FINEST LINK

Helsinki-Tallinn Transport Link

Feasibility Study of a Railway Tunnel

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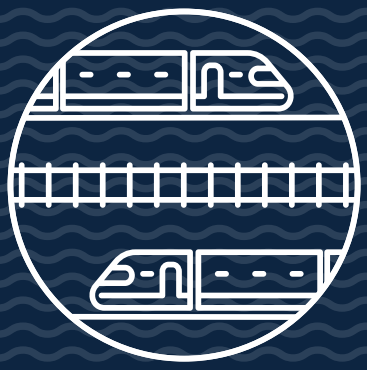
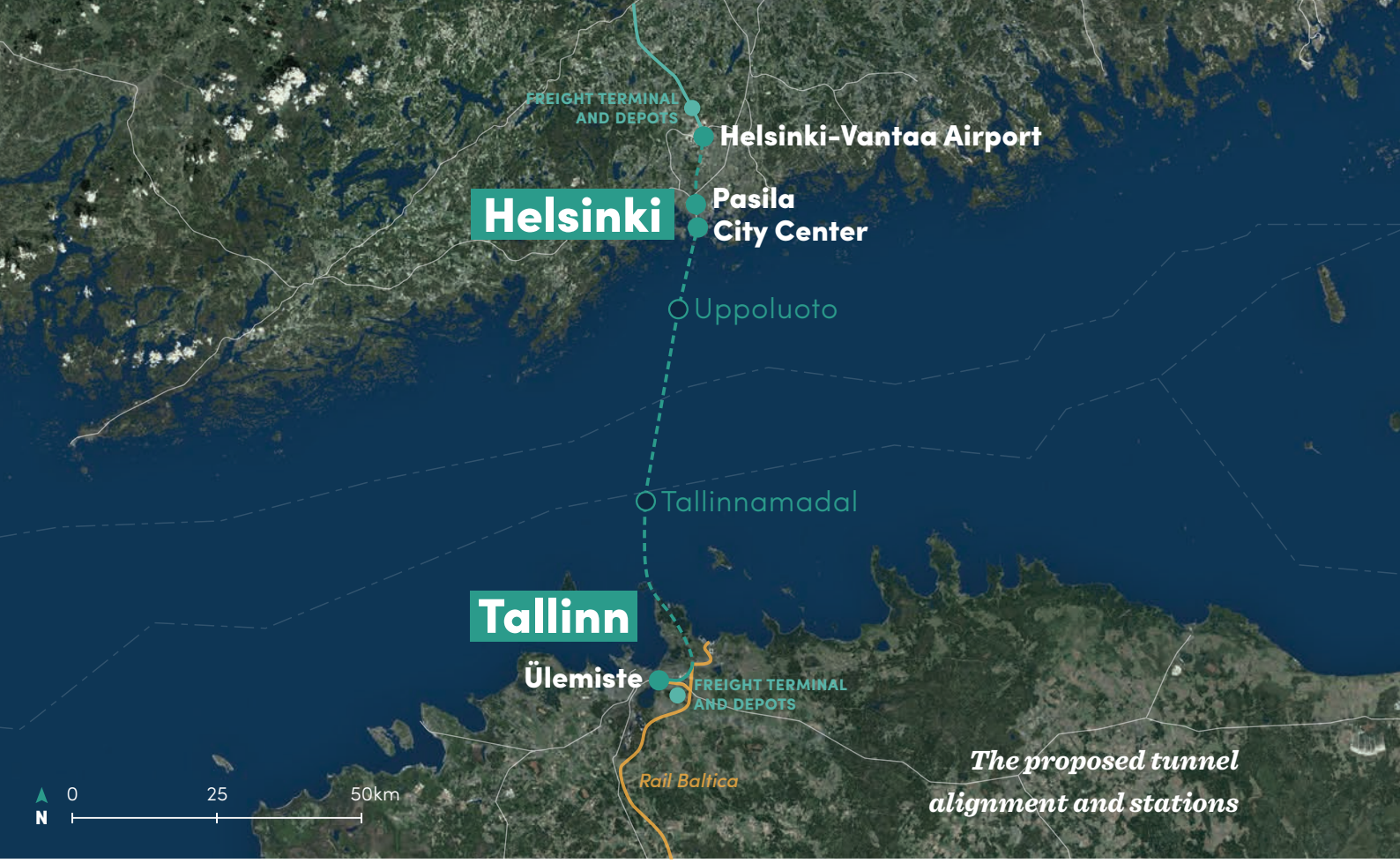
Interreg Central Baltic

