SYSTEM	AMOUNT OF SUPPORT	HOW IT WORKS	GOALS
Italy	Aid to railway undertakings and organizers of rail transport in the Province of Bolzano, 2017-2019	Aid for freight transport on the route was 33–43 per cent of the eligible costs. The aid corresponds to the costs of non-internalized costs for railways and provides a compensation of 0.44–0.56 cents per tonne-kilometer for goods transported on the route.	The aid goes to multimodal transport operators (MTOs) and to railway companies transporting goods on a 12-mile transit route across the Alps along the Brenner, an international transit route through the Alps that connects Germany, Austria and Italy.	The aid was intended to promote a modal shift from road transport to freight transport by rail. The general goal was to reduce the environmental, health and social consequences of heavy vehicle traffic.
UK	Freight Facilities Grant scheme in the UK 2018–2023 (SA49518)	According to the latest decision, the program extends over a six-year period and amounts to 24 million pounds. The aid level is a maximum of 50 percent and is based on environmental benefits (external costs) and on additional costs for reloading in comparison with costs for whether the goods were to be transported by road.	The aid is broadly designed and includes investment costs in different kinds of freight infrastructure such as railways, shipyards, loading equipment etc.	The support program was first introduced in 1974 to stimulate the transfer of freight transport on the way to more environmentally friendly modes of transport. It has since been extended for several periods and now also includes inland shipping as well as coastal and short sea shipping.
Italy	“Marebonus” for shipping companies, 2016-2018	The expanded support runs from 2016 to 2018 with a total budget of EUR 138.3 million (45.4, 44.1 and 48.9 per year, respectively). The support is paid at a maximum of 30 percent of the transport cost for the line.	Beneficiaries are shipping companies (shipowners) flagged in an EU country that operate ro-ro or ro-pax traffic on new or existing routes between more than 40 Italian ports. In order for a project to be eligible for support, at least two criteria must be met from a list of options (reduced environmental effects, implementing ITS systems etc.)	Marebonus aims to support the transfer of freight transport by road.
Germany	German start-up aid for intermodal transport, 2010	The aid was paid at a maximum of 30 percent of the eligible costs for a maximum of a three-year period.	Support was provided for investments in various forms of load carriers, railway vehicles and other goods handling equipment, costs for using the infrastructure for railways and inland waterways, as well as for personnel costs and costs for maintenance and equipment in connection with the new the transports	It aimed to reduce the financial risk associated with the introduction of combined transport solutions using rail and inland waterways within the German state of Saxony and to and from neighboring regions and Member States.

Trafikanalys 2019 – en breddad ecobonus



# TRANSPORT VOLUMES AND INFRASTRUCTURE IN THE BARENTS REGION

Analysis of the opportunities for modal shift in the Barents Region needs recognition of both industrial structure and extent of transport infrastructure. The highest road transport volumes are related to the location of population centres. Industrial production units are also located close to biggest cities due to the connection between population and structures of diverse businesses. This is shown on the map of road transport flows.

### Road and rail transport

Mining sector, energy, forestry and production of raw materials for industrial processes are special character of transport flows in the Barents Region. These form the highest transport volumes in rail transport as is shown in the enclosed map of rail transport flows.

One special characteristic of the transport system in the Barents Region is sparse transport infrastructure network both in road and rail. In addition, rail network doesn't exist in the northernmost part of the Barents region except railway from Sweden to Norway (Luleå-Kiruna-Narvik), which mainly serves mining ore, but also grocery, fish and passenger transport. Railway to Murmansk and railway to Vorkuta are mainly related to coal transport. Transport of fertilizers and its raw materials forms high volume transport flows on the Murmansk railway.

### Waterway transport

There are ways to utilize coastal short sea shipping in the sea areas. In addition, there is an inland waterway transport system available in Finland in Lake Saimaa district, which is connected to the Baltic Sea and also to Russian inland waterway transport network to all the directions, even to the Barents Sea. Short sea shipping and coastal sea transport is an available alternative in all the countries in the Barents Region. As a whole, Barents Region has a lot of port infrastructure in varying sizes. The service supply both on sea and inland waterways largely covers the region.

### Opportunities for modal shift

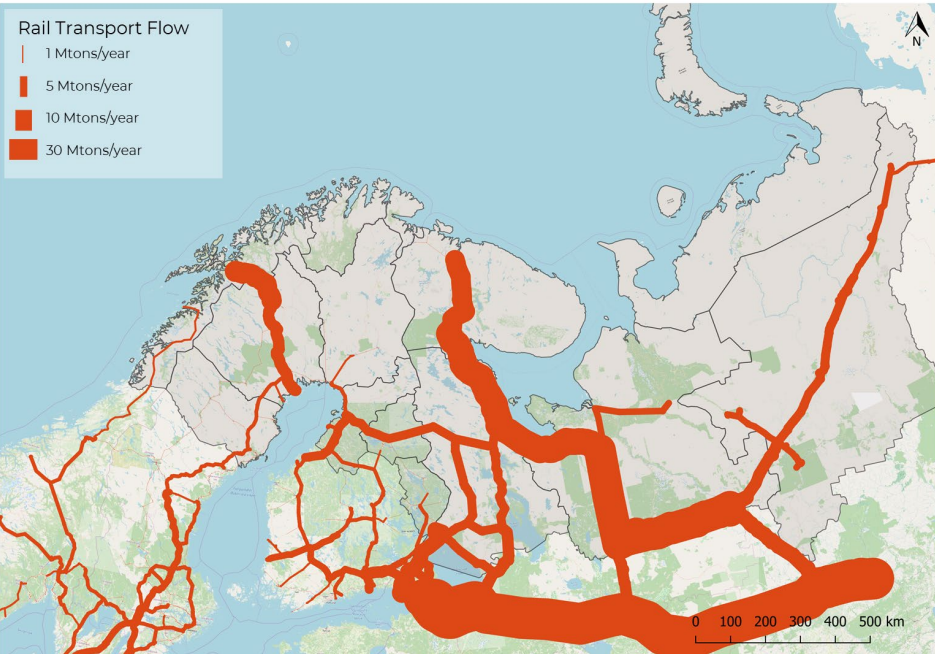
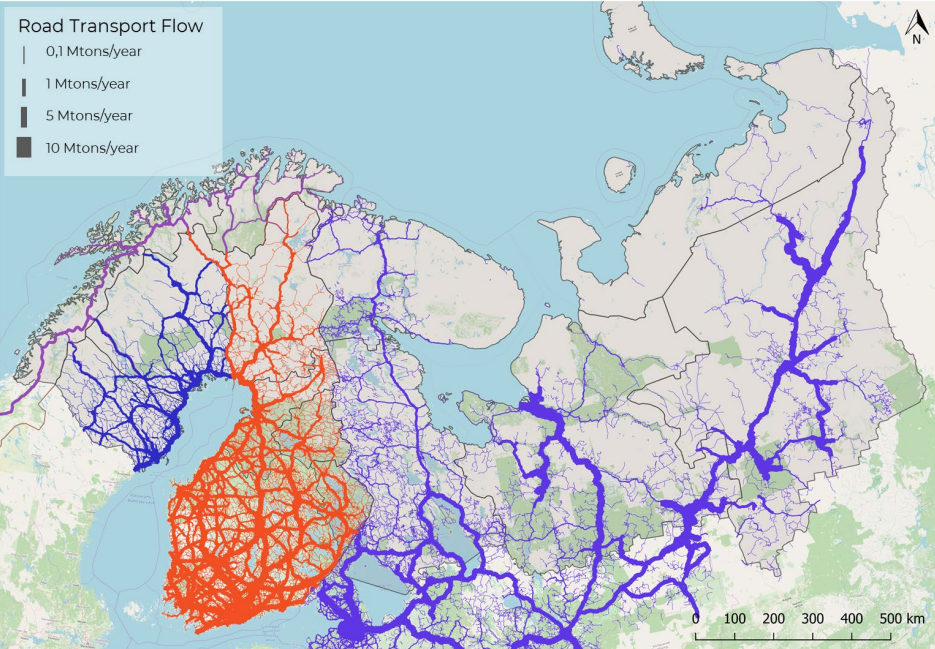
Based on the situation described above, there are quite limited opportunities for modal shift in long distance transport. The infrastructure and transport services are lacking. At the same time there are already very high volume transport flows on railways and railway network suffers from lack of capacity in some areas.

