PRESENTATION

Main road 8 – Smart Corridor

Preliminary study of the needs of business life and the possibilities of smart corridors
2021/2022

Process description

I

Current state of Main Road 8 and the needs of business life

Workshop 1
Identifying needs

II

A common vision for Main Road 8 - 2032

Workshop 2
vision themes

III

Roadmap to carry out the vision

Workshop 3
Roadmap contents and validation

Layers of smart corridor and supply chain development

National competitiveness

- *Government and its ministries*

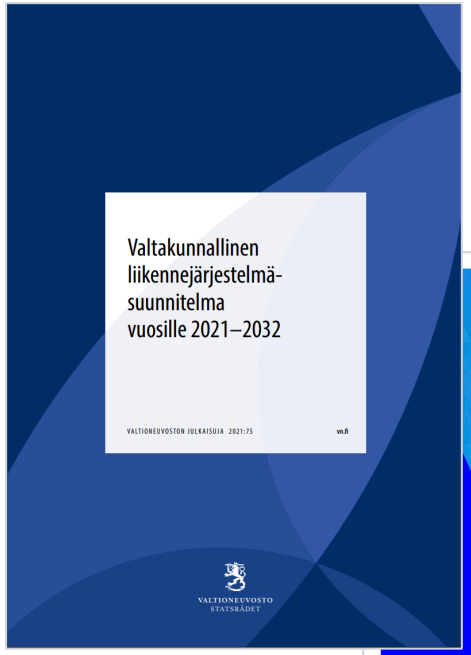
Supply chain management

- *Transport customers OR logistics operators*

Tasokuva: ITS Finland

LOGISTICS SERVICES	• *Logistics operators* • *Transport companies*
CLOUD SERVICES, INFORMATION, INTERFACES AND PLATFORMS	• *Fintraffic* • *Software companies*
SMART INFRASTRUCTURE AND SERVICES	• *Fintraffic* • *VTT* • *Private service providers*
INFORMATION, ELECTRICITY AND ENERGY INFRASTRUCTURE	• *Telecommunications operators* • *Charging service operators* • *Energy distribution operators*
TRANSPORT INFRASTRUCTURE	• *Fairway authorities: Finnish Transport infrastructure Agency* • *Traficom* • *Ports* • *Finavia*

National background documents and ongoing projects



National Transport Plan 2021-2032

Fossil Free Transport Roadmap

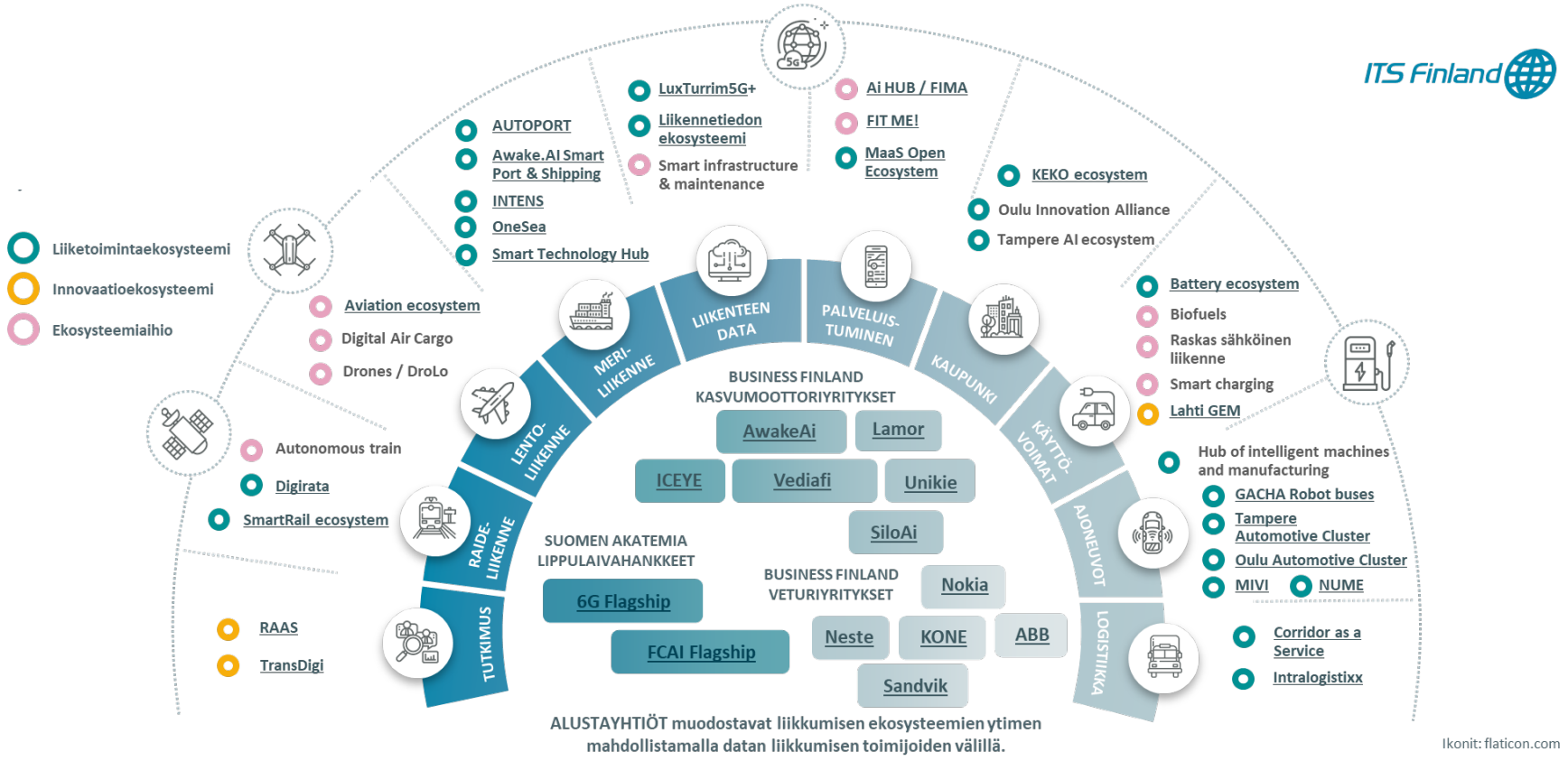
Logistics digitalization strategy

Ongoing projects

Nordicway 1-3 • NordicWay 1 (2015–17) 5,2 M€ • NordicWay 2 (2018–20) 18,9 M€ • **NordicWay 3 (2019–23) 20,5 M€**
Fintraffic Transport Ecosystem 2021 →
NEXT-ITS Digital Corridor
Seaforvalue (S4V) • Fairway-project • SMARTER (Smart Terminals) -project 2021–2023
PORT OULU Smarter 2019 →
Intelligent maritime logistics in Satakunta, starting on April 1, 2021 and ending on March 31, 2023

