

Transport vision 2040 for the Bothnian Arc corridor

Final report
September 2023



POHJOIS-
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COUNCIL OF OULU REGION



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Foreword

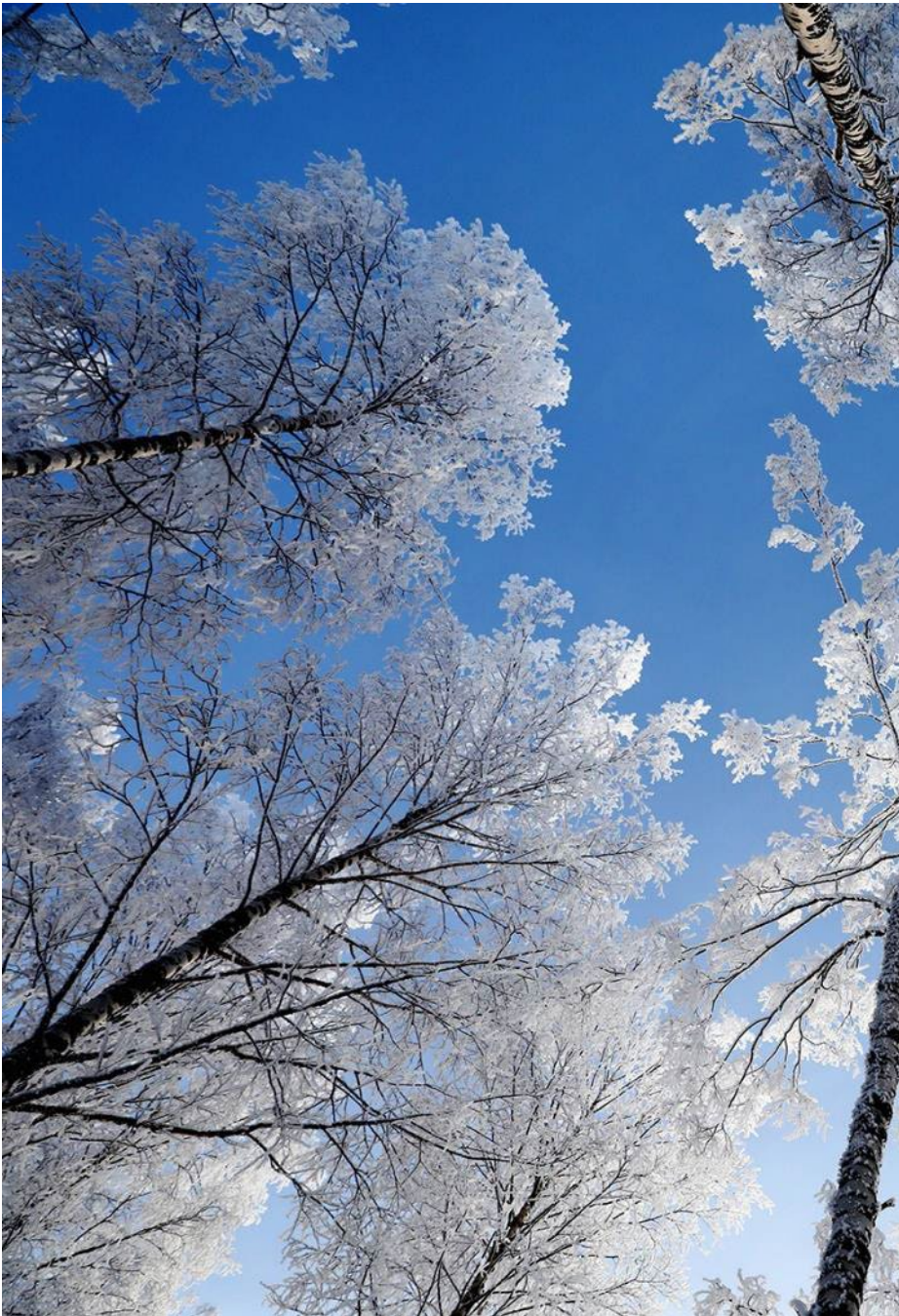
This report is a result of the project *Borderless and sustainable future of Bothnian Arc*, and the sub-project *Sustainable, cross-border traffic and functional logistic connections in Bothnian Arc*. The project aimed at enhancing cross-border co-operation on transport issues, creating a regional transport vision and promoting cross-border transport and travel chains.

The main focus was on stakeholder interaction at all stages of the work. The process included a series of four workshops from spring 2022 to spring 2023, with Finnish and Swedish participants.

The project was financed by the Finnish Ministry of Economic Affairs and Employment and led by the City of Oulu, in collaboration with Finnish-Swedish Bothnian Arc Association and Council of Oulu Region. The project was carried out by Ramboll Finland Oy. We'd like to thank all stakeholders and workshop participants for their valuable input during the vision process.

September 2023

City of Oulu



Summary

Bothnian Arc is an important economic area and an internationally significant transport corridor in the northernmost part of Europe and the Barents region. The area reaches from Skellefteå in Sweden to Kalajoki in Finland, following the coastline of the Bothnian Bay. Bothnian Arc is an important part of the Trans-European Transport network, connecting the Nordic to the rest of Europe.

In this report, the results of the cross-border co-operation process *Sustainable, cross-border traffic and functional logistic connections in Bothnian Arc* are presented. The process included a series of four workshops from spring 2022 to spring 2023, with Finnish and Swedish participants from municipalities, regions, development organisations, state organisations, transport operators and other stakeholders.

Transport vision 2040 for the region is *Seamless travel and logistics – for a sustainable, growing and attractive Bothnian Arc region*. To support the vision, eight goals were established:

Sustainable region

- 1 Sustainable mobility and transport
- 2 Resilience and security

Growing region

- 3 Borderless transport of goods and people, supporting investments
- 4 Connected logistics chains

Attractive region

- 5 Accessible region
- 6 Fluent travel chains
- 7 Enabling tourism and leisure travel

Common goal for the whole vision

- 8 Culture of co-operation

The transport vision and goals will be implemented via an Action plan consisting of the following actions:

- Sustainable transport planning in the region
- Security of supply and resilience in transport planning
- Charging and refuelling networks for non-fossil fuels
- Development of the TEN-T North Sea Baltic and Scandinavian-Mediterranean core network corridors
- Promoting other infrastructure projects jointly recognized as important for the region
- Ensuring railway capacity
- Ensuring funding
- Tornio-Haparanda as an essential node for the whole Bothnian Arc corridor
- Improving customer focused information and ticket purchasing
- Launching cross-border train traffic
- Flight connections for passenger traffic
- Launching a new cross-border transport forum
- Collecting information and data on transport volumes

To continue the work, it is suggested to launch a new cross-border transport forum. The forum could ensure continuous dialogue over transport issues, coordinate the implementation of the Action plan, as well as monitor and address emerging transport issues with cross-border relevance.

Tiivistelmä

Perämerenkaari on merkittävä taloudellinen keskittymä ja kansainvälisesti tärkeä liikennekäytävä Euroopan ja Barentsin alueen pohjoisosassa. Perämerenkaaren alue ulottuu Ruotsin Skellefteåsta Suomen Kalajoelle saakka, Perämeren rannikkoa seuraillen. Perämerenkaari on keskeinen osa Euroopan laajuista TEN-T-liikenneverkkoa, joka yhdistää Pohjoismaat muuhun Eurooppaan.

Tässä raportissa esitellään tulokset rajat ylittävstä yhteistyöprosessista *Perämerenkaaren alueen kestävä, rajat ylittävät liikenne ja toimivat yhteydet*. Prosessiin sisältyi neljä työpajaa, jotka järjestettiin aikavälillä kevät 2022–kevät 2023. Työpajoihin osallistui suomalaisia ja ruotsalaisia edustajia kunnista, maakunnista, kehittäjäorganisaatioista, valtionhallinnosta, liikenteenharjoittajilta ja muista sidosryhmistä.

Perämerenkaaren liikennevisio vuoteen 2040 on *Saumaton liikenne ja logistiikka – tavoitteena kestävä, kasvava ja kiinnostava Perämerenkaari*. Visiota tukemaan on laadittu kahdeksan tavoitetta:

Kestävä Perämerenkaari

- 1 Kestävä liikenne ja logistiikka
- 2 Resilienssi ja turvallisuus

Kasvava Perämerenkaari

- 3 Tavaroiden ja ihmisten rajaton liikkuvuus – investointeja tukemassa
- 4 Yhtenäiset logistiikkaketjut

Houkutteleva Perämerenkaari

- 5 Alueen saavutettavuus
- 6 Sujuvat matkaketjut
- 7 Mahdollistetaan matkailu ja vapaa-ajan liikenne

Koko vision yhteinen tavoite

- 8 Yhteistyön kulttuuri

Liikennevisio ja tavoitteet viedään käytäntöön toimenpidesuunnitelman kautta. Se sisältää seuraavat toimenpiteet:

- Kestävän liikenteen suunnittelu Perämerenkaaren alueella
- Huoltovarmuus ja resilienssi liikennesuunnittelussa
- Fossiilittomien käyttövoimien lataus- ja tankkausverkostot
- TEN-T ydinverkkokäytävien North Sea Baltic ja Scandinavian-Mediterranean kehittäminen
- Muiden, yhteisesti tärkeiksi tunnistettujen infrastruktuuriprojektien edistäminen
- Rautateiden kapasiteetin varmistaminen
- Rahoituksen varmistaminen
- Tornio-Haaparanta koko Perämerenkaaren keskeisenä solmukohtana
- Asiakslähtöisen matkustajainformaation ja lipunoston kehittäminen
- Ruotsin ja Suomen välisen junaliikenteen aloitus
- Matkustajaliikenteen lentoyhteydet
- Uuden liikennefoorumin perustaminen
- Liikennemäärätiedon ja -tilastojen kerääminen ja yhteen koonti

Tehdyn työn jatkoksi ehdotetaan perustettavaksi uusi, Suomen ja Ruotsin puolen yhteinen liikennefoorumi. Foorumin kautta voitaisiin varmistaa jatkuva dialogi liikenneasioista, koordinoita toimenpideohjelman toteutusta sekä seurata sellaisia esille nousevia liikenneteemoja, joilla on rajat ylittävä ulottuvuus.

Sammanfattning:

Bottenviksbågen är en viktig ekonomisk region och en internationellt viktig transportkorridor i den nordligaste delen av Europa och Barentsregionen. Området sträcker sig från Skellefteå i Sverige till Kalajoki i Finland längst Bottenvikskusten. Bottenviksbågen är en viktig del av det transeuropeiska transportnätet som förbinder Norden med resten av Europa.

I denna rapport presenteras resultaten från den gränsöverskridande samarbetsprocessen *Hållbar, gränsöverskridande trafik och funktionella logistikförbindelser i Bottenviksbågen*. Processen innefattade en workshopserie i fyra delar från våren 2022 till våren 2023, med finska och svenska deltagare från kommuner, regioner, utvecklingsorganisationer, statliga organisationer, trafikoperatörer och andra intressegrupper.

Bottenviksbågens transportvision 2040 är *Sömlös transport och logistik – för en hållbar, växande och attraktiv Bottenviksbåge*. För att stödja visionen fastställdes åtta mål:

Hållbar region

- 1 Hållbar mobilitet och transporter
- 2 Resiliens och säkerhet

Växande region

- 3 Gränslös transport av varor och människor, som stöder investeringar
- 4 Sammanlänkade logistikkedjor

Attraktiv region

- 5 Tillgänglig region
- 6 Smidiga resekedjor
- 7 Möjliggörande av turism och fritidsresor

Gemensamt mål för hela visionen

- 8 Samarbetskultur

Transportvisionen och målen kommer att implementeras via en handlingsplan som består av följande åtgärder:

- Hållbar transportplanering i regionen
- Försörjningstrygghet och resiliens i transportplanering
- Laddnings- och tankningsnätverk för icke-fossila bränslen
- Utveckling av TEN-T stamnätsskorridorer North Sea Baltic och Scandinavian-Mediterranean
- Främja andra infrastrukturprojekt som gemensamt erkänts som viktiga för regionen
- Säkra järnvägskapacitet
- Säkra finansiering
- Torneå-Haparanda som en viktig nod för hela korridoren längs Bottenviksbågen
- Förbättra kundfokuserad information och biljettköp
- Lansering av gränsöverskridande tågtrafik
- Flygförbindelser för passagerartrafik
- Lansering av ett nytt gränsöverskridande transportforum
- Insamling av information och data om transportvolym

För att fortsätta arbetet föreslås det att inrätta ett nytt transportforum för Bottenviksbågen. Dess uppgift är att säkerställa en kontinuerlig, gränsöverskridande dialog för gemensamma transportmål och att samordna genomförandet av handlingsplanen.

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I

Introduction

Photo: City of Oulu



Why a transport vision?

Bothnian Arc is an internationally significant transport corridor in the northernmost part of Europe and the Barents region. The area reaches from Skellefteå in Sweden to Kalajoki in Finland, following the coastline of the Bothnian Bay. There is a strong history of cross-border co-operation in the region, as the interests and concerns of the northern parts of Sweden and Finland coincide.

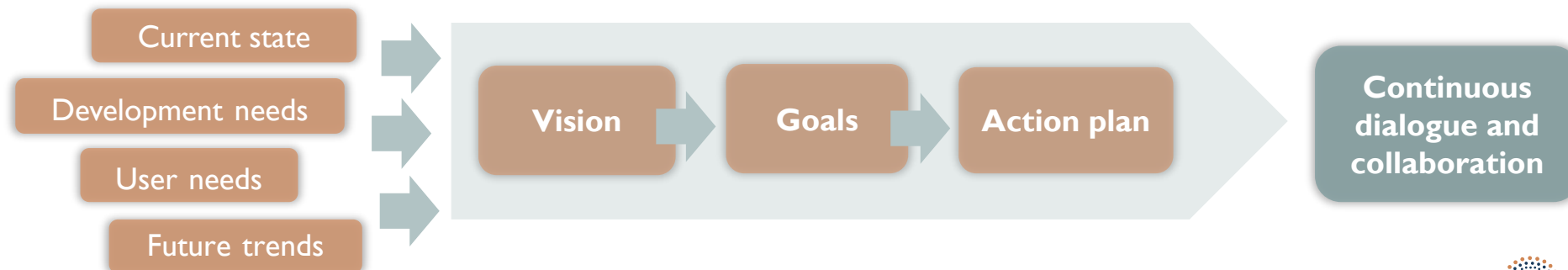
Transport issues have been on the agenda of Bothnian Arc co-operation for a long time. However, transport and infrastructure have gained even more importance in the North due to recent political and economic development. The current green transition in industry and energy production has emphasised the importance of the region, and investments in the North are increasing rapidly. People commuting across the border are one answer to the increasing demand on workforce. In addition to the common economic area, the Bothnian Arc shares common interests in security policy and security of supply.

All these developments create an increasing demand for well-functioning infrastructure, logistics and public transport services. Strategy formation between two countries is important, as the region is together stronger when communicating our goals in national and EU contexts. From this background stemmed the need for a vision and strategy for the Bothnian Arc transport system – raising the voice of the North in decision-making on transport issues.

Creating common understanding has been key in the vision process. The main focus has been on stakeholder interaction at all stages of the work. The process included a series of four workshops from spring 2022 to spring 2023 (see Appendix I), with Finnish and Swedish participants from municipalities, regions, development organisations, state organisations, transport operators and other stakeholders.

In the future, our cross-border transport vision needs to resonate in the planning and decision-making processes in each of the two countries and in EU. We will continue to work together to make this happen.