All the transport modes have their own characteristics, strengths and utilization areas. This is important to consider when estimating opportunities for modal shift. There are forward-looking investment projects both in extension of railway infrastructure to the north and seaport infrastructures, which may offer increasing opportunities for modal shift in the future. Extension of railways in Norway from Fauske to Troms and in Finland Arctic Railway Corridor to Kirkenes are examples of this kind of development, which are possible earliest in 2030-2040.

Capacity problems and bottlenecks may locate also outside the Barents Region, which affects the transport system in the Barents area. For example, in Finland the capacity problems on the main railway connection in south-north direction reflects also to the north and sets limitations to utilize for example combined transport.

### Road transport will remain important

Due to the above-mentioned characteristics of the area, road transport system is in a crucial role in the region. General cargo, grocery transport and industrial transport is operated by road. Flexibility, availability and extent of the road network also in border-crossing directions highlights the role of road transport in the region. It is important to take into consideration that road transport is also effective and increasingly sustainable mode of transport. Increasing dimensions of vehicles and therefore effectivity of road transport has increased. Technological development is very fast and new biofuel products are increasingly available. Basically, if you have one truck load of cargo, currently it's most effective transport mode is road transport.





# NORWAY

## – CURRENT SITUATION OF MODAL SHIFT



### Norwegian freight rail transport

There are several freight train companies that have or are in the process of establishing themselves on the Norwegian market. There are now a total of ten train companies that have a permit to transport goods on Norwegian rails. In 2019, there were seven. CargoNet is the largest intermodal transport operator which operates an extensive network around Norway. (see map on the right)

For example, on the Åndalsnes-Oslo section, the freight train company Onrail will establish itself with combined transport (containers). As of 9 September, CargoNet has started a new arrangement between the Port of Gothenburg and Oslo. The Swedish company BLS Rail has also started up timber transport to Norske Skog.

Bane Nor 2020



### Short sea shipping is getting a boost from ecobonus

Since 2017, the Norwegian Coastal Administration has provided grants to shipowners to establish new sea transport services that can compete with road transport

- So far (February 2021), commitments of up to NOK 175 million have been pledged to subsidies to 8 shipping companies.
- To date, these have moved 760,000 tonnes of goods from the road to the sea. This corresponds to almost 47,000 fewer trucks along Norwegian roads,
- This results in a reduction of approximately 21,000 tonnes of CO2 equivalents.

Kystverket 2021

### TRONDHEIM-BODO INTERMODAL TRAIN SERVICE, “THE FOODTRAIN”

Norwegian rail freight operator CargoNet launched a new intermodal connection between Trondheim and Bodø in 2019. It carries up to 52 semi-trailers in each direction. With the help of the new freight service, CargoNet will be able to remove up to 13,000 semi-trailers from the roads of Northern Norway annually and shift this cargo to railways.

#### Companies

The connection was arranged by CargoNet in a partnership with ASKO (Norway’s largest grocery wholesaler), Meyership (Norwegian logistics company based in Mo i Rana) and Nova Sea (Norwegian salmon farming company). The collaboration was initiated by ASKO, which wanted a green shift with a greater focus on the environment and traffic safety.

#### Rail service and goods

- The new rail freight connection runs daily with several stops between the terminals: Mosjøen, Mo i Rana and Fauske.
- Northbound freight consists of mainly daily consumer goods
- Southbound consists mostly of salmon transport to Europe
- The service could be connected with CargoNet’s intermodal link from Trondheim to Oslo in the future

#### Truck company perspective

Norwegian Truck Owners Federation considers the new line as good news. The new transport route for salmon will create an increased need for local Norwegian transport operators to transport the salmon from small towns to the nearest transshipment point for train transport.

The new transport option means that there will be shorter days for the drivers. They do not have to be away from home for weeks to deliver goods to Europe. They will simply run short routes to and from the production sites to the nearest transshipment site. With this solution, the stakeholders believe that they can recruit more young Norwegian drivers.

#### Modal shift benefits

- All the parties regard the new rail freight connection as a convenient tool to reduce their costs.
- At the same time, such rail services contribute to the shift to rail. The environmental benefit from the new CargoNet’s service is estimated at more than 6,000 tonnes of CO2.
- The service reduces congestion on roads in Northern Norway



Photo: CargoNet

Photo: Frank Lauritz Jensen



Railfreight.com 2020



[Click here for Table of Contents](#)

# SWEDEN

## – CURRENT SITUATION OF MODAL SHIFT

### RAILPORT INTERMODAL

Railport Intermodal is a rail shuttle system linking the logistics of sea and land efficiently and environmentally friendly. It is an open train system with both container and trailer trains.

The rail shuttles runs straight into the port and the freight can be rapidly loaded on board vessels for export to various world destinations or in reverse, from the vessel onto the rail wagon, which are then taken directly to its inland terminals.



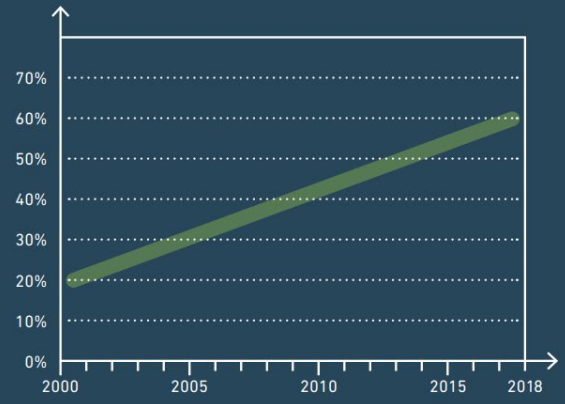
Source: Port of Gothenburg

Sweden has a long history of intermodal transport. Railport intermodal is an intermodal system where the seaport of Gothenburg is connected to the hinterland intermodal terminals by rail. Containers and trailers are transported by rail between the intermodal terminals and the port of Gothenburg. Last and first mile transports are carried out by road transport.

The system includes about 20 intermodal terminals, most of which meet the criteria of a dry port (includes customs clearance). 6 different operators are responsible for the rail transport. In addition to the system, there are also Railport Green Cargo intermodal and Railport conventional systems.

### VOLUME DEVELOPMENT

Railroad is a vital link in the transport chain for our customers. More than 60 per cent of the containers handled in the port is transported by rail.