Ongoing development of ecosystems and test beds

- There are many types of ecosystem development underway in Finland
- A new ecosystem for Main Road 8 Smart Corridor development?
  - *Development is needed in both physical and digital infrastructure*
  - *Requires extensive cooperation between actors*
- The starting point is the flow of goods, logistics hubs, modes of transport, domestic and export transport, and logistics operators in the west coast export area.
- The goal is **an ecosystem that produces intelligent corridor solutions, which originates from logistics operations instead of developing individual technological solutions**.
- The concept of the Smart Corridor is not intended to be a test platform, but a business production line developed using intelligent infrastructure-related solutions.
- The concept is scalable to other main routes as well



Testbeds

5GTN	Aurora Snowbox	ITS Factory	Jätkäsaari Mobility Lab	Lapland Proving Ground	Number9 UAS	OneSea Jaakonmeri	OuluZone+	Sodankylä test site	Test World

Transport ecosystems in Finland (Finnish version). Source: ITS Finland

System development in port operations and shipping - followed by road transport

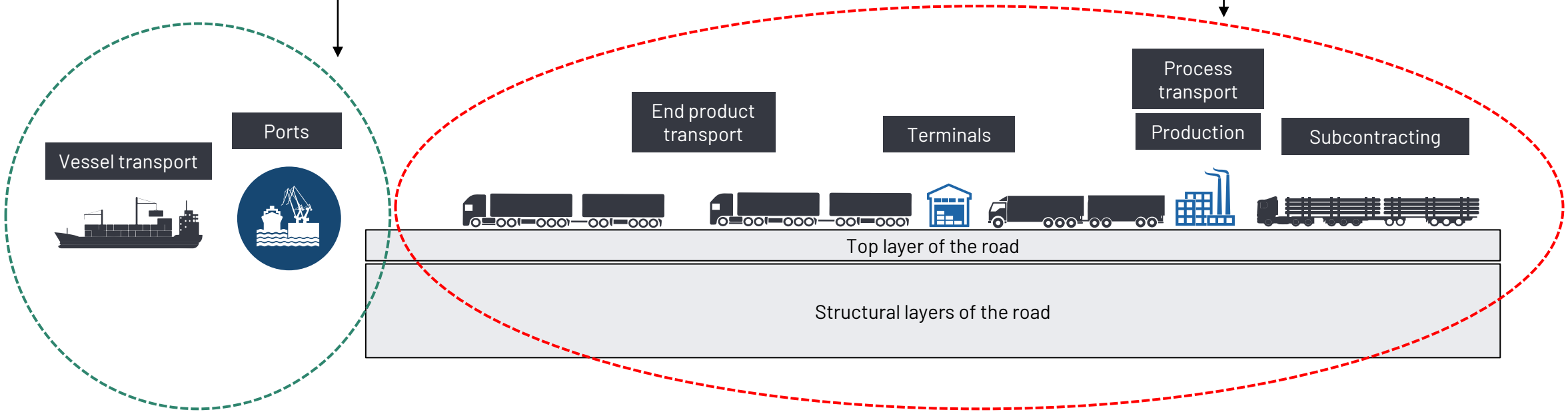
Vessel Traffic and Ports - Fintraffic Port Activity App

The port digitalization platform, which is open to all Finnish ports and port operators, was published in the spring of 2021. The application gathers the schedule information of the port's various stakeholders in one place from different systems and informs its users of possible schedule changes.

In this work, the possibilities of road infrastructure to increase the efficiency of the supply chain are investigated.

Road transport

The solutions for a common platform are still under development in the transport ecosystem project, but the logical common platform is the updated Fintraffic's Digitraffic. Through the interfaces of the platform services can be developed for the needs of road transport.



Main road 8 as part of the EU's comprehensive transport network

TEN-T ja CEF

- Main road 8 is one of the complementary roads of the TEN-T network

Alternative Fuel Infrastructure Directive (AFID)

- Requirements for charging infrastructure for trucks, cars and vans
- Finland is negotiating national guidelines, but it is clear that the requirements for charging infrastructure will also be tightened.

ITS Directive amendment 2021

- It is proposed that the current ITS Directive (2010/40 / EU) is to be updated
- Increased obligations for information sharing and services are suggested
- From the point of view of the development of Main Road 8 Smart Corridor, the proposal is good, as it would oblige wider C-ITS services.