The vision process 2022 - 2023



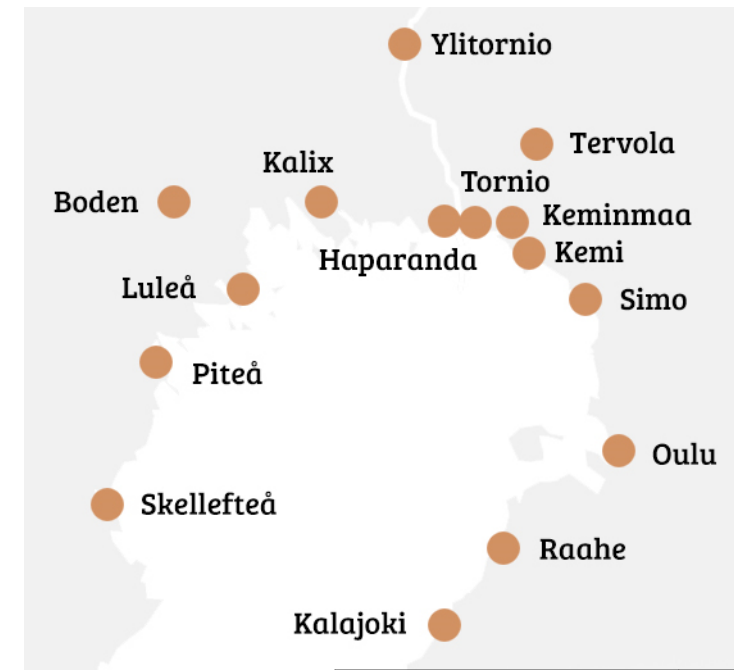
The Bothnian Arc region

There are more than 700 000 inhabitants in the influence area of the Bothnian Arc. The largest cities in the area are the university cities of Oulu and Luleå.

The area is rich in natural resources, which are utilized by further processing them in various parts of northern Sweden, northern Finland and northern Norway. The structure of the business sector varies from municipality to municipality. For example, in Raahе, Tornio and Luleå, the steel industry plays a major role while in Kemi the bioproduct industry is growing. There are also pulp mills, board mills, paper mills and major sawmills on both sides of the border.

Northern Sweden and northern Finland have been attracting green investments in recent years, as the region has significant potential for development of renewable energy and other sustainable solutions. Currently there are several ongoing green investments in northern Finland and northern Sweden. Consequently, logistics as an industry sector is growing too. The rapid industrial development taking place in northern parts of Sweden and Finland may form a challenge in terms of need for labour and skills while population has been declining. However, at the same time, it offers an excellent opportunity for the region to develop and innovate.

The enlargement of NATO will most likely increase military rehearsals and other kind of co-operation in the North, having impacts on the transport system as well.



Municipalities in Finland and Sweden forming the Bothnian Arc corridor (source: www.bothnianarc.eu)

MUNICIPALITY	POPULATION IN 2021
Haparanda	9 473
Kalix	15 701
Luleå	78 692
Boden	27 730
Skellefteå	72 560
Piteå	42 229
Tornio	21 335
Ylitornio	3 830
Kemi	20 150
Keminmaa	7 904
Tervola	2 901
Simo	2 869
Oulu	209 502
Raahе	24 178
Kalajoki	12 367

2

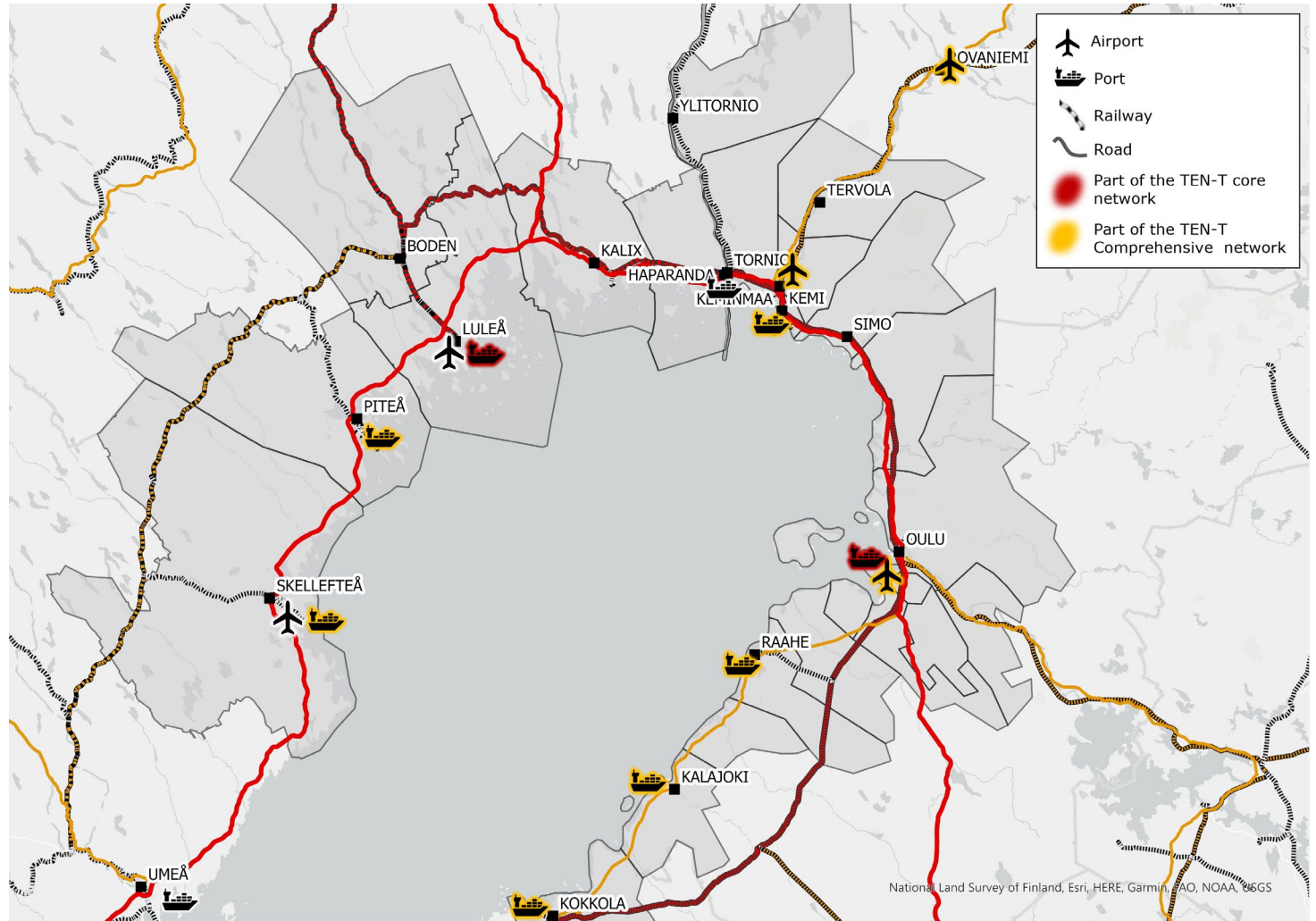
The basis

The Bothnian Arc transport system

The Bothnian Arc corridor connects the port cities of the northern regions of Finland and Sweden, as well as industrial, technological and trade centers. The transport system in the Bothnian Arc corridor consists of roads, ports, airports, waterways and railways.

Bothnian Arc is an important part of the European TEN-T network (Trans-European Transport network), connecting the Nordic to the rest of Europe. The railway connection through the Bothnian Arc is part of TEN-T core network, which consists of the main long-distance European transport links. Also, the ports of Luleå and Oulu are part of the core network. In addition, there are several ports and airports in the Bothnian Arc region which belong to the TEN-T comprehensive network.

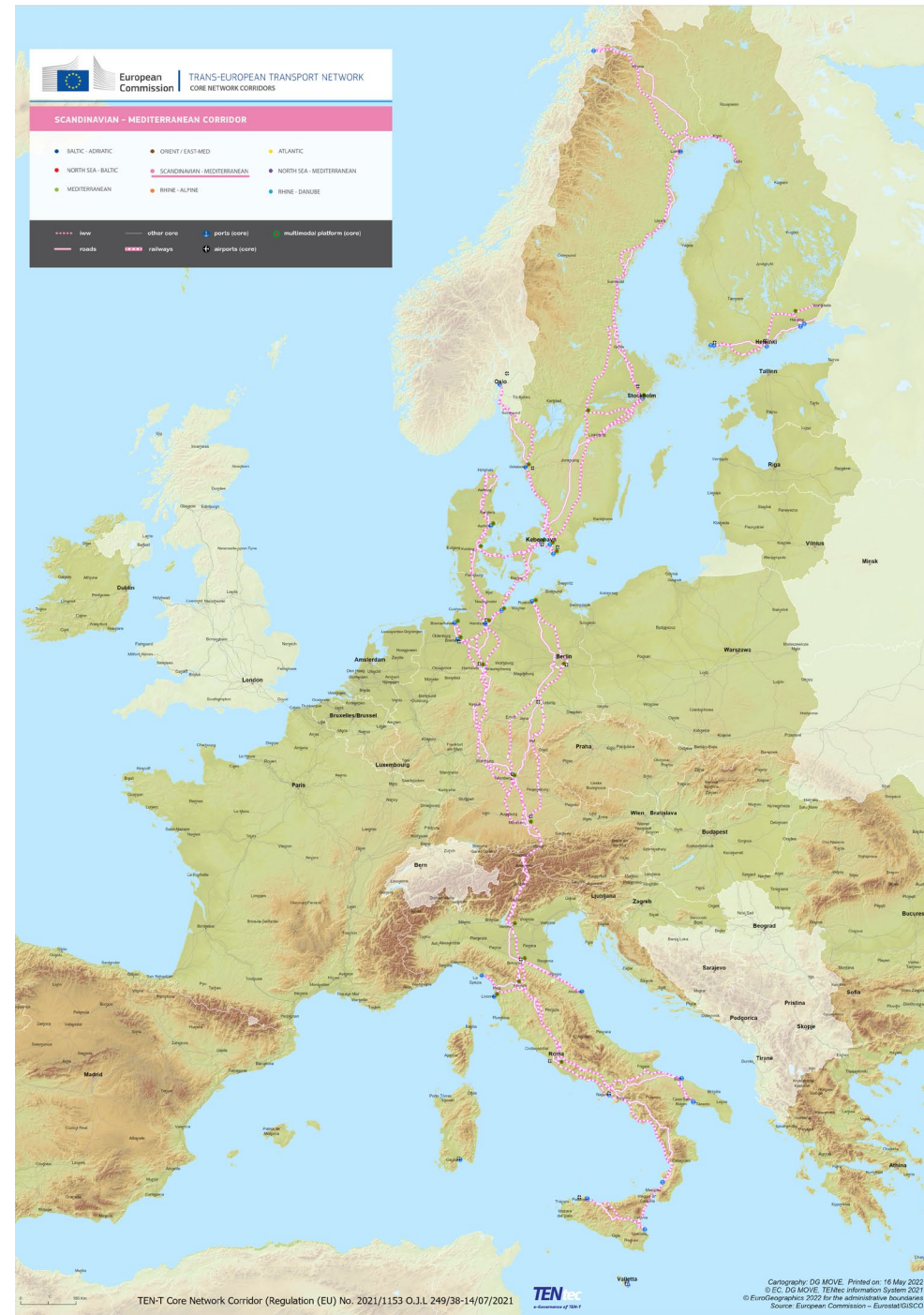
The road network in the Bothnian Arc area is well developed with major routes connecting the different regions. The main road connection through the Bothnian Arc corridor is part of both the Scandinavian-Mediterranean and the North Sea Baltic TEN-T core networks.



The North-Sea Baltic and the Scandinavian-Mediterranean TEN-T core networks

The North Sea-Baltic corridor goes through Belgium, the Netherlands, Germany, Poland and then north through the Baltic States. Following the corridor's extension in 2021, roughly half of Finland and the northern part of Sweden are part of this corridor

The Scandinavian-Mediterranean corridor is a vital north-south axis for the European economy. The corridor stretches from Finland and Sweden in the North to the island of Malta in Southern Europe.



The Bothnian Arc transport system

Road network

The main highways in northern Sweden are E4 and E10. In Sweden, the European route E4 runs from the southern border to the northernmost part of the country, passing through the Bothnian Arc area all the way to Tornio, Finland. Route E10 connects the Bothnian Arc area to northern Norway via Narvik.

The main highways in northern Finland are E4, E8 and E75. The E8 route provides a connection between the Bothnian Arc area and northern Norway, going from Turku in southern Finland to Tromsø in northern Norway. Route E75 runs from Vardø, Norway to Sitia, Greece, running from Finland's northernmost town of Utsjoki to the southernmost city of Helsinki.

The road network plays a vital role in the transport of goods and people in the region, facilitating the movement of products to and from ports and industrial areas.

Airports

There are four airports in the Bothnian Arc area: two in Sweden (Luleå, Skellefteå) and two in Finland (Oulu, Kemi-Tornio).

The airports in the region serve particularly the needs of the business sector. All of the airports serve mainly domestic passengers. Oulu airport is the busiest airport in the Bothnian Arc region and the second busiest airport in Finland.

In the area of influence of the Bothnian Arc, there are two more airports in Finland; Rovaniemi and Kittilä. Both of them have a higher number of international passengers than other airports in the Bothnian Arc region.

Harbours

The Bothnian Arc region has ten ports, four in Sweden and six in Finland. They are significant for transporting industrial raw materials and products in the region.

In Sweden, the ports of Luleå, Piteå, and Skellefteå serve the mining, steel, forest, and copper refining industries. The port of Umeå in Sweden has a larger volume of unitized goods consisting mainly of paper products, and it also offers passenger transport.

In Finland, the ports of Tornio and Raahe serve the metal industry, while the ports of Kemi and Oulu serve the forest and chemical industries. The Port of Kokkola is a leading bulk port in Finland, and the Port of Kalajoki is especially important for transporting sawn timber.

Railway network

On the Swedish side, the Stambana, Malmbanan, and Haparandabanan are the most significant railway connections in the Northern Sweden when it comes to freight traffic. Malmbanan transports the largest volume of freight traffic, especially iron ore to the port of Luleå. Malmbanan's freight transport covers up to 40 % of all rail freight in Sweden.

On the Finnish side, the Ostrobothnian railway and the Oulu-Kemi-Rovaniemi-Kemijärvi route are the most significant railway connections in Northern Finland. They are mainly used for transporting raw materials and industrial products (especially forest and mining industry). On Finnish side of the Bothnian Arc area, the largest volume of freight traffic is transported between Kokkola and Oulu.

Currently there is no cross-border passenger train traffic between Finland and Sweden. The largest passenger flows in the Bothnian Arc region in Finland are between Kokkola and Oulu (over 1 million journeys a year) and between Oulu and Kemi (over 600 000 journeys a year).

User needs

In the project workshops, the most important user needs were discussed with the help of “user cards” representing typical user groups (see Appendix VI). The results are summarized below.

Passenger traffic

Services

- Cross border train traffic / commuting busses
- Local trains or city busses in bigger cities and towns
- Easier park and ride; easy and safe parking for both cars and bikes

Ease of travel

- Flexibility
- Continuous timetables
- One ticket for both sides of the border
- Getting information from one source for cross border traffic -> would ease planning of travel chains
- Seasonal ticket valid for different modes and journeys

Co-operation

- Co-operation across borders, e.g., discussion on public transport timetables between Finland and Sweden

Tourism

Services

- Launching cross-border train traffic
- Cross border cruises
- Flight connections - important for international travellers
- Electric or hydrogen airplanes to move around in the region
- Development of the charging network for electric cars
- Possibilities for sustainable travel and tourism - tour operators from Europe are asking about green products

Ease of travel

- Development of the Tornio-Haparanda travel center
- Information and tickets from one source (hotels/accommodation, travel tickets, safari tickets, fishing licenses etc.)

Co-operation

- Co-operation between companies; bus routing to serve tourists; flexibility and services for individual travellers

Freight transport

Infrastructure

- Good infrastructure - ports, rails, roads, airports
- Increase in rail transport -> good service level and capacity on rails; double tracks are needed
- Easiness to change from one mode to another -> investments in terminals and terminal connections
- Different gauge in Sweden and Finland -> can be compensated by terminals and loading areas
- Good connections to the core network - lower road network thus also important

Services

- Importance of maintenance especially in rail, as volumes may increase
- Comprehensive fuelling and charging networks

Co-operation

- Need for better data collection on volumes and routes
- More co-operation between transport companies is needed -> fewer empty trucks on roads, more efficient utilization of the transport system. A common digital marketplace.

Future trends

The key trends that affect the transport system of the Bothnian Arc region have been identified as follows. A longer list of trends and their description can be found in Appendix II.

