The Barents Euro-Arctic Region transport and logistics system, current status

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Kolarctic CBC
EU FINLAND NORWAY RUSSIA SWEDEN

PROJECTS AND PLANS INFLUENCING THE FUTURE DEVELOPMENT OF THE AREA

Federal plans for transport infrastructure development

Regional development plans and strategies

UN Sustanable Development Goals

Smart specialization strategies

EU Projects in the area:
Northern Periphery Programme
The Baltic Sea Programme
Kolarctic ENPI

Other joint Barents Region plans and agreements

Arctic strategies in EU and diverse countries

Environmental commitments

EMERGING SIGNALS

Flight shame

Arctic shipping boycott

E-commerce

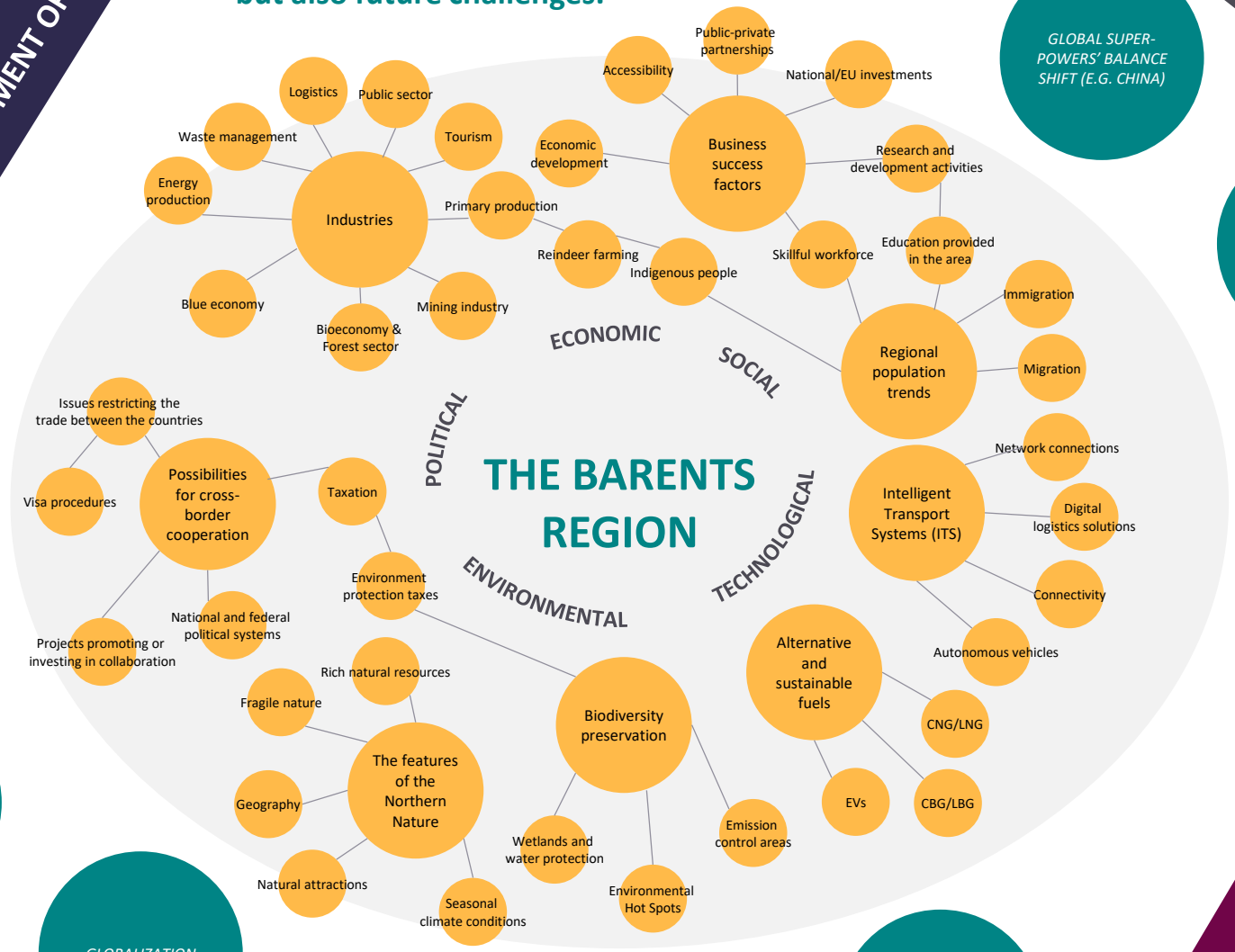
3D-printing

E-visa

Russian waste crisis

Online & remote meetings

> **" The Barents Region has many resources to gain a competitive advantage in the world market – but also future challenges.**