CEF funding applications (in Finnish)	Kokonaisbud-jetti (milj. €)	Haettava tuki (milj. €)
Ydinverkko:		
Lentoradan suunnittelu	17,3	8,65
Turun sataman infrastruktuurin kehittäminen - toteutushanke	66,0	19,8
HaminaKotkan sataman infrastruktuurin ja takamaayhteyksien kehittäminen	10,4	3,3
BalticEco – Helsingin ja Lyypekin satamien ym. yhteishanke	3,21	0,963
Kattava verkko:		
Meriyhteyden ja kestävän tehokkuuden parantaminen Porin satamassa	23,2	7,0
Kokkolan sataman kestävän kehityksen infrahankkeet	9,7	2,9
Rauman ja Ystadin sataman ympäristöinvestoinnit	1,5	0,45
Kestävän ja multimodaalisen liikenteen toimet, ml. merten moottoritiet:		
Twinport 5: Helsingin ja Tallinnan satamien kehittämishankkeet	8,0	4,0
Älykkään ja yhteentoimivan liikenteen toimet:		
Nemo-EMSWe: Suomen merenkulun kansallisen tietojärjestelmän toteutus	5,48	2,74
Just in Time Arrivals in European Ports	3,5	1,75
Vaihtoehtoisten käyttövoimien –hankkeet; AFIF-rahoitusväline		
Julkisen pikalatauksen runkoverkon rakentaminen Suomeen	9	3,5
yhteensä	157,29	**55,053**

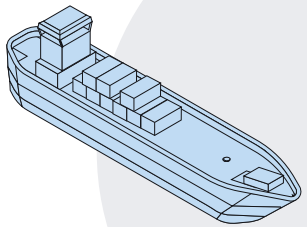
Effects along the entire Main road 8

https://valtioneuvosto.fi/paatokset/paatos?decisionId=0900908f8077c0b0

TEN-T network proposal from December 2021,
https://transport.ec.europa.eu/system/files/2021-12/TEN-T_National_Factsheets_0.pdf

Main road 8 as part of the Finnish export zone from Turku to Tornio

- The highway zone on the west coast is one of Finland's strongest export industry areas
- There is a wide variety of industries along main road 8

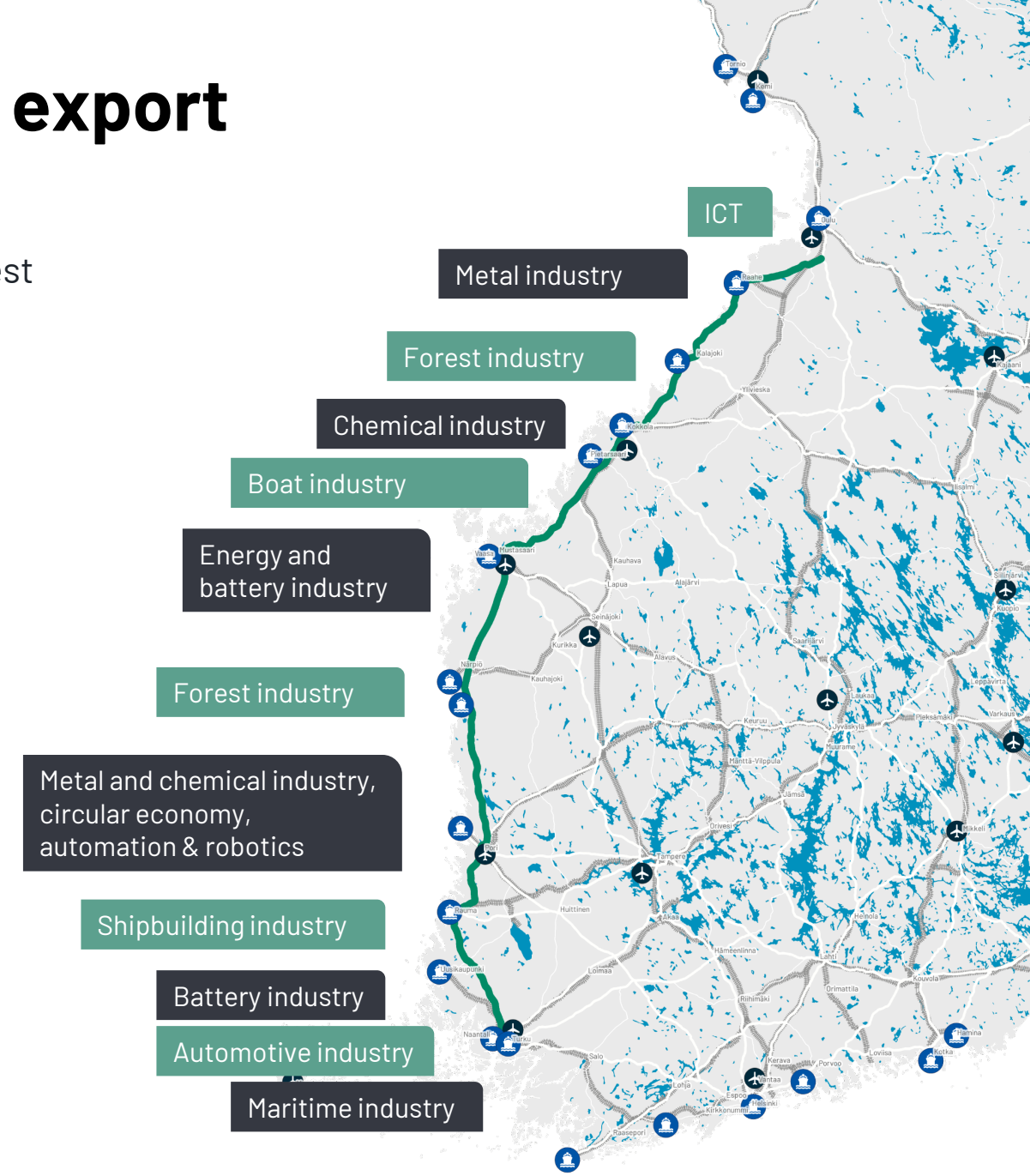


€ 19 billion

The value of goods export in 2019 in the 8 provinces of the highway, i.e.