- In the future, the **energy sector and the transport sector are more and more intertwined** in various ways. Global economy, green transition and energy crisis are linked together and changes in one factor will affect all of them. The war in Ukraine has accelerated the global transition to greener energy systems and the shift away from fossil fuels.
- **Climate change** will have a big impact in the Bothnian Arc region. EU climate policy will strengthen, setting the climate goals for member countries at a very high level. Climate change also enhances different sub-trends, like the energy transition, green investments, climate policy on different levels, as well as green values.
- New iron curtain is emerging, and the recent crises highlight the need for **a resilient and adaptive transport system**. Dialogue around military and infrastructure needs increases, and this may bring new kind of use to the infrastructure networks in the Bothnian Arc region.
- Remote work will somewhat lose its Covid-time popularity; however, it will still have an impact on the transport system, especially on public transport demand. In addition, the Bothnian Arc region will be threatened with **shortage of workers** because of the many investments planned in the area.
- Transport system users will increasingly be seniors, and **accessibility** becomes key part of transport system. In addition, growing population of immigrants will increase the need for clear and accessible traffic information in various languages.
- **Digitalization continues** to transform profoundly the methods of distribution, manufacturing and logistics, as well as business models and everyday life of citizens.

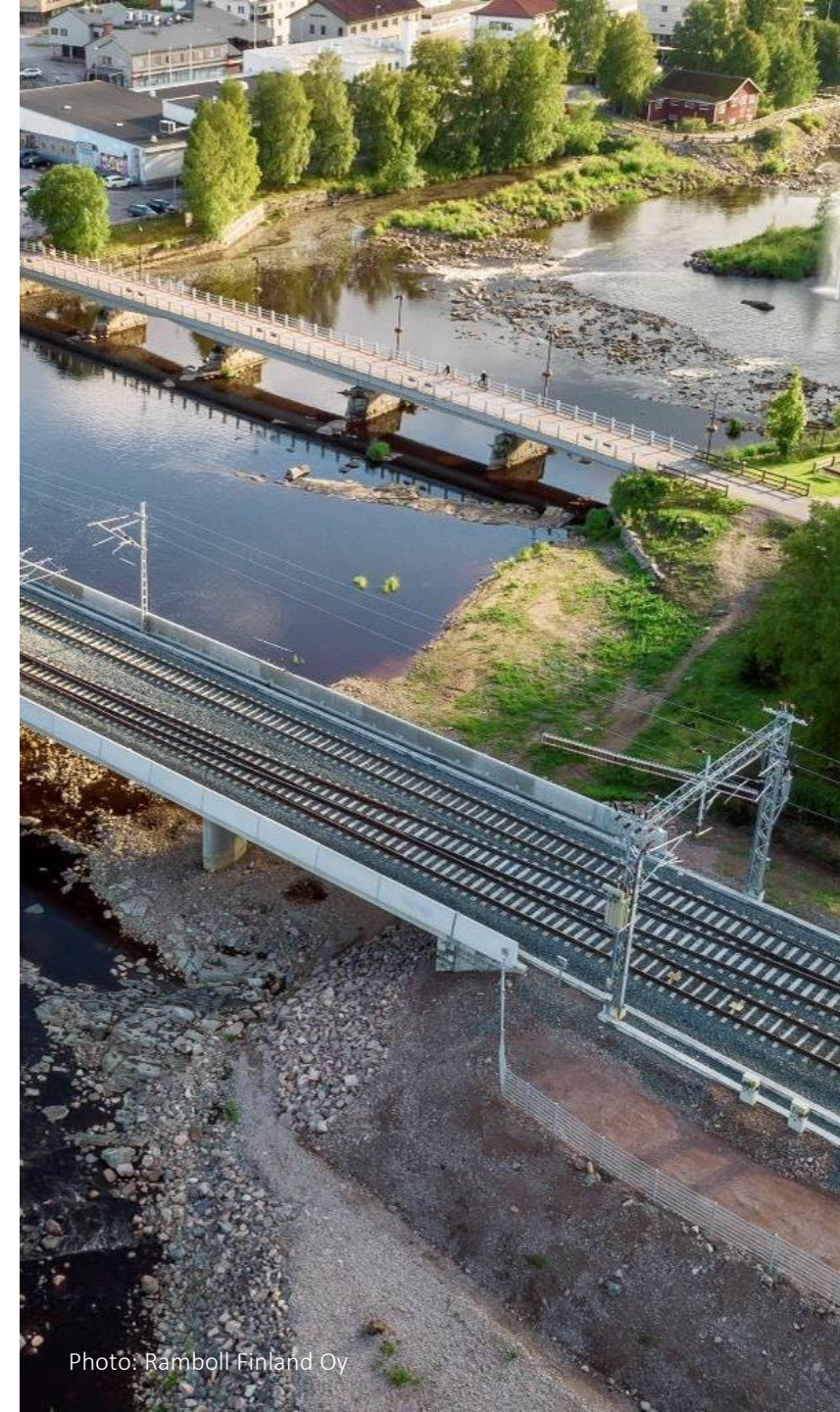
Main strengths and challenges of the Bothnian Arc transport system

Our strengths

- Strategic location in the North
- Long tradition of cross-border co-operation
- TEN-T North Sea Baltic and Scandinavian-Mediterranean core network corridors as a backbone of the area
- Strong existing industries
- Rapidly growing investments
- Green energy, facilitating the green transition
- Innovation opportunities, universities

Our challenges

- Securing funding for the necessary infrastructure investments – for all modes
- Sustainable transport options when distances are long
- Good service level and capacity on rails; double tracks are needed
- Good maintenance of the road network, as rails cannot cover all customer needs in a sparsely populated area
- Developing our flight connections
- Shortages and challenges in cross-border travel chains
- Consequences of climate change to infrastructure maintenance



3

Vision and goals

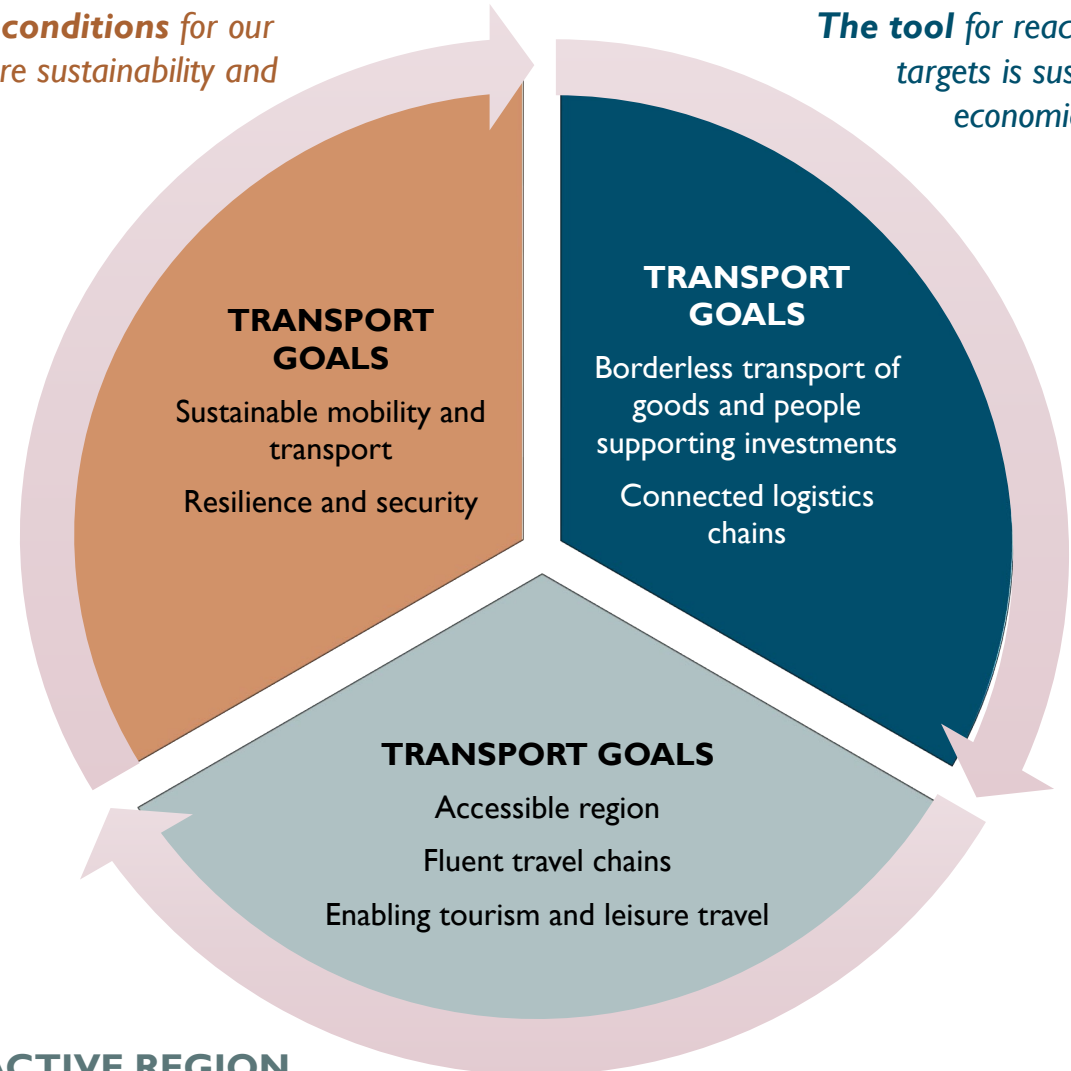
Transport vision 2040

Seamless travel and logistics

– for a sustainable,
growing and attractive
Bothnian Arc region

SUSTAINABLE REGION

The preconditions for our actions are sustainability and resilience



GROWING REGION

The tool for reaching our targets is sustainable economic growth

TRANSPORT GOALS

Borderless transport of goods and people supporting investments
Connected logistics chains

TRANSPORT GOALS

Sustainable mobility and transport
Resilience and security

TRANSPORT GOALS

Accessible region
Fluent travel chains
Enabling tourism and leisure travel

ATTRACTIVE REGION

The main target for our actions is an attractive region to live in and to visit

Transport vision 2040

Seamless travel and logistics

– for a sustainable, growing and attractive Bothnian Arc region

In the Bothnian Arc corridor, we work together for seamless transport of people and goods. Our identity as a cross-border region in the North is our asset. Our well-functioning transport system allows us to interact and innovate across the border, thus strengthening the Bothnian Arc as a sustainable, growing and attractive region. Our region has an important role in security of supply and economic growth both in Finland and in Sweden.

In 2040, our residents and visitors experience an integrated and intermodal transport system. Our logistics chains function seamlessly to enable sustainable growth in the whole area. The TEN-T core network corridors enhance our connections to the rest of Europe. Our municipalities and regions are connected to each other and to the rest of the world via fluent transport chains.

We aim for a sustainable Bothnian Arc region

The preconditions for all our actions are sustainability and resilience: without them, other targets cannot be reached. In our transport system we aim for sustainability with the following goals:

- Sustainable mobility and transport
- Resilience and security

We aim for a growing Bothnian Arc region

Sustainable economic growth creates employment and services, which are foundations for an attractive region. In our transport system we aim for growth with the following goals:

- Borderless transport of goods and people supporting investments
- Connected logistics chains

We aim for an attractive Bothnian Arc region

At the heart of our vision are people: residents, visitors, tourists. The main target for our actions is an attractive region to live in and to visit. In our transport system we aim for an attractive region with the following goals:

- Accessible region
- Fluent travel chains
- Enabling tourism and leisure travel

We work together for the Bothnian Arc region

Our cross-border co-operation, as well as interaction with stakeholders inside and outside the Bothnian Arc region, is based on the following goal:

- Culture of co-operation

Goals leading to the vision

Sustainable region

1 Sustainable mobility and transport

Both people and goods move sustainably

2 Resilience and security

We help to enable security of supply with our infrastructure. We keep prepared for changes in our operating environment.

Growing region

3 Borderless transport of goods and people supporting investments

Our infrastructure enables efficient goods transport and commuting

4 Connected logistics chains

Our logistical nodes and goods transport chains function seamlessly

Attractive region

5 Accessible region

Our region has good long-distance connections in passenger traffic

6 Fluent travel chains

We facilitate easy and accessible travel chains for residents and visitors

7 Enabling tourism and leisure travel

We enable sustainable tourism by flexible transport services

8 Culture of co-operation

We work actively and openly together for our common goals. Transparency and inclusiveness are key values.

4

Action plan

Photo: Ramboll Finland Oy

Structure of the Action plan

A Sustainability and resilience

- A.1 Sustainable transport planning in the region
- A.2 Security of supply and resilience in transport planning
- A.3 Charging and refuelling networks for non-fossil fuels

B Infrastructure

- B.1 Development of the TEN-T North Sea Baltic and Scandinavian-Mediterranean core network corridors
- B.2 Promoting other infrastructure projects jointly recognized as important for the region
- B.3 Ensuring railway capacity
- B.4 Ensuring funding

C Services

- C.1 Tornio-Haparanda as an essential node for the whole Bothnian Arc corridor
- C.2 Improving customer focused information and ticket purchasing
- C.3 Launching cross-border train traffic
- C.4 Flight connections for passenger traffic

D Co-operation

- D.1 Launching a new cross-border transport forum
- D.2 Collecting information and data on transport volumes



Photo: Henri Luoma hlp.fi

A Sustainability and resilience

Action	Description	Who should act / Stakeholders	First steps
Actions inside the Bothnian Arc region			
A.1 Sustainable transport planning in the region	Regions, city regions and individual cities plan their own transport systems according to sustainability principles. One tool for this can be the EU concept of Sustainable Urban Mobility Plans (SUMP). The Bothnian Arc corridor and its city regions can stand out as innovative actors preparing comprehensive Sustainable Urban Mobility Plans, possibly as cross-border action.	Cities, municipalities, regions <u>Other stakeholders</u> <ul style="list-style-type: none"> • EU funding organisations • Finnish and Swedish funding programmes for sustainable / smart mobility or for climate action 	Finding possible funding Launching of SUMP processes by cities or city regions
A.2 Security of supply and resilience in transport planning <ul style="list-style-type: none"> • Taking security of supply into account in transport and infrastructure planning • Supporting the diversity of different transportation modes 	In infrastructure development, security issues and security of supply are taken into account. These viewpoints are considered e.g. in impact assessments. As a whole, diversity of different transport modes increases the resilience of the whole system. Thus, the Bothnian region needs to enable the use of multiple transportation modes, including road, rail, air, and sea transport. This can reduce dependence on a single mode and ease the risk of disruptions.	<ul style="list-style-type: none"> • Infrastructure agencies • Cities and municipalities • Regions 	A pre-study / research project on impacts of climate change on infrastructure
A.3 Charging and refuelling networks for non-fossil fuels	A comprehensive charging and refuelling network is needed as fuels develop (electric, hydrogen, biofuel etc.), both for cars, buses and heavy vehicles. Stakeholders in the Bothnian Arc region can work together to monitor and coordinate the development of charging and refuelling infrastructure. Co-operation ensures that infrastructure is developed in a strategic manner, meeting the needs of the entire region.	The new cross-border co-operation forum coordinating the action <u>Other stakeholders</u> <ul style="list-style-type: none"> • Municipalities • Regions • Service providers • Energy companies 	Initiating a study on the needs for charging and refuelling networks in the Bothnian Arc region

B Infrastructure

Action	Description	Who should act / Stakeholders	First steps
Actions that need promoting outside the region			
B.1 Development of the TEN-T core network corridors North Sea Baltic (NSB) and Scandinavian-Mediterranean (ScanMed)	Development of the TEN-T core network corridors (railways, roads, ports, urban nodes) to increase accessibility, reduce travel times and cost and enable economic growth in the region.	<u>Who should act</u> <ul style="list-style-type: none"> Regions Municipalities The new cross-border co-operation forum Chambers of Commerce 	<u>Stakeholders outside the Bothnian Arc region</u> <ul style="list-style-type: none"> TEN-T corridor forums EU funding entities Infrastructure agencies National governments and politicians
B.2 Promoting other infrastructure projects (railways, roads, ports, airports, urban nodes) jointly recognized as important for the region	<p>Creating and updating an overall picture on infrastructure needs in the Bothnian Arc region</p> <p>Influencing the regional and national planning processes for securing the implementation of prioritized infrastructure projects. Also, facilitating easiness to change from one mode to another by investing to terminals and connections to them.</p>	<u>Who should act</u> <p>The new cross-border transport forum coordinating the action; constant and systematic interaction with all stakeholders in the area</p> <u>Who should act</u> <ul style="list-style-type: none"> Regions Municipalities The new cross-border co-operation forum Chambers of Commerce 	<u>Stakeholders outside the Bothnian Arc region</u> <ul style="list-style-type: none"> Infrastructure agencies National governments and politicians
B.3 Ensuring railway capacity	Good service level and capacity on rails is crucial - especially double tracks are needed. Increasing transport volumes also require investments in maintenance.	<u>Who should act</u> <ul style="list-style-type: none"> Regions Municipalities The new cross-border co-operation forum Chambers of Commerce 	<u>Stakeholders outside the Bothnian Arc region</u> <ul style="list-style-type: none"> Infrastructure agencies National governments and politicians
B.4 Ensuring funding	<p>The Connecting Europe Facility (CEF) is the EU funding instrument for strategic investment in transport, energy and digital infrastructure. For cross border issues the support can be 50 % of the costs.</p> <p>The region supports NATO co-operation with the necessary infrastructure and is active and ready to take advantage of possible military funding on infrastructure, as well as other financing models.</p>	<u>Who should act</u> <ul style="list-style-type: none"> Regions Municipalities The new cross-border co-operation forum Chambers of Commerce 	<u>Stakeholders outside the Bothnian Arc region</u> <ul style="list-style-type: none"> TEN-T corridor forums EU funding entities Infrastructure agencies National governments and politicians