GLOBAL SUPER-POWERS' BALANCE SHIFT (E.G. CHINA)

URBANIZATION

DIGITIZATION

POLITICAL UNCERTAINTY

PROTECTIONISM, POPULISM

GLOBALIZATION

GLOBAL WARMING

GLOBAL MEGATRENDS AND DRIVERS

MEGATREND

THE CURRENT STATE OF THE INFRASTRUCTURE

Port capacity

Flight connections

Arctic railway projects

Goods storage facilities

Railway electrification rate

HCT (Threshold values for vehicles)

Northeast passage /Northern sea route

Different rail gauges in SWE+NOR vs FIN+RUS

Cable infrastructure (e.g. Arctic Connect data cable)

KEY CHARACTERISTICS

Multiple special characteristics in the Barents region affect the transportation sector significantly

LARGE GEOGRAPHICAL AREA

Approx. 5,3 million inhabitants, density of population 3,5 inhabitants/km² (0,3-8)

DOMINATING INDUSTRIES

Industrial structure is dominated by mining and metal industries, petroleum and gas industries, forest industries, and seafood and marine resources.

BIG INVESTMENTS

A lot of huge investment project ongoing and transport volumes are strongly increasing.

FRAGILE ENVIRONMENT

Very sensitive area both in terms of nature and culture basis.

KEY CHARACTERESTICS

Overview on transport infrastructure and main transport flows in the Barents region.

- Road transport dominates as a transport mode in the Barents region and accessibility is mainly based on road transport both in passengers and freight in regional and cross-border transport needs.
- Sea transport is a main transport mode in high volume industrial transport chains. The role of NSR is increasing.
- There are a few very high-volume rail transport corridors. New container rail transport services and multimodal transport systems.
- Rail and especially air transport systems are vital for the accessibility of the region.
- A lot of transport flows east-west direction in cross-border transport chains. At national level transport infrastructure and system is based on southbound transport connections in each country. Therefore we need the change of paradigm to highlight the importance of transport connections to all directions.
- Arctic areas are the most potential sources of natural resources including energy. There are also increasing amount of process industries and value added chains.

TRANSPORT FLOWS IN THE BARENTS REGION

Summary of analysis in freight and passenger transport flows

DATA AVAILABILITY IS AN ISSUE
Lack of comprehensive data covering all the transport modes and the whole Barents region is one main challenge in analysing the present state of transport sector. Therefore uncertain basis for estimation of future development regarding development of transport volumes.

HIGHEST CARGO FLOWS FOLLOW LOCATION AND INVESTMENTS OF HEAVY INDUSTRIES, MINING, LNG, OIL AND PRODUCTION OF RAW MATERIALS, AND ITS INDUSTRIAL PROCESSING CHAINS.

NORTHERN SEA ROUTE IS GROWING
The cargo volumes in the Northern Sea Route is in strong growth and forms a significant logistics industry by itself, which includes both transportation and related logistics service supply and infrastructure.

→ Latest Arctic Strategy of Russia published in March 2020 emphasize a lot the development of growing and vital Arctic area with versatile business environment and structures. Utilization of huge potential of the area in focus.

→ Investments in vessel and ice breaker fleet, port infrastructure and safety technology will make NSR very attractive transport route in the future.