EUROPEAN UNION
European Regional Development Fund



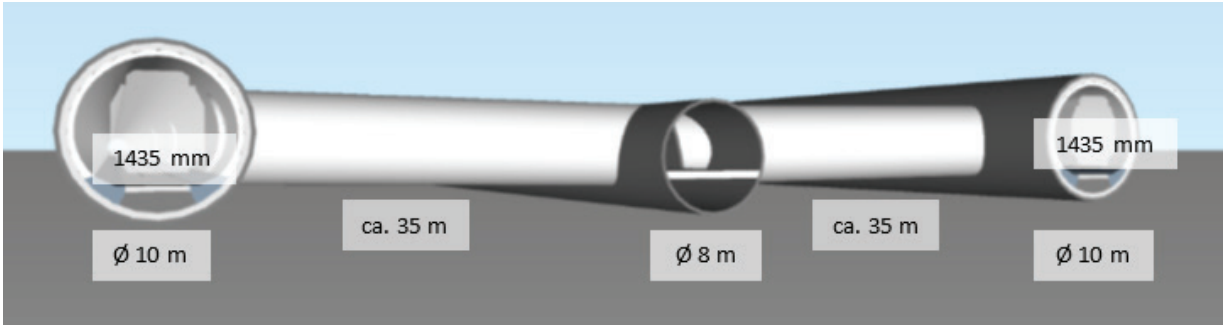


The proposed tunnel alignment and stations

Technical Concept

The technical concept of FinEst Link is based on a 1435 mm gauge railway tunnel with two rail tunnels and a service tunnel. The concept includes two artificial islands (Uppoluoto, Tallinnamadal).

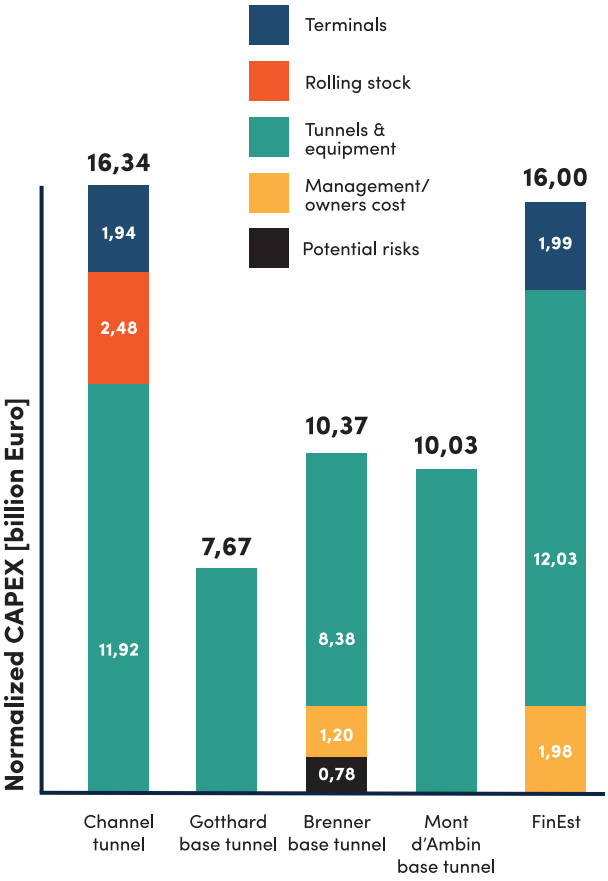
The stations are located in **Helsinki city centre**, **Pasila** and **Helsinki-Vantaa airport** for passengers, and there is a freight terminal area close to the airport with connection to the Finnish railway network (1524 mm gauge). In Tallinn, there is a passenger station at **Ülemiste in Tallinn** and a freight terminal near the airport. A connection to Rail Baltica is provided for passengers and freight.