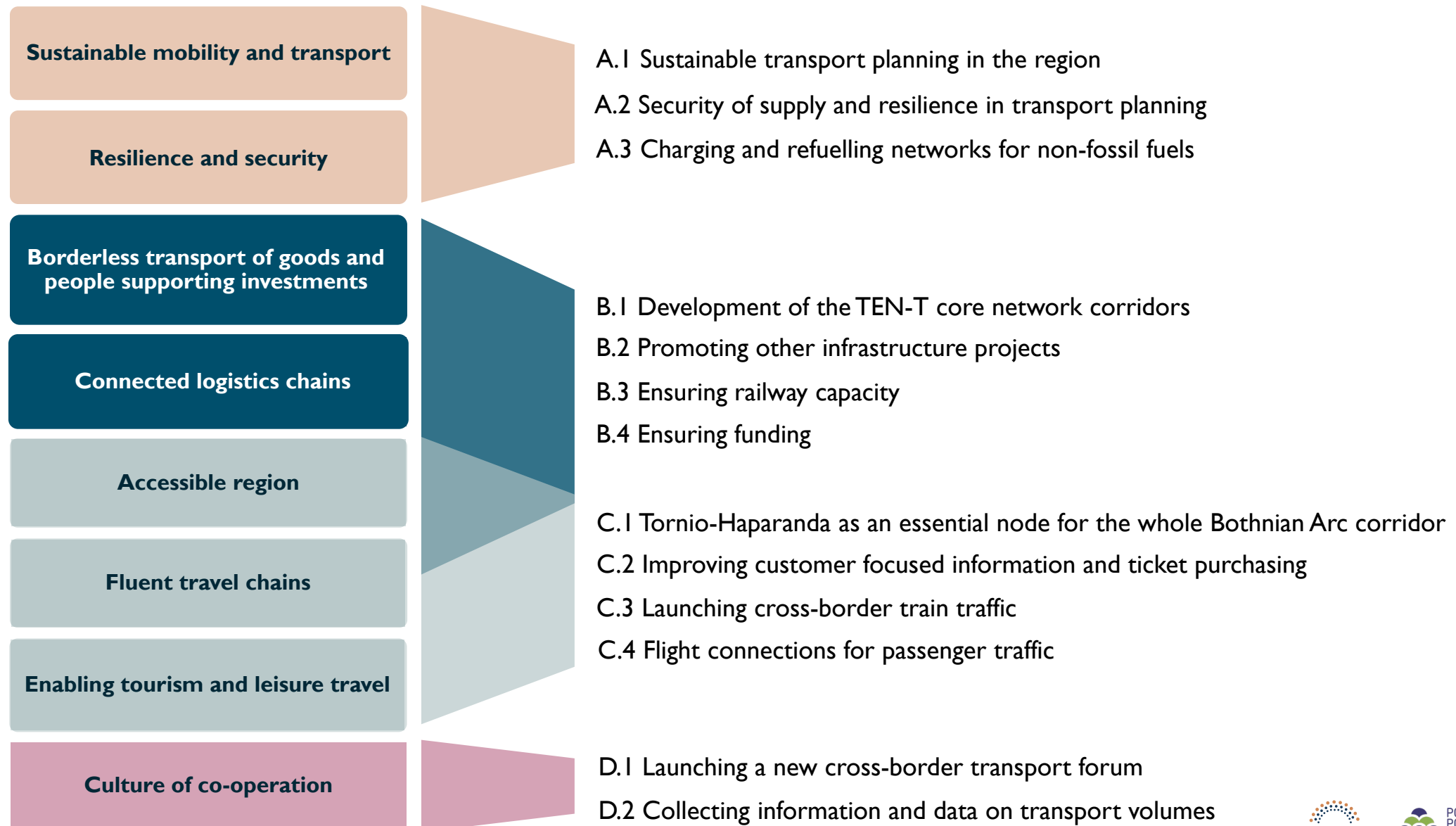
C Services

Action	Description	Who should act / Stakeholders	First steps	
Actions inside the Bothnian Arc region				
C.1 Tornio-Haparanda as an essential node for the whole Bothnian Arc corridor <ul style="list-style-type: none"> Development of the Tornio-Haparanda travel center Integrated local public transport in Tornio-Haparanda 	<p>Tornio and Haparanda form a unique border town, "twincity", which has the potential for even closer cooperation in transport issues.</p> <p>The joint travel center Tornio-Haparanda has not been used by all busses, but the cities have taken actions to improve the situation.</p>	<p>Tornio-Haparanda city region</p> <p><u>Other stakeholders</u></p> <ul style="list-style-type: none"> Public transport operators State regional public transport agencies Regions Tourism organisations 	Implementing the recent local plans (e.g. <i>Plan for organising public transport in Sea Lapland</i>)	
C.2 Improving customer focused information and ticket purchasing	Improving customer focused information and ticket purchasing services by digital platforms	<ul style="list-style-type: none"> Municipalities Public transport operators Private service providers State regional public transport agencies Regions 	Mapping + bringing together service providers of digital platforms	
Actions that need promoting outside the region				
C.3 Launching cross-border train traffic	Electrification on the rail infrastructure (<i>Laurila-Tornio-Haparanda</i>) enables new train traffic, but the transportation itself must be financed. Need to create a model for cross-border train traffic.	<p><u>Who should act</u></p> <ul style="list-style-type: none"> Regions Municipalities 	<p><u>Stakeholders outside the Bothnian Arc region</u></p> <ul style="list-style-type: none"> VR; SJ National governments 	<p>Swedish-Finnish regional co-operation in promoting the issue to the national level</p> <p>A study on the Swedish side financing model of Norrtåget</p> <p>Coordinating bus and train timetables also in the current situation</p>
C.4 Flight connections for passenger traffic <ul style="list-style-type: none"> Ensuring good long-distance flight connections and service level Preparing for new short-distance solutions in air travel Connections to airports, e.g. flight taxis 	Long-distance flights need a good service level. In addition, the region needs to keep prepared for new solutions like electric flights - their implementation will be contributed by developing infrastructure, promoting research and encouraging community engagement.	<p><u>Who should act</u></p> <ul style="list-style-type: none"> Regions, municipalities Neighbouring regions in Finland and Sweden R&D partners Bigger companies in the region Chambers of commerce 	<p><u>Stakeholders outside the Bothnian Arc region</u></p> <ul style="list-style-type: none"> National governments Airline companies 	<p>Promoting the need for good service level</p> <p>Regional study on e-flights</p> <p>Forming partnerships inside and outside the region with research groups, airlines, municipalities. Research and development is required .</p>

D Co-operation

Action	Description	Who should act / Stakeholders	First steps
Actions inside the Bothnian Arc region			
D.1 Launching a new cross-border transport forum	The forum should be open to municipalities, regional bodies, government representatives, business sector and other organisations committed to work for our joint vision.	The existing Bothnian Arc organisation has agreed to initiate the new forum	Inviting members and launching the forum
D.2 Collecting information and data on transport volumes	Currently there are no joint data sources for passenger or freight transport volumes cross border. New datasets and data sources are necessary. Information is needed both for building transport systems and for promotion activities.	The new forum as initiator, with all parties in the area	A joint project for data collection

Linking goals and actions



Issues to be followed

In the following, issues that need active monitoring are listed. These themes are important for the Bothnian Arc, though often managed at some other level of governance. Thus, multi-level co-operation and dialogue are needed in order to follow these themes and to influence them.

Issue	Description
Development of connections to Atlantic via Norway	Ensuring good connections to Atlantic via Norway. The issue is connected to security of supply especially in Finland.
Connectivity between modes and nodes in region	First/last mile actions, especially by municipalities: Improving park-and-ride facilities by car or by bike; last mile public transport connections; good service level in stations and terminals. Funding for joint R&D-projects could be applied together by municipalities and the region.
Operational reliability of the lower road network	Maintaining good service level on lower road network is critical for people and goods transport. The service level is the responsibility of infrastructure agencies and municipalities.
Service level in the public transport, such as providing good Wi-Fi on trains and buses	Good Wi-Fi on trains and buses helps commuters to stay connected to the internet and thus increases productivity. Wi-fi connections are also particularly helpful for tourists who are trying to navigate new areas. The Bothnian Arc region can be involved in discussion with public transport operators on the issue and communicate the needs of users in the region.
Monitoring the development of automated vehicles	Monitoring the development of automated vehicles in order to react with necessary actions when needed -> to ensure that automated vehicles can function in the road network in both countries easily, according to national legislations and infrastructure. Also, R&D activities are possible.
Functioning icebreaking	Ensuring the prerequisites for ports by assuring functioning icebreaking. The Bothnian Arc region can follow in discussions held among ports, national governments and operators.
Service level on the TEN-T core and comprehensive networks	Following the fulfilment of EU TEN-T requirements on the TEN-T networks in the Bothnian Arc Region.



5

The way forward

A new cross-border transport forum

Transport systems and transportation have long been the subject of interest of many actors in the Bothnian Arc region. However, the activity has been somewhat scattered and fragmented. There are currently several cross-border co-operation forums in the area, such as the Bothnian Arc organization and the Barents Euro-Arctic Council, but none of these have their focus solely on transportation issues.

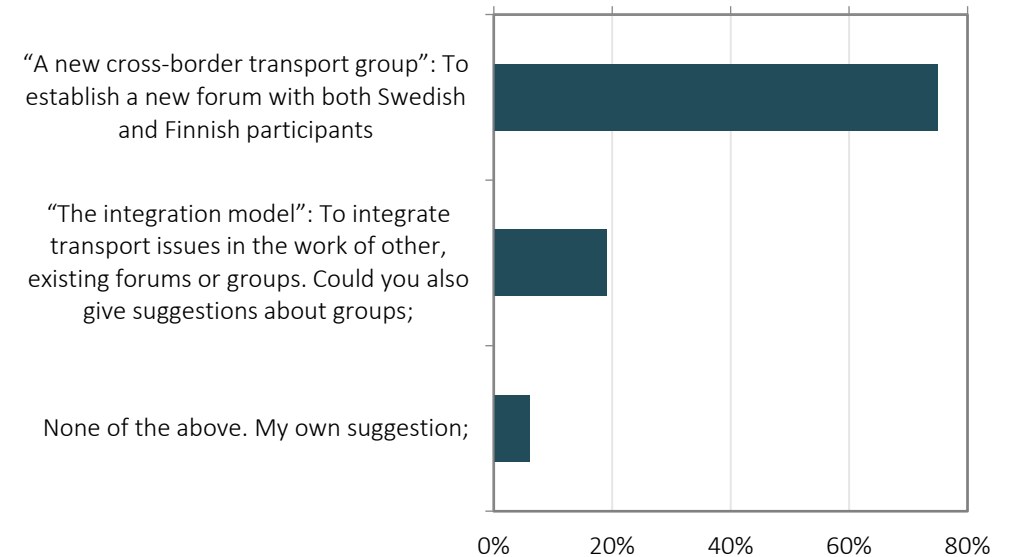
Thus, it is suggested to launch a new cross-border transport forum, in order to

- Ensure continuous dialogue, synergy, information exchange and a collaborative working environment
- Streamline and take forward the joint actions implementing our vision and goals
- Monitor and address new, emerging transport issues with cross-border relevance
- Organise regular communication towards existing transport planning and decision making bodies and processes – in both countries as well as on the EU-level

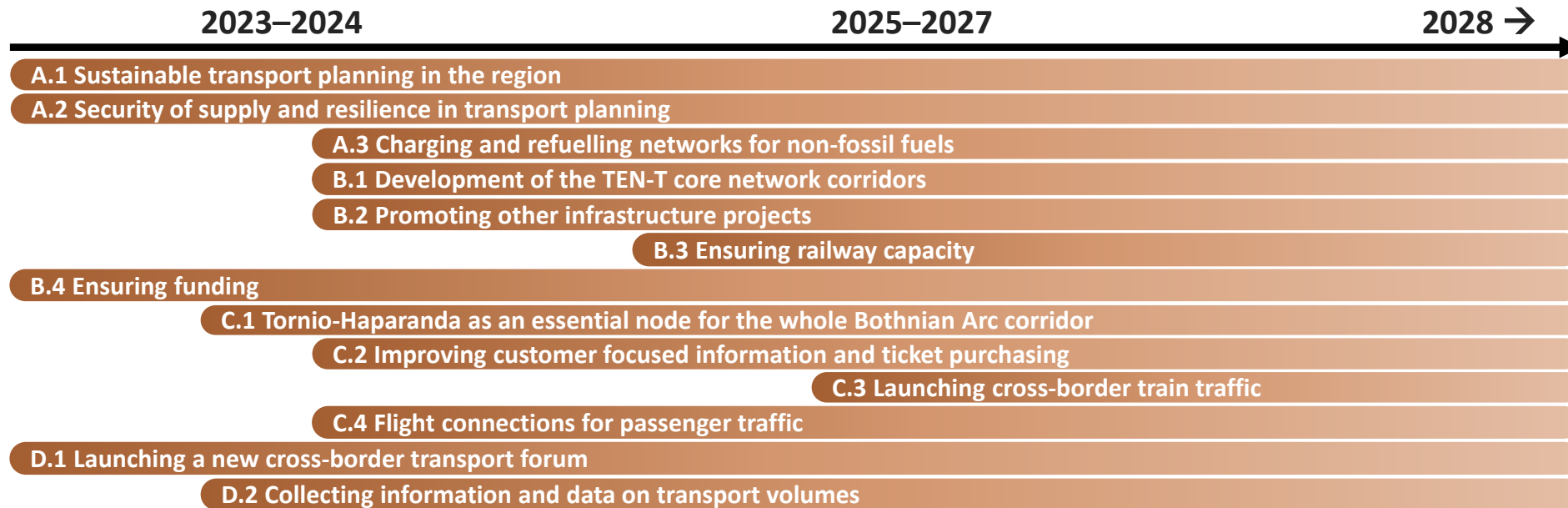
The new forum should have members from existing organizations and forums in the Bothnian Arc region. The forum should be open and inclusive, actively promoting participation among regional actors, municipalities and other parties.

Pre-workshop questionnaire

In your opinion, how could the cross-border cooperation on transport issues best continue after this project?



Timeline for the Action plan



6

Conclusion

Our main messages

- Recent geopolitical developments have brought infrastructure, security of supply and resilience issues of the North of Finland, Sweden and Norway, as well as cross-border collaboration, into the focus.
- Thanks to our strategic, northern location and our strong industries, the Bothnian Arc region has an important role in the green transition, economic growth, and security of supply both in Finland and in Sweden.
- To release the sustainable growth potential to the benefit of Finland, Sweden and EU, investments in infrastructure and connectivity are necessary to achieve our transport vision 2040: *Seamless travel and logistics – for a sustainable, growing and attractive Bothnian Arc region.*
- We invite all stakeholders and interested parties to work together for the vision. More systematic and intensified dialogue, collaboration and multi-governance are needed within the Bothnian Arc region: between the local, regional and national levels, between countries and governments, and with the European Union.
- The new Bothnian Arc cross-border transport forum is established to offer a platform for dialogue and collaboration.



