

## Tallinn – Helsinki tunnel

### Project financing model background memorandum

20.4.2018

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## EXECUTIVE SUMMARY

For large infrastructure projects funding should be the main focus. Financing will be available if sufficient funding sources and acceptable risk allocation structures are employed. In privately / debt financed projects, bankability must be accounted for in addition to economic feasibility.

Considerations to ensure project bankability are:

- 1) sufficient project preparation (including feasibility and risk studies, value for money analysis, contract and procurement document development and other studies),
- 2) market sounding with project stakeholders and future lenders and
- 3) overall risk allocation that is acceptable from the lenders position

In addition to local government funding and financial markets, there are grants (EU) that can be available and contribute to the funding and make the project financially viable. We propose that the project should approach suitable EU parties (INEA, DG-Move, EIAH) regarding requirements and opportunities to develop the project to be eligible for EU financing.

Public and private funding models are presented with a total of four case studies of various practical implementations of the models. Aspects of financing models and case studies that should be considered in the Tallinn – Helsinki tunnel project:

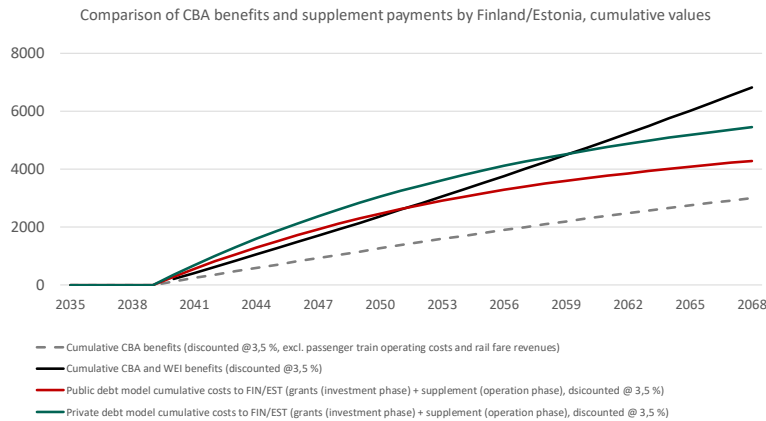
- **Öresund bridge (Public):** Public guarantees, if these are available is an affordable way of making projects bankable and spreading public costs over a longer period.
- **Thames Tideway Tunnel (Hybrid):** Flexible contractual arrangements (e.g. alliancing) can be combined with affordable private finance with suitable mechanisms to make large projects feasible.
- **Malaysia - Singapore HSR (PPP):** Alternative models (public, PPP) can be applied for various parts of the project, e.g. tunnel, infrastructure, rolling stock, artificial islands, etc. with a possibility to maximise the viability and manage risks of each sub project and providing public subsidies to those parts of the project where it is justified.
- **LGV Sud Europe Atlantique (Concession):** Public involvement is often required for mega-projects to be bankable and in the end feasible. Sometimes the public involvement can grow significantly over time if there is a risk that the project is cancelled without this. Mechanisms limiting public exposure to acceptable levels should be considered and used in contracting and financing models.
- Comparable **commercial projects** were not identified, but the project could be comparable with very large scale real estate developments.

Summary of financial modelling results for the three financing models:

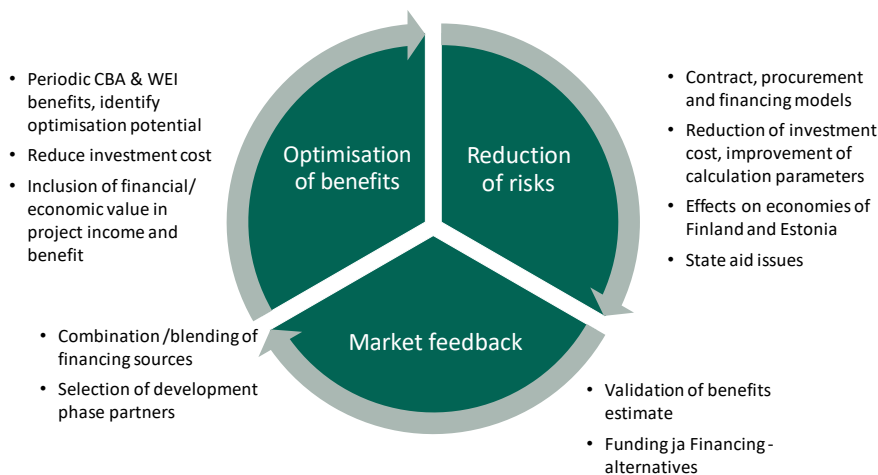
Scenario	Public debt	Private debt	Commercial project
<b>Additional funds needed annually</b>	500 MEUR → 300 MEUR in long term	700 MEUR → 500 MEUR in long term	1 600 MEUR → 1 400 MEUR in long term
<b>Project IRR</b>	2.8 %	3.7 %	6.2 %
<b>Equity IRR</b>	N / A	4,9 %	9,7 %

The calculations do not take into account the probability to reach feasibility study levels in demand, capital expenditure or operation/ maintenance costs. Taking these risks into account, the public project owners should be prepared to accept that the money required from the owners could be significantly above the 500 MEUR value and be closer to the 1 300 MEUR of the commercial scenario.

With the current estimate, including Cost Benefit Analysis benefits and Wider Economic Impacts benefits, the cumulative benefits estimate for the public sector are larger than the direct costs. The estimate includes a very long time period with significant uncertainty and risk regarding parameters and actual outcomes.



→ **Next steps should be evaluation of risks regarding costs escalation and expected benefits:**



In practice, the next step could be to form a publicly owned development vehicle, for example in the form of a publicly owned limited liability company. It would be set up to enter into a development phase to further advance the project based on the social and financial goals set by the project owners. The development company would need funding from the Finnish and Estonian states, with possible technical assistance from the EU for the development activities.

- |  |  |  |
|--|--|--|
| <ul style="list-style-type: none"> <li>• Idea</li> <li>• Early feasibility studies</li> <li>• Equity raising</li> <li>• More advanced feasibility studies</li> <li>• Equity arrangement</li> </ul> | <ul style="list-style-type: none"> <li>• Structuring</li> <li>• Negotiation and syndication</li> <li>• Commitments and documentation</li> <li>• Financial close</li> </ul> | <ul style="list-style-type: none"> <li>• Disbursement of financing</li> <li>• Monitoring and review</li> <li>• Commissioning</li> <li>• Repayments and monitoring</li> </ul> |
|--|--|--|

**Development phase**  
Typically 2-5 years but could be 10-20 years in megaprojects

**Financing**  
Typically 6-12 months but could be 2-3 years in megaprojects.

**Post Financing**  
Construction, operations and management. Steady state phase of project.

## 1. Background and introduction

This report has been commissioned by the Finnish Ministry of Transport to further develop certain viewpoints regarding the financing of the Tallinn – Helsinki tunnel. The report is based on analysis and financial modelling work carried out for the FinEst Link feasibility study.

The viewpoints have been developed together with representatives from the Ministry of Transport and the city of Helsinki.

In this study, complementary subjects to those presented in the feasibility study are presented:

- Various viewpoints regarding financing of the project in various practical structures are studied. The viewpoints to be considered are:
  - o Structuring of the project in various models
  - o Financing and funding of the project in various models
  - o Capital structure and capital providers in various models
- Case studies are presented and aspects of these are presented with respect to the Tallinn – Helsinki tunnel project.
- Additional background to the study is presented in this background section of the report.

*Conclusions to be taken into account in the Tallinn – Helsinki project are highlighted in italic text throughout this report.*

### 1.1. Main conclusions from financial feasibility study 3/2018

The following points can be highlighted as the main conclusions of the benchmarking and financial feasibility report (dated 3/2018).

- The Tallinn – Helsinki tunnel cannot be financed with a private funding model with demand risk transferred to private parties
  - o The project will require support from the public sector in the form of funding and risk bearing capacity
- Demand and cost estimates employed in the feasibility study can be regarded optimistic
  - o More detailed analysis and documentation of project benefits (Cost Benefit Analysis / Wider Economic Impacts) and evaluation of the distribution of these between Finland and Estonia should be carried out
  - o Alternative (cheaper) technical alternatives, such as the phasing of tunnel construction/ single track model could facilitate significant cost savings and risk reduction
- Commercial viability should be developed and alternative funding sources identified and further studied to improve project viability
- Acceptable public support levels and mechanisms should be further developed and discussed
- In the process of identifying suitable financial structures, market dialogue should be carried in order to ensure that the models can be implemented in practice

These aspects will be further developed and some summarising next steps proposed in this study.

## 1.2. Distinction between financing and funding

**Financing** is the source of money required up-front to meet the costs of constructing infrastructure. Financing is typically sourced through government borrowing (for traditional infrastructure financing models) or in private financing models by the private sector raising debt and equity finance.

**Funding** refers to the source of money required to meet payment obligations. Funding is used to pay for the project and will not be returned (as opposed to financing).

In a privately financed context, funding refers to the source of money over the long-term to pay the private partner for the investments, operating costs, and maintenance costs of the project. Funding in public infrastructure projects is typically sourced from taxes (in government-pays projects) or from user charges (in user-pays projects). Governments may also specify sources of funds, such as so called value capture funding which utilises income generated by the infrastructure project as earmarked funding sources.

*From a decision making perspective project funding should be the main focus. Financing will be available if sufficient funding sources and acceptable risk allocation structures are employed.*

## 1.3. Distinction between project feasibility and bankability

### Feasibility

Project feasibility refers to a project's potential for success. Feasibility is often evaluated based on a feasibility study which accounts for e.g. technical resources and evaluation of the technical solutions and the economic benefits of the project. In addition legal and operational aspects and financing should be taken into account to form an objective view.

The feasibility of an infrastructure project will partly depend on uncertain estimates of the future. Feasibility is a risk to be taken by the owner of the project. For this reason feasibility should be evaluated transparently and verifiably so that political and owner decisions can be taken.

*Feasibility is often a sufficient condition for a project to be realised if risks and financing lie with the public sector and project financing benefits from the public balance sheet. In privately financed projects, bankability must be accounted for in addition to feasibility.*

### Bankability

A feasible (cost benefit ratio) or even financially profitable (Equity Return / IRR % is above investor threshold) can end up being unbankable if risks are not managed and allocated in a way that results in an acceptable level of credit risk to lenders.

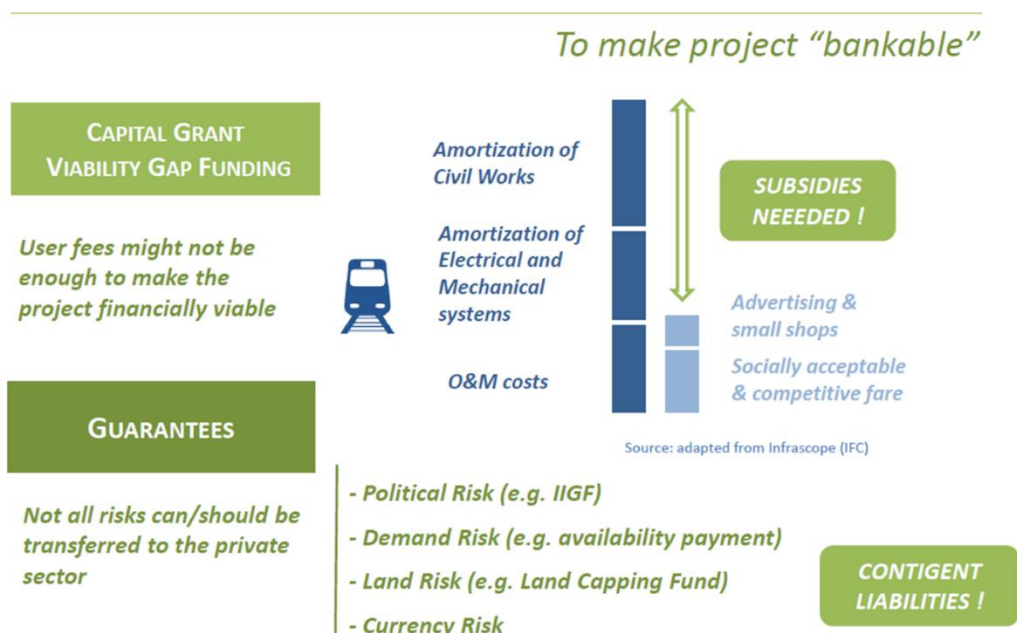
Banks and other infrastructure debt providers assess the bankability of the project and, if found acceptable, provide capital based on terms specified in the financing contracts. The lenders are concerned about the risk profile of the project, and the riskiness of their credit decisions. Lenders typically provide up to 80-90% of an infrastructure project's financing needs, and unless they are satisfied with the risk profile of the project, they will not finance the project. Alternatively, they would ask for various risk mitigations or credit enhancements that would raise the total cost of the projects or transfer risk to the public sector.

*Bankability should be a key issue to consider if private financing is part of the planned structure of an infrastructure project, as is the case in the Tallinn – Helsinki –tunnel. The most important*

considerations to ensure bankability are 1) sufficient project preparation (including feasibility and risk studies, value for money analysis, contract and procurement document development and other studies, 2) market sounding with project stakeholders and especially potential future lenders to the project and 3) overall risk allocation that is acceptable from the lenders position. The lending market changes over time so current lender feedback can be seen as an important issue for bankability.

### 1.4. Subsidy models

Subsidies are one source of funding to the project from the public sector. Subsidies can be provided by local or central government or from e.g. EU CEF funds<sup>1</sup>. When using subsidy payments to facilitate project development EU state aid rules must be carefully accounted for. Subsidies can generally be divided into investment grants or operations phase payments. Some central aspects regarding subsidies has been summarised in the image below<sup>2</sup>:



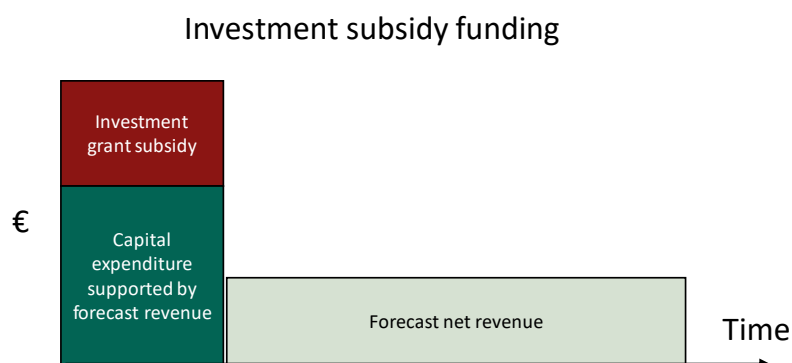
For the purposes of this report subsidies are defined as direct, public funding sources to the project that do not need to be repaid.