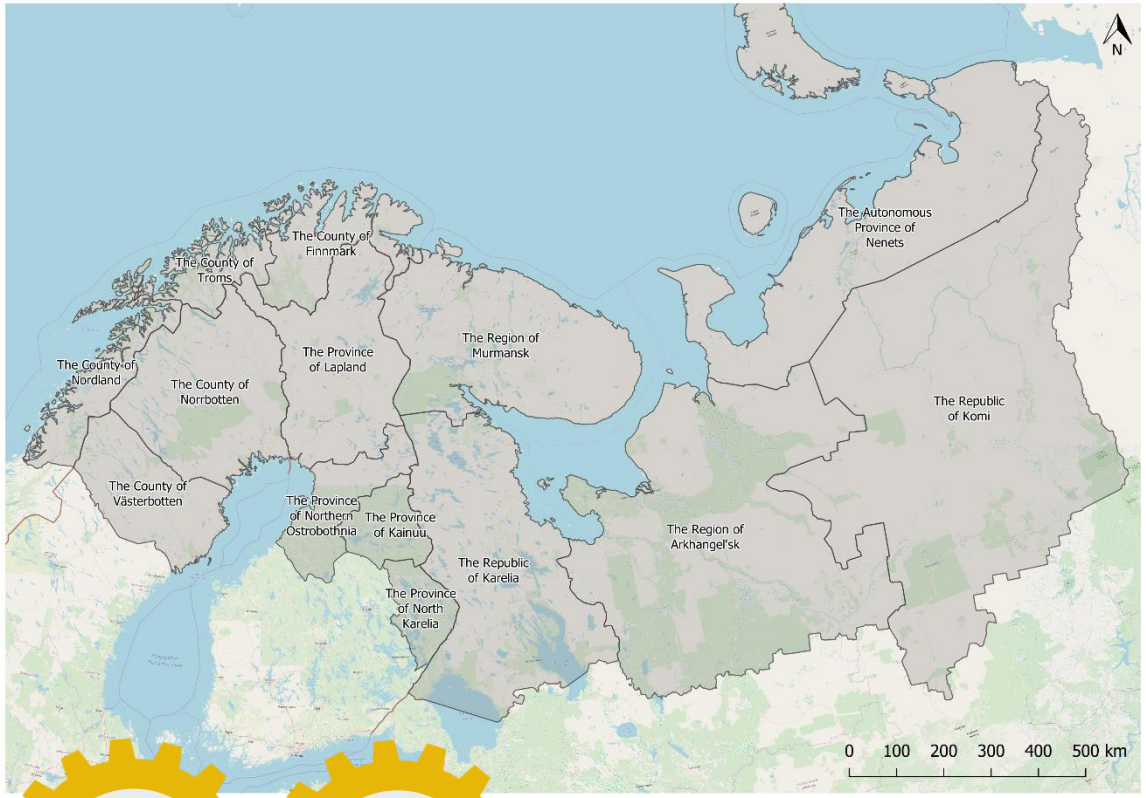
BORDER-CROSSING INFRASTRUCTURE IS KEY
Border crossing transport infrastructure as a basis of improved accessibility of the area both in freight and passenger transports is an important approach.

The roles of transport modes in different business areas, sourcing and market areas.

Cost and energy efficient transport systems for different transport volumes. Requirements for logistics are usually good service level, good cost-efficiency and moderate sustainability.

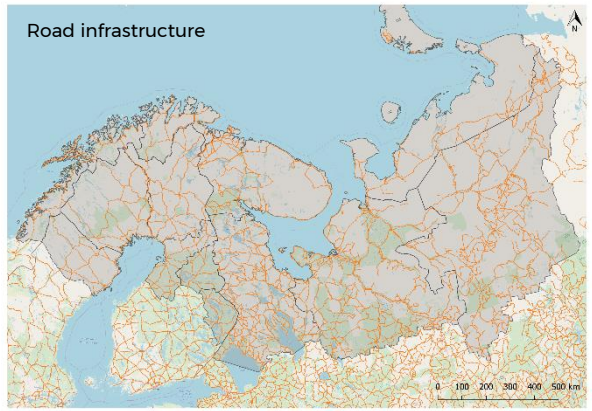
BARENTS REGION TRANSPORT AND LOGISTICS – SYSTEM OVERVIEW

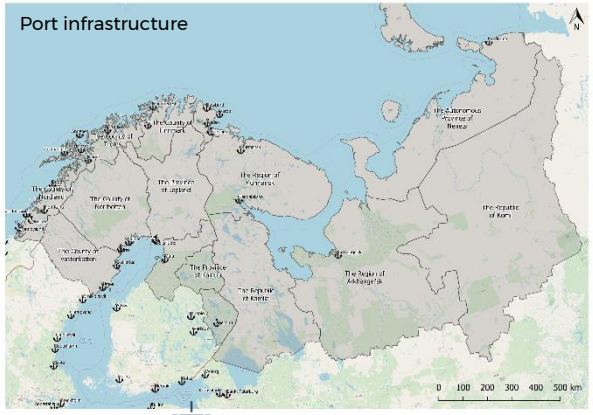
GLOBAL COMPETITIVINESS & VITALITY	• All the layers create competitivity for the Barents region	***Transport system goals***
BUSINESS LIFE AND TOURISM	• Transport and mobility needs of business and tourism	***Demand***
POPULATION	• Residents of Barents – demand for mobility services	
CLIMATE & ENVIRONMENT	• Transport emissions and supporting infrastructure	***Preconditions***
SAFETY	• Safety of different transport modes	
MOBILITY & TRANSPORT AND DATA SERVICES	• Goods • People	***Services***
PROPULSION POWERS & NETWORK	• From fossil fuels to alternative fuels and their respective distribution networks	***Enablers***
TRANSPORT INFRASTRUCTURE	• Road, rail, sea, air networks • Transshipment facilities	