Appendices



Photo: City of Oulu





Appendix I

Project workshops

Workshop 1

Current state and development needs

3 June 2022, Tornio (Finland)

35 participants (8 online)

Themes

- The current state of the Bothnian Arc transport system
- The most important development needs

Workshop 2

User needs and future trends

21 September 2022, Oulu (Finland)

The workshop was held together with the project *Maritime tourism co-operation in the Bothnian Bay region*

36 participants (7 online)

Themes

- Needs of various user groups
- The most important future trends that impact the region

Workshop 3

Vision, goals and future co-operation

3 November 2022, Luleå (Sweden)

30 participants (3 online)

Themes

- Draft for the vision and goals
- How to organise cross-border co-operation on transport issues

Workshop 4

Action plan

16 March 2023, Raahe (Finland)

27 participants (8 online)

Themes

- An updated vision draft
- Measures needed to implement the vision

Examples of workshop materials

TASK 2 12.15-13.00

Go through actions presented in the table and prioritize them into three categories;

- Priority class 1 (action is urgent, contributes to the implementation of other measures, resources are available etc.)
- Priority class 2 (action is necessary, but not as urgent or resources are available later etc.)
- "Trash can"


Write down reasonings for your choices below.

Who should be the main responsible party/initiator for each action?

10.05	Purpose of the projects and the workshop <i>Tytti Viinikainen & Kaisa Merilahti / Ramboll Finland</i>
10.15	A customer viewpoint
10.30	Introducing the workshop model of the day <i>Aino Nissinen / Ramboll Finland</i>
10.40	Group discussion 1: User needs
11.30	Summarizing the discussion
12.00	Lunch break
13.00	Group discussion 2: Future trends and travel chains

Nurse commuting from Kemi to Kalix

Current modes



Usual trip duration

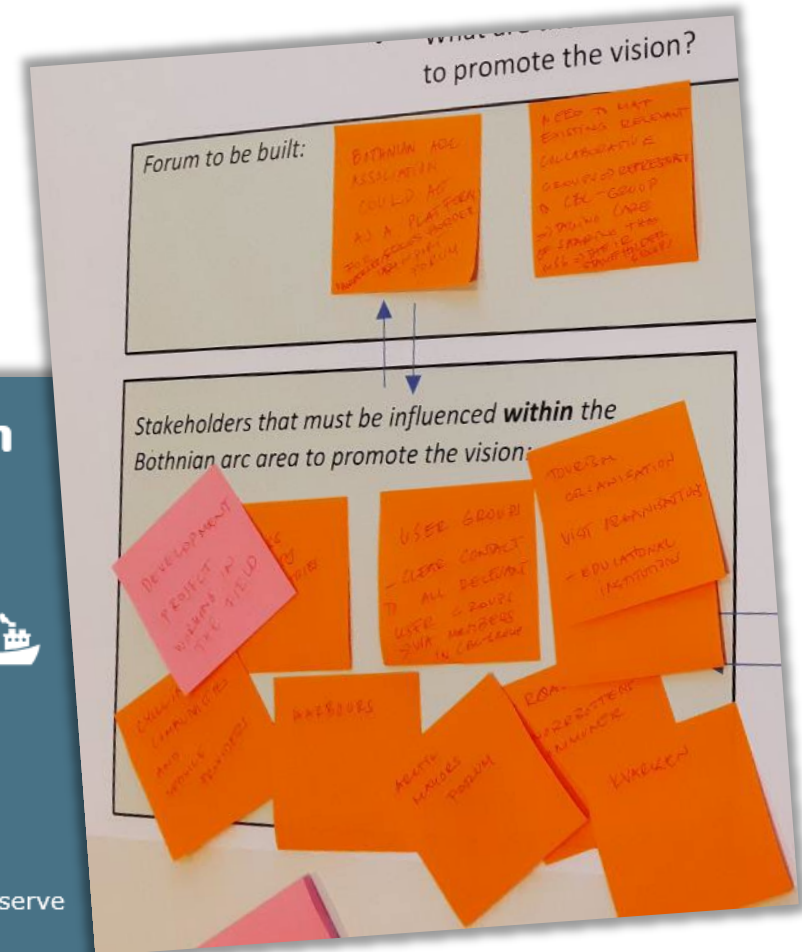
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Questions

- How could the transport system better serve the user?
- What are currently the bottlenecks of the transport system preventing better service?
- What changes should/could be done to make this user group's travel more environmentally friendly?
- What kind of future trends do you see that affect this user group's needs?

Forum to be built:

Stakeholders that must be influenced **within** the Bothnian arc area to promote the vision:



Forum to be built:

- Bothnian Arc Association could act as a platform to coordinate resources
- Need to have existing resources & resources to be used in a coordinated manner

Stakeholders that must be influenced **within** the Bothnian arc area to promote the vision:

- Development project in the field
- Use group to all relevant user groups in the area
- Developers & stakeholders
- Visit participants
- Edu/industry interaction
- Local authorities
- RAISES
- Health services
- ESA - presentation materials
- Workshop



Photo: Ramboll Finland Oy

Appendix II

Future trends

Economy & business

Global economy

In the near future, energy, food and electricity prices will continue rising, and international supply chains may experience disruptions. It has been predicted that inflation will remain high for a longer time. The war in Ukraine has weakened the confidence in economy, worsened supply disruptions and raised raw material prices, which weakens purchasing power and dampens economic development in the short term.

In a longer term, the development will be turbulent and very hard to predict, which makes any long-term decisions difficult. The global economic situation has a direct impact on private investments, national economies as well as state and municipal budgets.

Energy

The war in Ukraine has accelerated the global transition to greener energy. Just like the Covid pandemic pushed countries into remote work and digital leap, the war is driving countries into a climate leap faster than planned: to save energy and turn to non-fossil energy sources. However, the rising energy and electricity prices have caused harm to consumers as well as businesses, and governments are increasingly supporting measures to lower the price of electricity. In sum, the impacts of the current energy crisis – or any future ones – are not automatically positive for tackling the climate crisis.

In the future, the energy sector and the transport sector are more and more intertwined in various ways. The electrification and hydrogen transport value chain includes green energy, minerals, materials, batteries, charging equipment etc.

Electricity supply and shortages may affect the popularity and usage of e-cars. Local biofuel production can assist in using biofuel in local city buses. Increasing price of fossil fuels can lead to a transition away from private cars – or just to demonstrations against the prices. Increasing costs of fuel may e.g. reduce flights supported by the state to provincial airports.

Green transition

Green transition means a shift towards economically sustainable growth and an economy that is not based on fossil fuels and overconsumption of natural resources. A sustainable economy is based on low-carbon solutions that endorse the circular economy and biodiversity. There is more and more discussion about **just transition**: compensating the costs of green transition to the possible suffering population groups or industries. **EU Green Deal** is the regulatory and financing framework that supports green transition. It can e.g. increase the demand of minerals for the battery industry and the demand for bio-materials.

There are already companies in the Bothnian Arc area that focus on solutions in accordance with the green transition, for example by producing components for electric cars. In the future, **new green tech industries are more and more attracted to the North** because of the region's growing contributions on renewable energy production from wind and solar. EU policies will continue supporting this development. The Bothnian Arc can serve as an example of strong regional green transition in Europe.

Industry and investments

The Bothnian Arc area is rich in natural resources, which are utilized by further processing them in northern Sweden, northern Finland and northern Norway. There are plenty of investments planned in the area, such as a jointly built hydrogen pipeline. All in all, **investments will continue their increase in both Sweden and Finland but are very easily affected by changes in the global economy.** The impact of private sector investments on transport investments is not straightforward, as it depends heavily on the national decision-making structures in the transport sector.

Tourism

The future traveller possess high expectations of smooth travel chains. Tourists will demand both easiness to plan the journey and flexibility to tailor the journey according to their own needs. In addition, sustainable tourism is gaining ground. To meet this demand, transportation companies need to provide electrified services and include emission compensation in the service fee. Smooth and sustainable travel chains will be a key success factor in the competition between tourism destinations.

In the future, sustainable transport services can all be purchased on one platform. Different modes like electric flights, trains, ferries, buses and on-call services will form travel chains which make the destinations easy to reach. The tourist can buy all the tickets at the same time and feel secure of the smooth journey.

Social trends

Work and commuting

The Covid pandemic pushed countries into remote work and significantly changed business travel habits. The new work life with more flexibility creates a challenge for transport services: commuters are a significant group of public transport users, and extensive remote work can therefore reduce the demand for public transport. On the other hand, new possibilities for remote working can attract people to live further away from their physical workplaces, which can increase the appeal of the North as a place to live. The view held by experts at the moment is that **remote work will somewhat lose its Covid-time popularity**, the new normal being that people go to their workplace 2-4 times a week.

In the forecasts produced by Swedish and Finnish statistical centres, jobs are predicted to decrease in almost all the Bothnian Arc region. However, the view inside the area is that the region is soon threatened with a **shortage of workers** because of the many investments planned in the area.

Urbanization / counter-urbanization

So far, there is no clear view that the Covid pandemic would have shifted the earlier trend of urbanization – that has been going on worldwide and in the Nordic countries – to counter-urbanization. However, even if the direction of urbanization does not reverse totally, **new kind of multi-locality** may emerge, turning people's lifestyles to a more flexible direction. In any case, the regional and urban structure of a country or a region has a clear effect on transport and infrastructure needs.

Demographic changes

The most significant change in the demographic structure in Europe is the ageing population. The share of seniors in the population is increasing and the working-age population decreasing. In the future, the users of the transport system will increasingly be seniors, and **accessibility becomes key part of society**. Another trend, not only stemming from population ageing but also from general value changes, is the importance of health and wellbeing.

Immigrants are a growing population group both in Sweden and in Finland. Their needs for the transport system vary, but for many, clear and accessible traffic information in various languages is a necessity.

The growing share of **one-person households** is still another demographic trend, having an impact e.g. on car ownership.

Values and equity

Climate change, the pandemic, the current war and other factors are making people reflect on their values all over the world. Climate change can increase the **desire to influence political issues with one's own actions** and consumption choices, such as using green energy or by favoring local tourism. The pandemic may have emphasized the values related to the everyday living environment, personal health and the well-being of communities. However, in the research studying people's values, there is no unified view on whether societies will move into an individualised or to a more community-based value system.

In the future, people's values - like sustainability - may be a key factor when deciding on the mode of transportation. On the other hand, increased energy prices can increase mobility poverty, reduce mode options and thereby increase inequality. **Equity of the transport system** will become an increasingly important aspect.

Pandemics

In 2020, the Covid pandemic surprised the world and changed the daily mobility habits dramatically. Pandemic pushed countries into remote work and digital leap, while making the borders between states apparent again. The border between Sweden and Finland was closed due to the pandemic. The closing of the border can be considered a historical event, since before that especially Tornio and Haparanda had been profiled as a "twin city".

According to several views climate change will increase the risks of infectious diseases and bring new and old diseases to new regions. If climate change continues to accelerate, **serious diseases and even pandemics may become more common**.

Political trends

Climate change and climate policy

Climate policies can be local, national or international in scope. Finland and Sweden have independent climate goals, in addition to the goals set at the EU level. In transport policy at all levels, focus is increasingly shifting to sustainable modes of transport, especially on rail transport. Focus is also moving slightly from climate change prevention to climate change adaptation.

In the future, **EU climate policy will strengthen** even more, setting the climate goals for member countries at a very high level. Despite of this, climate change is not likely to stop in the coming decades, and it has clear **consequences on the Nordic climate and nature**. In addition, **polarisation of values** may lead to a situation where there is a clear support for stronger climate action but also a clear opposition to it. For the logistics sector, EU climate policy may bring more regulation but offer also financial possibilities.

Security of supply

The current geopolitical situation has brought the roles of northern Finland and northern Sweden as part of security of supply into discussion. In this setting, the importance of the North has been emphasized. Especially in Finland the North is Finland's gateway to the west and thus critically important in terms of the country's defense and security of supply. Thus, a smooth connection between Finland, Sweden and Norway, but also sufficient capacity and connections within Finland and Sweden to the North are important. In the future, it can be expected that security of supply stays **high on the national political agendas**.

Geopolitical changes

Due to recent geopolitical changes, it is possible that the focus of infrastructure projects may shift more to North. Joining NATO may bring new kind of use and new development needs to the infrastructure networks in the area.

The war in Ukraine and its consequences have had a significant effect on transport systems and freight transport, especially in Finland where the eastern border is practically closed. In the future, it is likely that also other **geopolitical crises far away from us have a global effect** and thus impact on the trade and transport sector in the Nordics. As the crisis cannot always be anticipated, there is a demand for **a resilient and adaptive transport system**.

Power of networks

The **strengthening role of networks** as a platform for co-operation and decision-making is a megatrend that affects all sectors of society. The role of traditional public sector institutions has – at least slightly – diminished, as the decision-making happens more and more in networks that consist of cities, businesses, regions, various development organisations and NGOs. In addition, **the social media** is functioning more and more as a platform for political discussion.

From the point of view of regions like the Bothnian Arc, the importance of networks can either mean new, beneficial platforms for discussion, or in the worst case, being left out of the new emerging networks and thus out from the agenda setting and decision making.

Technological trends

Data and digitalization

Digitalization is changing the society at an accelerating pace. Digitalisation not only affects people's everyday lives - as in enabling the sharing economy or remote work - but also **transforms profoundly the methods of distribution, manufacturing and logistics, as well as the business models**. The questions of data sharing and open data are crucial in the development of data-based services to the consumer.

In transport, impacts of digitalization are multiple as well, and the vast development of smart mobility solutions will continue in the future.

Digitalization enables, for example, the use of autonomous cars. Artificial intelligence is one of the digitalization tools that could be used to meet the challenges of road maintenance. The future of Mobility as a Service (MaaS) development is yet to be seen, but promising. On the other hand, growing connectivity in transport makes it **vulnerable to cyberattacks**.

Vehicles

Consumer's vehicle demand is difficult to predict especially during energy crisis. Electric vehicles have been presented as the savior of emission-free transport, but they still have needs for city space and charging infrastructure. The move to electric transport is a very big technological and cultural transformation, with a whole ecosystem to be built. Possible robotic or autonomous vehicles also have specific needs for infrastructure, not to mention the need for a vast cultural change. In addition, in the future more and more heavy transport equipment ("giant trucks") may move on the roads and pose new challenges for the transport system. Another emerging phenomenon is a subscription-based car use: not owning a car but leasing one for one's private use.

The Bothnian Arc region consists of municipalities in two states and as a result, different laws and regulations may apply in the region, also regarding vehicles.




Appendix III

UN Sustainable Development Goals

Sustainable Development Goals (SDG's) connected to the Bothnian Arc transport goals

Globally, close to a quarter of energy-related greenhouse gas emissions come from transport, and these emissions are estimated to grow substantially in the future. Thus, transport sector is especially important in climate action, trying to reach the Paris Agreement. However, all other aspects of sustainability should also be considered in transport planning and strategy formation.

Goals leading to our transport vision all follow the UN's Sustainable Development Goals (SDG's) in terms of specific targets. The following lists these specific targets in more detail (as the vision does not include the SDG's thoroughly). All SDG's and all specific targets are described on the UN website <https://sdgs.un.org/goals>.




8 DECENT WORK AND ECONOMIC GROWTH
This SDG is included in the following goals:
Borderless transport of goods and people supporting investments
Connected logistics chains
Enabling tourism and leisure travel

This SDG includes targets which try to: achieve higher levels of economic productivity through diversification, technological upgrading and innovation (8.2.), promote job creation, entrepreneurship (8.3.) and labour rights (8.5.), and support sustainable tourism that creates jobs and promotes local culture and products (8.9.)



9 INDUSTRY, INNOVATION AND INFRASTRUCTURE
This SDG is included in the following goals:
Connected logistics chains
Fluent travel chains

This SDG includes targets which try to: develop reliable, sustainable and resilient regional and transborder infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all (9.1.)



11 SUSTAINABLE CITIES AND COMMUNITIES
This SDG is included in the following goals:
Accessible region
Culture of co-operation

This SDG includes targets which try to: provide access to safe, affordable, accessible and sustainable transport systems for all (11.2), as well as enhance inclusive and sustainable urbanization and capacity for participatory, integrated and sustainable human settlement planning and management (11.3)



13 CLIMATE ACTION
This SDG is included in the following goals:
Sustainable mobility and transport
Resilience and security

This SDG includes targets which try to: strengthen resilience and adaptive capacity to climate-related hazards and natural disasters (13.1.) and to integrate climate change measures into national policies, strategies and planning (13.2.)