#### Investment grant subsidies

<sup>1</sup> Subsidies are form of financial aid or support with the aim of promoting economic and social policy. The Connecting Europe Facility (CEF) supports the development of high-performing, sustainable and efficiently interconnected trans-European networks: <https://ec.europa.eu/inea/en/connecting-europe-facility>

<sup>2</sup> Financing Sources for Public-Private Partnerships (PPPs), UINESCAP <http://www.unescap.org/sites/default/files/1a%20-%20ESCAP%20-%20Infra%20needs%20and%20private%20financing%20in%20SE%20asia.pdf>

The investment grant subsidy includes payments during the investment phase (e.g. on a milestone basis when construction goals are met). The figure below shows how investment grants affect project cash flows:

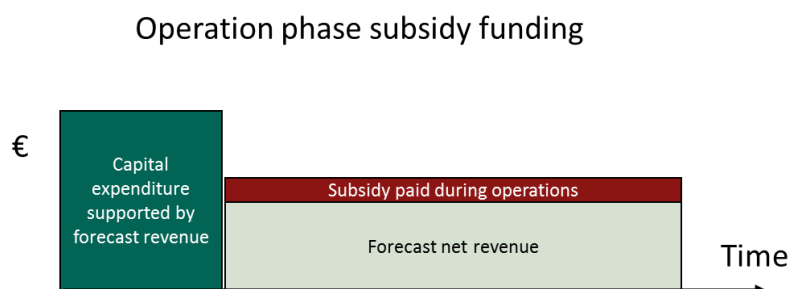


Investment grants are in this way used to make the project financially viable. The remaining funding requirement is covered with net revenues generated by the project.

*In this report, an investment phase subsidy is expected to be the model employed for EU investment subsidies in the Tallinn – Helsinki tunnel project. Investment grant financing will generally have the biggest impact on the project’s feasibility. Also the periodic framework for EU funding (Multiannual Financial Framework) makes an investment subsidy a more viable alternative for the Tallinn – Helsinki project.*

### Operations phase subsidies

Operations phase subsidies are paid over a longer period. Subsidies can be structured in various ways depending on the contract structure (e.g. compensations to a publicly owned company (Finnish "vastike") or service payments in a PPP model).



In the operation phase subsidy model, the project would raise financing to pay for the construction of the tunnel. Payments of subsidies are often combined to performance indicators or availability (in PPP projects), to incentivise the recipient of the subsidy to perform as agreed over the project life cycle.

*In this report, an operation phase subsidy is expected to be the model employed local subsidies (Finland and Estonia) as the project costs can in this way be better aligned with the long term benefits of the project.*



## 1.5. EU Financing

EU financing for infrastructure projects is available and significant contributions to cross border tunnel infrastructures have been made, such as:

- Lyon-Turin rail link (Mont d'Ambin base tunnel) totally approximately 1,45 bn euros<sup>3</sup>
- Brenner base tunnel approximately 2 bn euros<sup>4</sup>

Currently (4/2018) the post-2020 Multiannual Financial Framework (MFF) for the EU is being prepared. For the Tallinn – Helsinki project the upcoming changes in EU priorities can be seen as a source of uncertainty, but on the other hand it could be possible to develop the project so that it could be incorporated as a priority project in the upcoming MFF for 2020-. Due to its size and complexity it can also be expected that the project implementation would span over several EU MFF periods.

An estimate of the total amount of EU financing for the Tallinn – Helsinki -tunnel is in practice impossible to estimate in advance. Any estimate would have to assume that the project would fulfil future EU transport priorities. **In the financial analysis provided in this report, an estimate of 2 bn euros investment grants is used.**

*We propose that the project should approach suitable EU parties (INEA, DG-Move) regarding requirements and opportunities for EU financing to the project. One way could be to utilise the European Investment Advisory Hub as a source for expertise in EU funding and financing alternatives. If the project's feasibility can be developed and documented before upcoming MFF decisions are made, the project could be seen as a candidate for EU priority financing in future decisions.*

## 1.6. Alternative financing support structures

In addition to direct grants and subsidies, alternative financing support structures are often used by public sector project promoters in infrastructure projects. Possible support structures include for example<sup>5</sup>:

- Contractual guarantees protecting lenders from e.g. early termination and non-repayment in situations where the project could be in difficulties
- Direct guarantees to lenders (unconditional and irrevocable), which are provided by the treasury. Guarantees can be restricted to cover some time period (for example during construction) or a some portion of the total debt for the project;
- Guaranteed income (e.g. minimum traffic guarantees in user-pays transport projects), can also be seen as a form of subsidy payment
- Direct public long term loans can be provided as subordinated loans compared to commercial senior loans, sometimes including soft terms, that could result in parts of the capital not being paid back if the project does not perform
- Public equity investments can be invested at market conditions or as investments that have grant elements

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<sup>3</sup> [https://ec.europa.eu/inea/sites/inea/files/download/map\\_review/ppbundles/pp6.pdf](https://ec.europa.eu/inea/sites/inea/files/download/map_review/ppbundles/pp6.pdf),  
[https://ec.europa.eu/inea/sites/inea/files/fiche\\_2014-eu-tm-0401-m\\_final.pdf](https://ec.europa.eu/inea/sites/inea/files/fiche_2014-eu-tm-0401-m_final.pdf)

<sup>4</sup> <https://ec.europa.eu/inea/en/news-events/newsroom/green-light-brenner-base-tunnel>

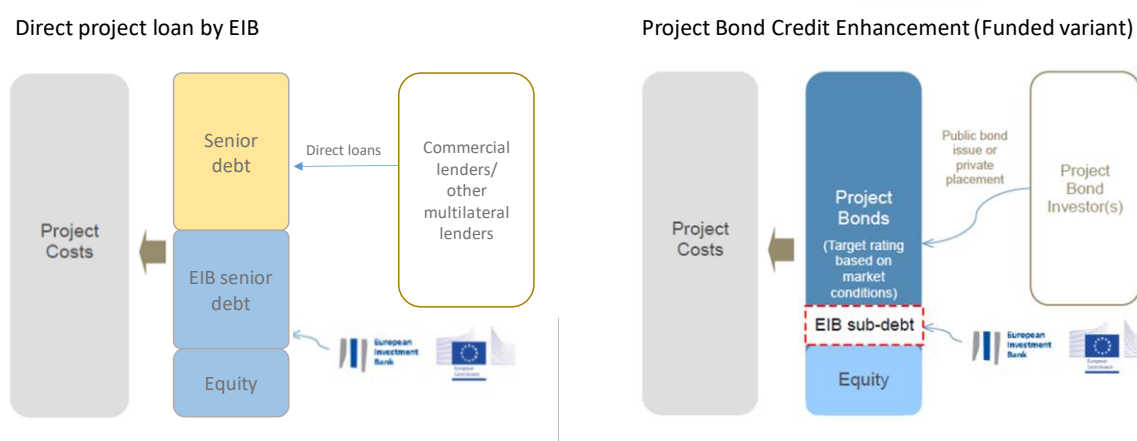
<sup>5</sup> Support elements should always also be evaluated from a state aid perspective.

Various financing / credit support structures should be considered for the Tallinn – Helsinki tunnel to make the project bankable. For these to be of use, they should be developed in connection to ensuring economic and technical feasibility and strong political support for the project. In the Tallinn – Helsinki project the direct exposure (e.g. guarantees, if they are called) could be so large that it could have effects on state financing and budgeting capacity.

## 1.7. EIB / EFSI financing

Financing from the European Fund for Strategic Investments (EFSI) has been discussed as a possible financing for large infrastructure projects. The European Fund for Strategic Investments (EFSI) is an initiative to help overcome the current investment gap in the EU. Jointly launched by the EIB Group and the European Commission, it aims to mobilise private investment in projects which are strategically important for the EU. The aim is to mobilise 500 billion euros of investment in the EU through making financing available for investments in sectors (e.g. energy efficiency, SME:s, etc.) promoted by the European Commission. The EFSI is in practice managed and deployed by the EIB.

For large infrastructure projects EIB financing can be allocated as direct financing or as credit enhancement, or as a combination of the two<sup>6</sup>:



EIB and other multilateral lenders work with a market based model and the granting of EIB, NIB or other investment banks' financing will require the project to be financially feasible/bankable and to utilise credit support structures identical to those that other lenders would require.

The current EFSI framework is in place until the end of 2020 (end of the current EU MFF –period). After this it could be, that the EFSI model, combining publicly supported financing with private financing is further expanded. The model of using small amounts of public money to mobilise private investment that would otherwise not occur (so called "blending" -models) require bankability of the projects, which sets extra requirements on the financial project preparation. On the other hand this results in emphasis of risk management and project evaluation/ justification<sup>7</sup>.

*The Tallinn – Helsinki project should be developed to a level where there is economic feasibility and political support in advance of approaching multilateral or other market based financiers regarding EFSI or other financing alternatives. The financial markets can be included in discussions on structures*

<sup>6</sup> adapted from: [http://www.eib.org/attachments/documents/project\\_bonds\\_guide\\_en.pdf](http://www.eib.org/attachments/documents/project_bonds_guide_en.pdf)

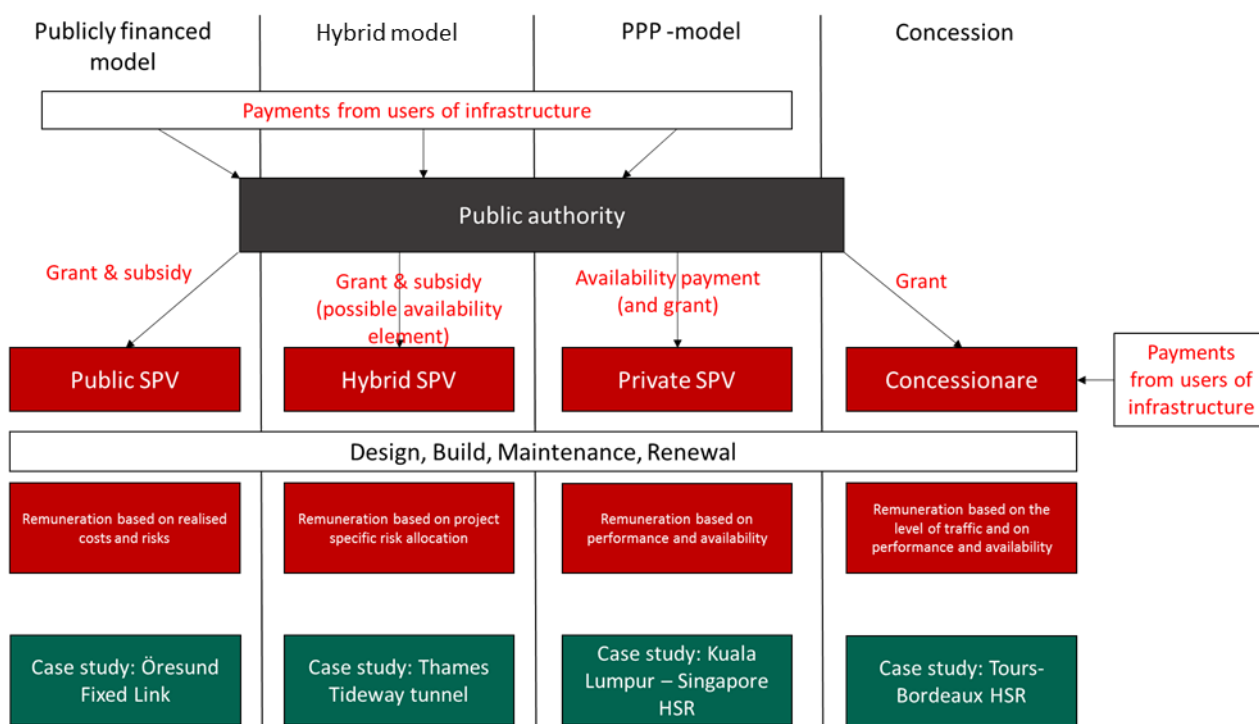
<sup>7</sup> <https://www.buinessseurope.eu/publications/views-eu-multi-annual-financial-framework-mff-post-2020>

and financing alternatives, but binding commitments cannot be expected until project funding, risk allocation and ownership issues are resolved.

## 2. Alternative financing models

Alternative financing models and elements of these have been discussed in the FinEst Link financial feasibility study<sup>8</sup> at some length. Further characteristics of various models is discussed in this section.

Below alternative models for a financing model for the FinEst Link project are depicted (SPV=project company founded to build project):



Source/Image adapted from: Railway Reform: Toolkit for improving Rail Sector Performance Case Study: SNCF Réseau

The first two models (Publicly financed and Hybrid model) will be defined for the purposes of this study as publicly financed, i.e. the bulk of the financing exposure and project credit risk lies with the public sector. The PPP-model and Concession models will represent so called privately financed projects, where the public sector has transferred several central risks to a private infrastructure provider/owner.

Project models can be challenging to categorize and alternative interpretations could be made regarding the structures and financing mechanisms used in these, however the authors consider these interpretations to be in line with market standard for the presented models.

<sup>8</sup> [http://www.finestlink.fi/wp-content/uploads/2018/04/FinEst\\_Benchmark-and-Financial\\_Final-report\\_2018-03.pdf](http://www.finestlink.fi/wp-content/uploads/2018/04/FinEst_Benchmark-and-Financial_Final-report_2018-03.pdf)

### **3. Publicly financed project**

#### **3.1. Model outline**

A publicly financed project involves the provision of a project with financing from or supported by a public sector entity (often State, regional or local government). In large projects (as seen e.g. in Oresund Bridge or Fehmarn belt tunnel) financing is usually channelled through a limited liability company that would receive equity and raise debt from the financial markets. In this report the term public sector financing indicates that the debt would benefit from public sector support, such as a guarantee which shifts most of the project risk away from the financiers to the public project owners.