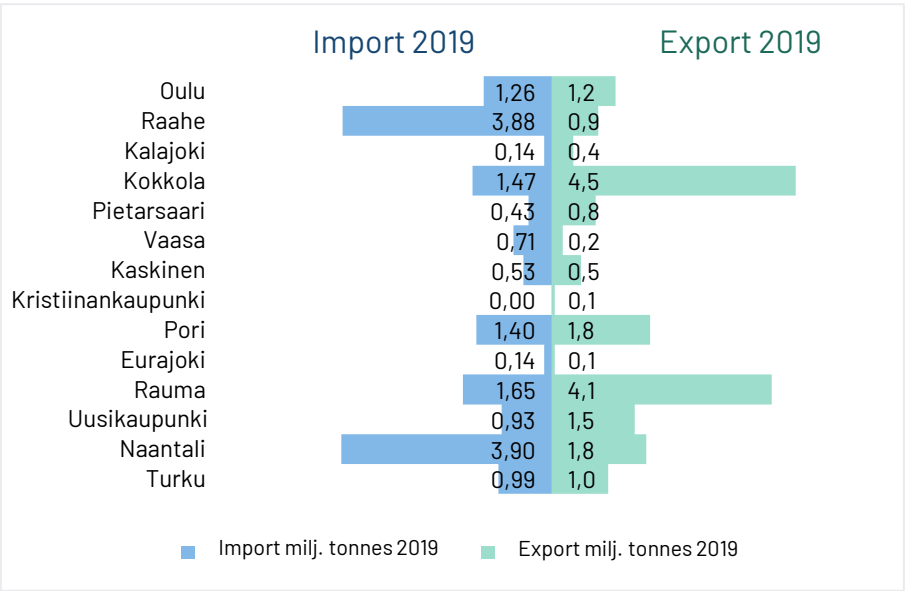
29 %

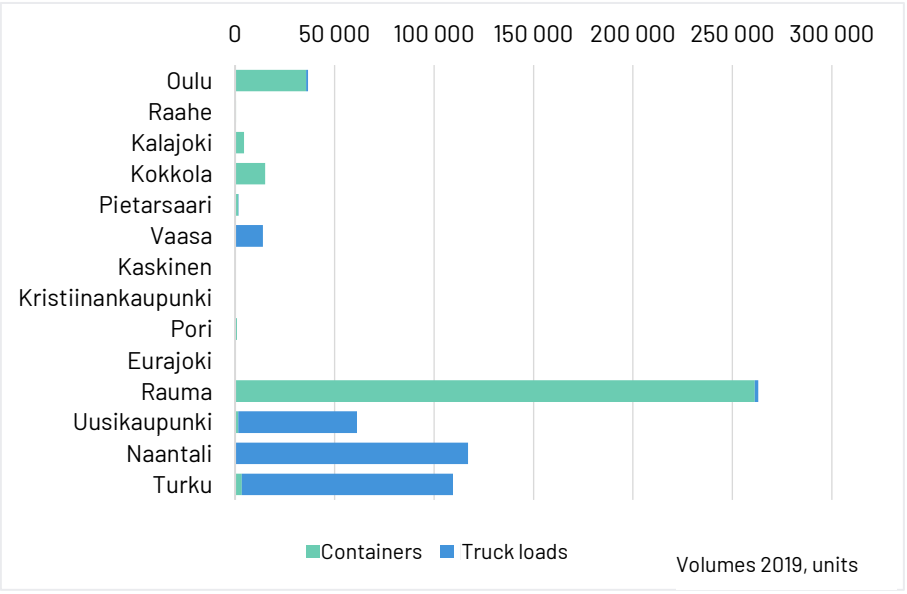
on the value of all Finnish exports of goods (€ 65 billion)