Appendix IV

Review of travel chains and public transport schedules

Current bottlenecks for fluent travel chains in the Bothnian Arc area

Scheduling

- There are many public transport routes in the Bothnian arc area, both by train and bus. Travel times between cities are reasonable. However, non-coordinated timetables as well as changes between modes increase travel time significantly. There are many actors operating in the area, which makes coordinating the schedules a challenging task.

Travel time

- Traveling by public transport takes longer than with own car since the travel chains are not fluent.
- As there is a limited amount of information on the number of passengers using public transport and private vehicles, especially between countries, it is difficult to determine the impact potential of reducing the travel time of public transport.

Availability of services and information

- Availability of public transport options is rather limited in certain parts of the region, particularly in rural or remote ones. This emphasizes the need for first-and-last-mile services.
- Traveling in both countries or between countries would require better real-time travel information.
- Depending on the specific route, travellers may encounter language barriers with local transport providers, as well as difficulties with signage or announcements in a foreign language.

Scheduling

There are currently a few railway connections that serve commuting traffic in the region. However, they usually provide connection from city center to city center. Thus, there is a need for fluent travel chains by other modes to/from the railway station.

One of the challenges in coordinating the schedules of transport modes is that there are many actors; the state, the municipalities and the private operators. In addition, in each country there is country-specific legislation and instructions.

Currently, there is no any cross-border long distance passenger traffic between Finland and Sweden. By coordinating schedules, it would be possible to improve the situation rather quickly even without direct cross-border connection. This could be implemented with pilot projects.

Public transport within the Bothnian Arc area has rather limited schedules especially at off-peak times or on weekends. However, the biggest travel needs are typically on weekdays, so current timetables may serve the customer needs reasonably well.

Examples of current railway timetables serving commuting in northern Finland

	Travel time by car
Kempele-Oulu, 07:57-08:06, Oulu-Kempele, 16:11-16:19	17 min
Oulu-Kemi, 06:30-07:52, Kemi-Oulu, 16:59-18:00	1 h 25 min
Kemi-Oulu, 06:39-7:37, Oulu-Kemi, 14:27-15:29 / 18:00-19:05**	1h 25 min
Oulu-Tornio East, 06:30-08:21, Tornio East-Oulu, 22:16-00:10**	1 h 40 min
Vihanti(Raahe)-Oulu, 07:18-08:06, Oulu-Vihanti(Raahe), 16:11-16:50	1 h

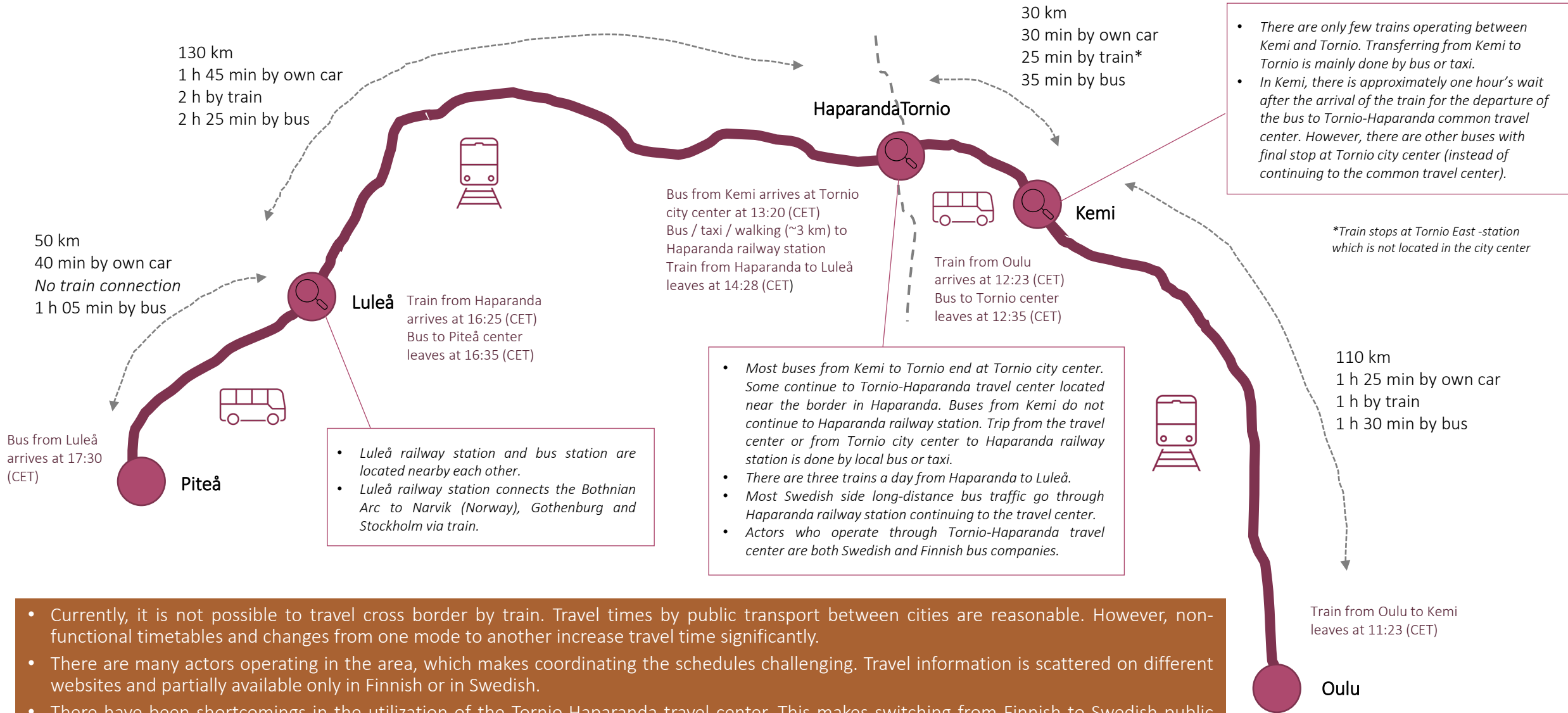
***Not suitable for commuting*

Examples of current railway timetables serving for commuting in northern Sweden

	Travel time by car
Haparanda-Kalix, 07:34-07:55, Kalix-Haparanda 18:18-18:40**	45 min
Kalix-Haparanda, 07:03-07:26, Haparanda-Kalix, 14:28-14:49**	45 min
Kalix-Luleå, 06:16-07:56, Luleå-Kalix, 16:35-17:5	1h 5 min
Luleå-Kalix. 05:28-07:03, Kalix-Luleå, 14:49-16:25**	1 h 5 min

***Not suitable for commuting*

Example of a travel chain from Oulu to Piteå by public transport, ~6 h 10 min, ~ 300 km



- There are only few trains operating between Kemi and Tornio. Transferring from Kemi to Tornio is mainly done by bus or taxi.
- In Kemi, there is approximately one hour's wait after the arrival of the train for the departure of the bus to Tornio-Haparanda common travel center. However, there are other buses with final stop at Tornio city center (instead of continuing to the common travel center).

- Most buses from Kemi to Tornio end at Tornio city center. Some continue to Tornio-Haparanda travel center located near the border in Haparanda. Buses from Kemi do not continue to Haparanda railway station. Trip from the travel center or from Tornio city center to Haparanda railway station is done by local bus or taxi.
- There are three trains a day from Haparanda to Luleå.
- Most Swedish side long-distance bus traffic go through Haparanda railway station continuing to the travel center.
- Actors who operate through Tornio-Haparanda travel center are both Swedish and Finnish bus companies.

- Luleå railway station and bus station are located nearby each other.
- Luleå railway station connects the Bothnian Arc to Narvik (Norway), Gothenburg and Stockholm via train.

- Currently, it is not possible to travel cross border by train. Travel times by public transport between cities are reasonable. However, non-functional timetables and changes from one mode to another increase travel time significantly.
- There are many actors operating in the area, which makes coordinating the schedules challenging. Travel information is scattered on different websites and partially available only in Finnish or in Swedish.
- There have been shortcomings in the utilization of the Tornio-Haparanda travel center. This makes switching from Finnish to Swedish public transport more difficult, since the buses do not stop at the same spot.
- It will be possible to arrange effective cross border travel by train after December 2024 due to electrification of the Kemi-Haparanda line. The change between Finnish and Swedish trains at Haparanda railway station is relatively easy to implement.

Availability of information

Availability of information plays a key role in the attractiveness of public transport. Providing accurate and up-to-date information about timetables, routes, delays and alternative options can increase passenger trust in the public transport system, thus making it more attractive.

Especially if the trip is made using several modes or different operators, accessible information is important. There are many public transport operators in the region and many of them have their own information sites. Many sites are either in Finnish or in Swedish, depending on the operator. The 1-hour time difference between Finland and Sweden can also make it difficult to plan travel chains, if time zones are not clearly indicated on the sites.

Providing information in different formats could help reach a wider group of passengers. In addition, combining information with other forms of transport, such as bike sharing services, can offer passengers a seamless and convenient travel experience, which further increases the attractiveness of public transport.

Availability of public transport options may be limited in certain regions, particularly in rural or remote ones. This emphasizes the need for information about connecting journeys and park-and-ride.



Actors responsible for organising and operating public transport

Finland

The Finnish Transport and Communications Agency **Traficom** is involved in developing public transport services into an interoperable entity. Traficom coordinates the public transport activities of the competent authorities (PTA), and monitors demand and supply of transport services.

In rail traffic, **Finnish Transport Infrastructure Agency** is responsible for the rail network, its maintenance, and the platform areas. **Finrail**, which is part of the state special company Traffic Management Finland, is responsible for the platform screens and the information displayed on them. The state-owned company **VR** operates the long-distance train journeys in Finland.

Local (and in some cases regional) public transport in cities and city regions is organised by competent **public transport authorities (PTA)**. A PTA can be either **a city, city region or ELY-center**. The public transport authorities assign the targeted service level of public passenger transport. In addition, **municipalities** or the PTAs are in charge of public transport infrastructure (e.g. bus stops) on the street network.

ELY-centers - regional state authorities - oversee the availability of public passenger transport services by bus in longer distances inside their region, as well as in smaller municipalities. In the Bothnian Arc area there are two ELY-centers: North Ostrobothnia and Lapland. They define the targeted service level of public passenger transport, in cooperation with other actors in the area, and are responsible for procuring transport services. In addition, ELY-centers are responsible for public transport infrastructure and its maintenance on the public road network.

The actual operation of public transport is mostly procured by the public transport authority (city, city region or ELY-center) and operated by **private operators**.

Long distance buses between the regions are organised market-based. Long distance train connections are either market-based or nationally subsidised (operated by VR). Air transport is market-based, but there are national subsidies for some connections.

Sweden

The **Swedish Transport Administration** is responsible for long-term planning of the transport system for railway traffic as well as for the construction, operation and maintenance of state railways. It is also responsible for platform displays, announcements and traffic control.

Regional **public transport authorities** have the overall responsibility for all regional public transport in each county, both traffic that is deemed to be able to be carried out on a commercial basis and traffic that is to be procured. **Each region has a public traffic company** with operative responsibility for the regional transport infrastructure and regional public transport operations for all modes, including passenger information, within each region.

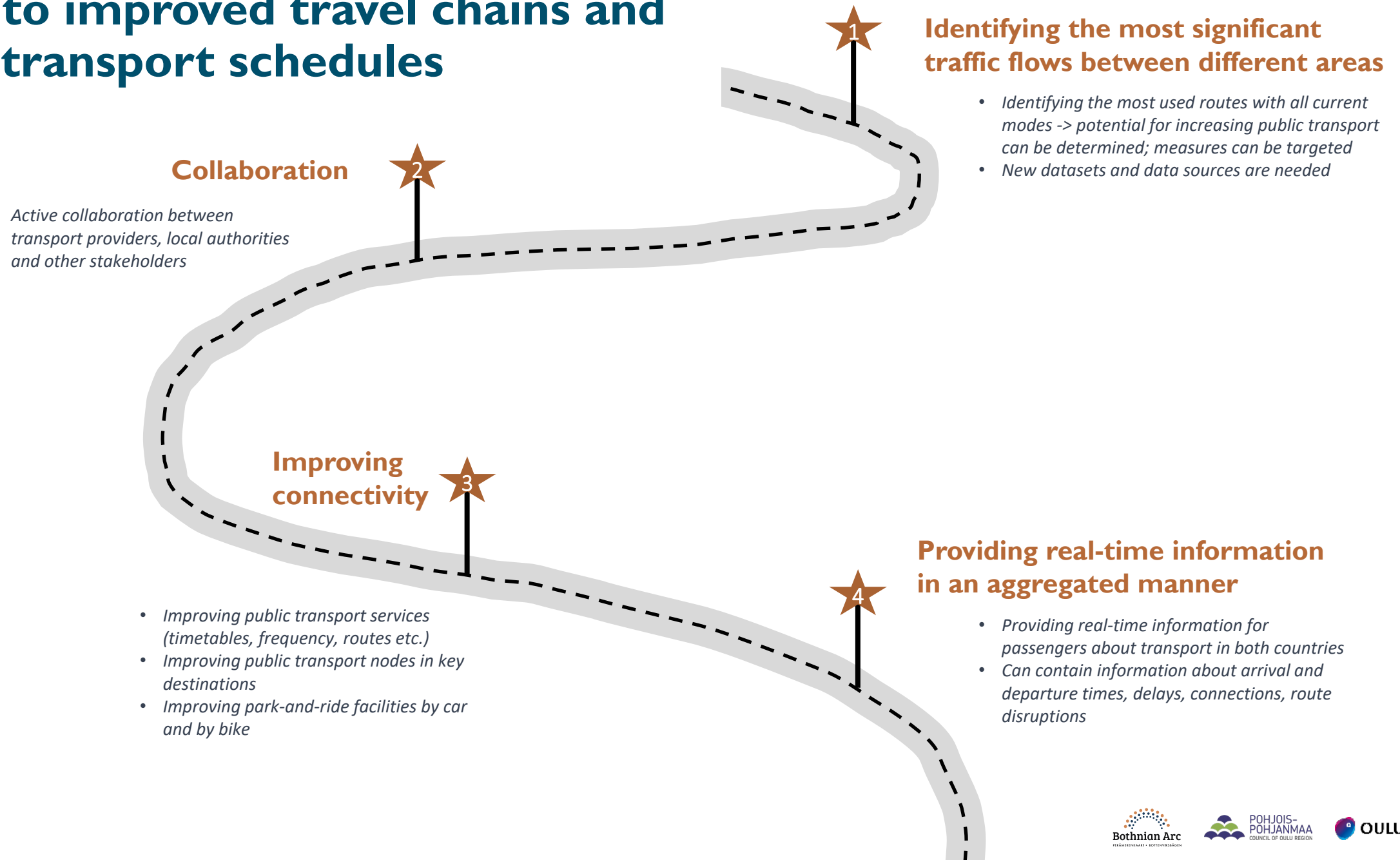
Närtrafiken is a transport service in those areas where regular public transportation is not possible. The passenger usually has to order the transport two hours ahead for a predefined time-table.

For regional passenger train traffic it is common that several regional public traffic companies jointly own a **regional train company** with operative responsibility for regional traffic on the national infrastructure. For example, **Norrståg** is owned by the four northernmost regions in Sweden.