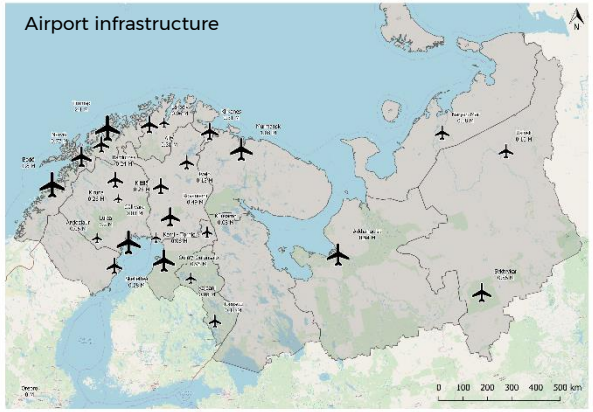


BRTL Case study examines the Barents transport system from three key perspectives: modal shift, alternative propulsion powers and ITS in winter maintenance cases. The cases are based on previous studies carried out in the BRTL project on world logistics market, green logistics and ITS. EU Green Deal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

FREIGHT TRANSPORT MODE FEATURES IN THE BARENTS REGION







	Road transport	Rail transport	Maritime transport	Inland waterway transport	Air cargo
Capacity	**Dozens** of tonnes	**Hundreds** of tonnes	**Thousands** or **tens of thousands** of tonnes	**Thousands** of tonnes	**Dozens** or **hundreds** of tonnes
Optimal range	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
Speed	~70-80 km/h	Speed: ~70-80 km/h	~25 km/h	~44 km/h	450-900 km/h
Description	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.
Barents	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.
Example of cost per tonne-km	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)