### REDUCED ENVIRONMENTAL IMPACT

Moving goods from lorries to electrified trains has significant environmental benefits. Each year, the railport intermodal system shuttles save 53,000 tons of carbon dioxide emissions. That would equal the emissions from 23,000 passenger cars during one year.

ENVIRONMENTAL IMPACT FACTOR	DIFFERENCE BETWEEN TRAIN AND LORRY 2016*
Fuel, diesel	22,600,000 cubic meters
Carbon dioxide (CO <sub>2</sub> )	53,000 tons
Nitric oxide (NO <sub>x</sub> )	260 tons
Hydrocarbons (HC)	3 tons
Particles/dust (PM)	3 tons

\*IVL 2016.

Source: Port of Gothenburg

### VAGGERYD INTERMODAL TERMINAL, "DRYPORT"

#### Companies

For several years, Green Cargo has been operating the so-called Båramo shuttle between the combined terminal in Båramo in Vaggeryd municipality and Gothenburg seaport.

The shuttle has been operated since 2016 in partnership between Green Cargo, PGF Terminal and GDL. GDL has the commercial responsibility and is responsible for the road transport to and from the terminal, Green Cargo runs the trains and PGF operates the terminal which is leased by Vaggeryd municipality. The business has been successful, and transport has increased.

#### Rail service and goods

- 84 TEU train connection 6 times a week between Gothenburg and Vaggeryd
- Yearly volumes of 52 000 TEU (2020)
- Area of operations is a 50 km radius from the terminal
- The main export flow is comprised of timber products of Waggeryd Cell – 20 units of 40ft containers per day
- The import flow consists of retail customer deliveries
- The dryport is located 200 km from Gothenburg seaport

Båramo Terminalen



# FINLAND – INFRASTRUCTURE AND SERVICES FOR MODAL SHIFT ARE LACKING

Finland had a working combined transport system until the year 2014, when the route from Helsinki to Oulu was closed. Previously there were combined transport routes from Kemi/Tornio to Tampere, Turku and Helsinki. The rolling stock still partly exists and there are combined terminals in Oulu and Turku, but the capital region is missing one. Also, in Tampere there is opportunity to load combined transport trains.

In 2010 there was a lot of effort to widen the combi transport network in Finland. As a result, a study found a lot of potential for combined transports to many directions in Finland and many operators and other interest groups were interested in development of the new transport system which had operated between Helsinki and Oulu from the early 1990's.

Currently there is a new challenge in moving road transport vehicles to the railways. In Finland, new dimensions of road transport vehicles increased, and the new height of vehicles is 4,4 meters. This makes these trailers and vehicles impossible to transport by train. Trailers in overseas transport is still possible to use in combined transport as well as older equipment in general. But modern vehicles are out of question without investments to even lower rail wagons.

## Recent study on combined transport possibilities in Finland 2020

- The study finds that combined transport in Finland would be profitable if there would be a train with 20-25 trailers/trucks running daily between Helsinki/Turku and Oulu. This would reduce the CO2-emissions by 9 000 tonnes per year. The system would replace 25 to 30 % of the current truck traffic between Helsinki/Turku and Oulu.
- If there would be a 10% ecobonus (the Swedish ecobonus proposal) for this system, the total cost for the state would be about EUR 1 million annually.
- The study finds that a combined transport aid would give 15x more environmental benefits in comparison with the current state funded electric car purchase aid.
- The main barriers for implementation of a combined transport system are the timetables and punctuality of the railway system and the lack of a combined terminal in the capital region.

Taloustutkimus 2020

**HAPARANDA-TORNIO**  
For cross-border combined transport terminal infrastructure is located in Haparanda rail yard, logistics infrastructure in domestic combined transport system in Finland may be needed

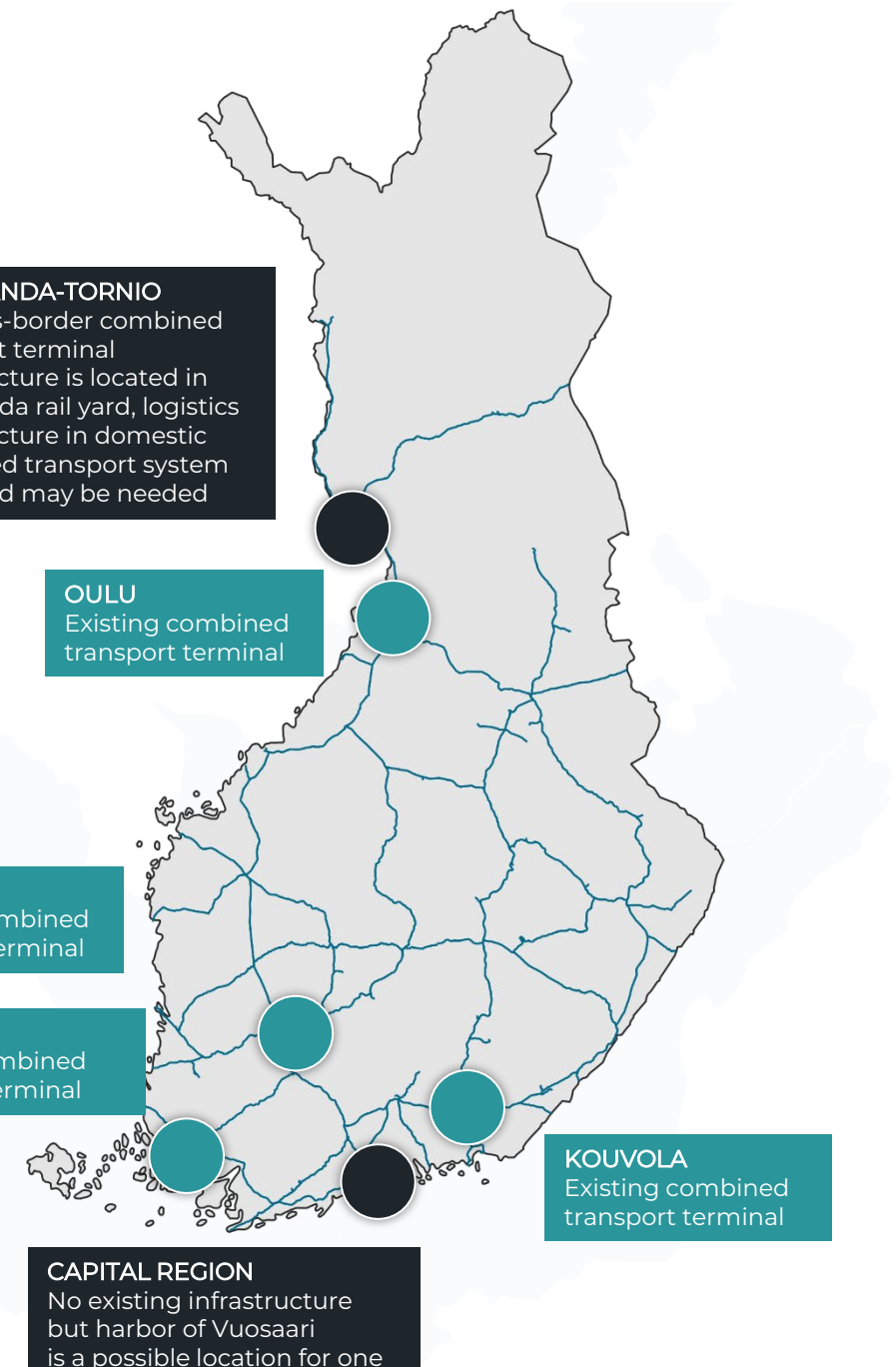
**OULU**  
Existing combined transport terminal

**TAMPERE**  
Existing combined transport terminal

**TURKU**  
Existing combined transport terminal

**KOUVOLA**  
Existing combined transport terminal

**CAPITAL REGION**  
No existing infrastructure but harbor of Vuosaari is a possible location for one



# FREIGHT TRANSPORT SYSTEM IN RUSSIA – MODAL SHIFT PERSPECTIVE

Barents Region in Russian part is sparsely populated area, with few bigger cities: Arkhangelsk, Murmansk and Petrozavodsk. There are a lot of production structures and refining chains in mining and energy. Huge investments both for production processes and logistics (sea ports and railways) are under construction in the Region.