#### **3.2. Application to a comparable large scale infrastructure project**

##### **3.2.1. State guarantee model<sup>9</sup>**

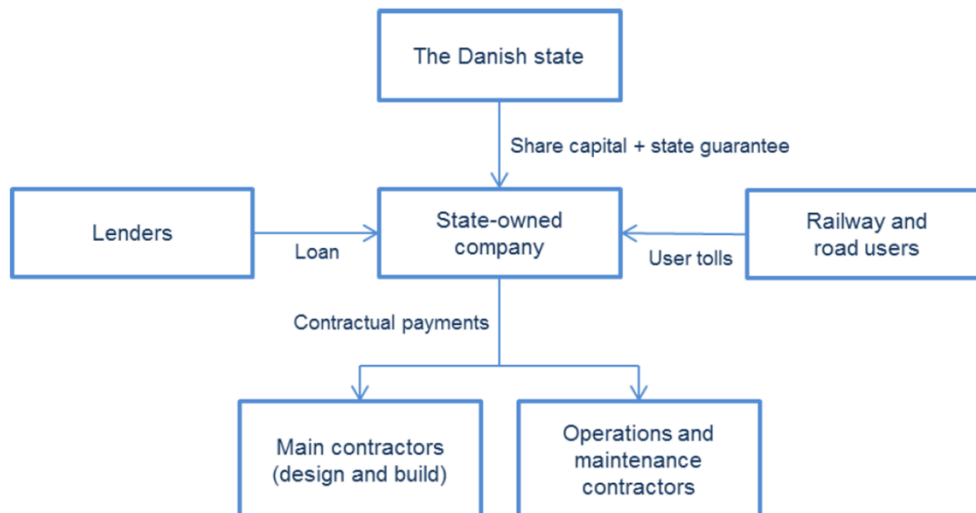
After opening of the combined Oresund Bridge and tunnel link between Copenhagen and Malmö, road traffic was initially below forecasts, but in the following years traffic rose strongly until 2008 when just over 7 million vehicles used the link. Since then this level was largely maintained. The train service has been a particularly great success – in 2010 it carried 10.6 million passengers. On the Oresund tunnel and bridge, the estimated repayment period varied between 30 and 36 years after commencing operation. This was primarily due to changes in traffic expectations. On current assumptions the debt of the consortium can be repaid 34 years after the opening, i.e. by 2034.

The Oresund fixed link has lived up to its purpose to serve to integrate the two large urban centres in Denmark and Sweden across the frontier. Therefore the EU Commission also hails the project as a model for removing barriers between countries. This would not have been possible without the use of the state guarantee model since it is unlikely that the two governments would have been able to agree to finance the link through tax revenues.

The state guarantee model was used for the development of the fixed links across Storebælt and Oresund and will also be used for the upcoming Fehmarn belt link. It is characterised by transferring the responsibility to design, construct, finance – as well as operate and maintain the project – to a 100 per cent state-owned company with its own board of directors and management. Funding is based on the company raising loans in financial markets or from the state. The state guarantees the loans through a guarantee commission. With the Danish state's high credit rating, therefore, favourable loan terms are obtained. Toll charges are collected, which, after covering operating and maintenance costs, are used to pay interest and loan instalments. The model is illustrated below:

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<sup>9</sup> The Danish State Guarantee Model, Working Principles and Experience with Largescale Infrastructure Projects, Sund & Bælt Holding A/S, September 2014



The main benefit of the state guarantee model – compared to the traditional publicly funded model – is that it allows both full and partial user payment. This means that the project is not (or is to a lesser degree) a burden on public finances.

The state continues to bear the residual risk in the project. If it turns out that the project does not live up to expectations, and that revenue from user payment is not sufficient to repay the debt, the state will ultimately have to cover the resulting shortfall. An advantage of the state guarantee model is that the state can maintain control of a number of strategic decisions in the project; for example the tender strategy and fixing toll charges. Meanwhile, the company can act more freely than a government agency; for example, in relation to the state authorisation procedures. The experience from the Storebælt and Oresund projects shows that an independent project company with its own financing is better placed to optimise operations and maintenance, including reinvestments, than is the case with a government body that is dependent on appropriations in the annual Finance Acts.

A disadvantage, compared with PPP models, can be the division of contracts between construction on the one hand and operations and maintenance on the other. In the same way as with the Finance Act model, however, it is possible to alleviate this problem if a contract is entered into that covers both construction and the early years of operation as will be the case on the Fehmarn belt Project.

Furthermore, the model offers good opportunities to integrate the construction and operation. For example, the design phase can take account of operational considerations, including experience drawn from equivalent facilities already in operation. In the case of Denmark, the Storebælt, Oresund and (future) Fehmarn belt links are owned by the same group (Sund & Belt Holding), which in turn is owned by the Ministry of Transport.

### 3.2.2. Hybrid model

The Thames Tideway Tunnel will be a major new sewer, which is needed to protect the tidal River Thames from pollution. The Thames Tideway Tunnel will be 25km long, with the main tunnel’s internal diameter measuring 7.2 metres. It will have a storage volume of 1.24 million cubic metres and run up to 66 metres beneath London.

The Thames Tideway project will be carried out through a privately owned SPV Bazalgette Tunnel Limited. The company is regulated by Ofwat (the economic regulator of the water sector in England and Wales), which awarded its licence in August 2015. The project’s shareholders are Allianz, Amber

Infrastructure, Dalmore Capital and DIF. Collectively they represent the interests of 1.7 million British pension fund holders.

The project includes various techniques for structuring the project risk and make the project bankable<sup>10</sup>:

#### Construction contracts

- The main works contract model (NEC3) Option C Target Price with Activity Schedule contract Encourages cooperation between Tideway and its contractors, and proactive risk mitigation
- Transfers key risks to the contractors (design, consents, ground conditions)
- Pain/gain sharing mechanism shared on a 50/50 basis, subject to adjustments for compensation events and liability caps, with delay damages provisions in place and
- Joint and several liability and step-in rights
- Alliance agreement framework for collaborative working between the Main Works Contractors, other contractors and the client
- Alliance Incentive Framework will incentivise early and cost efficient delivery of the investment programme

*The employed contract models are similar to target price and alliancing models employed in local Finnish projects that share risks between the public sector and contractors.*

#### Regulation

- The project construction expenditure will be included in the regulatory capital value, which will act as base to payments from clients
- The regulatory WACC to the project will be 2,5% which will be lower if the project is accepted late
- Some adjustments are possible based on changes in the market cost of debt
- There is a provision for state financing above the threshold outturn price ((£4.1bn real)

#### Government support

- The Government acts as insurer of last resort and provides cover for insurable events above the amount the market is ready to provide
- In the event of cost overruns above Threshold Outturn, the Government can be required to provide equity financing to fund the shortfall otherwise it must discontinue the project
- In certain circumstances, the Government may elect to discontinue the project and pay compensation. Compensation equal to 1 x Regulatory Capital Value (with adjustment for break costs)
- £500m committed liquidity facility in case of market disruption

The project risk allocation is summarised in the following diagram by the project<sup>11</sup>:

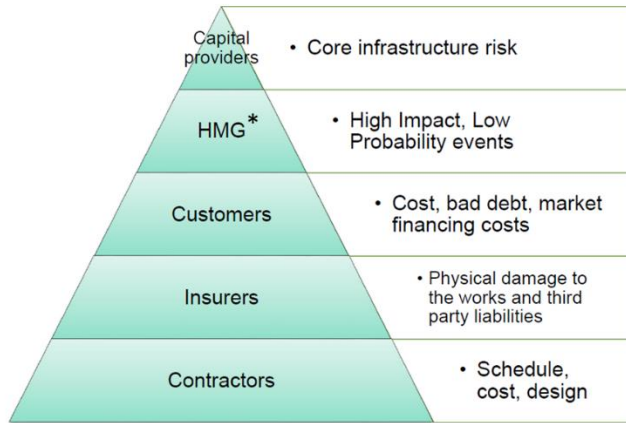
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<sup>10</sup> <https://www.tideway.london/media/2905/investor-presentation-26-jan-2017.pdf>

<sup>11</sup> [https://www.tideway.london/media/3239/tideway-investor-event-19-may-2017-final\\_master\\_for-investor-centre-final.pdf](https://www.tideway.london/media/3239/tideway-investor-event-19-may-2017-final_master_for-investor-centre-final.pdf)

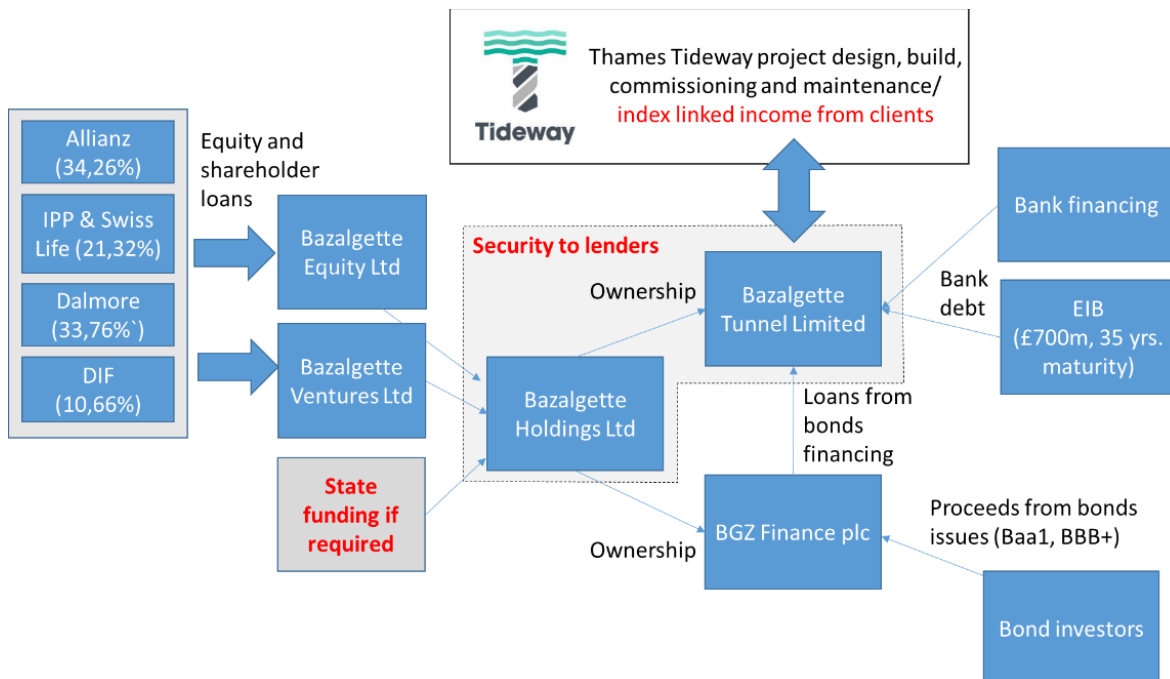
## Delivery Model – Risk Sharing

- Risks have been allocated to the party most capable of managing them
- Package targeted at all capital providers



\*Government

The financing structure of the Thames tideway project involves a variety of financial instruments and financiers. An illustration of the project's financing structure is displayed below<sup>12</sup>:



<sup>12</sup> Adapted from: [https://www.tideway.london/media/3591/holding-company-principles-report-2017\\_v3.pdf](https://www.tideway.london/media/3591/holding-company-principles-report-2017_v3.pdf)

Cost of capital (including both equity and debt) is used to determine private sector returns from projects. The cost of capital for the TTT was 2.497%, which can be considered low compared to private finance and a relatively small premium compared to long term government cost of capital.<sup>13</sup>

The Thames Tideway Tunnel project's financing consists of at least the following elements<sup>14</sup>:

Facility	Amount	Type	Maturity	Pricing
<b>Equity and shareholder loans</b>	£1274 M	Equity capital to the project	Project maturity	2,5 % p.a. WACC for project Regulated Capital Value. Owners receive difference between WACC and actual costs
<b>Private placement</b>	£300 M	fixed debt	2032	2,86 % p.a.
<b>Bond</b>	£675 M	<b>RPI-index (Retail Prices Index<sup>15</sup>) linked bond</b>	2040-5052	0,1 % real rate, which grows with inflation over
<b>EIB loan</b>	£700M (911,19 M€)	floating / swapped to <b>index linked</b>	2051	negative real rate, which grows with inflation
<b>Green bond</b>	£250 M		2027	2,375 % p.a.
<b>Bank loan</b>	£100 M	Term loan	-	0,1 % over Libor + 35 % commitment fee of margin <sup>16</sup>
<b>Revolving debt facility</b>	£1000 M	liquidity facility (floating) for construction	2025 (10 years) (after construction has finished)	Libor + Ca. 0,1% margin p.a.

### 3.3. Application to Tallinn – Helsinki tunnel project

In a publicly financed and owned project, the public sector is responsible for procurement, construction and operation of the transport link.