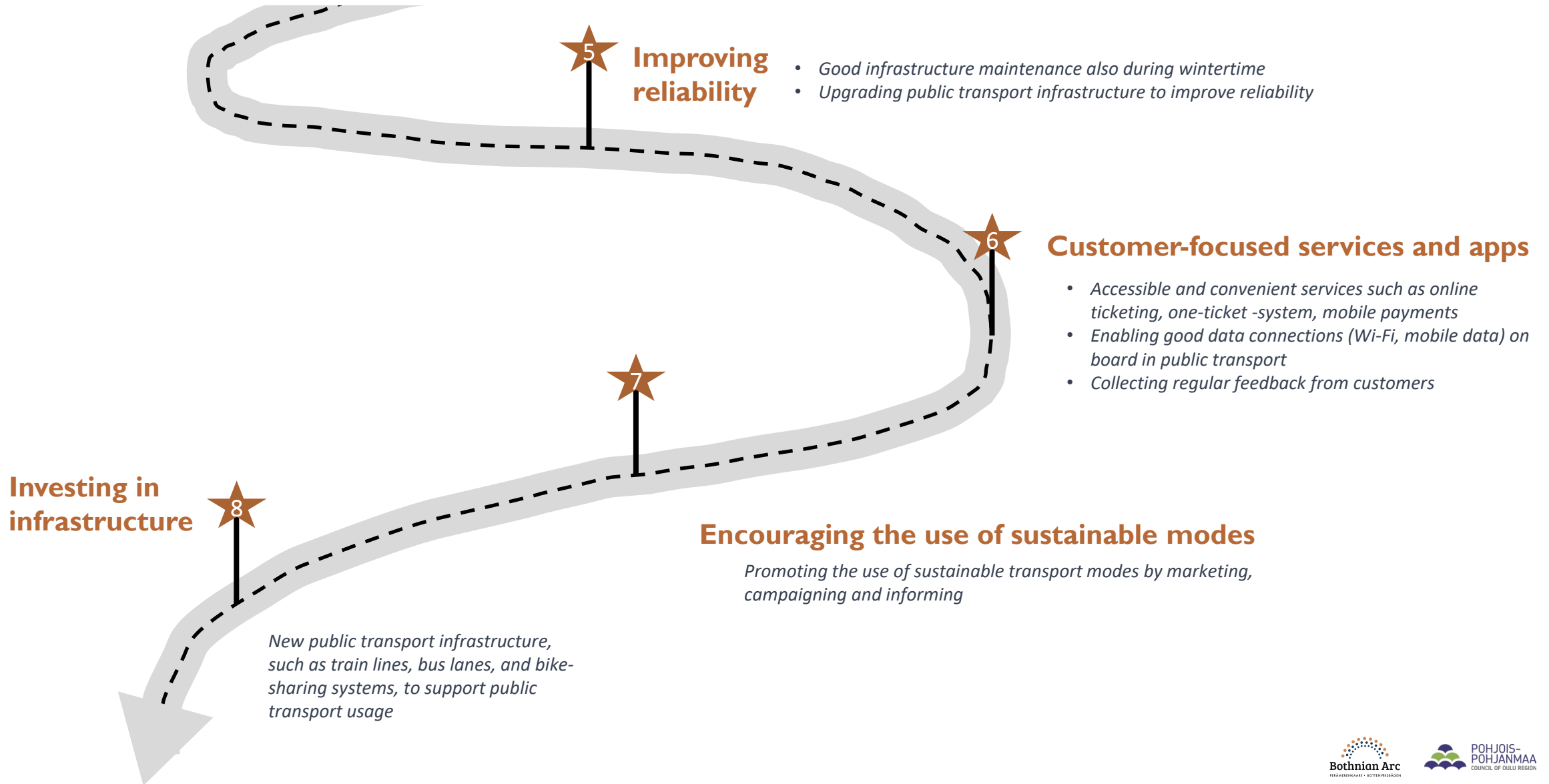
Municipalities are responsible for the construction, operation and maintenance of municipal railways (mostly industry connections), tramways and metros (where applicable). Building and maintenance is mostly a cooperation between the municipality and the region.

For long distance bus, train and plane transport, the market is free. However, there are national subsidies for some aeroplane connections to/from Stockholm, mainly smaller airports in Lapland.

Route to improved travel chains and public transport schedules



Route to improved travel chains and public transport schedules





Appendix V

Co-operation on transport issues in the Bothnian Arc region

Background: Current cross-border co-operation

There are currently several cross-border co-operation forums in the area such as the Bothnian Arc organization and the Barents Euro-Arctic Council. However, none of these have their focus only in transport issues, which is why a need for a new forum has been recognized.

The Bothnian Arc organisation, with a long tradition of cross-border activity, aims to promote and develop its members' co-operation in areas such as advocacy, logistics, tourism development, education and culture. It aims to facilitate active communication, exchange of experience and general co-operation in the region.

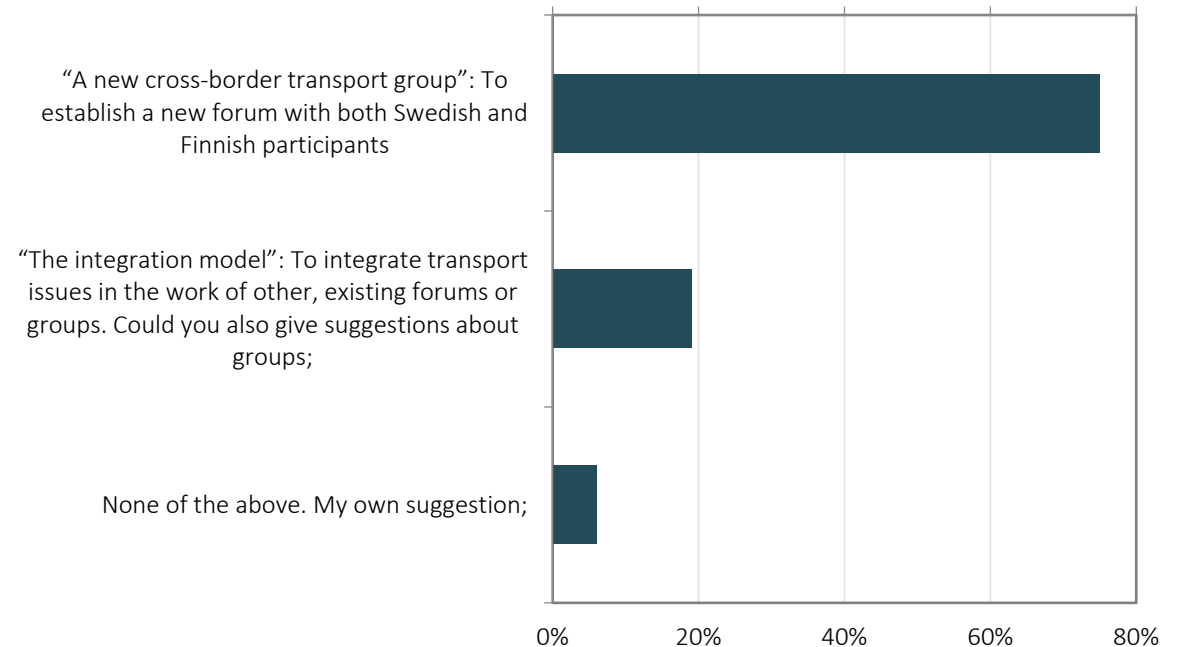
The Barents Euro-Arctic Council (BEAC) is a regional intergovernmental forum that aims to promote co-operation and dialogue between the countries in the Barents region as well as observer states such as European Union. One of the areas of focus for the BEAC is transport, and the organization works to improve transport connections and infrastructure in the Barents region.

Besides the cross-border organisations, there are internal forums in both countries which focus on transport themes on a more limited scale.

Transport systems and transportation, the related infrastructure and travel chains have long been the subject of interest and development activities of many actors in the region. However, the activity is currently scattered and fragmented, which is why a new forum is needed to ensure synergy and information exchange between all parties.

Pre-workshop questionnaire

In your opinion, how could the cross-border cooperation on transport issues best continue after this project?



Model for continuous cross-border co-operation

Building the new forum

1. Decisions on administration / facilitation
2. Inviting forum members
3. Establishing clear goals and objectives
4. Setting up regular meetings
5. Utilizing digital solutions to support live meetings
6. Establishing decision-making and co-operation processes
7. Regularly evaluating and adjusting the work

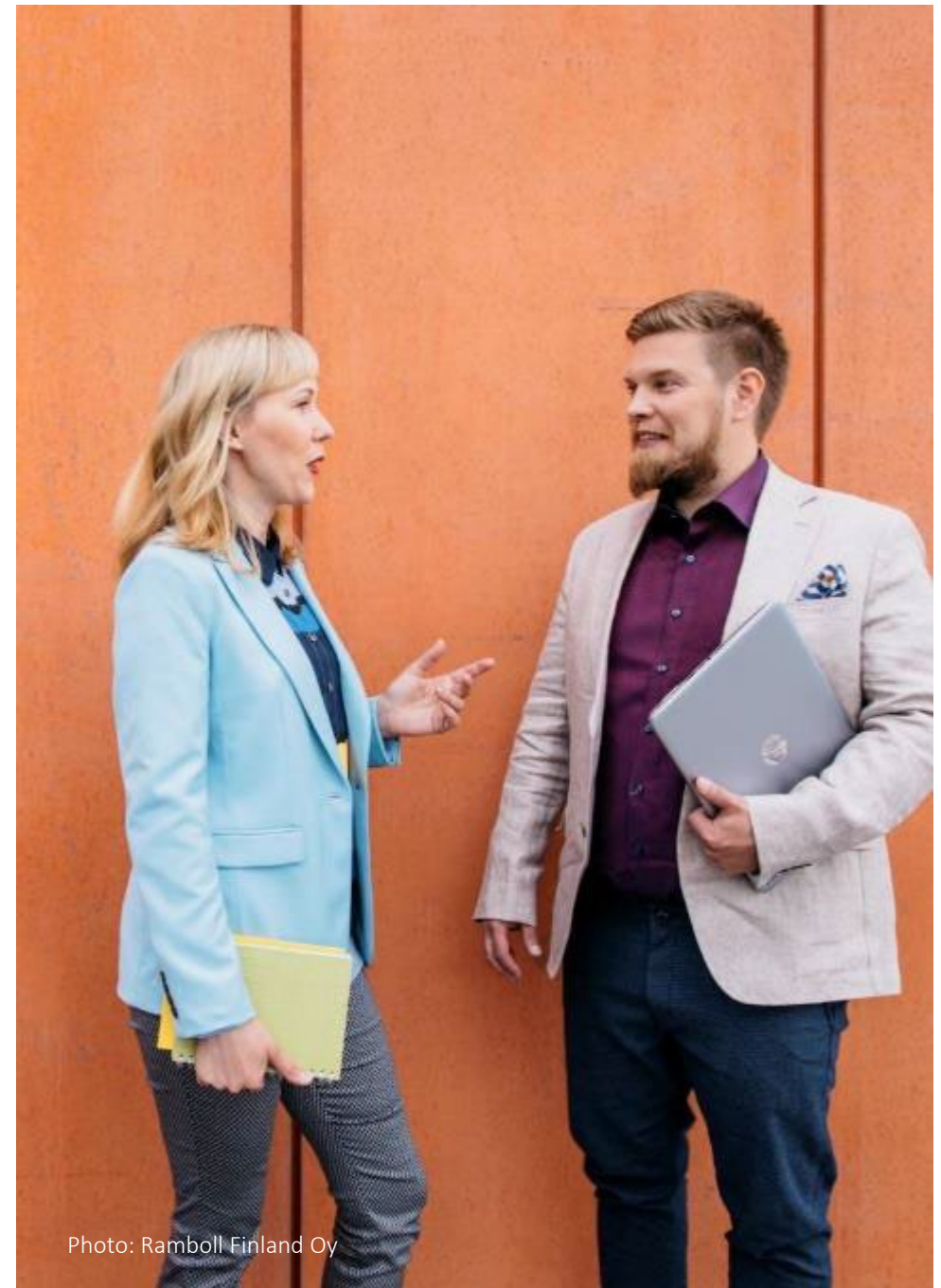


Photo: Ramboll Finland Oy

Model for continuous cross-border co-operation

One of the main goals for the project *Transport vision 2040 for the Bothnian Arc corridor* has been finding a model for future cross-border co-operation. During the project, it was recognized that the best model would be a new forum with both Swedish and Finnish participants. Unlike other cross-border forums, the new forum can focus solely on transport issues in the Bothnian Arc area. The new forum will also improve co-operation between the two countries.

1. Decisions on administration / facilitation

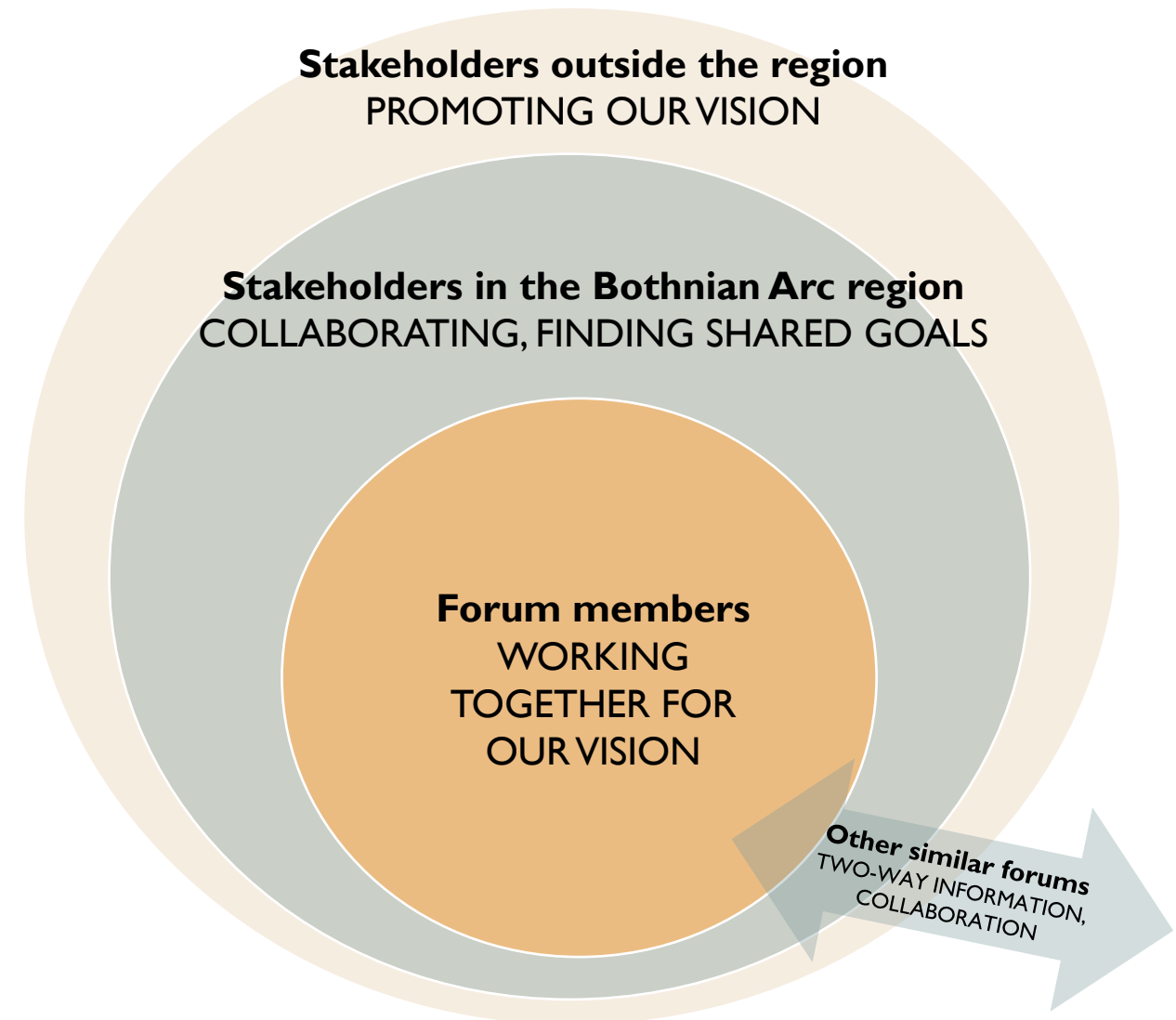
It is suggested that the existing Bothnian Arc organisation acts as the initiator for the forum, organizing the first meeting(s). If so decided, the new forum could continue its work connected to the Bothnian Arc organisation. This would give the forum an **established background to lean on**.

Chairing of the meetings could be rotated. A common secretariat, responsible for coordination and communication, might be helpful to **ensure there are resources** designated for the work. Alternatively, members could assign coordination responsibilities to their own staff.

2. Inviting forum members

The forum should have **members from existing forums and organizations** in the region. This allows participants to commute thoughts and current issues back and forth between the new forum and their own organisations.

The forum should be **open and inclusive**, actively promoting participation among regional actors as well as all municipalities and other parties in the region.



Model for continuous cross-border co-operation

3. Establishing clear goals and concrete objectives

The new forum should work to achieve **the goals defined in the Vision**, as well as address new **emerging transport challenges**. In the first meeting, the goals and objectives should be discussed and clarified together, in order to establish common ground for future work. One of the goals is to monitor the implementation of the actions listed in the Transport vision 2040.

To get the work going, it is suggested that the forum identifies the most urgent issues and/or current challenges where co-operation can help to find solutions. It is beneficial to **tackle common concrete issues right from the start**, to avoid losing the momentum.