## Sea ports have large volumes

There are a few high volume sea ports, Murmansk as a western hub for Northern Sea Route with fast increasing transport volumes (already 60 million tonnes per year). Sea port of Sabetta has also growing transport volumes due to huge investment projects to LNG production close to the Barents Region. Although Yamal is not located in the Barents Region, it has a lot of reflections to transport systems in the Barents. Also sea port of Dudinka has increasing significance with investments in Norilsk mining and production processes, which reflects to the increasing volumes in Murmansk area. These development processes indicate also increasing transport volumes in NSR corridor.

Investments on ice-breaker fleet, ARC7-class cargo vessels and LNG carriers for NSR traffic. At the moment, there is ongoing development to integrate existing NSR to global logistics system and connect major sea transport hubs on each continent together. Russian Federation has said in 2018, that the NSR would become the key role to the development of the Russian Arctic and Far East regions. Russia set ambitious goal of increasing the cargo volume in the NSR to 80 million tonnes by 2024. This is mainly based on above mentioned LNG investment projects, but also as a transit transports of energy, mining products, containers and general cargo.

## Rail transport is in heavy use

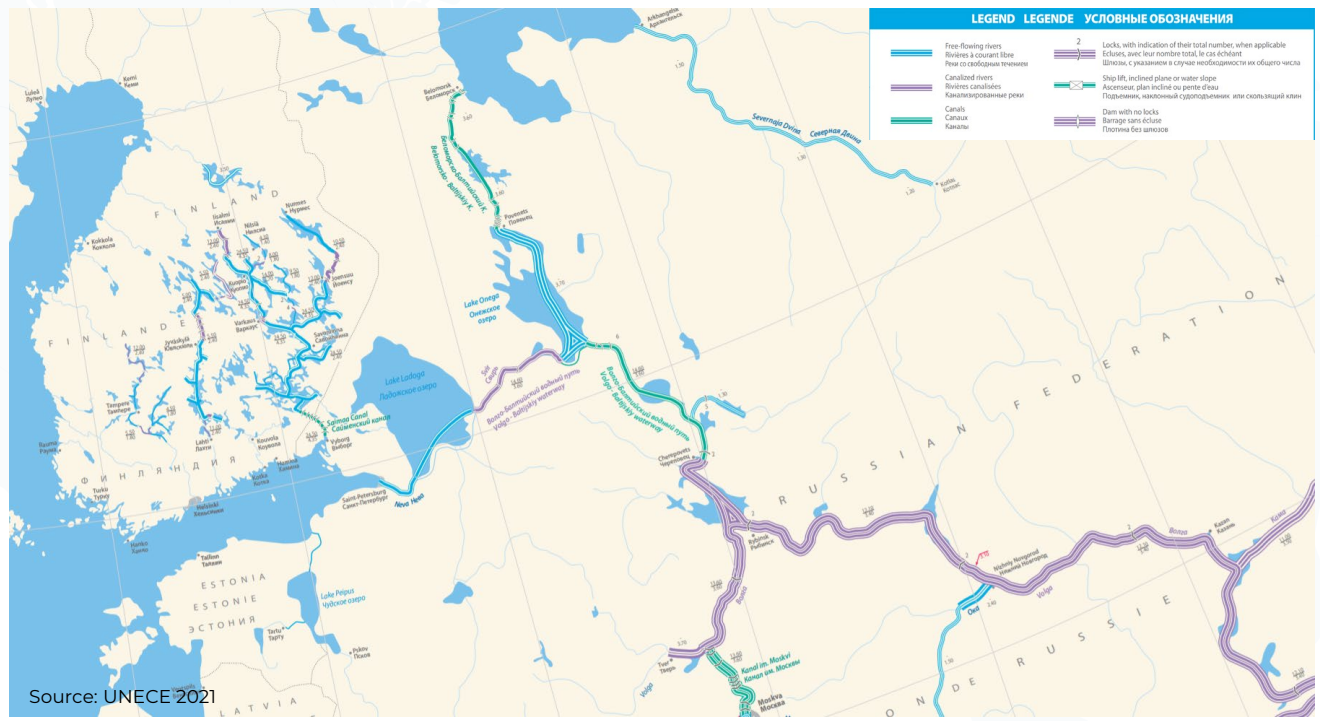
Freight transport system in Russia is mainly based on very effective rail transport system with high transport volumes. Road transport is mainly focused on shorter distances and areal transport needs. Thus it's difficult to find opportunities for modal shift in great extent in freight transport systems in Russia.

Especially in the Barents Region freight transport system utilize rail and sea transport systems in a very effective way serving high volume industrial value-adding chains.

## Extensive inland waterway transport system

Russia has also extensive inland waterway transport network and system available. There are very high volume routes and at the same time accessibility to large areas in diverse directions. Operations are possible only about 6 months per year, which leads to need for alternative transport solutions, usually by train. Inland waterway transport system is very competitive also for project deliveries, where products have large dimensions. Other limitation is, that inland waterway transport system is open only for Russian vessels, which have river transport registration.

It is important to take into consideration, that although Russia has different approach to green transport topics than for example EU, it is very important driving force also in Russian transport system. Russia has a strong focus on Arctic areas and Russia meets severe economical and operational consequences in the Arctic, if global climate warming continues. Therefore, Russia is very active in forming effective transport systems and investments in utilization of cleaner fuels. For example, Novatek has announced an investment program together with Siemens to change LNG production to ammonia in Yamal. Ammonia is generally seen as a main future fuel solution for carbon neutral sea transport and vessel engine production is focusing on this at the moment



Inland waterway system near Finnish and Russian border

Source: UNECE 2021

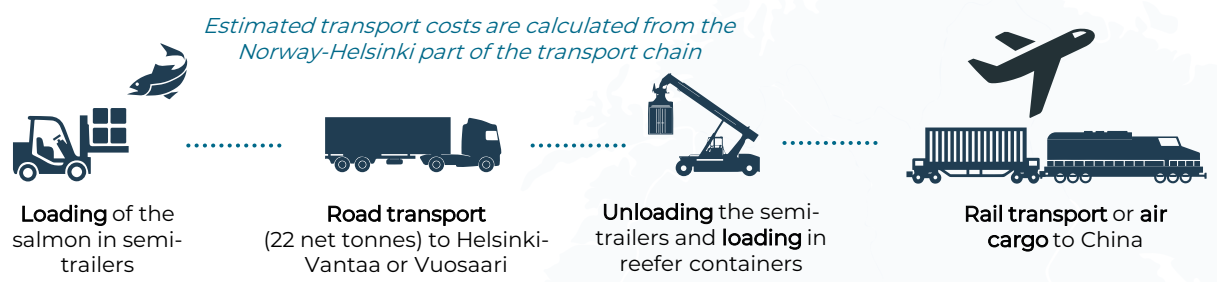


# SALMON TRANSPORT – CURRENT SITUATION

Total volume of salmon and other seafood transports from Norwegian High North area are approx. 0,4 million tonnes per year. This volume is estimated to grow to 1,6 million tonnes by 2050. In this case study three transport routes are evaluated as potential border-crossing freight transport flows for modal shift. Transport volumes on E8 main road are 160 000-200 000 tonnes per year from two origins, Skjervoy and Hammerfest. About 2/3 is transported from Skjervoy and 1/3 from Hammerfest. These are operated by trucks to Helsinki-Vantaa airport and further to diverse destinations in Asia. Part of the transport volume is transported to Finland, Sweden and Russia.