A publicly financed project could be structured as follows:

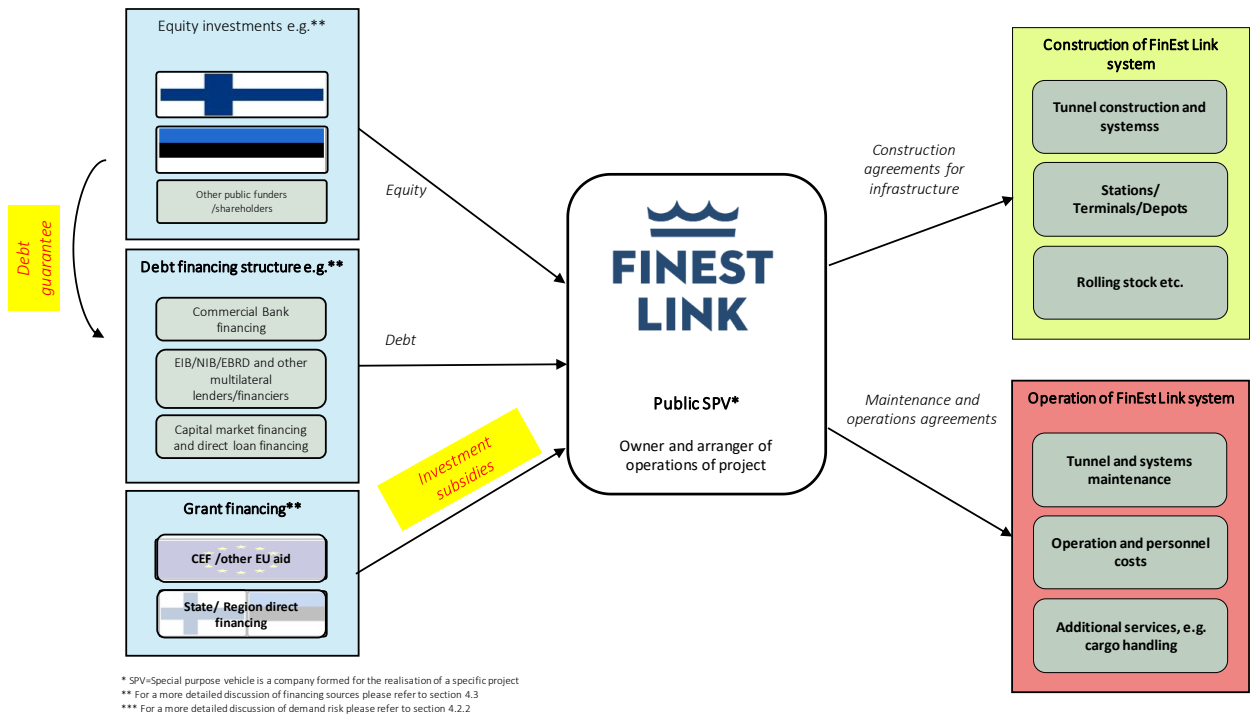
<sup>13</sup> InfraNews

<sup>14</sup> InfraNews, [https://www.tideway.london/media/3239/tideway-investor-event-19-may-2017-final\\_master\\_for-investor-centre-final.pdf](https://www.tideway.london/media/3239/tideway-investor-event-19-may-2017-final_master_for-investor-centre-final.pdf)

<sup>15</sup> The Retail Price Index (RPI) measures the change in the price of goods and services purchased by consumers for the purpose of consumption. RPI differs from Consumer Price Inflation (CPI) in that it only measures goods and services bought for the purpose of consumption by the vast majority of households and includes housing costs, which are excluded from CPI., source: <https://www.investing.com/economic-calendar/rpi-267>

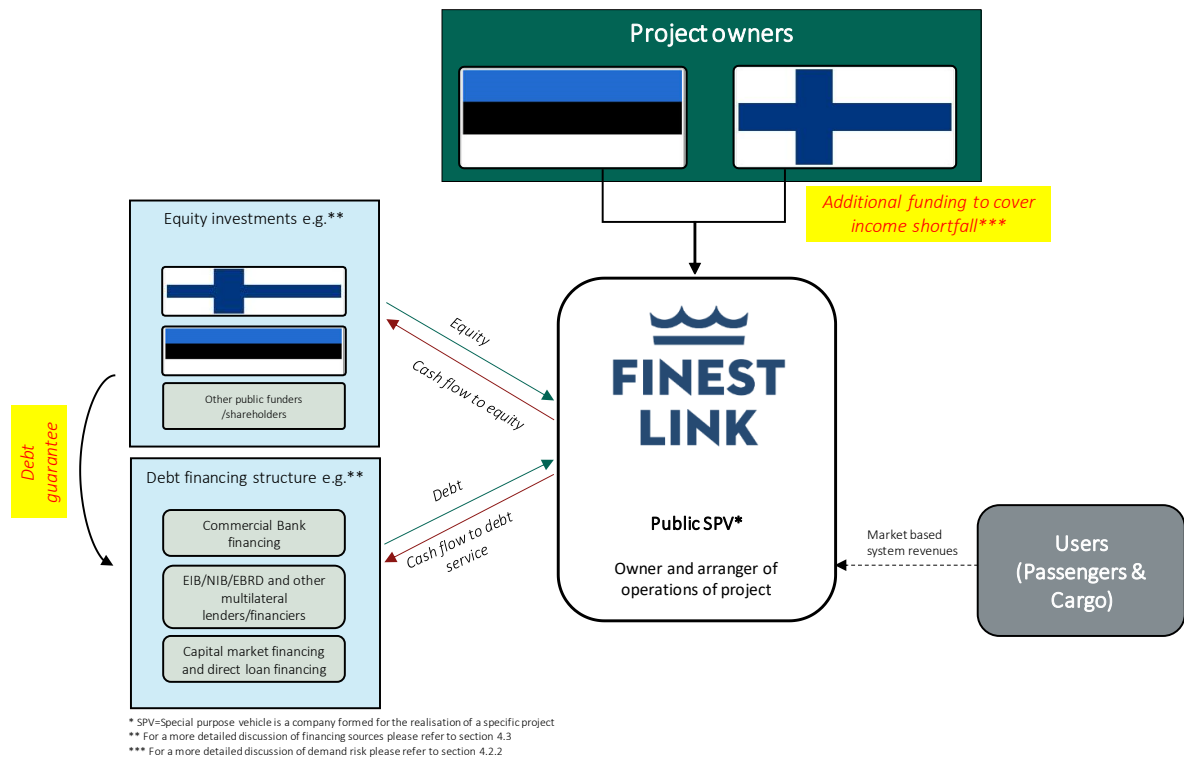
<sup>16</sup> <https://uk.reuters.com/article/thames-tunnel-loans/lpc-banks-line-up-1-blnc-stg-loan-for-allianz-super-sewer-bid-idUKL5N0ZW47E20150716>





Typically, public projects are procured as Design-Build contracts or similar structures that are focused mainly on the investment preparation and investment phase of the project. Risks related to life cycle cost and fitness for purpose lie with public sector owners.

The project is made bankable using public credit support structures such as debt guarantees and payment guarantees to ensure cash flow for debt services. Different credit support structures can be combined to function as complementary structures, which will determine the overall risk and cost of financing. Possible credit support alternatives can be seen in the following picture in yellow:



Benefits of the publicly owned and financed project model:

- Model can be implemented quickly when political and funding decisions have been made
- If public credit support such as public loans or debt guarantees are used, the project will have the lowest possible cost of capital
- Flexibility for changes during the investment phase and project life
- Due to Tallinn – Helsinki project characteristics (e.g. demand uncertainty, ground conditions, planning/permits), some risks could be best managed by the public sector
- A possibility to split procurements into smaller lots could increase cost efficiency

Potential challenges

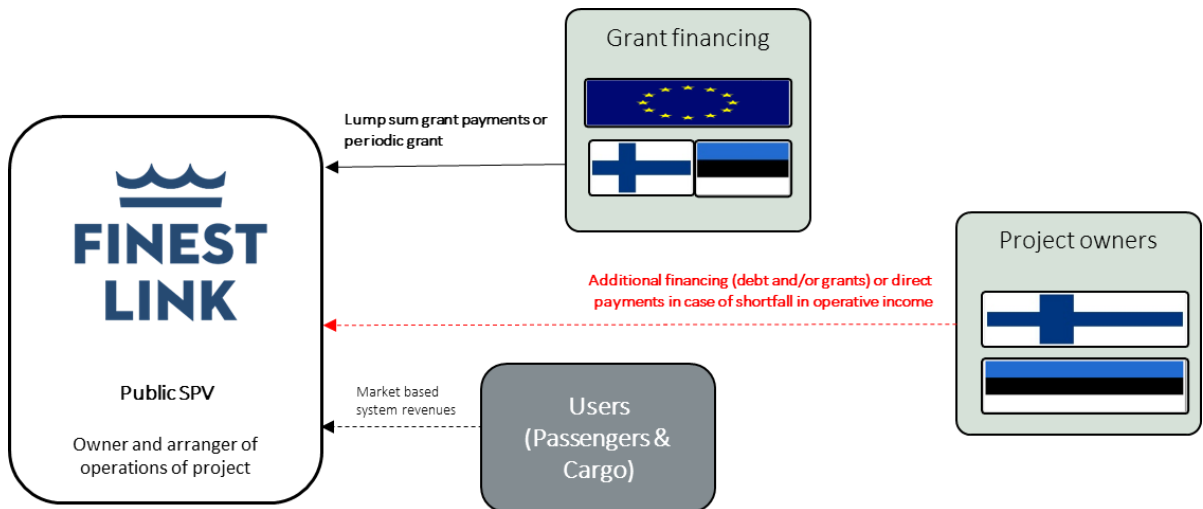
- Public project owners will need to manage project risks (technical and commercial) internally
- Limited integration of design, build, maintenance
- Limited due diligence could result in uncertain cost estimates, insufficient risk management activities or changes in project scope over the project life
- Requirements on project owners to organize and staff the project
- Limited long term incentives, risk transfer or certainty about performance
- Maximum project costs are difficult to estimate in advance and could have an effect on state aid considerations

### **3.4. Structure of payments to project company/ support to project company**

In the publicly financed model the payments for the tunnel infrastructure can be arranged in various ways, e.g.

- Credit support structures (financing)
  - o The public sector can act as provider of financing in user-pays projects where the project is economically viable but there is a viability gap that is filled by public finance. The public financing can be combined to public support payments, such as would be required in the Tallinn – Helsinki tunnel project.
  - o If the project base case estimates indicate a profitable project, direct debt guarantees can be used to make projects bankable and to reduce the cost of debt. Guarantees have been used e.g. in the Länsimetro project by the cities of Helsinki and Espoo and in the Oresund fixed link project with a joint and several guarantee from the Danish and Swedish governments (debt rated AAA by S&P).
  - o Minimum revenue guarantees can be used to cover expected shortfalls in revenue. In this way the project is in advance shielded from financial distress in case revenues cannot cover operation and financing costs
- Payments (funding)
  - o The public owners of the project would be expected to cover any shortfall with compensation payments (Finnish: Vastike). A similar model is used in several public projects, such as the Länsimetro project in the cities of Helsinki and Espoo (project company receives no direct revenue from operations). Direct payments can be used where the project is known not to produce an operating surplus sufficient to cover all project costs.

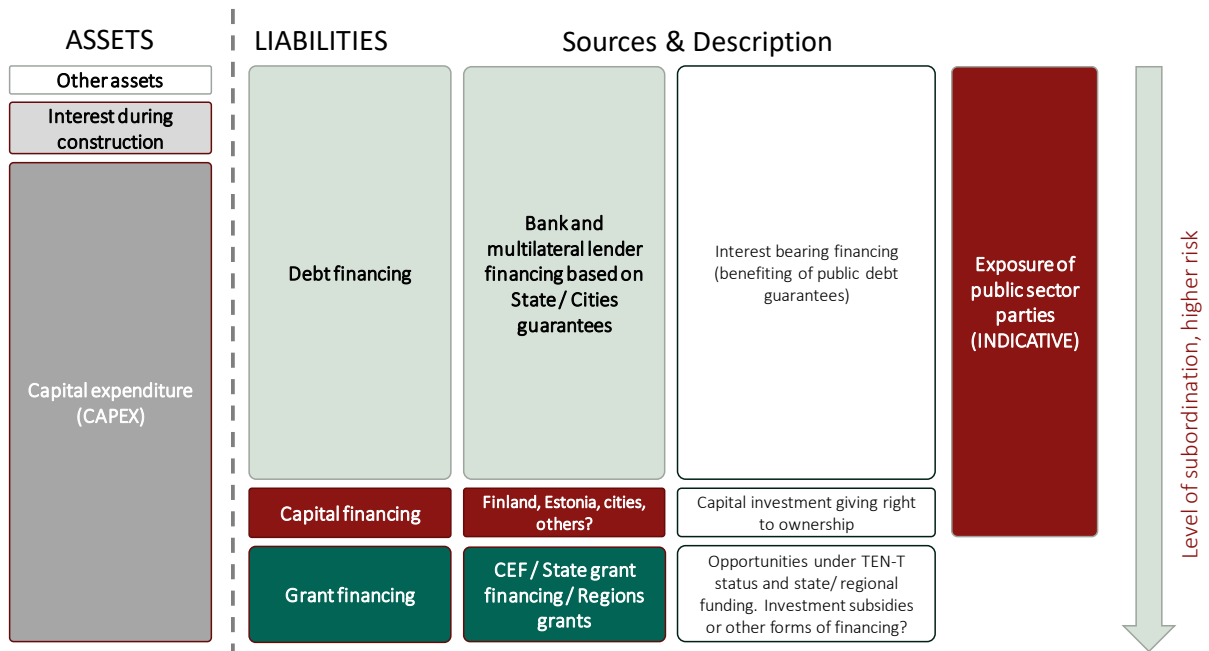
The FinEst Link tunnel project payments structure could be structured as follows (minimum revenue guarantee model):



In the model the public project owners carry demand risk and the majority of various other costs such as cost and schedule risk. This means the public owners will need to invest more money in case the demand is lower than expected or if project risk materialise. **For the Tallinn – Helsinki tunnel project the requirement for additional financing could be in the order of hundreds of millions of euros annually.** If this level of risk is not acceptable, the project should be further developed to reduce risks and ensure an acceptable level of project cost variability.

### 3.5. Possible capital structure

A publicly financed project’s capital structure is heavily dependent on the public credit support in the form of payments to the project. The amount of debt can in this way be very high, as the variability of debt service capacity is minimal.



### **3.6. Possible financiers to the project**

Project financiers in a publicly financed project would include various financiers acting as lenders to or investors in public sector debt. Lenders could include e.g. following parties that would depend on the public support and its form:

- Loans: EIB, NIB, Municipality Finance Plc., commercial banks
- Investment: Various bond investors

## **4. Privately financed project /PPP**

### **4.1. Model outline**

A Public Private Partnership (PPP) it is a long term service contract between the public and private sectors where the public sector pays the private sector (typically a consortium) to deliver infrastructure and related services over a long period of time. PPPs provide design, construction, financing, operation or maintenance of public infrastructure. Depending on the type of asset, the Government generally retains responsibility for delivery of the core service (in social infrastructure such as school projects) or demand risk for usage of the infrastructure (often in transport infrastructures).