4. Setting up regular meetings

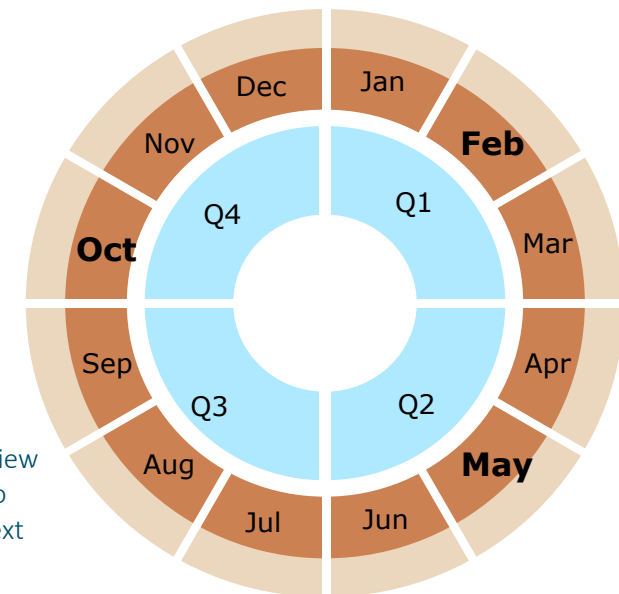
Regular meetings are important, as they provide a platform for discussing the latest developments and sharing best practices and updates on the progress made. It is suggested that the forum meets three times a year. This would provide a balance between keeping the activities moving forward and not overwhelming participants with too many meetings.

In addition, there would be sufficient time to prepare and follow up on the discussions, implement decisions, make progress on agreed-upon initiatives, and identify new topics for discussion. However, the **pace of the meetings could be adjusted** based on feedback from participants and the effectiveness of the work.

5. Utilizing digital solutions to support live meetings

The forum can make use of **video conferencing and collaboration platforms**, such as Teams, to facilitate communication and information sharing between participants. However, **live-meetings are recommended** since they provide an opportunity for face-to-face interaction, allowing for better communication and commitment to common goals. The use of digital tools and platforms can also facilitate communication and information sharing between the meetings, to maintain momentum and ensure that progress is made.

February: First meeting of the year. Reviewing the progress of the initiatives from the previous year and setting goals for the year ahead.



October: Third meeting. Finalizing activities and preparing for the coming year. Opportunity to review the progress and to set goals for the next months.

May: Second meeting. Reviewing and discussing the implementation of the initiatives and strategies that were set in the first meeting. Identifying any challenges or obstacles that need to be addressed.

Model for continuous cross-border co-operation

6. Establishing decision-making and co-operation processes

The forum should have **collaborative working environment and decision-making processes** to ensure that all parties have a voice and decisions are made efficiently. Participants are encouraged for open and transparent discussion. The forum should thrive for decision-making in consensus. Decisions, reasoning behind the decisions and the specific steps to implement the decisions should all be **documented**.

The forum is a cross-border body, not directly connected to planning and decision-making processes in each of the two countries (e.g., regional development strategies; regional transport system planning; municipal decision-making; regional and national infrastructure planning). To avoid overlap and inefficiency, **regular communication and organic collaboration** with these processes should be encouraged. With organisations like Barents Euro-Arctic Council, there might be a need for some kind of (unofficial) agreement on how to handle transport and infrastructure issues together.

7. Regularly evaluating and adjusting the work

Regular **evaluations and assessments** of the forum's performance should be conducted to ensure that it remains relevant, effective, and aligned with the Transport vision 2040 as well as with the members' needs.

Example of a meeting agenda

1. **Welcome and Introduction:** *Opening words from the chair, introductions of attendees, summary of the purpose and goals of the meeting*
2. **Review of Previous Meeting:** *Review of the decisions, actions, and outcomes*
3. **Current Status of Transport System Development Initiatives:** *Updates on the progress of ongoing initiatives, as well as any new initiatives that have been proposed or are under consideration*
4. **Discussion of Key Issues and Challenges:** *Discussion of any current challenges related to the transport system or initiatives, opportunities for addressing these challenges*
5. **Planning and Prioritization of Initiatives:** *Discussion of the priorities for the next period and allocation of resources to support these initiatives*
6. **Review of Progress Towards Goals:** *Review of the progress towards the goals set in the vision and identification of any areas where further work is needed*
7. **Next Steps and Action Items:** *Discussion of next steps that need to be taken, as well as assignment of responsibilities for specific actions and follow-up tasks*
8. **Ending the Meeting:** *Closing remarks from the chairperson, a summary of the decisions and outcomes from the meeting, preview of the next meeting*

(Possible site visit after the meeting)



Appendix VI

User cards

Nurse commuting from Kemi to Kalix

Current modes



Usual trip duration



Motives for the trip

A nurse is living in Kemi, Finland. He/she works five days a week in a hospital in Kalix, Sweden. He/she is currently commuting by own car and sometimes by carpooling. Since the trips between Kemi and Kalix are daily, he/she appreciates short travel time and an affordable cost.

Other needs of the user

He/she lives approximately 5 km from Kemi centre. Needs a connecting trip when using public transport (bus, train) from Kemi centre to Kalix. If using public transport, he/she needs a ticket that is valid in both countries. He/she currently works in day shifts but the work in hospital can be three-shift.

He/she is interested in using the time spent driving to Kalix for self-development (reading etc.). He/she is worried about climate change and interested in a sustainable lifestyle.



Grandmother from Piteå visits grandchildren in Tornio

Current modes



Usual trip duration



Motives for the trip

Grandmother living in Piteå visits her grandchildren in Tornio every two months. She currently makes the trip by bus and taxi, since she has no driving licence. She appreciates an affordable cost of the trip and a good level of accessibility. She appreciates easiness while traveling and while planning and buying tickets.

Other needs of the user group

She lives near Piteå centre, and her grandchildren live 3 km from Tornio centre. She depends on public transport. While using public transport (whether bus, train, etc.), she needs a ticket valid in both countries. She appreciates ease in travelling and is interested in buying one single ticket which could also be used for connecting trips.



A student traveling from Ii to Kemi

Current modes



Usual trip duration



Motives for the trip

A 17-year-old student lives in Ii, Finland, and travels daily both ways to Kemi, Finland to a trade school. The student has not yet got a driving license. He/she travels by bus, and there are several bus connections to choose from. Appreciates affordable prices.

Other needs of the user group

He/she lives approximately 2 km from the bus stop, walking or cycling to the stop. In cold or bad weather his/her parents give a lift. He/she studies in the bus or chats with schoolmates.



Resident of Tervola who travels for a weekend vacation to Stockholm

Current modes



Usual trip duration



Motives for the trip

A resident of Tervola travels to a concert in Stockholm for the weekend. She/he makes the trip by driving to Kemi-Tornio airport and then flying to Helsinki, where she/he takes a flight to Stockholm. She/he appreciates a relatively short travel time but also an affordable cost.

Other needs of the user group

The traveller lives in Tervola and owns a car. She/he appreciates fast and easy travel that doesn't take too much time from visiting the city and its sights before the concert.

She/he can work remotely, so would be able to work while travelling in public transport, for example during Friday or Monday.



Tourist from Central Europe - fishing and hiking

Current modes



Motives for the trip

A tourist from Central Europe wants to enjoy the nature in the Bothnian Arc region. Currently makes the trip by air. Appreciates short travel time, good schedules and flexibility. Rents a car from the airport for moving around. Spends ten days in the area.

Other needs of the user group

- Is interested in moving quite flexibly and freely in Finland and Sweden during the vacation
- Is worried about climate change and interested in a sustainable lifestyle
- Values environmentally friendly options
- Would value a possibility to get fishing permit to all countries (Finland, Sweden, Norway) from one place



Family from Norway – Explores the Bothnian Bay

Current modes



Motives for the trip

Family from Norway visits the Bothnian Arc region. Is interested in seeing different towns and exploring the shoreline in Finland and Sweden. Interested in taking a coastal cruise in the archipelago.

Makes the trip by an electric car. The family carries bikes with them so they can cycle in the area. Appreciates good infrastructure (car+bike) and clean nature. Spends one week in the area.

Other needs of the user group

- Is interested in moving quite flexibly and freely in Finland and Sweden during the vacation
- Interested in taking a coastal cruise
- Appreciates child-friendly activities such as waterparks and amusement parks

Elderly couple – maritime culture and lifestyle

Current modes



Motives for the trip

An elderly couple from south of Sweden is interested in visiting both Finland and Sweden. Makes the trip to the region by train and then uses a bus while traveling around. Spends ten days in the area. Appreciates versatile destinations – not only nature, but also culture and history, village life and good restaurants.

Other needs of the user group

- Interested in guided tours to various destinations
- Interested in moving quite flexibly in Finland and Sweden

Food products

Current modes



Food products are generally transported as domestic road transport, from warehouses located in central Sweden or southern Finland. As foodstuff is time sensitive and volumes are low, train is usually not considered an option. One of the factors that influence transport mode choice is the time sensitive transshipment of goods at cross-docking* terminals (= between long distance transport and local distribution).

Current traffic

- Road transport from central Sweden and from southern Finland

Typical traffic

- Daily distribution from centralized warehouses to destination
- Possibly cross-docking at northern terminals
- Small volumes
- Northbound commodity flow
- Domestic flows in Sweden and Finland, not usually cross-border

Typical needs of the user group

- Daily service
- Time sensitive
- Very time sensitive at cross-docking

Cross-docking* is a logistics procedure where products from a supplier or manufacturing plant are distributed directly to a customer or retail chain with little to no handling or storage time.



Industrial transports to Oulu: case Valio

Current modes



Valio is a Finnish dairy and food product company. Valio has a factory in Oulu, where more than 81 million kilograms of finished products are processed from raw milk annually. Factory is located in Maikkula next to highway 22 and about 10 km from the port of Oulu.

The factory employs more than 300 people and the influence in the Oulu region is in the order of 70 million euros. Good connections to the core network are very important.

Current traffic and needs

- Raw milk mainly comes from milk farms in Oulu's surroundings, within a radius of about 120 kilometres, but the northernmost milk comes from the banks of the Tenjoki River.
- Products and raw materials are transported mainly by trucks.
- This user group values economic costs and efficacy.
- There is an increasing pressure to find more environmentally friendly transport options.



Industrial transports to the Metsä Fibre's Kemi bioproduct mill

Current modes



Metsä Fibre, part of Metsä Group, is building a new bioproduct mill to Kemi, Finland. The value of the investment is EUR 1.85 billion and it is the largest investment ever made by the Finnish forest industry in Finland.

The Kemi bioproduct mill will use approximately 7.6 million cubic metres of pulpwood a year, which is 4.5 million cubic metres more than the current pulp mill in Kemi. Wood will be procured mainly from Finland.

Most of the products are shipped for export. The bioproduct factory exports will be concentrated entirely in Kemi port.

Good connections to the core infrastructure network are very important. There is an increasing pressure to find more environmentally friendly transport options. Like most of the industrial transports, the mill values economic costs and efficacy.



Arctic Rail Express (ARE) and Nordic Rail Express (NRE) trains

Current modes



Arctic Rail Express (ARE) and Nordic Rail Express (NRE) are competing services between Narvik and Oslo, based on fish transport. From Narvik, there are ten trains each week via Sweden to Oslo. On return trip from Oslo to Narvik, consumer goods are transported. The operator has tested new wagon types which use electricity instead of diesel. Electricity wagon type is designed for containers and trailers.

Current and potential traffic

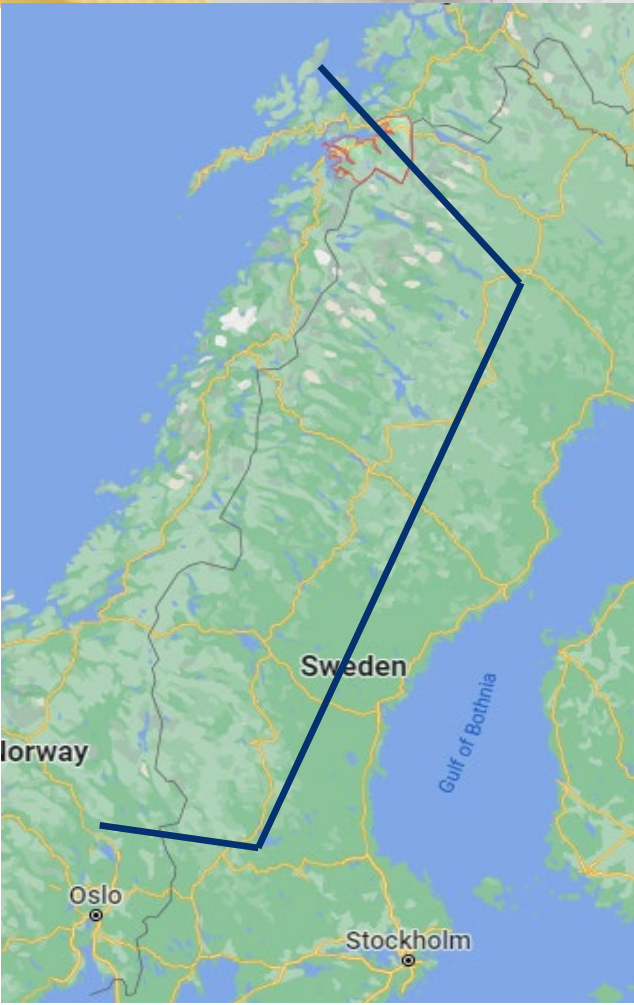
- Railway transport between Oslo and Narvik

Typical traffic

- Inbound: general cargo
- Outbound from Narvik: fish
- Regular traffic

Typical needs of the user group

- Efficient marshalling
- Reliable transport (time)
- Capability to control and manage material flows





SSAB Cargo Traffic

Current modes



SSAB is a main special steel manufacturer on a global market. In the Bothnian arc area SSAB has two steel plants; one in Luleå (Sweden) and one in Raahе (Finland). In Sweden there is a specified railway system ("Steel shuttle") transporting about 3 million tonnes of goods between the SSAB production plants in Luleå, Borlänge and Oxelösund. In Finland, about 70 trucks pass through the Raahе factory area every day, and finished products are loaded and transported to ships and trains in the factory area as well.

Typical traffic

- Inbound: raw-material
- Outbound: end products
- Maintenance and service traffic
- Large volume flows
- Heavy traffic, high-capacity units

Typical needs of the user group

- Every transport mode should be available
- Connectivity and access to global logistics chains and networks is important
- Needs to control and manage material flows
- Is a typical user of dedicated freight solutions
- Heavy industry -> needs a lot transport capacity



ScandFibre Logistics

Current modes



ScandFibre Logistics (SFL) is the largest logistics company in Sweden for rail transport to the forest products industry. Its main users are BillerudKorsnäs, SmurfitKappa and Mondi Dynäs. ScandFibre is the main supplier of rail logistics for paper products from their mills in Sweden to European terminals. The rail transport system is developed for the needs of the forest industry. Empty space in the trains (back to north) is offered to other companies.

Current traffic

- Railway transport for forest industry
- Wagon load between industries

Typical traffic

- From production sites via Hallsberg to ports and Malmö/Continental Europe
- Outbound: paper, carton etc.
- Inbound: general cargo (empty space sold to other companies)
- Heavy traffic, high-capacity units

Typical needs of the user group

- Separate transport between industries/marshalling yards
- Efficient marshalling – handled by GreenCargo in Sweden
- Pre-planned train channels in the entire system





Northvolt

Current modes



Northvolt is a Swedish battery developer and manufacturer, specializing in lithium-ion technology for electric vehicles. Northvolt supplies batteries for electric cars to big German automakers such as Volkswagen and BMW. Northvolt has a new Gigafactory located in Skellefteå. Production in Northvolt Ett started in June 2022. Gigafactory has +3 000 employees, and 9 % of Skellefteå's work force will have a job at the factory. There is no information on freight volumes and routes yet, however one company (Scanlog) is in charge of road logistics and other (Wallenius SOL) transports batteries by sea to Germany.

Commodity flows

- Inbound: component
- Outbound: batteries from Skellefteå to Wulfsburg, Germany
- Recycling plant in the future

Possible traffic - long time perspective

- Inbound and outbound railway transport
- Outbound transport by sea (container)

Typical needs of the user group

- Energy consuming
- Needs connectivity and access to global logistics chains and networks
- Capability to control and manage material flows



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