The third transport chain is the latest, called container rail transport Narvik-Haparanda/Tornio-Helsinki-China. At the moment this transport system is operated by road transport between Narvik and Helsinki and further to Asia by rail container transport. This route has a lot of potential in the future for diverse cargo types and forms a transport corridor between Asia-Helsinki-Narvik and further to Iceland, USA and Canada.

There are also direct air transports of salmon from Narvik (Evernes) to Asia. Qatar Airways is operating transport route Narvik-Doha-Asia to diverse destinations. This transport route is not taken into account in this case study, because it's not modal shift from long distance road transport. Though it is a very interesting and potential transport solution for the Barents region in the future.



DIRECT TRANSPORT COSTS

SOSIO-ECONOMIC COSTS

Cost component	Narvik-Vuosaari (single truck)	Skjervoy-Helsinki (single truck)	Hammerfest-Helsinki (single truck)	27 trucks (average)
Distance cost [EUR]	975	1 052	1 098	28 444
Time-based cost [EUR]	625	669	695	18 100
Loading and unloading [EUR]	42	42	42	1 141
Emissions [EUR]	48	51	54	1 392
Infrastructure cost [EUR]	25	27	29	741
Accident cost [EUR]	38	41	43	1 111
<b>Total cost [EUR]</b>	<b>1 754</b>	<b>1 883</b>	<b>1 960</b>	<b>50 929 €</b>

Table: Summary of calculations for transporting 600 tonnes of salmon from Norway to Helsinki by road transport.

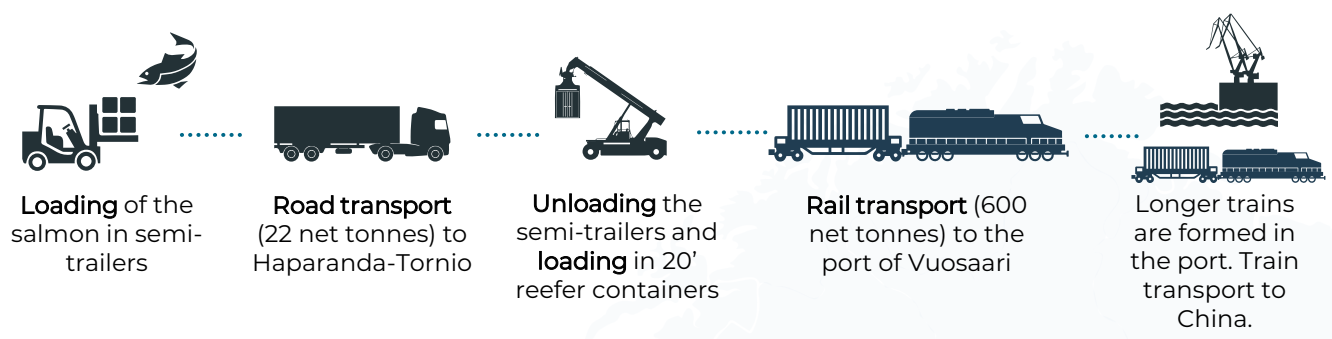
Unit costs based on report: Cost Benefit Analysis IWW Saimaa 09/2018. Explanations included in the report.





# SALMON TRANSPORT –MODAL SHIFT OPTION

In the modal shift analysis, the road transport part of the transport chain is shortened. The goods are transported from salmon farms to Haparanda-Tornio terminal via road transport. In the terminal, the salmon is transhipped to reefer containers that are required for salmon transport. The containers maintain the correct temperature for the fish to stay fresh. The containers are loaded on a freight train. The wagons can fit two 20’ reefers each. The calculation is done with a 10-wagon train that would carry around 600 net tonnes of goods. The goods are then transported from Tornio to the port of Vuosaari via the Finnish main railway line. In Vuosaari, longer trains are assembled ready to be transported to China via the Khorgos dryport. The transport cost calculation is done for the part between the salmon production and the port of Vuosaari. In some extent salmon transports can be operated by air freight transports from Helsinki-Vantaa airport as it operates at the moment. In that case, transport chain includes road transport in Helsinki from seaport to airport.



Cost	ROAD Norway-Tornio average (27x22 net tonnes semi-trailers)	RAIL Tornio-Vuosaari (600 net tonnes)
<b>DIRECT TRANSPORT COSTS</b>		
Distance cost [EUR]	12 929	5 926
Time-based cost [EUR]	8 735	6 160
Loading and unloading [EUR]	1 141	1 560
Fairway dues [EUR]	-	883
Emissions [EUR]	633	-
<b>SOSIO-ECONOMIC COSTS</b>		
Infrastructure cost [EUR]	337	-
Accident cost [EUR]	505	-
<b>Total cost [EUR]</b>	<b>24 280 €</b>	<b>14 530 €</b>

Table: Summary of calculations for transporting 600 tonnes of salmon from Norway to Helsinki.

Unit costs based on report: Cost Benefit Analysis IWW Saimaa 09/2018. Explanations included in the report.



# SALMON TRANSPORT

## – CONCLUSION AND RECOMMENDATIONS

### Clear benefits

The transport length in the case is in the optimal range for rail transport. Rail transport becomes more competitive the bigger the transport volumes are and the longer the transport distance by land is. So, it is no surprise that combining road transport flows in Haparanda-Tornio would provide savings both in transport costs and socioeconomic costs.

### Requirements

Modal shift in this case requires infrastructure investments in Tornio-Haparanda region. There is need to develop a logistics hub in Haparanda-Tornio further for salmon transports and for general cargo in the future. There is already rail freight terminal in Haparanda rail yard, but for future purposes investments in more efficient operations for growing transport volumes would be needed. It would be a logistics node between road and rail transport. City of Tornio has also made plans to construct logistics area for logistics service providers and there is already an area reservation for logistics purposes mainly focused on road transport system.

There is also a need for electrification of rail track Tornio-Laurila (already decided) and over the border to Haparanda to operate the whole transport chain with electric driven trains. Otherwise, it would need a change of locomotive in Kemi shunting yard or usage of modern hybrid locomotives.

Transporting salmon from Narvik by train requires rail-to-rail loading facilities in Haparanda-Tornio due to different rail gauges between Finland and Sweden. There are also questions related to rail capacity in Sweden between Kiruna and Narvik in Norway. There is an increasing demand for mining products transport, general cargo, salmon and also passenger transport. There is lack of rail capacity for new transport flows. In Finland there are plans to remove bottlenecks on the main rail network from Kemi to Helsinki. Increasing freight transport in this rail route would demand more double track sections to be a fast connection for both passenger and freight transport.