Private sector costs are covered over time through availability payments made by the Government or in the case of some economic infrastructure assets (such as the Tallinn – Helsinki tunnel) either partially or wholly from users. Service payments are payable once operations commence. Payments are subject to the private sector’s performance in supplying the services to specified standards e.g. meeting certain quality and performance standards.

### **4.2. Application to a comparable large scale infrastructure project**

#### **4.2.1. PPP project model<sup>17</sup>**

In December, 2016, Malaysia and Singapore signed a bilateral agreement to jointly develop the 350km HSR. This project will reduce the travelling time between the two cities by two hours, to approximately 90 minutes. The HSR serves as an alternative mode of public transport travel between Kuala Lumpur and Singapore. It is seen to be in line with the transformation of Malaysia by linking the two capital cities to meet growing demand, catalysing economic growth and enhancing long term economic competitiveness while improving the quality of life of its people. It will also help to open and rejuvenate smaller cities in Peninsular Malaysia.

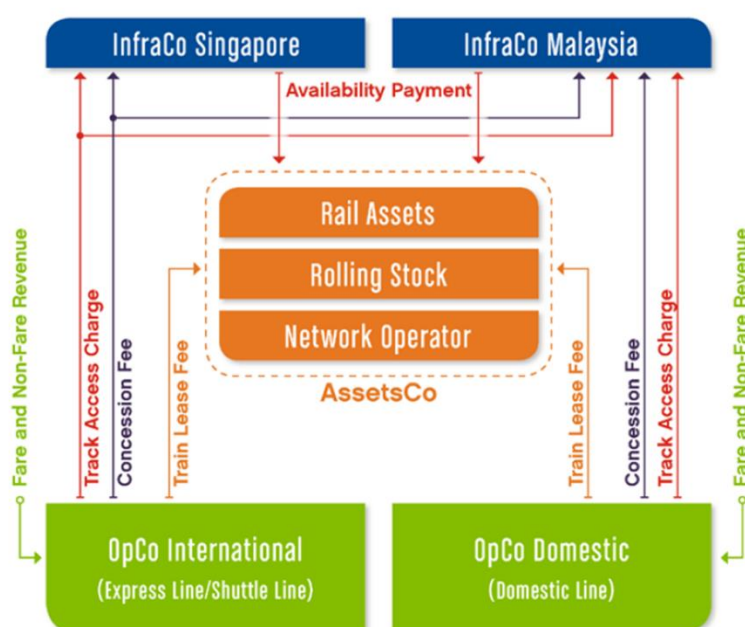
The project will divide the tasks of implementing the HSR project between various parties<sup>18</sup>:

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<sup>17</sup> Source: Infrastructure Financing in Malaysia, NOMURA JOURNAL OF ASIAN CAPITAL MARKETS | Spring 2017 Vol.1/No.2, <http://www.nomurafoundation.or.jp/en/wordpress/wp-content/uploads/2017/04/NJACM1-1SP17-06.pdf>

<sup>18</sup> Selection Process on Track for Malaysia-Singapore High-Speed Rail Project, Jones Day White Paper, [http://www.jonesday.com/files/Publication/45834582-5338-4729-a998-6aedd1043f7b/Presentation/PublicationAttachment/5fad68ab-a9c4-40ad-b644-7425f4f16f27/Selection\\_Process\\_on\\_Track.pdf](http://www.jonesday.com/files/Publication/45834582-5338-4729-a998-6aedd1043f7b/Presentation/PublicationAttachment/5fad68ab-a9c4-40ad-b644-7425f4f16f27/Selection_Process_on_Track.pdf)

- Each government will separately construct the HSR civil infrastructure (e.g., the tunnels, viaducts, bridges, depots, maintenance bases, etc.) and stations within their own countries via a separate Infrastructure Company (“InfraCo”) in each country.
- A single privately financed entity will be jointly appointed as the AssetsCo by the two InfraCos through an international public-private partnership (“PPP”) tender to develop the HSR project, including to procure and maintain the rolling stock (i.e., the HSR trains) and associated systems (i.e., track work, power, signalling, and telecommunications systems), and to manage the network.
- Two train-operating companies (“OpCos”) will be appointed to operate the HSR train services. An international OpCo will be jointly appointed by the InfraCos to operate the cross-border train services, while a domestic OpCo will be appointed by MyHSR to operate the domestic Malaysian services.



The chosen model facilitates some characteristics that are especially suited for the cross-border megaproject<sup>19</sup>:

- The respective governments retain ownership of the core HSR infrastructure;
- Tasks that are better performed by the public sector (such as land acquisition, planning, design, civil infrastructure works, and project supervision) can still be assumed by the respective governments for purposes of core HSR infrastructure; and
- Risks around delivery, operation, and management of the rolling stock, rail assets, network operation, and train services can be largely transferred to the private sector players.

The operations companies (OpCo) will act with agreements that could have an element of demand risk. However, the infrastructure investment which will form the capital-works intensive bulk of the financing need of the project will be based on availability based contracts with state backing. Based on available information, the InfraCo:s will be responsible for availability payments even if the OpCos do

<sup>19</sup> Selection Process on Track for Malaysia-Singapore High-Speed Rail Project, Jones Day White Paper, [http://www.jonesday.com/files/Publication/45834582-5338-4729-a998-6aedd1043f7b/Presentation/PublicationAttachment/5fad68ab-a9c4-40ad-b644-7425f4f16f27/Selection\\_Process\\_on\\_Track.pdf](http://www.jonesday.com/files/Publication/45834582-5338-4729-a998-6aedd1043f7b/Presentation/PublicationAttachment/5fad68ab-a9c4-40ad-b644-7425f4f16f27/Selection_Process_on_Track.pdf)

not make their payments to the InfraCos. From a risk division viewpoint, it is interesting that the national InfraCos will be severally (not jointly and severally responsible for the payment of their availability payment (50% for both parties).<sup>20</sup>

As a conclusion from the PPP model case study it can be said that increasingly, governments look to applying different financing models to different sections of the project. Decisions are made based on socio-economic factors for each section of the network, as well as estimated returns. Mix-and-match of financing models should be done carefully, however, and not without thorough financial appraisal and feasibility study of the project.<sup>21</sup>

*From the Tallinn – Helsinki project’s perspective various models could be applied for the tunnel, infrastructure, rolling stock, artificial islands, etc. with a possibility to maximise the viability and manage risks of each sub project and providing public subsidies to those parts of the project where it is justified.*

#### 4.2.2. Concession model<sup>22</sup>

An example of the concession model is the LGV Sud Europe Atlantique (SEA) line; a 303-kilometer HSR line connecting Tours and Bordeaux. The SEA is the largest Greenfield HSR project in Europe, with an estimated cost of 7.8 billion euros. Once the SEA is operational, it is expected that the travel time between Paris and Bordeaux will be reduced from three hours to two hours and 10 minutes. With the improved accessibility, this line is expected to carry about 18 million passengers per year. The line opened up for traffic in July 2017.

The SEA project was been structured on a 50-year concession model, contracted with the Vinci-LISEA consortium in 2011. All design, construction, and operations risks, including traffic risk, are borne by the concessionaire. In return, the concessionaire will collect track access fees on trains using the corridor, including both those operated by SNCF Mobilités (the state owned rail operator) and other operators.

In the concession model the private sector also takes the traffic risk, while in the partnership model, SNCF Réseau would assume the traffic risk. The allocation of traffic risk to the public sector reduces the risk of the private sector taking a short-term view, in order to ensure adequate revenue to service the debt in the early years. (See Figure «Allocating the risks» below.)<sup>23</sup>.

**Figure 7** Allocating the Risks

	Public Scheme	Partnership	Concession
Financing Risk	State & SNCF	SPV/Concessionaire	SPV/Concessionaire
Design and Construction Risk	State & SNCF	SPV/Concessionaire	SPV/Concessionaire
Operation and Maintenance Risk	SNCF	SPV/Concessionaire	SPV/Concessionaire
Availability Risk	SNCF	SPV/Concessionaire	SPV/Concessionaire
Traffic Risk	SNCF	SNCF	SPV/Concessionaire

Source: Henn, L., Sloan, K., and Douglas, N. (2013). European Case Study on the Financing of High-Speed Rail. Australasian Transport Research Forum.

<sup>20</sup> *ibid.*

<sup>21</sup> Kuala Lumpur – Singapore High Speed Rail Project, Hogan Lovells  
[https://www.hoganlovells.com/~media/hogan-lovells/pdf/publication/client-note--kuala-lumpur--singapore--high-speed-rail-project\\_pdf.pdf](https://www.hoganlovells.com/~media/hogan-lovells/pdf/publication/client-note--kuala-lumpur--singapore--high-speed-rail-project_pdf.pdf)

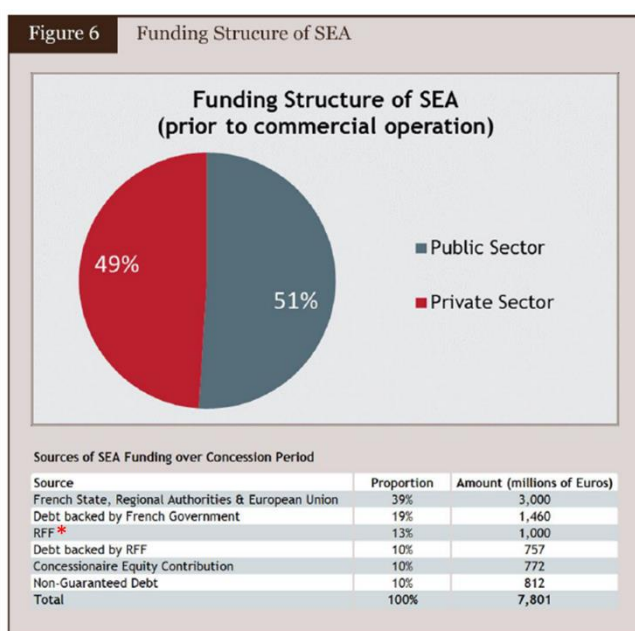
<sup>22</sup> Source: Railway Reform: Toolkit for improving Rail Sector Performance Case Study: SNCF Réseau,  
[https://ppiaf.org/sites/ppiaf.org/files/documents/toolkits/railways\\_toolkit/PDFs/RR%20Toolkit%20EN%20New%202017%2012%2027%20CASE14%20SNCF.pdf](https://ppiaf.org/sites/ppiaf.org/files/documents/toolkits/railways_toolkit/PDFs/RR%20Toolkit%20EN%20New%202017%2012%2027%20CASE14%20SNCF.pdf)

<sup>23</sup> *ibid*

Although the project follows a concession model, where financing risk should be transferred, the financing structure included a significant amount of publicly backed financing. In the end the project received 3 billion EUR in grant financing.

The private project company LISEA is provided €3.8 billion of the financing<sup>24</sup>:

- €772 million of equity contributed by LISEA shareholders, pre-financed by commercial banks and the European Investment Bank (EIB);
- €1,060 million of bank debt guaranteed by the French government;
- €612 million of non-guaranteed bank debt;
- €757 million provided by Fonds d'Épargne, managed by the Caisse des Dépôts and guaranteed by RFF;
- €400 million of EIB credit guaranteed by the French government;
- €200 million of non-guaranteed EIB credit.



Source/Image adopted from: Railway Reform: Toolkit for improving Rail Sector Performance Case Study: SNCF Réseau  
 \*RFF: Public Infrastructure owner and manager in France (years 1997-2014)

Table: Project financing structure at financial close

<b>Profile: Tours-Bordeaux HSR</b>	
<b>Project Sponsor</b>	LISEA consortium
<b>Sponsor Allocations</b>	Vinci Concessions (33.4%), Caisse des Dépôts (25.5%), SOJAS (21.9%), Axa Private Equity (19.2%)
<b>Sponsor Total Equity</b>	EUR772m
<b>Transaction Size</b>	EUR7.8bn
<b>Total Debt</b>	EUR3.8bn
<b>Total Commercial Bank Debt</b>	EUR1.672bn (BBVA, BNP Paribas, Crédit Agricole, Dexia, Mediobanca, Santander, SG, SMBC and UniCredit)
<b>Tenor</b>	27 years
<b>Margins</b>	EURIBOR +300bps stepping up to 425bps in year 10 (EUR612m non-guaranteed debt); EURIBOR + 145bps (EUR1.06bn guaranteed debt)
<b>Total EIB Debt</b>	EUR1.2bn
<b>Total Caisse de Dépôts Debt</b>	EUR757m
Source:InfraDeals	

The financing structure was finalised in the period after the financial crisis, which will have had an impact on the structure. The model can on the other hand be seen as a structure where project risks will have been taken into account and partly been allocated to the private sector through the financing structure.

During the end of the construction phase in 2015, a club of lenders considered suspending provision of drawdown loans to the project following concerns around potentially lower-than-forecast traffic volumes. This was because state-owned SNCF Mobilités, which runs trains on the Tours-Bordeaux line, said it might operate fewer trains than originally envisaged, due to concerns of high costs being charged by the project's concessionaire. After negotiations, LISEA and SNCF reached an agreement in 2016. The agreement involves 18.5 daily trains doing direct round journeys on the line, in addition to other trains doing partial journeys<sup>25</sup>.