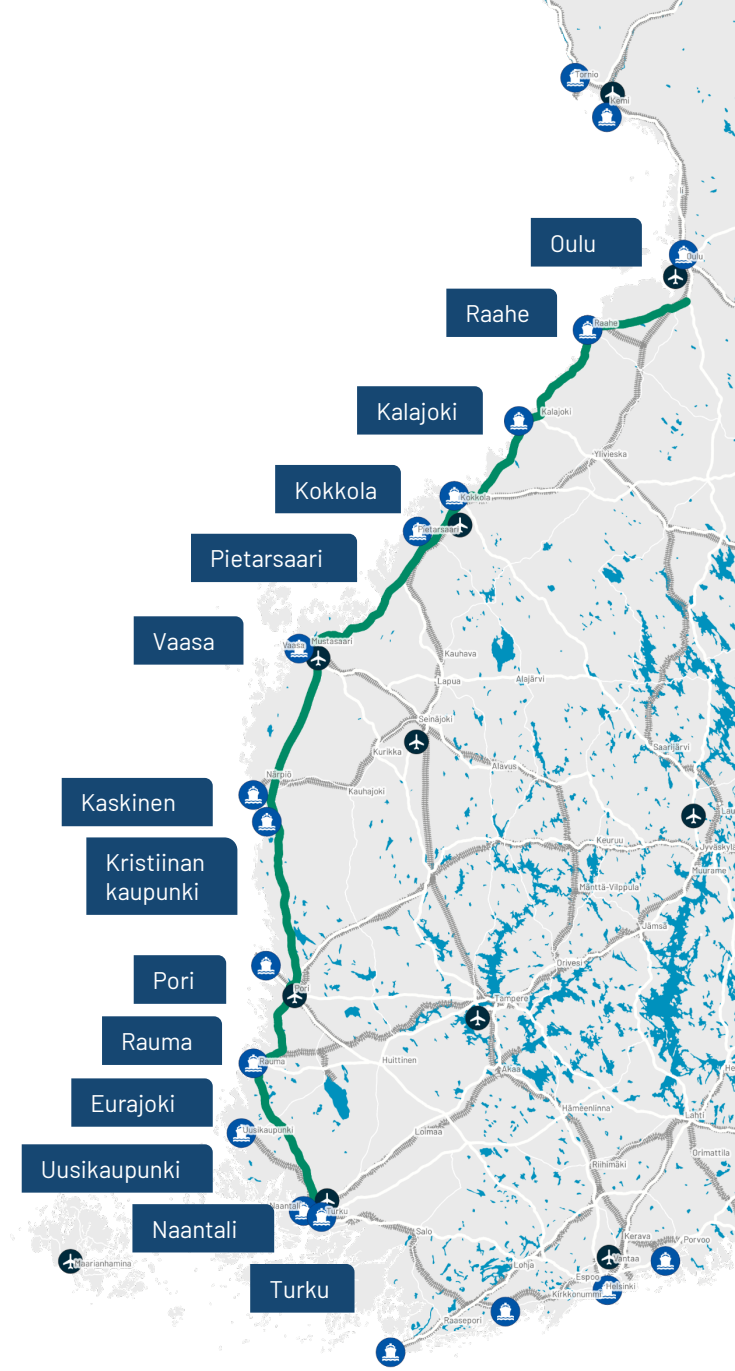


Main road 8 port profiles

Port	Profile
Oulu	Cardboard, pulp, paper, lumber, containers and chemicals, RoRo and StoRo
Raahe	Export and import transport flows, steel, project cargo
Kalajoki	Timber, minerals
Kokkola	Mining, transit, bulk
Pietarsaari	Cellulose, lumber, paper, cement and lye
Vaasa	Imports and exports of oil, agricultural products, general cargo and project cargo
Kaskinen	An export port for sawn timber and pulp, also specializing in the handling of the chemical industry and bulk cargo
Pori	Project cargo, bulk, chemicals, concentrates
Eurajoki	Pig iron, gypsum, coke, turnings, scrap metal, timber, car sheet metal, feed materials, blast furnace slag, E40 crushed stone, E1 / E2 / E3
Rauma	Containers, Ro-Ro, Lo-Lo, dry and liquid bulk cargo, project cargo, paper, pulp, general cargo such as agricultural machinery and windmill parts, power plant projects, etc. and dry and liquid bulk cargo
Uusi-kaupunki	Components and finished products for the automotive industry, general cargo transport, transportation for the chemical industry
Naantali	Scandinavian truck and trailer traffic, and also German traffic, bulk, RoRo and Ropax
Turku	Scandinavian truck and trailer traffic



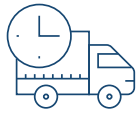




Needs of key actors in the supply chain

Transport customer needs (industry and trade)

"Ordered transport services operate predictably and reliably at appropriate costs"

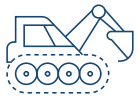


Road transport operator needs

"Necessary and reliable information on road conditions is obtained for the planning of driving arrangements"

Port needs

"Information on the state of hinterland transport"



Transport infrastructure authorities needs

"Information on the condition of the road and road traffic"

Logistics operator perspective

Easily accessible information about the road and its services is needed

Today, three manageable entities and the optimization of these → the pursuit of efficiency

1. Customer needs	**3. Resources** - Vehicles - Drivers - Terminal structure
2. Goods to be transported	

Electricity as propulsion

4. Optimal charging of the trucks at suitable locations for the transport chain, considering rest periods and resource management

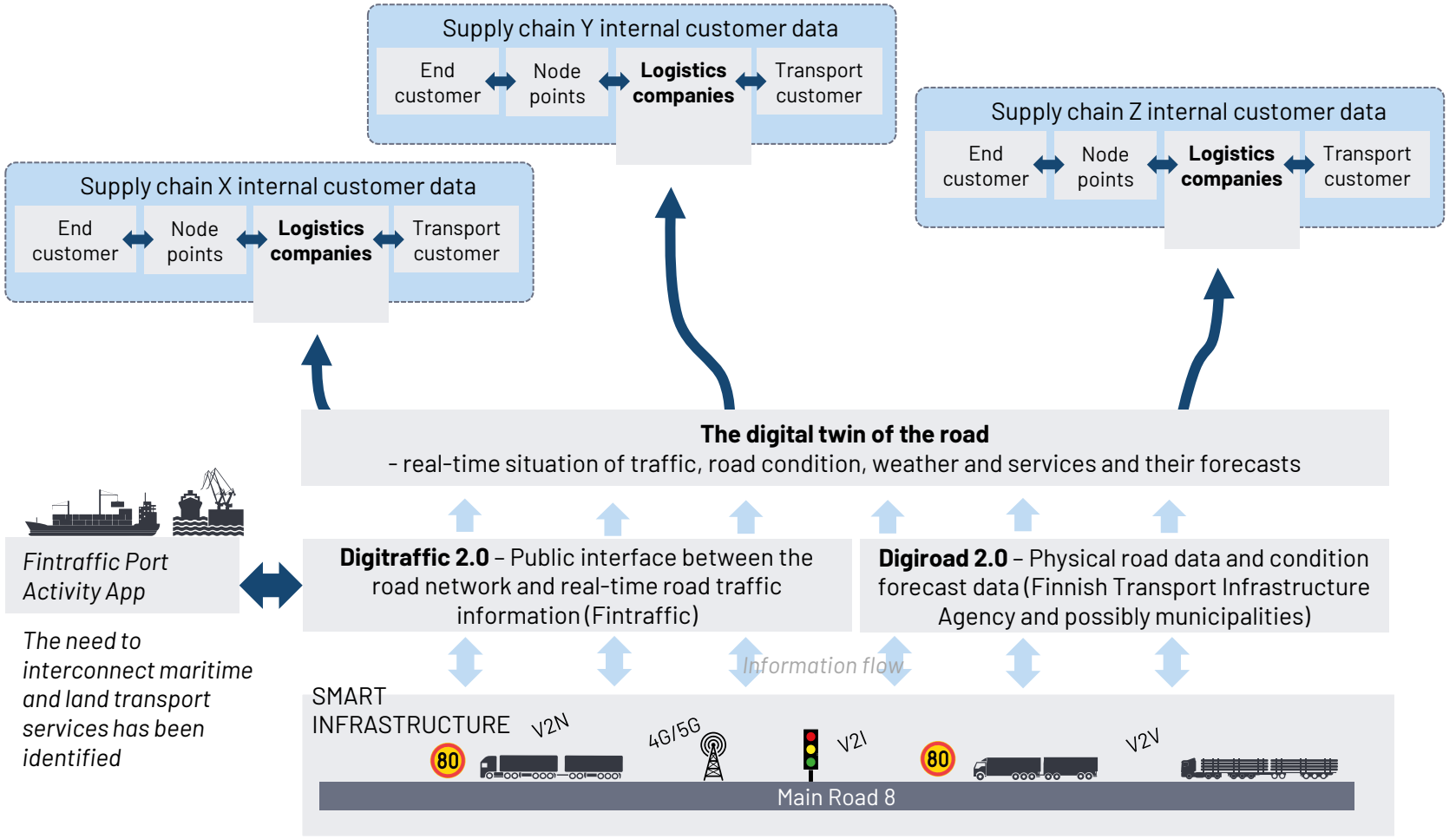
Information related to the infrastructure and its usage

So far little exploited opportunity. Introduces better, more real-time information on the state of the road and road traffic for the transport company. This also benefits other parties in the supply chain.