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

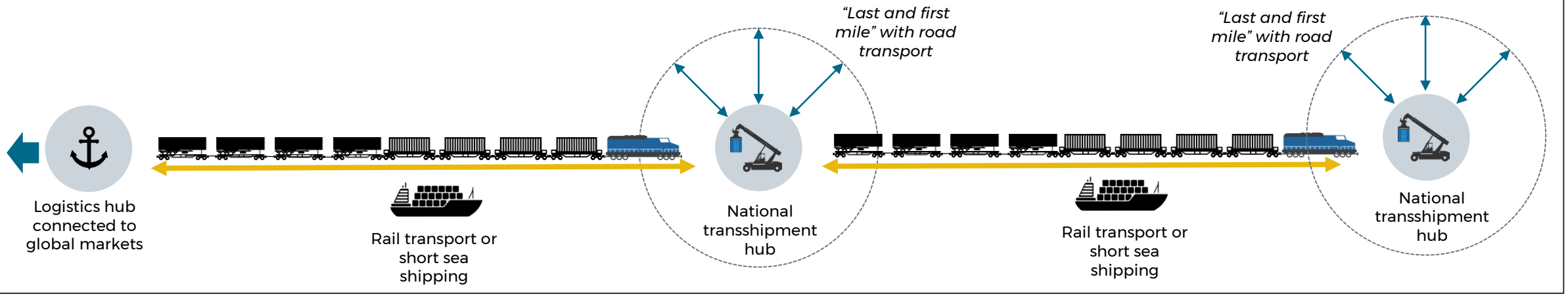
Threats for competitivity

- 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



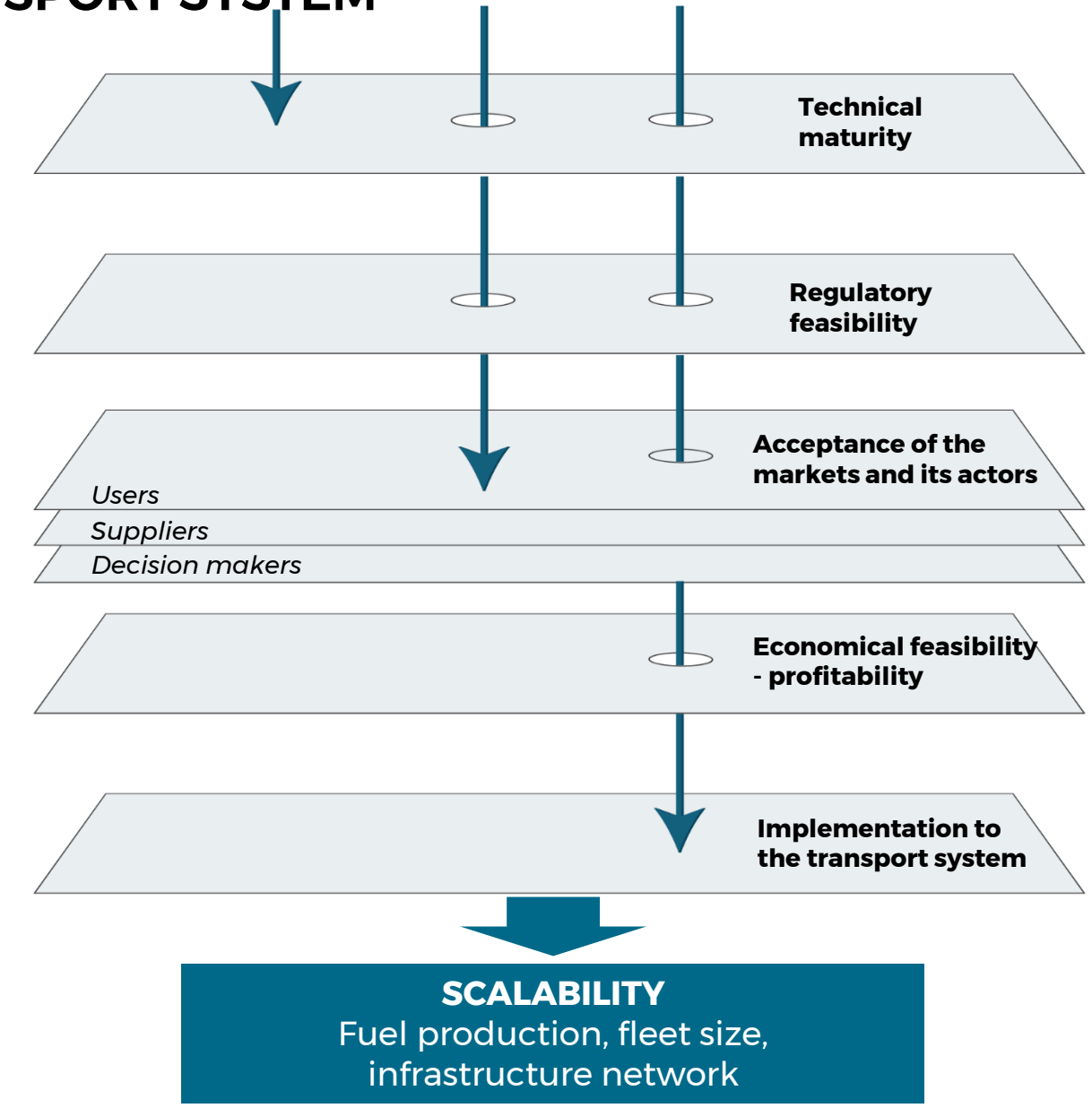
IMPLEMENTATION OF NEW TECHNOLOGIES AND PROPULSION POWERS IN THE TRANSPORT SYSTEM

All the forementioned propulsion powers are technologically feasible but their technical maturity varies

All the forementioned propulsion powers are generally accepted in different forms of regulation. But there is still development needed on different levels.

Renewable diesel is largely considered a good alternative. For BEVs, range anxiety and vehicle prices are still barriers in many cases. For hydrogen and e-fuels, the lack of scale and suppliers limits the notoriety.

BEVs are estimated to reach price parity with respective ICEVs by 2023. Hydrogen and e-fuels are in many cases still too expensive for large scale production.



WHAT PROPULSION POWERS FOR THE BARENTS REGION TRANSPORT?

MODE OF TRANSPORT	PRIORITY FOR THE NEXT FEW YEARS	2030+
Heavy long-haul truck transport	• Renewable diesel • LBG and LNG	• Hydrogen • E-Fuel
Light short-haul truck transport	• Battery electricity • CBG • Renewable diesel	• Battery electricity • E-Fuel • CBG
Passenger vehicles	• Battery electricity • CBG • Renewable diesel	• Battery electricity • E-Fuel
Rail transport	• Electricity • Renewable diesel	• Electricity • Hydrogen
Shipping	• Hybrid battery electricity • LNG	• Ammonia • Hydrogen
Aviation	• Battery electricity • Sustainable aviation fuel	• Battery electricity • Hydrogen / E-fuels

It is crucial to recognize that the Barents region or even the whole transport sector won't determine the future of transport fuels. The biggest decisions are made in the energy sector and from there the energy assortment will be carried on to the transport sector.