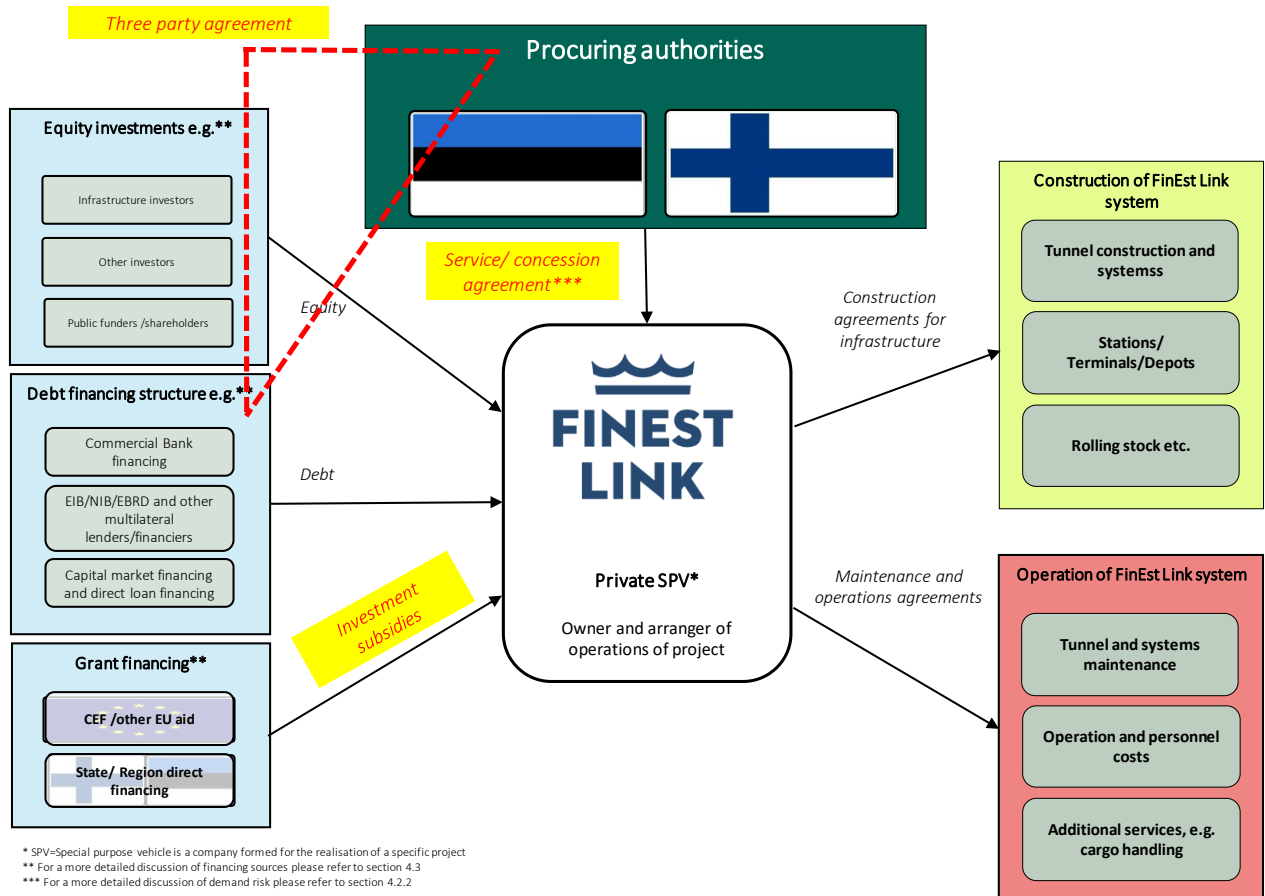
<sup>24</sup> <http://www.eib.org/attachments/press/lgv-sud-europe-atlantique-en.pdf>

<sup>25</sup> Infra News: French high speed rail refi talks launched, <https://www.inframationnews.com/news/2410416/french-high-speed-rail-refi-talks-launched.shtml>

The SEA case study gives a good picture of how public involvement is often required for mega-projects to be bankable and in the end feasible. Especially if the financing package initially involves state guarantees or other credit support mechanisms, negotiations can be challenging to finalise without public exposure growing beyond levels originally envisaged.

### 4.3. Application to Finnish – Estonian tunnel project

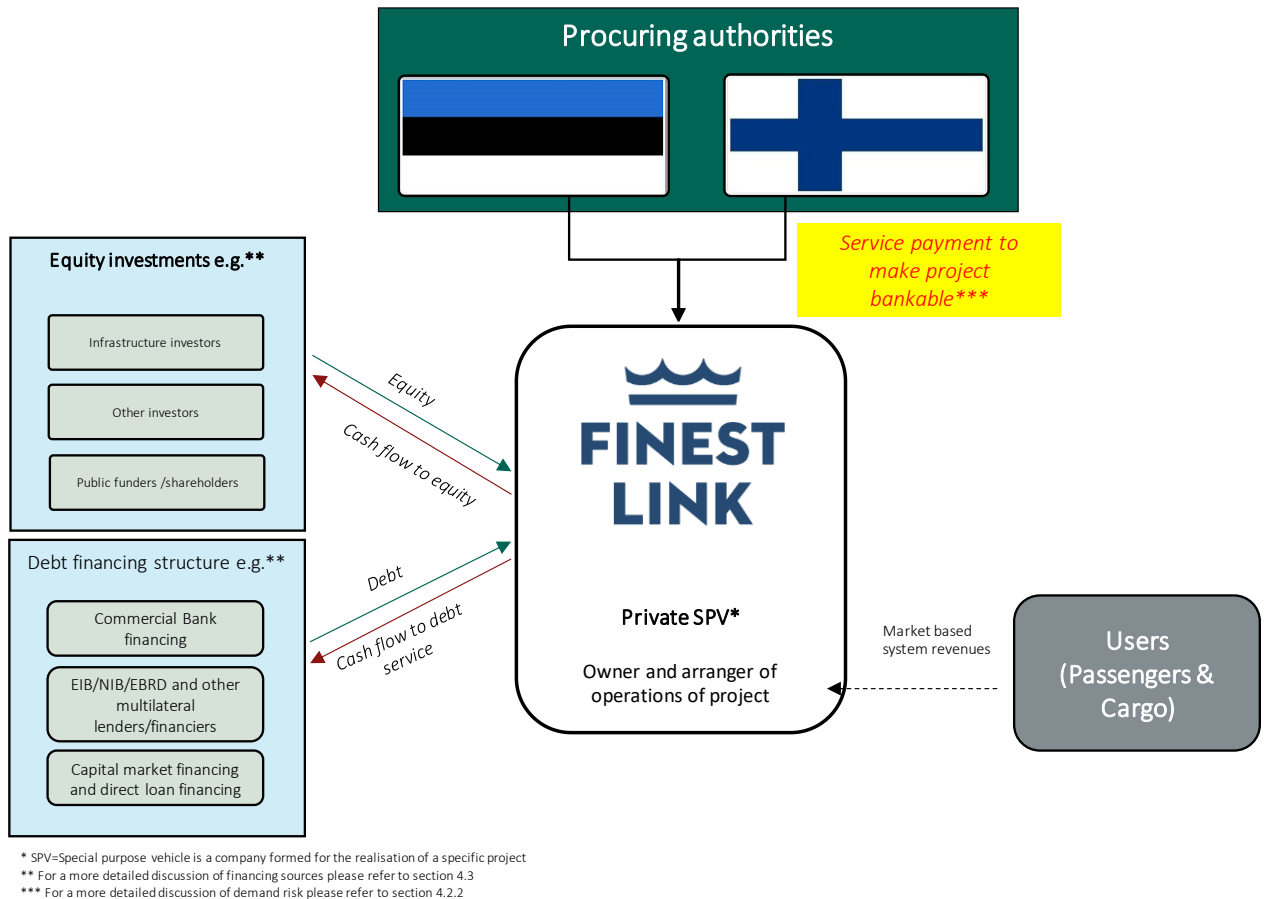
Privately financed PPPs can be used to ensure life cycle performance of the asset and delivery of the service in accordance with agreed timescales and performance specifications. Some, in particular technical responsibilities of the project are shifted to the private sector service provider.



A part of the risk (e.g. schedule, cost-overrun) will transfer to the contractor compared to a more traditional e.g. design build structure. The service provider should be able to identify and manage these key risks of the project more efficiently than the public sector. Not all risks will be shifted to the private service provider.

The project financiers (equity and debt) are paid over time based on the system performance in service payments and user charges. User charges can alternatively be charged by the procuring authorities, which in principle further reduces the credit risk for the projects financiers.





Benefits of the private (PPP) financing model are:

- Life cycle approach and long term responsibility of constructors and owners with fixed prices and on time delivery
- Private financing can reduce investment phase funding requirements of the public partners
- Risk transfer should result in functionality and savings from the public stakeholder's viewpoint
- Internal interface risks of the project are efficiently handled within a suitably incentivized project organization
- Project transfers to public ownership after the project agreement has ended

Issues to account for in a possible PPP contract model for FinEst Link are:

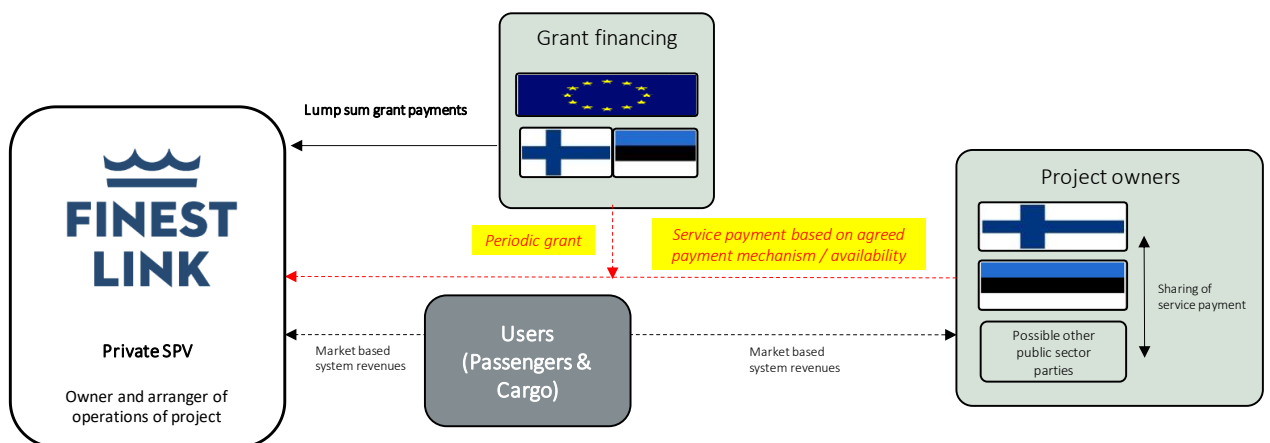
- Higher financing costs compared to public credit risk
- Risks related to political, zoning, interface with other utilities (e.g. Baltic Connector and other networks) and force majeure events cannot be transferred
- Technical risks that cannot be fully managed until actual construction works could result in large risk reservations in fixed price agreements
- The public sector needs to carry the demand risk (using a suitable availability based payment or minimum revenue guarantee)
- Contracts are inflexible during the contract term

#### 4.4. Structure of payments to project company/ support to project company

The PPP model is based on a privately financed model. In practice the financing is subject to careful structuring which results in a low risk financing structure.

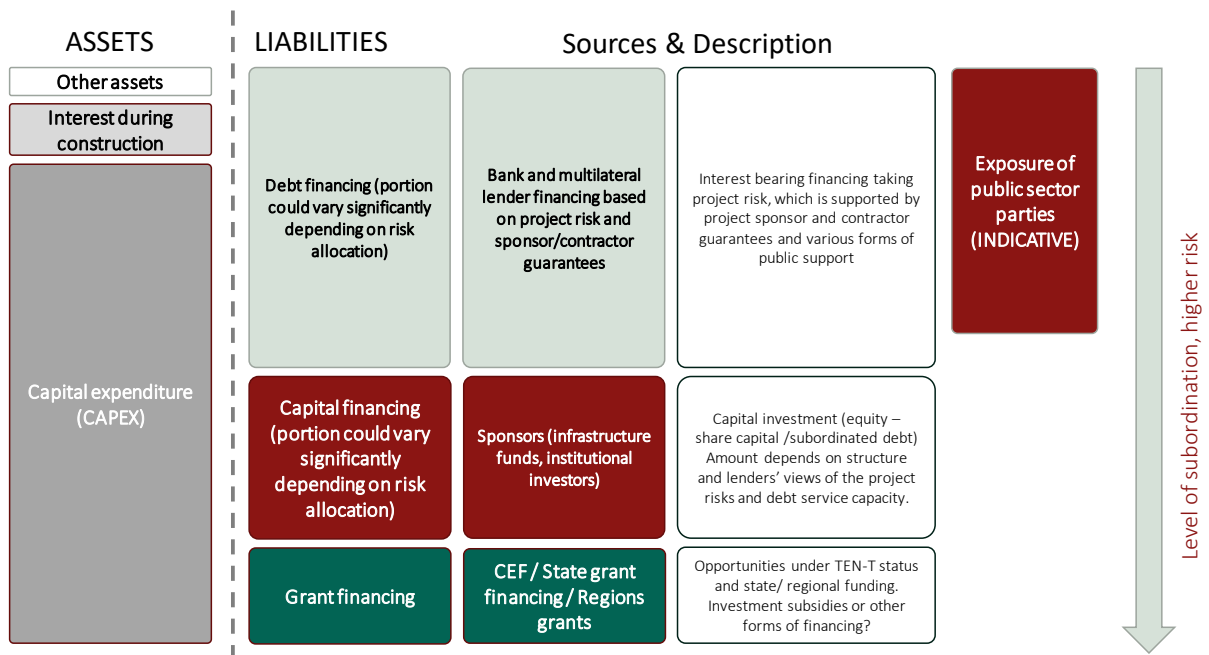
- Financing
  - o The project is financed based on a private financing model with a structure of equity and debt reflecting the risk allocation of the project.
  - o The project structure (in terms of revenues and especially in terms of risks) has to match lender requirements (bankability) in addition to those requirements from the private party as an equity investor (feasibility).
  - o The public party (or the government in the general sense) may be a finance provider in many forms, including the provision of public financing in strict terms (grant financing), co-lending schemes, and equity, or it may support bankability in other ways (de-risking and credit enhancement).
- Funding
  - o The payment stream is typically based on availability of the system (so called 'Public Private Partnership' or PPP). If the private party also retains demand risk, the payment is based on what is called a 'concession agreement'. Availability payments can be combined with operation or investment grants depending on project type and size.