Cost Estimation

The cost estimation of the railway tunnel between Helsinki and Tallinn including railways (European gauge), terminals and stations is 13–20 billion euros.

The wide gap between the minimum and maximum cost estimation is due to the lack of information of planning details of the fixed link and its technical concept. The cost estimation is based on information of costs in Finnish, Estonian and other large international transport projects. In international benchmarking, FinEst Link appears cheaper per kilometer which is due to the lower costs of boring in the Finnish conditions.



Demand

The demand in passenger transport in different scenarios is as follows:

- 9 million (in 2017)
- 14 million (in 2050 scenario without tunnel)
- 23 million (in 2050 scenario with tunnel) of which 12,5 million passengers in tunnel and 10,5 million on ferries

Maritime transport and daily commuting between Helsinki and Tallinn continue to grow also if the rail tunnel service will be built. This is due to the overall growth of the Helsinki-Tallinn twin city daily commuting and transport volumes.

The demand in freight transport in different scenarios is as follows:

- 3,8 million tons (in 2017)
- 7 million (in 2050 scenario without tunnel)
- 8 million (in 2050 scenario with tunnel) of which 4 million tons in tunnel and 4 million on ferries; freight in the tunnel represents value/ton above the average.

Cost-benefit Analysis

In the standard cost-benefit analysis, the railway tunnel scenario (*scenario 1*) is compared to the scenario without the tunnel (scenario 0+). The standard model of cost-benefit analysis shows low economic feasibility to the railway tunnel due to its large investment costs.

The standard cost-benefit analysis applies weakly to other than traditional transport infrastructure projects. The Helsinki-Tallinn railway tunnel represents a totally new connection concept in the macro-regional transport system, and therefore requires more innovative research approach than traditional models can offer.

Result with **3,5% discount**

Total economic costs
11200 million euros

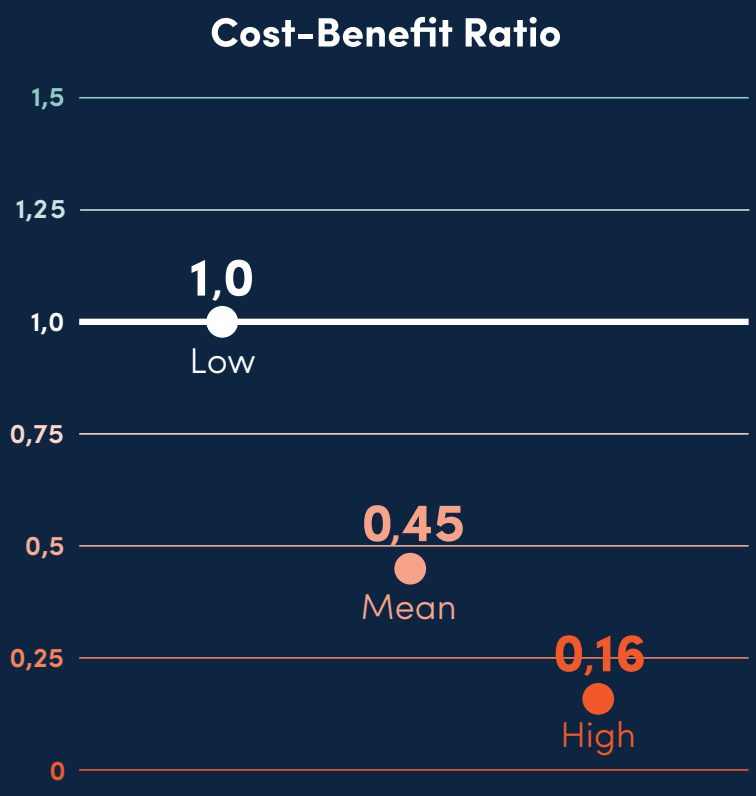
Total economic benefits
5000 million euros