Logistics operators are key players to seize the benefits of smart corridors

Information management in the planning and operation of road transport

- In logistics, everything starts with data that combines customer needs, transportation resources and the goods being transported as efficiently as possible.
- Supply chain development has moved to ecosystem thinking, where all parties involved in the supply chain are connected to the same platform.
- It is important to distinguish between customer data in a logistics network and data of intelligent infrastructure.
- Information management has a direct link to reducing emissions. According to a logistics company's experience, 2/3 of the emission reduction potential in freight transport is related to knowledge and using it to improve efficiency.



The need to interconnect maritime and land transport services has been identified

An overview of intelligent road infrastructure and transport solutions

TRAFFIC FORECAST

- Road site warnings (cellular and ITS-G5)
- Alarm & Service Vehicle Alerts (4G & cloud)
- Queuing warning
- Detour guidance system
- Speed limits that adapt to congestion
- Intelligent parking organization for truck parks

EMISSION REDUCTION

- Optimal Green Light Speed Assistant (GLOSA)
- Dynamic access control (truck driver can ask permission from the control room to use e.g. a bus lane)
- Electrified road & heavy transport
- Dynamic environmental zones (hybrids switch to electricity in the area)

TRANSPORT SAFETY

- Sharing information about road conditions such as slipperiness
- Automatic emergency braking systems and hazard warning systems (e.g., reindeer bell)
- eCall system (connects to the nearest emergency center)
- Intelligent road lighting based on traffic situation

TRANSPORT AUTOMATION

- Arctic challenge (automatic driving in winter)
- Platooning
- Vehicle-to-infrastructure and infrastructure-to-infrastructure communication: V2X (WiFi or 4G / 5G)

DATA SHARING PLATFORMS IN FINLAND 2021

SP	Service	Data			Free or open data	Licence / fee
		*Traffic, disturbances	Weather & road conditions	Other		
Fintraffic	DigiTraffic	x	x	x	x	
FTIA	Digiroad			x		
FMI	Open data		x		x	
FMI	Road Weather Forecasts		x			x
Infotripla	DATEX2 Premium Feed	x	x			x
Infotripla	Crowdsourced traffic warning data	x	x			x
EEE	E3 REST API	x	x			x
Safety4traffic	Accident, Crosswind, Elk, Deer, Reindeer, Road weather and Road work warning services	x	x			x
Roadcloud	Premium connected vehicle data service		x			x
Sitowise	Carrio, Routa	x	x	x		x
Here	Traffic API	X				x
TomTom	Intermediate Traffic service, Traffic API	x				x
Waze	Transport SDK, Connected Citizens Program	x				
OEM & public authorities	Safety Related Traffic Information Ecosystem	x	x			

Source: Väylävirasto AUTOMOTO 06/2021 (osa NordicWay3-projektia)

MAIN ROAD 8 | Smart Corridor vision

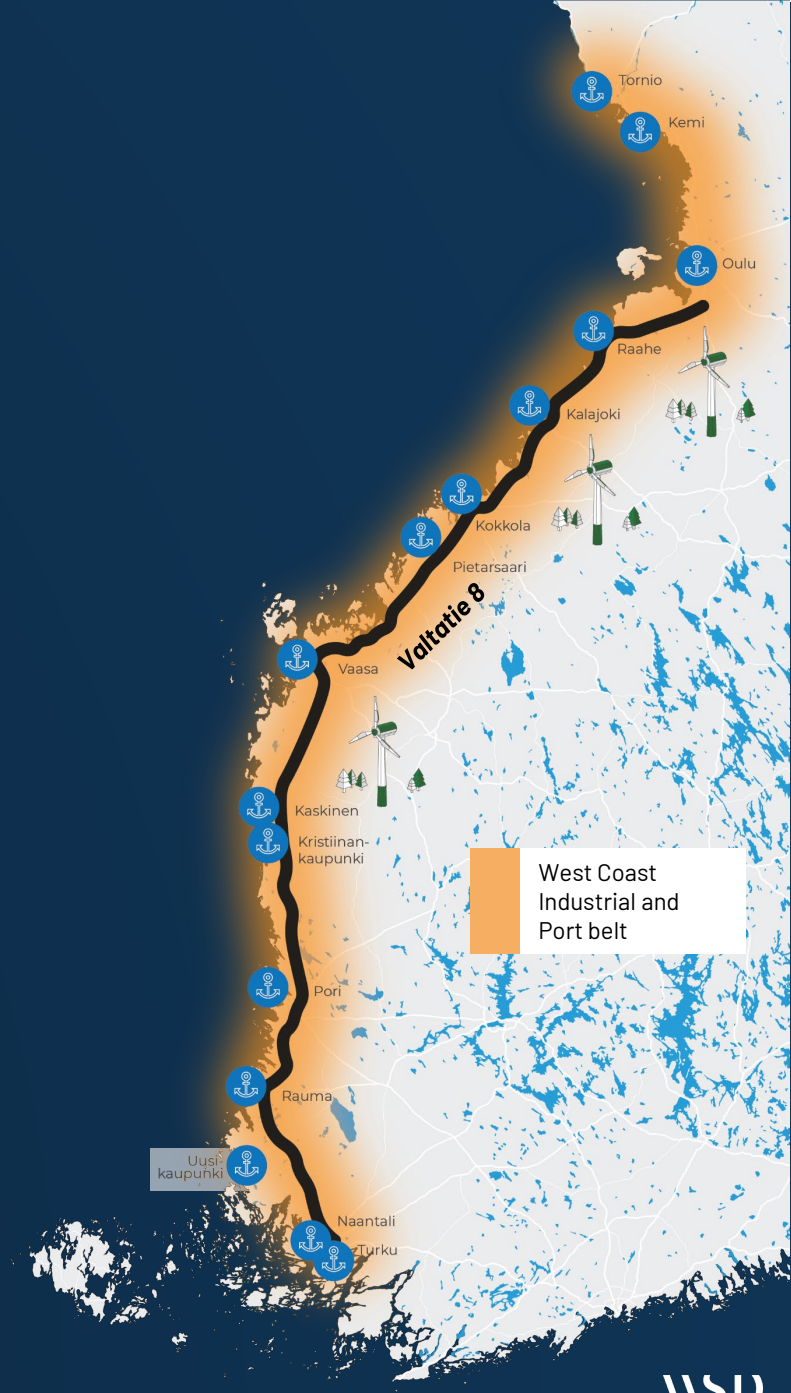
Main road 8 is a high-quality platform for resource-efficient supply chains managed with reliable information