Typically, privately funded infrastructure projects are made bankable through a public payment stream that can be combined with market-based revenues from the system. An example of a payment structure can be seen below:



In the PPP model the public project owners carry demand risk and parts of other risks, depending on the contract model and the project. This means the public owners will need to invest more money in case the demand is lower than expected or if project risk materialise. **For the Tallinn – Helsinki tunnel project the requirement for additional financing could be in the order of hundreds of millions of euros annually.** *If this level of risk is not acceptable, the project should be further developed to reduce risks and ensure an acceptable level of project cost variability. A fixed price long term PPP agreement is one way of ensuring that project risks are manageable, as developers will not bid for the project if risks cannot be managed and mitigated to make the project bankable.*

#### 4.5. Possible capital structure



#### 4.6. Possible financiers to the project

There are multiple sources of funds for equity and debt, including pure financial investors to provide equity, institutional investors, development banks, and commercial banks.

Project financiers in a privately financed project would include various financiers acting as equity investors in project equity or lenders/ investors in infrastructure debt.

Investors could include e.g. following parties

- Multilateral development institutions: EIB, others?
- Commercial banks investing subordinated capital
- Infrastructure funds, institutional investors
- Construction companies typically take part in PPP projects as investors, partly to align interests with the project owners. For this volume of financing the construction company financing cannot be expected to be significant.

Lenders could include e.g. following parties that would depend on the public support and its form:

- Loans: EIB, NIB, commercial banks, other multilaterals
- Investment: Infrastructure debt investors (direct loans or rated bonds)

## 5. Commercially financed project

A commercially financed model for the Tallinn – Helsinki tunnel project could in theory be built around the concept of “value capture”. In many infrastructure projects, the value of the private real estate properties surrounding the infrastructure is increased by improved connectivity or by urban regeneration. This economic value could be directed towards a privately financed project.

*For the Tallinn – Helsinki tunnel project the extra value would have to be significant. In addition the value extraction would be expected to require additional investments (e.g. in real estate developments) making the overall project development capital expenditure and financing requirement enormous when viewed from a local perspective.*

### 5.1. Examples of commercially financed megaprojects

In addition to transport infrastructures that often take the before described forms (public or PPP/Concession models) megaprojects are usually city developments or real estate development projects. Some completed projects are described in the table below:

Project	City/Country	Status	Cost	Special Notes
Burj Al Arab	Dubai, United Arab Emirates	Completed	\$1,000,000,000	Completed and Opened in 1999, it is the 3rd tallest hotel in the World.
Burj Khalifa	Dubai, United Arab Emirates	Completed	\$1,500,000,000	Originally call the Burj Dubai, the Burj Khalifa is currently the tallest building in the World and has held that title since its Completion and Grand Opening on 4 January 2010.
Palm Jumeirah	Dubai, United Arab Emirates	Completed	\$12,300,000,000	It is the world's largest man-made island.
Business Bay	Dubai, United Arab Emirates	Under Development	\$30,000,000,000	Comprises 240 high and low rise buildings, mostly residential and mixed use skyscrapers.
CityCenter	Las Vegas, Nevada / USA	Completed	\$11,000,000,000	The largest privately financed development in the United States.
Hudson Yards Redevelopment Project	Manhattan, New York City, New York / USA	Under Construction	\$20,000,000,000	A mixed-use real estate development currently being built over the 28-acre West Side Rail Yard.
Brickell Key	Cloughton Island, Miami, Florida / USA	Completed	\$2,000,000,000+	A man-made island called Cloughton Island[95] off the mainland Brickell neighborhood of Miami, Florida.
Apple Park	Cupertino, California / USA	Completed	\$3,000,000,000+	The "spaceship", as it is nicknamed, is Apple's new flagship headquarters (formally named Apple Campus 2). Taking the shape of a giant ring, it is expected to house over 14,000 employees. It was completed and opened in April 2017.

*The Tallinn – Helsinki project could include opportunities with regards to artificial islands or developments around Tallinn or Helsinki areas. It is however uncertain how the value from these could be transferred to the project in order to subsidise the cash flow and feasibility gap / deficit from the tunnel's operations.*

### 5.2. Possible financiers to the project

For a commercially financed project, additional financing could be available by selling future rights to developers and constructors. The overall financing structure of a commercially financed Tallinn – Helsinki –tunnel is difficult to plan without a more accurate description of the drivers of the commercial model.

## 6. Evaluation of alternative models and decision making for the project

Key assumptions in the financial modelling are the same as in the FinEst Link feasibility study. The key assumptions are summarized in the table below.

Variable	Value
Capex	16 billion euro (before inflation)
Total trips per year in 2050	13,05 million passenger trips
Total opex in 2050	123 million euro (before inflation)
Annual inflation	1,0 % p.a.
Construction period length	15 years

Some changes to FinEst Lin feasibility study have been made and are summarized below:

1. EU Grant amount is set at 2 billion euros (10,8 % of project costs)
  - EU grant amounts for cross-border infrastructures have been as high as 40% of project costs and even higher
  - In some projects, such as the Rail Baltica –project EU CEF grants have been as high as 85%<sup>26</sup>
  - Feedback received after the FinEst Link study has considered 40 % grant unrealistic
  - The potential grant should be discussed further with DG-Move, CEF facility and INEA. This discussion could possibly be facilitated by the European Investment Advisory Hub (EIAH)
2. Adjustments to private debt scenario assumptions
  - The equity of total capex after grants has been adjusted to 15 % from 20 % of the feasibility study, as the original assumption 20 % can be seen as an unnecessarily high level of equity taking into account a model where the public stakeholders would carry major risks.
  - The DSCR level of private debt scenario has been adjusted to 1.20 from 1.15 of the feasibility study 1.15. The higher ratio gives a more conservative estimate and results in Equity returns that are closer to actual investor expectations
  - Other financing assumptions and the modelling structure remain unchanged
3. A commercial project (speculative additional revenue) scenario has been added.
  - The scenario describes how much additional income the project could require to be entirely privately financed
  - The additional income is income from outside the project. It can come from the owners (Finland & Estonia) as a yearly subsidy payment or from other sources.
    - o The mechanism affects project risk. The less secure the income is the higher the risk for the outside investor is and the higher the required return is.
    - o The public project promoters can carry part (or all) of the most relevant risks and reduce the cost of capital of the project. However, by doing so the owners are more likely to end up in a situation where risks realize and they will need to step in and inject additional funds into the project.

Financial model assumptions an comparison to case studies is presented in the following table:

<sup>26</sup> <http://www.railbaltica.org/rb-rail-as-submits-a-new-application-for-eu-funding-for-rail-baltica/>

	<b>Public debt</b>	<b>Private debt</b>	<b>Commercial project</b>
<b>Example project from case studies</b>	Öresund fixed link	Kuala-Lumpur – Singapore HSR model could include risk sharing elements similar to Thames Tideway Tunnel	Comparable projects are large private developments (e.g. real-estate projects)
<b>State Guarantees</b>	Yes, project on balance sheet	Contractual payment obligation, project should be possible to structure off balance sheet	Some contractual obligations from public sector can be expected
	<b>Calculation assumptions</b>		
<b>Grant (EU)</b>	10,8 % (2bn €)	10,8 % (2bn €)	0 %
<b>Investment Grant (Finland &amp; Estonia)</b>	0 %	0 %	0 %
<b>Equity of capex after grants before interest during construction</b>	0 %	15 %	30 %
<b>Debt Service Cover RAtio minimum requirement</b>	1,02	1,20	2,25
<b>Margin</b>	1,0 %	2,0 %	2,5 %
<b>Base interest rate</b>	1,5 %	1,5 %	1,5 %

## 6.1. State financing requirement

For all models the development phase costs will have to be financed by the project owners (Finland & Estonia) until the project is ready to be financed and constructed. After project financiers are on board, construction costs will be financed with capital sources in all models during the investment phase, and the project costs will be eventually funded in the operations phase of the project.

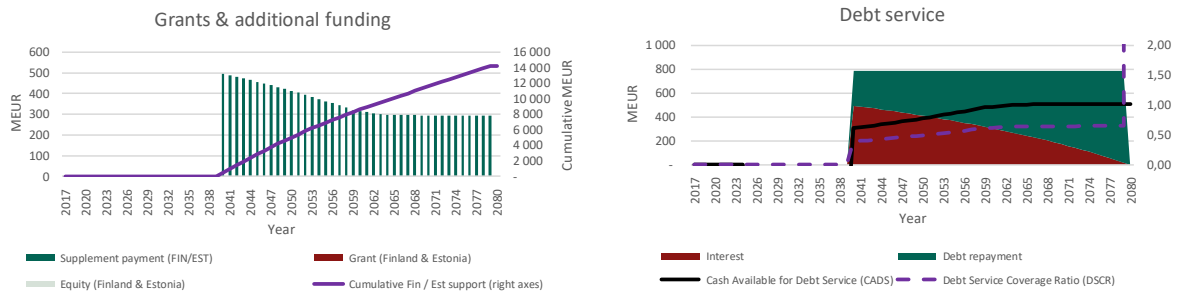
It can be estimated, that irrespective of project model, a significant cost (in the order of 10 million euros) will have to be invested by the public promoters to develop the project to a stage where it can be financed.

Equity investments would generally be made ahead of debt financing to cover construction costs, after which debt financing drawdowns can be made as the project progresses.

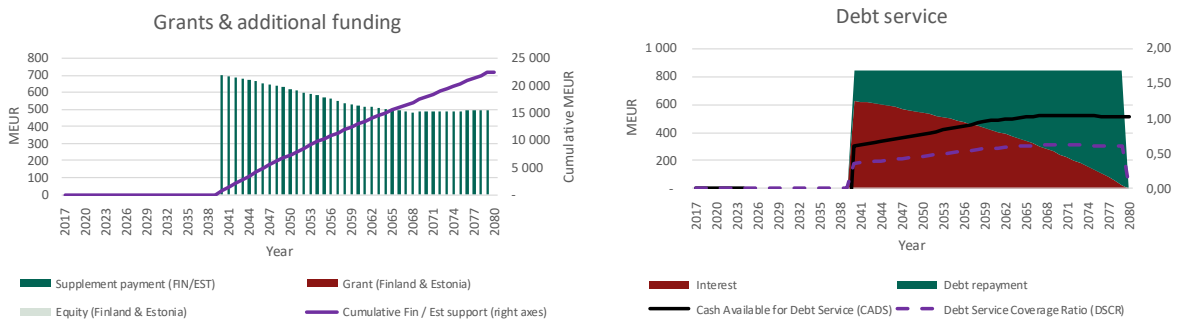
In the public financing model a state guarantee would be applied. The cost of the guarantee would be small (legal costs, transaction costs of financing), unless it would be called, in which case the liability would be significant. The guarantee should be notified to the European commission in order to ensure compliance with state aid regulations and no requirement for guarantee provisions. If state guarantees are planned to be employed, a careful study of effects on Finnish and Estonian state finances is recommended.

## 6.2. Subsidy requirements in alternative financing models

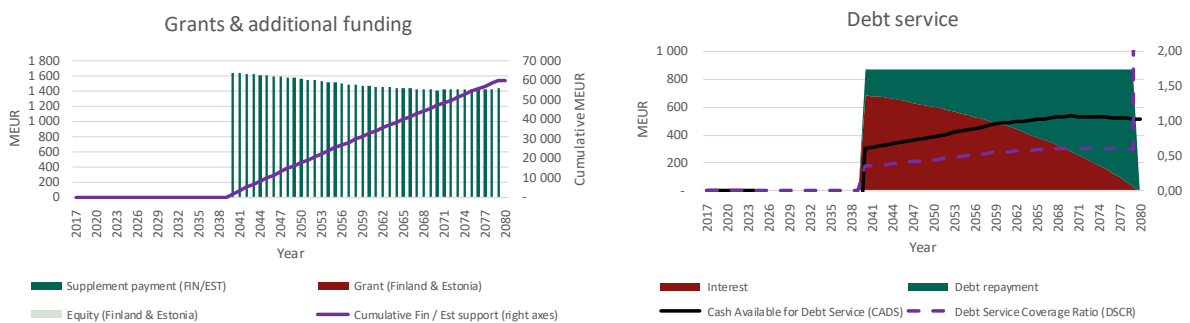
Yearly operational subsidy requirement with **public financing** model is estimated at 300 - 500 MEUR:



Yearly operational subsidy requirement with **private financing** model is estimated at 500 - 700 MEUR:



Yearly operational subsidy requirement with **commercial/ speculative financing** model is estimated at 1 400 – 1 600 MEUR.



## 6.3. Summary of financial model results

A summary of the key results in the 3 scenarios is shown in the following table:

Scenario	Public debt	Private debt	Commercial project / Speculative additional income
<b>Additional funds needed annually</b>	500 MEUR → 300 MEUR in long term	700 MEUR → 500 MEUR in long term	1 600 MEUR → 1 400 MEUR in long term
<b>Project IRR</b>	2.8 %	3.7 %	6.2 %
<b>Equity IRR</b>	N / A	4,9 %	9,7 %

The calculations do not take into account the probability to reach feasibility study assumptions in demand, capital expenditure or operation/ maintenance costs. For example the probability of receiving less than 13.05 million passengers in the year 2050 has not been accounted for. *Taking these risks into account, the public project owners should be prepared to accept that the money required from the owners could be significantly above the 500 MEUR value and be closer to the 1 300 MEUR of the commercial scenario*

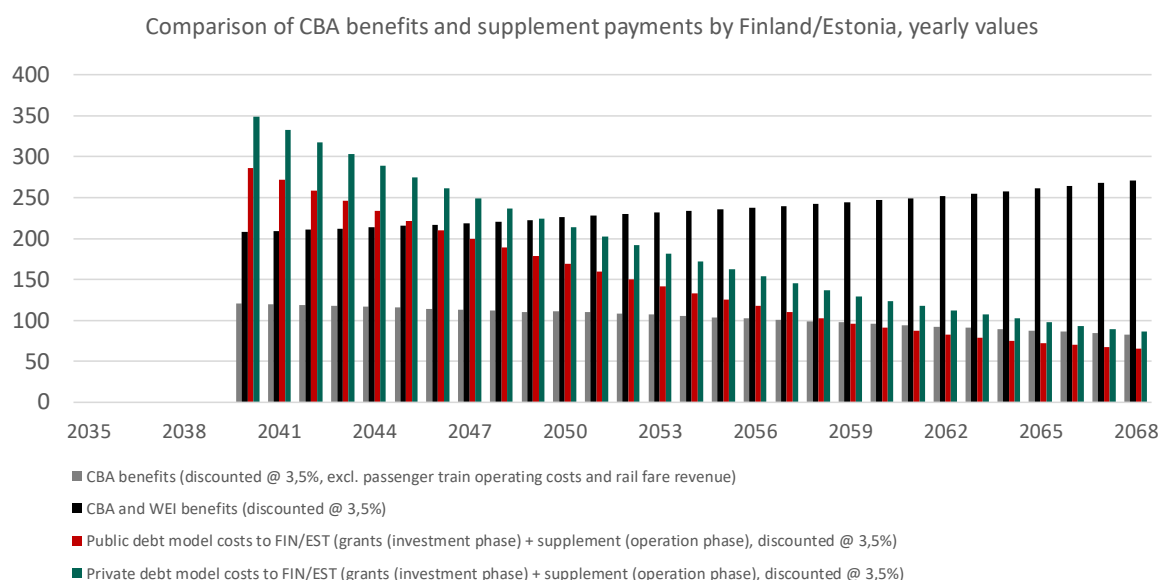
#### 6.4. Evaluation of project feasibility taking into account wider benefits framework

As part of the FinEst Link project, the financial and economic feasibility included economic benefits of the traditional Cost Benefit framework from the comparative impacts analysis sub report<sup>27</sup>. In addition a Wider Economic Impacts (WEI) analysis was conducted, which was not included in the financial feasibility analysis.