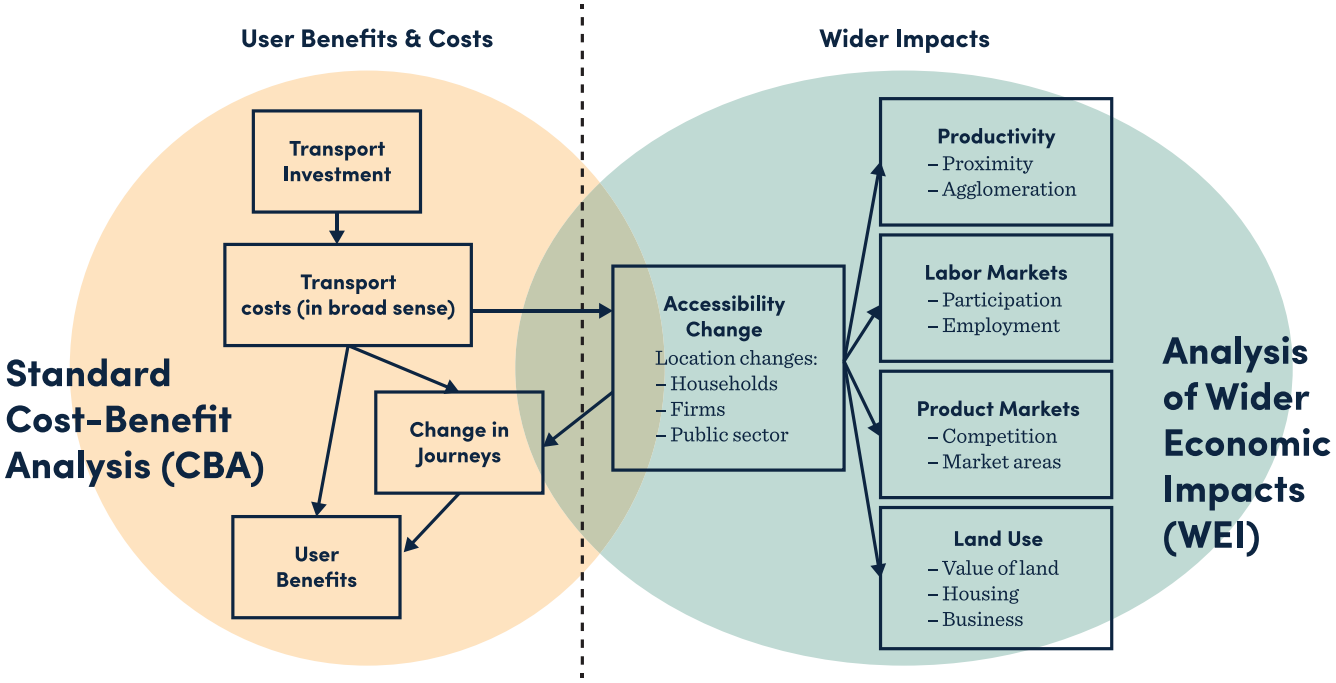
ENPV/Net benefits are
-6200 million euros

ERR is **0,8%**

B/C ratio is **0,45**

The B/C ratio of the railway tunnel is 0.45 with a range in sensitivity analysis between 0.16 (all parameters negative) and 1.0 (all parameters positive).





Economic Impacts of FinEst Link

The analysis of the economic impacts of FinEst Link consists of a cost-benefit analysis and analysis of wider economic impacts. The focus of the standard cost-benefit analysis model and wider economic impact analysis are only partially overlapping.

The analysis of the wider economic impacts focuses on the overall impetus that a new transport connection has on the economy and regional development on agglomeration, labour mobility, productivity and land use. The methodology, however, on long-term structural changes in the economy is lacking an internationally acknowledged model, which remains a challenge for further research.