Main road 8:

Enables safe, predictable and carbon neutral transport chains

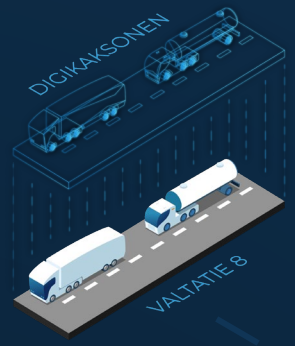
Connects industrial ecosystems and the west coast port network

Promotes the competitiveness of Western Finland's export industry



MAIN ROAD 8

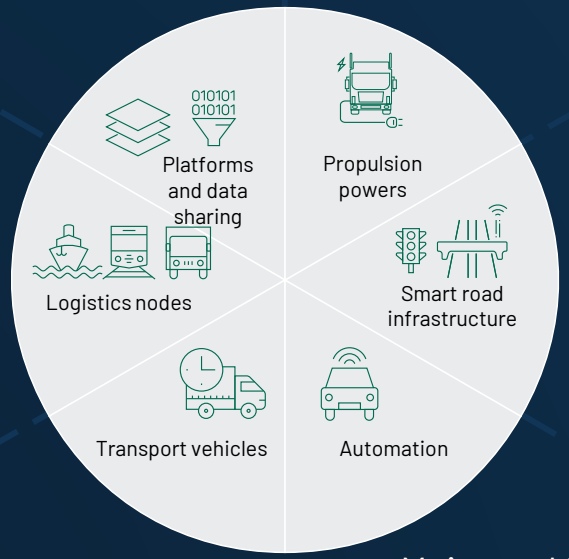
Smart Corridor themes 2032

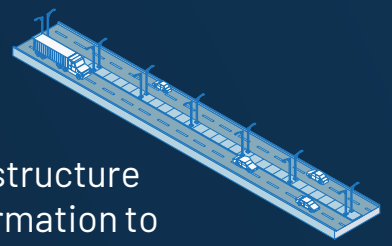


Digital twin of Main road 8 has been constructed

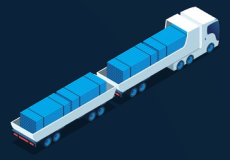
Main Road 8 enables the use of newest propulsion powers

Port and road transport information platforms communicate with each other and bring predictability to logistics processes





The road infrastructure transmits information to the digital twin. Extensive use of C-ITS services, such as obstacle and accident warnings.



Main road 8 enables a proactive experimental culture for the latest vehicles and technology

Main road 8 enables autonomous transport in both freight and passenger transport

The impact of main road 8 extends to the industry in Tornio

Kuva: WSP Finland Oy, 3D-ikonit: Freepik.com

A theoretical transport chain illustrating the vision

The logistics operator is planning its future driving arrangements. **Main road 8's digital twin provides forecast information** that congestion during the holiday season can be avoided with evening delivery. Booking information for truck fleet charging points is easy to obtain and can be used to optimize rest times and schedule recharges cost-effectively.

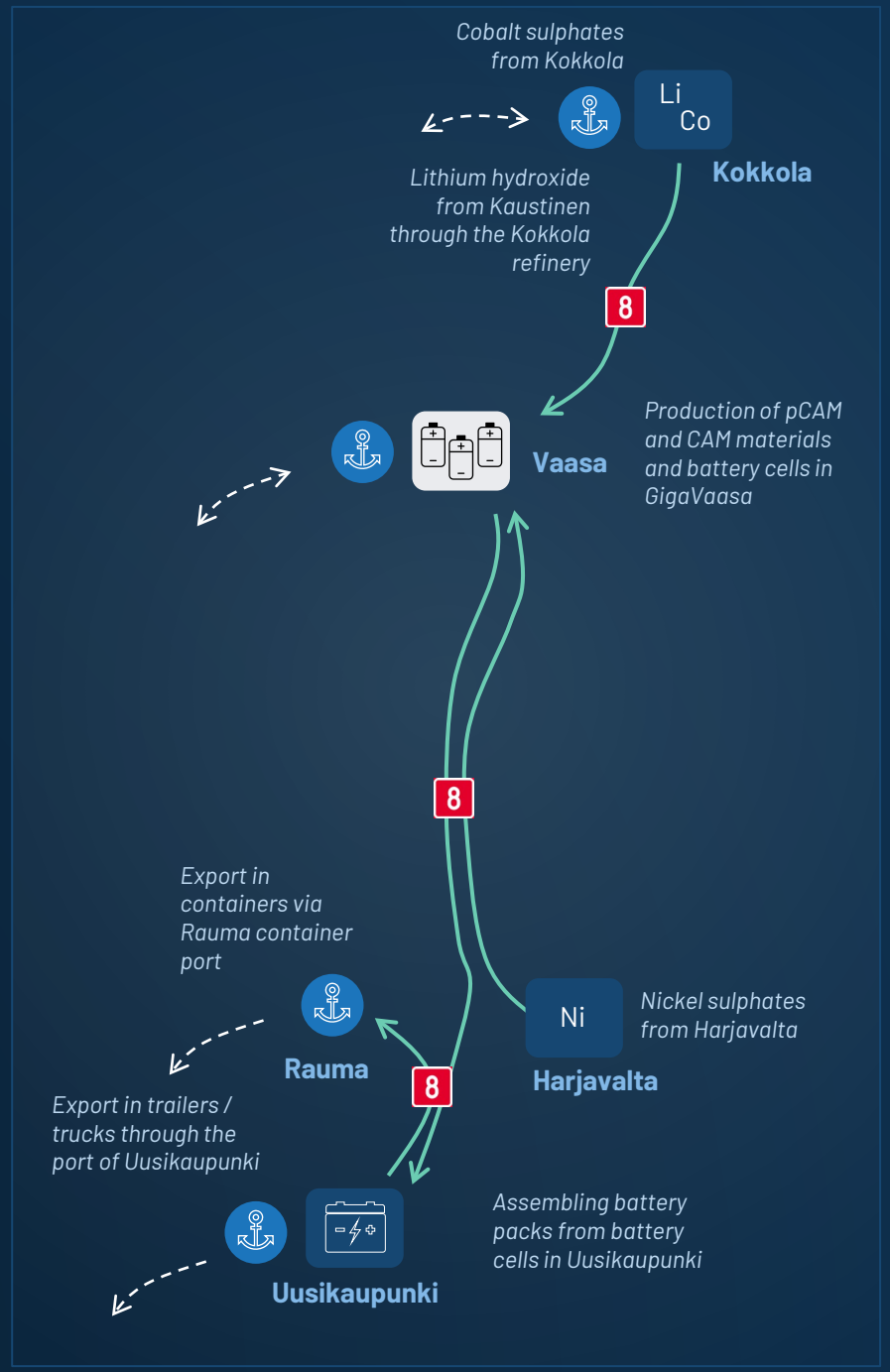
Information on a special transport of a wind power component moving on the road is transmitted to the digital twin. The transport causes a slowdown due to traffic arrangements. **The transport company reacts and delays their own transport.**