It should also be considered, that seaport of Narvik is an effective logistics hub for bulk products. Container handling and transport of general cargo would require new investments to the seaport infrastructure including rail and road connections in different locations than present infrastructure.

It must also take into consideration, that these salmon transport routes and estimations of modal shift is based on present situation and availability of infrastructure and logistics services. There are a lot of other transport flows of sea food including salmon transported to diverse markets in Nordic countries, Europe and overseas. Therefore, transport solutions are not stable, but effective logistics solutions with a high service level are always attractive for diverse material flows.

### Possibilities for larger combined transport flows

As stated earlier, Finland has had a working combined transport service running until 2014. Now, there are some studies taken to get the system working again. This case demonstrates that salmon transport could be an option to begin container train transport between Norway and Finland.

This shuttle service could serve also the Finnish South-North axis grocery transport which is currently done by road transport. Also, this service could be used by Finnish paper and cardboard industry near the logistics hubs.

Unit costs based on report: Cost Benefit Analysis IWW Saimaa 09/2018. Explanations included in the report.

	Cost	Road	Road + rail
DIRECT TRANSPORT COSTS	Distance cost [EUR]	28 444	17 265
	Time-based cost [EUR]	18 100	13 242
	Loading and unloading [EUR]	1 141	2 701
	Fairway dues [EUR]	-	646
SOSIO-ECONOMIC COSTS	Emissions [EUR]	1 392	633
	Infrastructure cost [EUR]	741	337
	Accident cost [EUR]	1 111	505
	<b>Total cost [EUR]</b>	<b>50 929 €</b>	<b>35 330 €</b>

**Table:** Summary of calculations for transporting 600 tonnes of salmon from Norway to Helsinki. Road column describes the current situation and road + rail column describes a modal shift solution.

Emissions	Road	Road + rail
CO2 [kg]	35 164,8	15 984,0
NOx [kg]	267,4	121,5
VOC [kg]	7,9	3,5
SO2 [kg]	0,1	0,0

**Table:** Summary of emissions for transporting 600 tonnes of salmon from Norway to Helsinki. Road column describes the current situation and road + rail column describes a modal shift solution.

In the modal shift option, **CO2-emissions would be reduced by 55 %**. In the future, road transport emissions will be reduced, but from safety and infrastructure perspective, the costs remain.





# MODAL SHIFT

## – CASE FINNISH SAW INDUSTRY

Regions of North Karelia and Kainuu have many saw mills in diverse dimension and product supply. There are also opportunities for modal shift from direct road transport to rail and inland waterway transport. In practice all of these transport modes are in use delivering wood products to diverse markets. It should take into account, that inland waterway transport is not year round operating transport system, but sailing period is nowadays about 10 months a year. There are also investments plans and decisions to lengthening the locks in Saimaa channel. After that longer, modern and ice classified vessels can operate in Lake Saimaa district and this improvement makes inland waterway transports more effective and almost year round operating transport system. Other aspect is that export flows in inland waterway transports are mainly operated to European logistics hubs and further to Central European markets without visiting HaminaKotka sea port. Thus, the costs would be reduced greatly and the option would definitely be most competitive cost wise. Here we have used simplified analysis through sea port of HaminaKotka by all the transport modes.

### Inland waterway system

Inland waterway transport system in Finland offers transport connections to Russian inland waterway transport network. This would serve export and import transport between Finland and Russia and further to CIS markets. This requires use of Russian vessels or transhipment in some sea port in the St. Petersburg region.

	Cost	Road	Road+rail	Road+ship
DIRECT TRANSPORT COSTS	Distance cost [EUR]	29 510	19 805	13 133
	Time-based cost [EUR]	20 015	24 828	13 046
	Loading and unloading [EUR]	6 080	14 400	38 080
	Fairway dues [EUR]	0	2 287	5 500
SOSIO-ECONOMIC COSTS	Emissions [EUR]	1 576	238	1 292
	Infrastructure cost [EUR]	678	102	262
	Accident cost [EUR]	1 018	154	394
	<b>Total cost [EUR]</b>	<b>58 878 €</b>	<b>61 814 €</b>	<b>71 707 €</b>

*Table: Summary of calculations for transporting 3200 tonnes of saw products from Kuhmo To HaminaKotka.*

Unit costs based on report: Cost Benefit Analysis IWW Saimaa 09/2018. Explanations included in the report.





# CASE HAPARANDA-TORNIO HUB - COMBINING THE BARENTS RAILWAY SYSTEM

	Rail gauge 1 435 mm		Rail gauge 1 524 mm
	Rail gauge 1 435 mm		Rail gauge 1 520 mm

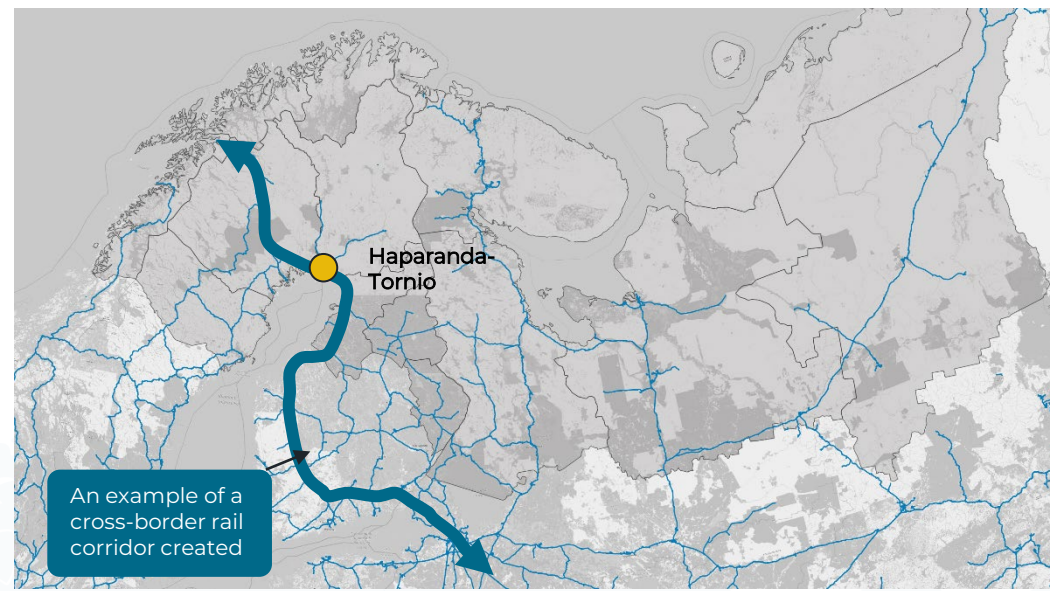
Swedish and Norwegian rail transport systems are connected with each other and further to European rail transport network with technically the same rail gauge. There are already significant border-crossing transport volumes between Sweden and Norway both in the south and north.

Finnish and Russian rail transport networks are connected also well through many border-crossing stations and with about same rail gauge. There are already significant rail transport flows between Finland and Russia. Some of these transport flows are transit transport further to European and overseas markets. This transport network combination offers transport corridors to CIS and Asian countries and thus forms interesting northern alternative to the sea transport system between Europe and Asia with growing volumes.