Wider Economic Impacts

The study on wider economic impacts focuses on the growth of the national economies of Finland and Estonia and on macro-regional development. The wider economic impacts to GDP in total range between +4000 (low scenario) and +6900 (base scenario). The agglomeration impacts, including price of land, form the most important positive factor. Other factors include labour supply, work relocation and competition. The wider economic impacts extend widely into both countries. Further methodological development is needed on wider economic impacts, as there is no international standard for modeling.

Planning Objectives

The FinEst Link was given six planning objectives each with a specific set of Key Performance Indicators. The project succeeded in meeting all six planning objectives. The following list states the parameters for each KPI:

Improvement of the travel service to facilitate daily commuting between Helsinki and Tallinn

- Travel time ca. 30 min
- Passenger trains with frequency of 20 min in peak hours;
  car and truck shuttle trains
- Ticket price 18 €/single trips,
  480 €/30-days ticket,
  70 €/car, 450 €/truck

More effective freight transport chains

Price, frequency, reliability and delivery time enable multimodal and international travel chains in passenger and freight transport.

Improved environmental sustainability

Improved energy efficiency, healthy urban environments and lower emissions of CO2 and NOX due to modal shift to rail with electrified railway and less truck traffic in city centers.

Improved safety and security

Lowered risk levels in the transport system. Less truck traffic in city centers and less vessels in Gulf of Finland. High safety standard in tunnel system.

Smooth travel chains and integration with transport systems

- Integration with the Finnish rail network, possibly including the Airport Rail Line and Arctic Rail, and the Estonian rail network including Rail Baltica.
- Integration with airports and with public transport systems in both cities.

Economic viability

A financial model has been designed in which transport operator's revenues cover all operative costs, and the project implementation model is based on minimal public support for the investment cost.

Strategic Positioning

Together, Helsinki-Tallinn railway tunnel and Rail Baltica form a European Gateway. For the vision of Helsinki-Tallinn tunnel, Rail Baltica is a pre-requisite.

Together the two transport connections form a European Gateway that connects an intensive cross-border area between two capitals separated by the Gulf of Finland. Improved connectivity is a necessity to enable their full metropolitan growth. The European Gateway provides people and companies with better accessibility between the core of EU's transport network, High North, Black Sea area and Asia.

On the Helsinki-Tallinn railway tunnel, freight represents approximately 30% in revenue of tunnel operation. In Helsinki node, which is the national multimodal transport hub, the European gauge 1435 mm railway needs to be synchronised with Airport Rail Line and freight terminals to Finland's 1524 mm gauge rail network.

In the FinEst Link project the vision of the Helsinki-Tallinn fixed link has developed into a technically and economically feasible concept of an undersea railway tunnel.

European added value of the vision is highest when seeing the Helsinki-Tallinn railway tunnel as a direct continuation to Rail Baltica. This gateway would connect

Europe from High North to Black Sea and could enable also new routes to Asia.

The FinEst Link concept of the railway tunnel combines Finland's and Estonia's transport networks and the local twin-city commuting systems. The level of interoperability and multimodality in the system is higher than those without the railway tunnel.

The greatest direct beneficiaries of the railway tunnel are citizens, workers, students and tourists as passengers. When considering the wider impacts, the railway tunnel would benefit remarkably businesses, trade, investments and culture related to the Helsinki-Tallinn twin-city development.

The FinEst Link vision to the future encompasses the Helsinki-Tallinn twin-city of 3 million inhabitants in a society of intensive cross-border cooperation, education and business life. The society is built on high level of digitalisation, which enables fast growth rates in productivity and international competitiveness.

Project Partners

Helsinki-Uusimaa Regional Council

Helsinki

Liikennevirasto

HOL Harjumaa omavalitsuste liit

Tallinn

Republic of Estonia Ministry of Economic Affairs and Communications

Consultants

Amberg Engineering

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