The Fintraffic Port Activity App informs the logistics operator that the ship is late

The driver receives information, **takes a statutory rest break earlier than planned**

The driver checks the status of the nearest truck rest area from the truck interface. Driver receives information about

- **the charging point situation**: the high-power charger (350kW) is free. The driver makes a reservation for this charger during the break so that the journey can continue directly from the port with a fuller battery
- **services**: takes a food break and orders food in advance through the interface



When the truck leaves Kokkola, it communicates with the traffic lights and the system **gives the truck a green wave.**

A moose has been spotted on the road north of Vaasa. This will be notified to the driver. At the same time, **adaptive road signage warns of danger** and the **road lighting is set to maximum settings**, also illuminating the areas around the road.

When the truck arrives at the GigaVaasa, it **downloads the latest HD-map data from the area's high-speed network**, enabling it to run automatically on the next section.

There is an accident on the road - this will be immediately reported to the truck's interface. Taking into account the characteristics of the truck, the system **directs the truck to a detour**, the information of which can be found as part of the digital twin.

The accident will result in a delay in. This information transmits to the port, which can **redirect its already reserved resources**.

The truck's tires start to slip, transmitting position and **friction information** to the digital twin. Vehicles moving in the area receive information about slipperiness from the C-ITS service. Variable speed displays lower the speed limit at the point of danger.

Continuous monitoring of the road surface on the vehicle transmits information about the condition of the road to the digital twin. Through this, the road authority receives information on the condition of the road and **can manage resources more efficiently**.

First steps

Project owner: Kasitieverkosto





PHASE 1 - COMMITMENT

Objective: To get the ministries, Finnish Transport Infrastructure Agency, Fintraffic and Traficom behind the project. Strong commitment from the state to the long-term development of the Smart Corridor. Main road 8 as a Smart Corridor is added to key strategic plans, such as the 12-year transport system plan.

How: Marketing the vision to public authorities –why get involved and why start with this road? The uniqueness of the area is a justification as itself. Then scalability to the whole of Finland.

Responsible parties: Kasitieverkosto & West Coast Chambers of Commerce

Further information: The involvement of the state actors is the most critical thing to begin with, so that Main road 8 is recognized as a good development destination that supports state-level goals in improving efficiency and sustainability. This is a condition for receiving funding.

PHASE 2 – PROJECT COMPANY

Objective: Actors in the region under a joint venture to implement short-term measures and vision. Find a suitable company model, engage the actors and set up the company.

How: Bring together the actors in the region and identify key actors that can benefit from the development of the Smart Corridor. Preliminary networking of actors has been done in this work.

Responsible parties : West Coast Chambers of Commerce & Ministry of Transport

Further information : The project company model differs e.g., from the railway infrastructure companies so that the physical infrastructure is mainly in place and development is required in the digital infrastructure as well as in the energy and telecommunications networks, which are commercial activities.

PHASE 3 – MASTER PLAN

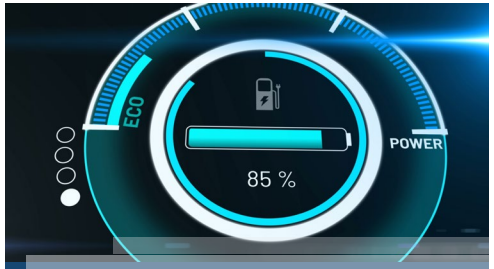
Objective: A Master Plan for the near future, i.e., a big picture implementation plan, will be drawn up, which will serve as the framework for the development work of the company.

How: The measures of the themes of this work will be specified and their implementation will be decided.

Responsible parties : Main Road 8 Company

Further information : The Master Plan contributes to the determination of development and the timing of funding applications. In the Master Plan phase, it is also good to identify projects that are starting up and to consider linking the Smart Corridor development to these, if possible.

Highlights of potential projects that improve the competitiveness of the business life



Main road 8
Energy Hubs

Main road 8
Digital Twin

Main road 8
Level 4 Automation

Main road 8
C-ITS – services

Smartest road that produces the least emissions in Finland by 2032