### What kind of action would support modal shift from road to rail from the Barents Region point of view?

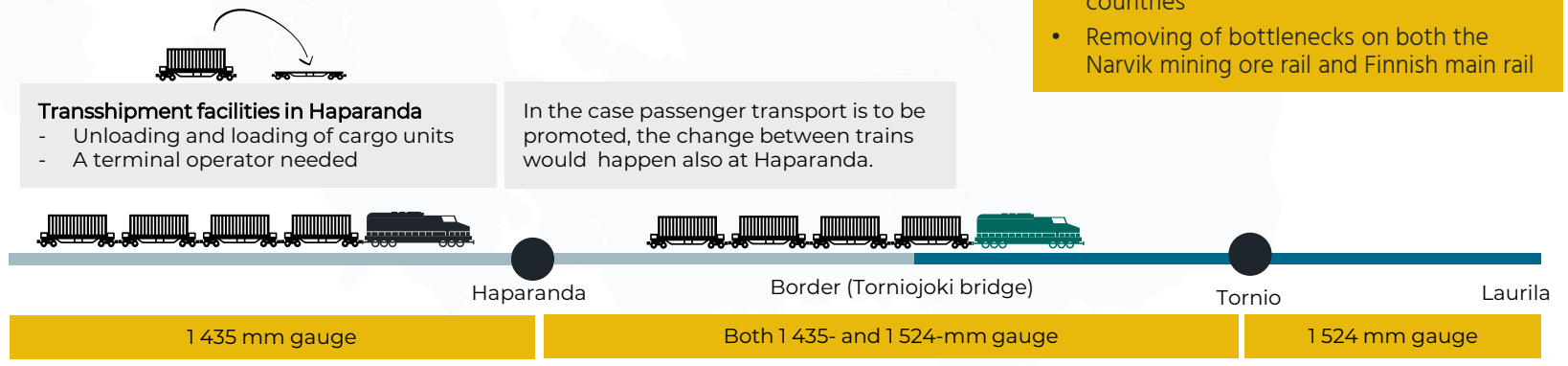
One approach is to combine all the rail transport networks to each other in the most efficient way. This is a basis for creation of a Barents wide rail transport network which is connected to diverse directions further to potential markets. Main bottleneck in this approach is connectivity of rail network between Finland and Sweden. These have different rail gauges and therefore it requires construction of effective transshipment facilities. Therefore, there is potential for transport of cargo units, mainly containers and trailers.

Development of connectivity through the whole Barents Region offers more opportunities for modal shift. At the moment there are diverse development plans and programs to proceed with these targets. For example, *Northern East West Freight Corridor* is one concept, which supports this idea. Rail container trains from Asia to Finland and further towards Narvik seaport is a transport corridor which has already started, although only from Asia to Helsinki in Finland is transported by rail and rest of the corridor is based on road transport. In the future this offers a versatile transport corridor between the Barents Region and Asia and also further to North America.



### Key benefits

- Connected railway systems, which enables efficient multimodal transport chains
- New potential transport corridors with increasing connectivity
- Provides infrastructure supply that attracts suitable transport flows, thus providing an opportunity to reduce transport emissions



### Infrastructure requirements to start freight transport at the Finnish-Swedish border

- Laurila-Tornio-Haaparanta rail electrification and a new Torniojoki railbridge 24 MEUR (Väylä 2019)
- A solution for different rail gauges between Finland and Sweden: developing transshipment facilities more efficient in Haparanda and some rail tracks to the Tornio railway yard.
- Tornio has made area reservation for logistics center, which would support the role as a logistics hub regarding road transport system.

### Other requirements

- Political will and understanding of the possibilities created
- A terminal operator
- Competitive rail service available in all countries
- Removing of bottlenecks on both the Narvik mining ore rail and Finnish main rail

## HOW TO PROMOTE A MODAL SHIFT IN THE BARENTS REGION?



### CHALLENGES TO BE SOLVED

- High transshipment costs have been suggested as one explanation for why the market has been slow to develop. Transshipment costs are substantial, and they also make up a much larger share of the total cost of carriage by rail and ship than carriage by road. As a result, compared to heavy goods vehicle transport, much larger freight volumes are required over longer distances to generate economies of scale for rail and maritime transport.
- The intermodal market consists of several different modes of transport with discrete market terms and various business models. Transport modes are in some cases in competition with each other and at this creates a challenge. On the other hand, with digital platforms and efficient transshipment, synergies can be found for all transport modes.
- In addition, the lack of access and connections to loading terminals, as well as capacity limitations in the rail network, could reduce opportunities and incentives to reload.
- The freight forwarder market is also relatively poorly developed, and there is a significant lack of firms able to coordinate and market transport solutions, which are attractive to customers in the intermodal transport market.
- Operating aid is considered to be more distortive for competition than investment aid and the EU Commission is often restrictive in approving operating aid other than temporarily and for shorter periods.



### OPPORTUNITIES FOR THE BARENTS REGION

- Finland and Sweden can receive funds from the EU to promote a modal shift and intermodal transport, and to invest in rail and intermodal infrastructure.
- Extension of TEN-T network towards north is an important approach in infrastructure and connectivity development in the region. Main focus in infrastructure investments of the EU is related to TEN-T core corridors and therefore core corridor status is important to keep in focus in the Barents region. This needs also consolidation of national transport plans from border-crossing perspective in the region. In addition to rail network, TEN-T includes road, sea ports and airport networks, which are essential to combine to the complete system of examination.
- Creation of logistics hubs in strategic locations can offer competitive transport system for the Barents region, which utilize both road and rail transport systems in a very efficient way in border-crossing transport flows regarding Finland, Sweden and Norway. Total solution must be competitive on cost, transshipment and total transport time. At the same time the logistics service product can promote operations model towards sustainable and even carbon neutral system. Tornio-Haaparanta as a future logistics hub is one example of this approach.
- There are many railway connections available between Finland and Russia. At the moment there are restrictions by segment of goods, which border-crossing stations are available and Vainikkala is the only possibility to transport all type of goods, including food deliveries. In a case of significant volume increase other three border-crossing rail connections are also available to start transport of diverse type of goods and also container trains. This requires, however, a common will from Finnish and Russian part including rail operators.

An article by Pinchasik et al. describes a simulation of different policy measures and their effects on mode choice and emissions from freight transport in the Nordics

The study finds that Norwegian ecobonus scheme for rail yields larger modal shift away from road than a similar ecobonus for sea transport. Facilitating longer freight trains yields more modal shift but has high policy costs.

Effects of harmonizing policies across Nordic countries vary but can be strengthened by combining different measures.



However, even for scenarios with strong policy measures, reductions in CO<sub>2,eq</sub> emissions do not exceed 3.6% in 2030 while sometimes increasing local air pollution.

Modal shift policy should therefore not exclusively be regarded as environmental strategy, although it may contribute to other policy objectives.



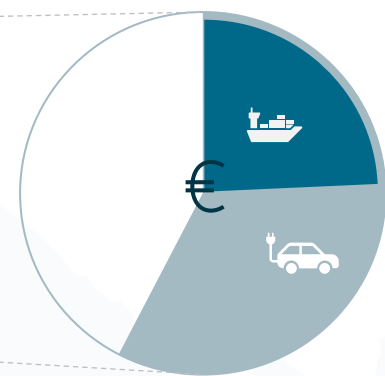
# EU FUNDING OPPORTUNITIES – INFRASTRUCTURE PROJECTS

In the future EU's main transportation related goals are the development of the TEN-T Core and Comprehensive Networks. Infrastructure development is one of Union's key financing areas

EU's aim is to have the Core network fully integrated by 2030 and the Comprehensive network by 2050. Majority of the Barents region belongs to the Comprehensive network and. EU funded projects can include countries outside EU. New CEF Program 2021-2027 is under final review process and the program will start immediately after formal approval.

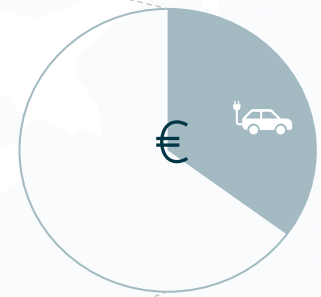
- CONNECTING EUROPE FACILITY (CEF)**
  - The main financing instrument in EU to bolster infrastructure development
  - New programme will start soon for 2021-2027 and calls for funding will start in Q2-Q3 / 2021
  - 33,7 bn** euros in which
    - 25,7 bn for transportation
    - 5,8 for energy
    - 2,1 for digital
  - ▶ Priority will be given to further development of the trans-European transport networks (TEN-T), **focusing on missing links and cross-border projects with an EU added value .**
- NATIONAL COVID-19 RECOVERY FUNDING (RFF)**
  - National infrastructure investment plans (in Finland 310M€ for energy transition, 320M€ for green and digital industrial investment, 40M€ for transportation)
- INVEST EU**
  - EU guaranteed funding directly from EIB or authorized regional banks
- EUROPEAN REGIONAL DEVELOPMENT FUND (ERDF)**
  - For regional development initiatives through regional councils
  - React-EU projects
- EUROPEAN FUND FOR STRATEGIC INVESTMENT (EFSI)**
  - EU's additional investment on a strategic development initiatives

## Future funding allocation criteria in CEF



**24%**  
for inland waterways and multimodal transport, and gas infrastructure -if enabling increased use of renewable hydrogen or bio-methane.

**60 %**  
Must reduce transportation related greenhouse gases

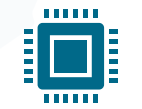


**30 %**  
Must reduce transportation related greenhouse gases and comply with EU's sustainable finance standards

## All funded projects must have



**CLEAR CLIMATE BENEFITS**



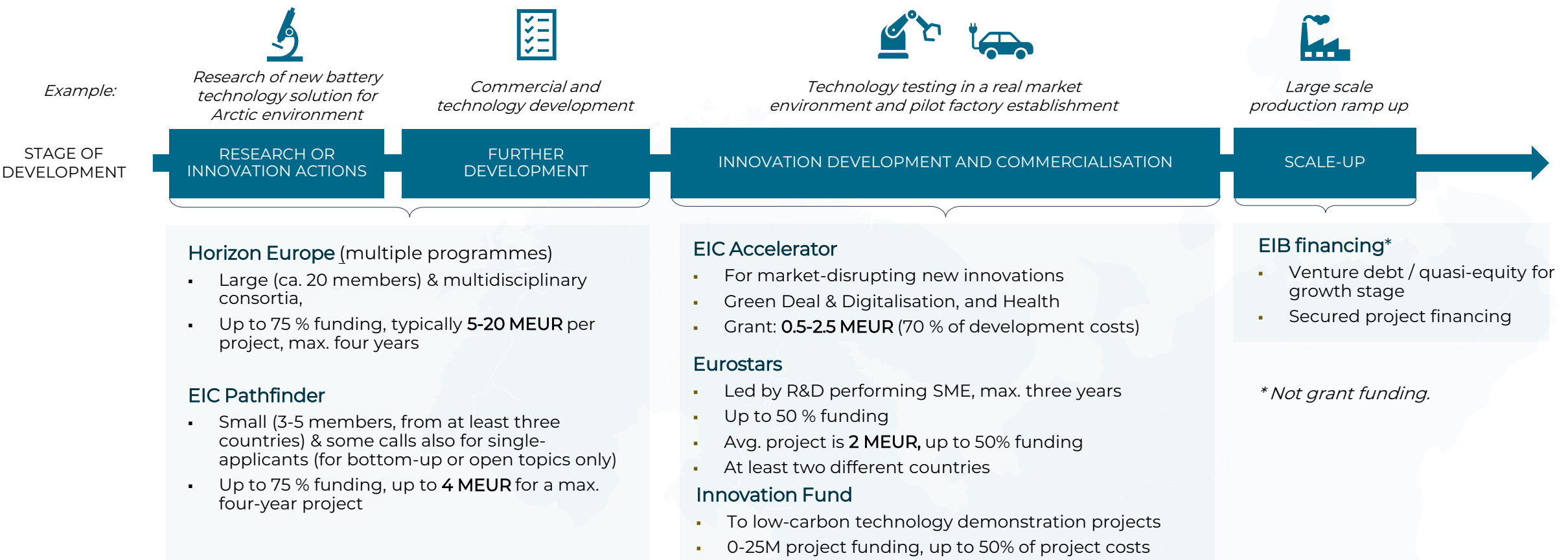
**DIGITAL REACH**



# EU FUNDING OPPORTUNITIES – INNOVATION AND RESEARCH DEVELOPMENT

## EU funding for private companies and research institutions in the field of Smart Mobility

- EU provides significant funding opportunities for technology researcher and developers
- In addition to the research measures, funding opportunities are also available for commercial development and scaling



**Multiple funding opportunities to accelerate research in innovation development & commercial scaling in the Barents region**

# MODAL SHIFT

## Key points for the Barents region

# 1

### Modal shift should not be pursued for the sake of it

It must be seen as a holistic transport system development work that improves logistical competitiveness and brings added value to the transport customers. Many modal shift options are already in use in the Barents region, but there are still many other user cases available.

# 2

### Modal shift is not to be exclusively regarded as an environmental action

Studies show, that even strong policy measures will only lead to relatively small emission reductions (few percentages). It has more to do with using each transport mode's best qualities in each transport chain and maximizing the usage of infrastructure.

# 3

### Modal shift requires infrastructure investments – EU Green Deal funding mechanisms should be used

From transport sector point of view, EU Green Deal is a funding mechanism focusing on TEN-T network. Most of TEN-T network in the Barents region belongs to the comprehensive network. In addition, there is a clear focus on multimodal transport systems, inland waterways and rail transport. All the investments must have clear climate benefits and digital reach. This approach offers a lot of opportunities for the Barents region because these support development of connectivity of the region.

# 4

### Logistics hubs are critical nodes in multimodal infrastructure

Development of logistics facilities for terminal operations and transshipments are one key approach to promote modal shift in the Barents region. The region has a lot of potential for development of new transport solutions because there is an extensive rail network available between Scandinavia, Russia and Asia. Therefore, there are a lot of opportunities to construct new and alternative transport corridors to diverse directions by combining all the transport modes available in an effective way.

# 5

### Modal shift needs a clear vision and target setting to form a competitive and sustainable transport system

Modal shift and intermodal transport systems must be seen from many perspectives and layers. Modal shift can be a political target which needs support and investments to proceed. Basically, a transport system has concrete product transport flows which have a product owner (or producer) and a customer. This transport system must be cost efficient with high service level and increasingly sustainable. Thus, a combination of looking at the big picture and local development is needed.