The WEI results are included in in this study in addition to the formal Cost-Benefit analysis. The Wider impacts analysis should give a better understanding of the actual effects of the project and could give additional basis to the political justifications of a possible project.

Including the WEI analysis would give an additional (in addition to CBA) measure to optimise to a level that would make the project feasible and could justify an investment decision if project cost and benefits can be aligned.

Below, a summary of project public costs and benefits is shown. All numbers are discounted at 3,5 % (the discount rate used for the CBA and WEI benefits analysis):

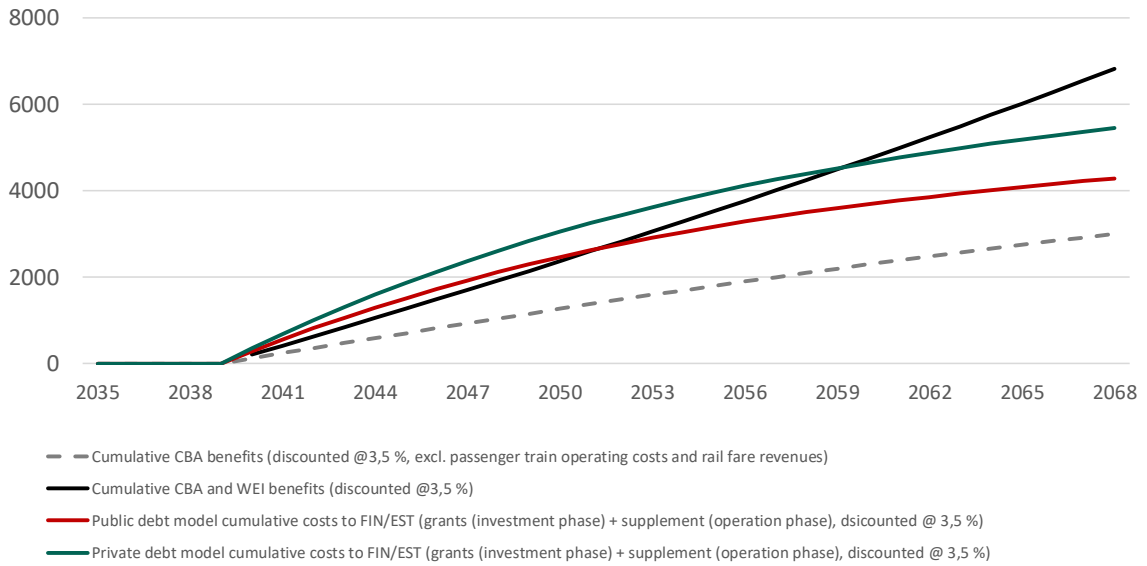


With the current estimate, the project periodic costs for the public sector are larger than the benefits. → *Next steps should be optimisation of Costs and benefits & impacts.* Including wider economic impacts, a periodic benefit larger than costs can be reached, but the analysis rests heavily on benefits occurring (and risks not materialising) over a very long estimation period.

<sup>27</sup> [http://www.finestlink.fi/wp-content/uploads/2018/04/FinEst-Link Comparative-Impact-Analysis-sub-report\\_2018\\_1.pdf](http://www.finestlink.fi/wp-content/uploads/2018/04/FinEst-Link_Comparative-Impact-Analysis-sub-report_2018_1.pdf)



Comparison of CBA benefits and supplement payments by Finland/Estonia, cumulative values

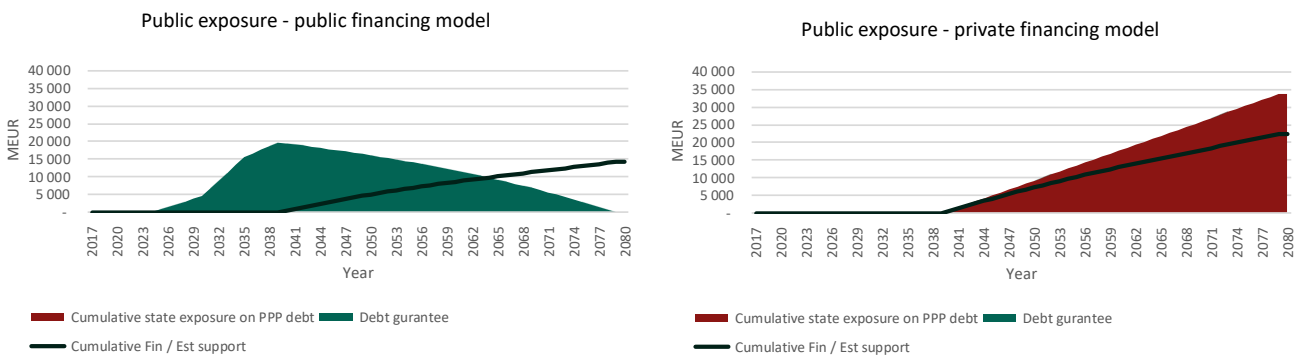


With the current estimate, the cumulative benefits for the public sector are larger than the costs to the public sector. → *Next steps should be evaluation of risks regarding costs escalation and smaller than expected benefits (and more detailed analysis of sources).* Including wider economic impacts, a periodic benefit larger than costs can be reached, but this result requires a very long observation period.

### 6.5. Public exposure in alternative financing models

It is important to note, that the financial exposure and public cost varies in the presented financing models.

Exposure for the various models is presented in the following images:



In the public financing model public exposure grows in the investment phase, and reduces during the operations phase as the debt liability reduces with amortisations. In addition to the guarantee exposure, Finland and Estonia would be liable to make subsidy payments to the project, depicted by the cumulative black line.

In the private financing model, public exposure is small, as no explicit guarantees are given. The exposure (red area) grows with time as the project produces benefits and receives payments. Public sector exposure is limited from a technical risks viewpoint, but the analysis does not account for lower than expected demand, which would in both models result in larger support payments than presented.

In practice the model would most likely be a hybrid model that would result in some amount of front ended exposure and an aim of allocating some risk over the longer term to project partners or financiers.

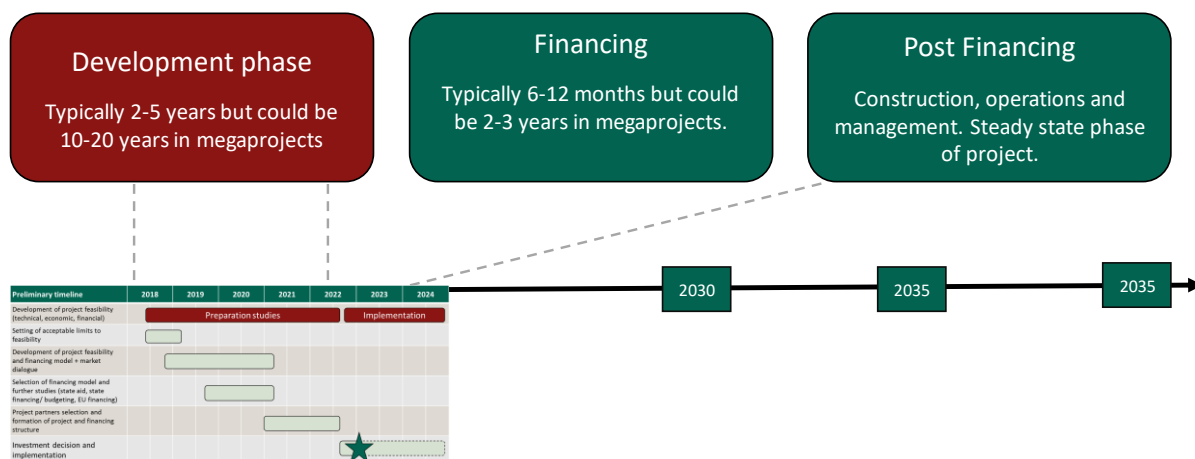
The commercial model would in its purest form result in no public exposure, but this cannot be seen as a realistic alternative based on current information about the project.

## 7. Next steps to consider regarding financing of the project

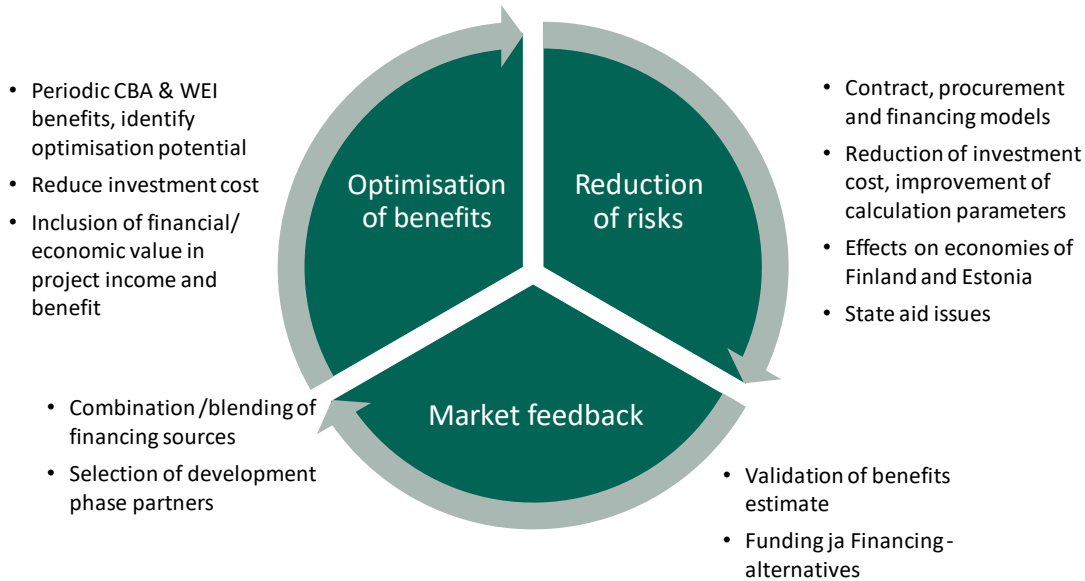
In practice, the next step could be to form a publicly owned development vehicle, for example in the form of a publicly owned limited liability company. It would be set up to enter into a development phase to further advance the project based on the social and financial goals set by the project owners. The model could draw inputs from e.g. the Kuala Lumpur – Singapore HSL and Thames Tideway Tunnel models – combined with local models for contracting etc. The development company would need funding from the Finnish and Estonian states, with possible technical assistance from the EU for the development activities.

### Project financing lifecycle overview

- Idea
- Early feasibility studies
- Equity raising
- More advanced feasibility studies
- Equity arrangement
- Structuring
- Negotiation and syndication
- Commitments and documentation
- Financial close
- Disbursement of financing
- Monitoring and review
- Commissioning
- Repayments and monitoring



The work should then proceed to develop the Tallinn – Helsinki tunnel project within set limits, such as the target price, investment and operation cost risk, cash flow, credit rating and ratio of project costs to estimated benefits. Over the long term, this co-operative model should facilitate the joining of additional project partners to form an overall structure with sufficient information and financial resources to implement the project when socio-economic and financial boundary values are met with a sufficient level of confidence:



Some more detailed next steps for the development phase can be listed as follows:

1. Subjects for further study regarding project viability
  - Phasing of tunnel construction/ single track model could facilitate significant cost savings and risk reduction
  - Other alternatives to improve cost / benefit and reduce uncertainty and technical risk level
  - More detailed analysis and documentation of project benefits (Cost Benefit Analysis / Wider Economic Impacts) and evaluation of the distribution of these between Finland and Estonia
  - Further study and evaluation of demand estimates and role of freight both by shuttle trains as well as normal freight trains.
  - Overall improvement of commercial viability and maximising funding sources
  - Independent/ unbiased estimates of demand, cost and risks as basis for decision making if acceptable benefit levels can be achieved through project development
  - State contributions and public sector risk exposure should be at an acceptable level, but not too low, so that public total costs (cost of risk transfer) can be minimised.
2. If acceptable levels of project risk and cost – benefit levels are reached
  - Market dialogue regarding construction and financing, risk allocation and management and overall project development model
  - Grant and equity financing dialogue with co-funders
  - Selection of partners e.g. construction companies, investors (infrastructure funds, institutional investors, debt investors, etc.), advisors
3. If sufficient consensus on project model and partners can be reached
  - A development phase –model based on e.g. a limited development company model could be one way to develop the project further
  - As the FinEst Link project develops, budgetary limitations for the project as a whole (Finland, Estonia, EU, others) must be evaluated in the overall financing structure and cash flow profile.
  - Effect on state finances should also be considered before proceeding.

- Addressing issues regarding state aid

#### 4. Project implementation

Illustrative time line for the presented steps:

