

# Feasibility of a PPP-based delivery and financing model for the Parainen-Nauvo bridge project

FINAL REPORT

Public version

May 2019

Foundation for project research

Anders Jungar

Kim Wikström

Felix Wrede

## Table of Contents

1	Tiivistelmä ja suositukset .....	3
2	Summary and recommendations.....	6
3	Acknowledgements.....	9
4	Background and Aim .....	9
5	Feasibility of the proposed PPP3 model for Parainen-Nauvo bridge .....	10
5.1	Local and regional actors' view.....	10
5.2	Market players .....	11
6	Benchmarking of Swedish and Norwegian experiences .....	12
6.1	Optimal ownership structure for SPV and lessons learned from the Nya Karolinska Solna hospital project .....	12
6.2	Norway's experience from toll fees .....	15
6.3	Sweden's experience from infrastructure fees.....	16
7	Description of a local/regional toll fee company for the Parainen-Nauvo bridge project .....	17

## 1 Tiivistelmä ja suositukset

Parainen-Nauvo kiinteä tieyhteys -hankkeesta on keskusteltu yli 60 vuotta. Lähtökohta vuoteen 2018 asti oli ollut se, että hanke tulisi rahoittaa 100 %:sti suoraan Suomen valtion budjettirahoituksella. Oli kuitenkin tullut selväksi, että tarvitaan uusia, vaihtoehtoisia toimitus- ja rahoitusratkaisuja, jotta hanke voisi toteutua.

Vuonna 2018 alettiin kehittämään hankkeelle vaihtoehtoisia toteutus- ja rahoitusratkaisuja. Nämä tutkimukset ja lisäarvioinnit sekä keskustelut eri sidosryhmien kanssa johtivat Public Private Partnership perustuvaan malliin (PPP, FI: elinkaarimalli), johon sisältyy myös tietullien käyttöönotto osana sillan investointikustannusten rahoittamista. Tätä mallia kutsutaan myöhemmin PPP3:ksi. Suomessa on aiemmin onnistuttu toteuttamaan menestyksekkäästi neljä PPP-malliin perustuvaa infrastruktuurihanketta. Nämä hankkeet ovat luoneet hyvän kotimaisen tietopohjan PPP-malliin perustuvien infrastruktuurihankkeiden suunnitteluun, hankintaan ja toteuttamiseen.

Parainen-Nauvon kiinteä tieyhteys -hanke tarjoaa mahdollisuuden viedä PPP-mallin asiantuntemusta seuraavalle tasolle Suomessa esittelemällä uusia ansaintalogiikoita tietullien kautta. Parainen-Nauvon -projektin tietullimalli on sovellettu norjalaisen ”Bompengeselskap” -mallin pohjalta, jota on menestyksekkäästi käytetty Norjassa 1980-luvulta lähtien.

Parainen-Nauvo -hankkeen PPP3-malli on saanut positiivista palautetta sekä markkinatoimijoilta (sijoittajat, rakennusyhtiöt), Väylävirastolta että Paraisen kaupungilta. Konkreettisen mallin esittely ”Hyötyjä maksaa” -periaatteen soveltamiseksi, sisältäen selkeät kannustimet paikallis- ja aluekehitykselle, on otettu myönteisesti vastaan. Markkinatoimijoiden mielestä sekä saatavuuspohjaista (ENG: availability based) PPP-mallia, että konservatiivisia oletuksia ja arvioita investoinnin kannattavuutta arvioitaessa, on pidetty hyvänä lähtökohtana.

PPP3-mallin virstanpylväsmaksu (ENG: milestone payment) voi aiheuttaa verotuksen kannalta riskin/haasteen, joka on myös tunnistettu Hailuodon hankkeessa. Näin ollen verottajan ennakkopäätös on tarpeen, jos PPP3-mallia käytetään sellaisenaan.

Tarvittavien paikallisten / alueellisten sitoumusten varmistamiseksi on kehitetty uusia hallintomalleja. Tässä raportissa ehdotetaan PPP3-mallin parannusta, joka ottaa paremmin huomioon paikallisten / alueellisten toimijoiden, kuten Paraisen kaupungin, taloudelliset valmiudet investoinnille. Suomen valtio voisi olla tietulliyhtiön vähemmistöosakas, koska tietulli on täysin uusi konsepti Suomessa. Taulukossa 1 esitetään yhteenveto vähemmistöosakkuuden vaikutuksista Suomen valtiolle.

Suomen valtion rooli paikallisessa/alueellisessa tietulliyhtiössä	Taloudelliset vaikutukset Suomen valtiolle	Edut/mahdollisuudet Suomen valtiolle	Haitat/riskit Suomen valtiolle
<b>Oletukset:</b> - 30 % osakkeista tietulliyhtiössä - 25 M€ ulkoisen velan takaus, - 10% todennäköisyys, että kysyntäriski toteutuu Suomen valtion takaamalla lainoilla - Hallituksen jäsenyys tietulliyhtiössä	<b>Lisäkustannukset</b> - 2 M€ (oma pääoma) - 2,5 M€ (vain jos kysyntäriski toteutuu) - 0,5 M€ (ylimääräiset transaktiokustannukset, hallituspaikan resursointi) <b>Yhteensä 5 M€</b>	- Ensimmäinen hanke Suomessa, joka luo kansallista, uutta ja tärkeää osaamista tietulleista - Siltainvestoinnin mahdollistaminen ja siten nykyisen lauttaliikenteen ylläpitokustannusten poistaminen - Suomen valtion kustannus-hyötyanalyysin (H / K) ja elinkaarikustannusten rajallinen vaikutus - Perusteellinen käsitys paikallisesta tietulliyhtiön toiminnasta esim. hallituksen jäsenyyden kautta - Kysyntäriski on rajoitettu, koska sillan käyttäjillä ei ole vaihtoehtoja reittiä.	- Osa kysyntäriskistä siirtyy paikallisilta / alueellisilta toimijoilta Suomen valtiolle. - ”Pandoran lippaan” - syndrooma, eli riski, että paikalliset / alueelliset toimijat edellyttävät Suomen valtion osallistumista myös muihin tulevaisuuden infrastruktuurihankkeisiin (joissa tietulleja) Suomessa

Taulukko 1: Yhteenveto Parainen-Nauvo -siltahankkeen PPP3-mallin toteutumisen vaikutuksista, joita Suomen valtiolle on tulossa 30 %:n vähemmistöosakkuudella paikallisessa / alueellisessa tietulliyhtiössä.

Osana tätä tutkimusta PPP-hankkeista toteutettiin vertailu Ruotsin ja Norjan vastaavanlaisiin hankkeisiin (erityisesti Tukholman Nya Karolinska Solnan sairaalahanke, myöhemmin NKS), joissa toteutettiin PPP-hankkeena. NKS-hanke on ollut hyvin kiistanalainen ja asiasta on käyty vilkasta keskustelua Ruotsissa viime vuosina. Näin ollen Ruotsin poliittinen ilmapiiri ja yleinen mielipide eivät ole tällä hetkellä kovin myönteisiä uusien PPP-infrastruktuurihankkeita kohtaan. On kuitenkin äärimmäisen tärkeää muistaa, että NKS-hanke ja Paraisten-Nauvon kaltainen siltahanke ovat pohjimmiltaan hyvin erilaisia mm. projektien kompleksisuuden suhteen. Huolimatta näiden hankkeiden selvästi erilaisista ominaisuuksista, tietyt lainalaisuudet Parainen-Nauvo -hankkeen kohdalla kuitenkin pätevät:

- PPP-malli ei ole sopiva toimitus- ja rahoitusratkaisu kaikentyyppisille infrastruktuurihankkeille. Kansainväliset tutkimukset osoittavat, että tiet ja sillat soveltuvat hyvin PPP: hen. Erittäin monimutkaisten ja epävarmojen infrastruktuurihankkeiden, kuten sairaaloiden ja lentoasemien osalta ”Integrated Project Delivery”, IPD-malli, on usein parempi vaihtoehto.
- Vahvan, riippumattoman ja pätevän omistajan merkitys: Parainen-Nauvon tapauksessa omistaja olisi Väylävirasto. NKS-tapauksessa projektin omistaja (Stockholms Läns Landsting) päätti solmia julkisen ja yksityisen sektorin kumppanuussopimuksen vain yhden tarjouksen perusteella.
- PPP-mallissa projektiyhtiön optimaalinen omistusrakenne on tapauskohtaista. Edelleen on olemassa kansainvälisiä kokemuksia ja tutkimuksia, jotka ohjaavat rakenteita, joissa institutionaaliset sijoittajat muodostavat yhdessä osuuskuntia/konsortioita muodostaen

enemmistön omasta pääomasta. Syynä tähän on se, että investoinnit tarvitsevat pitkäaikaisia omistajia, joilla pyritään maksimoimaan investoinnin ja myös taloudellisen tuoton yhteiskunnalle. Hallitus ja / tai valtiot voivat osallistua omaan pääomaan takauksella tai lainalla sen osan kattamiseksi, mikä voidaan merkitä julkiseksi hyödyksi ja jotka katetaan siis julkisella rahoituksella. On myös syytä rohkaista hankkeessa mukana olevia johtavia rakennus- ja teknologiayrityksiä ottamaan vähemmistöosuuden itselleen rakentamis- ja takuuajan aikana, kuitenkin niin, että heillä on sen mahdollisuus myydä osuutensa projektiyhtiöstä.

Aiemman analyysin ja tämän raportin perusteella suositellaan seuraavia vaiheita:

**Suositus #1: Paraisen kaupunki tule ajaa paikallisen projektiorganisaation perustamista Parainen-Nauvo -siltahankkeen edistämiseksi.**

Tämä suositus on täysin edellisten analyysien suositusten mukainen. Projektiorganisaation tulisi luoda helposti ymmärrettävä ja selkeä ”tarina” hankkeelle, jota voidaan käyttää paikallisen / alueellisen / kansallisen hyväksynnän ja tuen saamiseen. Projektorganisaation konkreettisiä tehtäviä olisi:

Aktiviteetti 1: Tehdään tutkimus tietullimaksujen maksuhalukkuudesta (kohderyhmänä vakituiset asukkaat, paikallisten yritysten omistajat sekä kesäasukkaat). Kuinka paljon käyttäjät olisivat valmiita maksamaan, jos tietullimaksuilla siltahanke saataisiin toteutettua? Ovatko he halukkaita ostamaan paikallisen/ alueellisen tietulliyhtiön osakkeita saadakseen alennusta tietulleista?

Aktiviteetti 2: Tunnistetaan suurimmat kiinteistönomistajat Nauvossa, Korppoossa, Houtskarissa kuten myös muut mahdolliset paikalliset / alueelliset osakkeenomistajat. Miten nämä toimijat voitaisiin sitouttaa Parainen-Nauvon siltaprojektiin?

Aktiviteetti 3: Paikalliset toimijat analysoivat yhdessä ja ”avoimen kirjan” -periaatteiden mukaisesti sillan kvantitatiivisia hyötyjä ja kuinka suuria osuuksia nämä toimijat olisivat valmiita ottamaan paikallisessa / alueellisesti omistetussa tietulliyhtiössä. Tässä yhteydessä tulisi hyödyntää norjalaisia malleja ja asiantuntemusta.

Aktiviteetti 4: Analysoidaan PPP3-mallin parannusta selventämään esimerkiksi, mikä on oman pääoman ja velan enimmäismäärä, jonka osakkeenomistajat kuten Paraisen kaupunki ja muut paikalliset / alueelliset toimijat voisivat hyväksyä? Miten tämä sitoutumisaste vaikuttaisi Suomen valtion näkemykseen rahoittajana? Voivatko yksittäiset käyttäjät ostaa osuuden tietulliyhtiöstä?

**Edellä mainittujen aktiviteettien 1-4 tulosten tulisi johtaa paikallisten toimijoiden, sisältäen paikallispoliitikot, selkeään kirjalliseen lausuntoon** (esim. Aiesopimus) alueellisesta sitoutumisesta Parainen-Nauvo -hankkeen toteuttamiseen, sisältäen tietullien pilotoinnin.

**Suositus #2 (riippuu Suosituksen #1 tuloksesta): Määritellään Parainen-Nauvo -siltahanke Suomen ensimmäiseksi tietullien pilottihankkeeksi.**

Tämä mahdollistaisi hankkeen priorisoinnin Suomen 12-vuotisessa liikennejärjestelmäsuunnitelmassa. Tämä turvaisi myös rahoituksen (~ 2 MEUR) suunnitteluasiakirjojen päivittämiseksi (YVA ja Yleissuunnitelma).

## 2 Summary and recommendations

The Parainen-Nauvo bridge project has been discussed for more than 60 years. Up until 2018, the starting point was that the bridge should be 100% financed directly from the Finnish state budget. This said, it had become clear that new, alternative delivery and financing models must be proposed to make the project become reality. In 2018, studies started to look for alternative models. These studies and further evaluations and discussions with related actors resulted in a Public Private Partnership (PPP) based model which also includes the introduction of toll fees to finance part of the investment costs for the bridge<sup>1</sup>. This model is later referred to as PPP3. Finland has so far successfully implemented four motorway PPP-projects. These projects have created a good domestic knowledge base on how to design, procure and implement PPP-based infrastructure projects. The Parainen-Nauvo case provides an opportunity to take PPP expertise in Finland to the next level by introducing elements of new earning logic through toll fees. The model for toll fees in the Parainen-Nauvo bridge project has been adopted based on the well-established Norwegian Bompengeselskap model, which has been in use in Norway since the 1980s.

The PPP3 model for the Parainen-Nauvo project has overall received positive feedback from both market players (investors, construction companies), the Finnish Transport Infrastructure Agency as well as the City of Parainen. Introducing a concrete model for applying the 'Beneficiary pays' (FI: Hyötyjä maksaa) principle including clear incentives for local and regional development was positively noted. For market players, an availability-based PPP was considered a good starting point. Finally, the conservative assumptions and estimates when calculating the business case of the investment was clearly acknowledged. The milestone payment in the PPP3 model may introduce a risk/challenge from a taxation point of view, a risk that also has been identified in the Hailuoto project<sup>2</sup>. Consequently, applying for a preliminary ruling (FI: ennakkopäätös) from the Finnish Tax Authority is needed if the PPP3 model is pursued as such.

To ensure the required local/regional commitment new governance models have been developed. A variant of the PPP3 model is proposed that better considers the financial capabilities of local/regional actors such as the City of Parainen. The Finnish state could be a minority shareholder in the toll company considering that toll fees is a completely new concept in Finland. Table 1 summarizes the implications for the Finnish state from a becoming a minority shareholder.

---

<sup>1</sup> Alternativa leverans- och finansieringsmodeller för Pargas-Nagu fast vägförändelse, Foundation for project research, 2018.

<sup>2</sup> Discussions with Seppo Toivonen, Finnish Infrastructure Transport Administration

Role of Finnish state in local/regional toll fee company	Financial implications for the Finnish state	Advantages/opportunities for the Finnish state	Disadvantages/risks for the Finnish state
<b>Assumptions:</b> <ul style="list-style-type: none"> <li>- 30% of shares in toll fee company</li> <li>- Guarantee 25 M€ of the external debt,</li> <li>- 10% probability that demand risk materializes on loans guaranteed by the Finnish state</li> <li>- Board membership in toll company</li> </ul>	<b>Additional costs</b> <ul style="list-style-type: none"> <li>- 2 M€ (own equity)</li> <li>- 2,5 M€ (only if demand risk materializes)</li> <li>- 0,5 M€ (additional transaction costs, resourcing Board position)</li> </ul> <b>Total 5 M€</b>	<ul style="list-style-type: none"> <li>- 1<sup>st</sup> pilot project for toll fees in Finland to create nationally, new, important knowledge.</li> <li>- Enabling the bridge investment and thereby get rid of annual costs for maintaining current ferry traffic</li> <li>- Limited impact on Cost Benefit Analysis (H/K) and total lifecycle costs for the Finnish state</li> <li>- Full insight into local toll fee company through e.g. Board membership</li> <li>- Demand risk limited as no alternative route for users of the bridge.</li> </ul>	<ul style="list-style-type: none"> <li>- Some of the demand risk moved from local/regional actors to the Finnish state.</li> <li>- 'Pandora's box' syndrome, i.e. risk that local/regional actors in other infrastructure projects in Finland (with toll fees) also require involvement from the Finnish state.</li> </ul>

*Table 1 Summary of implications for the Finnish state of becoming a 30% minority shareholder in local/regional toll company in case Parainen-Nauvo bridge, PPP3 model.*

A 30% ownership by the Finnish state in the local/regional toll company would not have any significant impact on the financial feasibility of the overall bridge investment from the Finnish state's point of view.

As part of this study, benchmarking of Swedish and Norwegian experience from PPP projects (especially the Nya Karolinska Solna hospital project in Stockholm, later: NKS) and toll fees was carried out. The NKS project has been highly controversial and debated vividly in Sweden over the past years. Consequently, the political landscape and general opinion in Sweden is currently not fruitful for further PPP infrastructure projects as of now. It is vitally important, however, to understand that the NKS project and a bridge project such as Parainen-Nauvo are fundamentally very different in terms of e.g. complexity. Despite the clearly different characteristics between these two projects, certain lessons learned of relevance also for the Parainen-Nauvo project can still be drawn:

- PPP is not a suitable delivery and financing solution for all types of infrastructure projects. International research<sup>3</sup> shows that roads and bridges may well be suited for PPP. However, for highly complex and uncertain infrastructure projects such as hospitals and airports, the Integrated Project Delivery (IPD) model is often a better choice.
- The importance of a strong, independent and competent Owner. In the case of Parainen-Nauvo, this Owner would be the Finnish Transport Infrastructure Agency. In the NKS case, the Owner (Stockholms Läns Landsting) decided to enter into a PPP contract with only one quotation from the market, with strong commercial interest from private actors in the background.
- Optimal owner structures in PPPs are case-specific. Still there are international experiences and research that guides towards structures where institutional investors together form collaboratives that take a majority share of the equity. The reasoning is that the investments need long-term owners with the purpose to maximise the benefit to society from the

<sup>3</sup> See e.g. Riess, A., 2006, Is the PPP model applicable across sectors?, EIB Papers, 10-32

investment and also the financial return. Government and / or states can take part of the equity with a guarantee or loan to cover the part that can be marked as public benefit that are covered with public funding. It should also be encouraged that the involved construction and technology companies that have a leading role can take a minority share during construction and guarantee periods but then have the option to exit.

Based on previous analysis and this feasibility study, the following next steps are recommended:

**Recommendation#1: City of Parainen to drive the establishment of a local project organisation to promote the Parainen-Nauvo bridge project.**

This recommendation is fully in line with recommendations from previous analysis<sup>4</sup>. The project organisation would need to create an easily understood and clear “story” for the project that can be used to gain local/regional/national acceptance and support. Concrete activities of the project organisation include:

*Activity1:* Conduct a study on the willingness for user fees (both permanent inhabitants, local business owners as well as summer cottage owners). What is the level of support for toll fees as an enabler for the investment? How much would users be ready to pay? Is their willingness to buy shares in a local/regional toll company against discounts on toll fees?

*Activity2:* Identify all major property owners in Nauvo, Korppoo, Houtskari as well as other potential local/regional shareholders in the local/regional toll company. How could these actors be engaged to drive the Parainen-Nauvo bridge project?

*Activity3:* Local actors to analyse *together and through open-book principles* the quantified benefits from a bridge and how big stake these actors would be ready to take in the locally/regionally owned toll fee company. Here, Norwegian models and expertise should be utilized.

*Activity4:* Analyze a variant of the PPP3 model to clarify e.g.: what is the maximum level of own equity and external debt that shareholders such as the City of Parainen and other local/regional actors could accept? How would this level of engagement impact the business case for the Finnish state if a decreased share of the investment costs is covered by toll fees? Could individual users buy a share in the toll fee company?

**The output from the Activities 1-4 above should result in a clear written statement** (e.g. Letter of Intent) from local actors, also signed-off also by local politicians, whether there is local/regional commitment to pursue the Parainen-Nauvo project incl. piloting of toll fees.

**Recommendation#2 (dependent on the outcome from Recommendation#1): Define the Parainen-Nauvo bridge project as Finland's first pilot project for toll fees**

This would enable the prioritization of the project in Finland's national 12-year plan for infrastructure development. This would also enable financing (~2MEUR) for updating planning documentation (YVA and Yleissuunnitelma).

---

<sup>4</sup> Alternativa leverans- och finansieringsmodeller för att gynna regional utveckling, Pargas-Nagu fast vägförbindelse, Stiftelsen för projektforskning, 2018.



### 3 Acknowledgements

This feasibility study has been financed by The Finnish Transport Infrastructure Agency, FTIA (Väylävirasto), The Centre for Economic Development, Transport and the Environment in Southwestern Finland (Varsinais-Suomen ELY-keskus, VARELY), the City of Parainen and the Foundation for project research (Stiftelsen för projektforskning). The authors would like to express their gratitude to all the financers of this feasibility study.

The Steering Group for this study consisted of Seppo Toivonen, Chief specialist in Financing at FTIA, Matti Vehviläinen, Director, Transport and Infrastructure, VARELY, Patrik Nygrén, Mayor of the City of Parainen and professor Kim Wikström, Foundation for project research. The valuable comments and contributions of all Steering Group members is hereby acknowledged. The authors also wish to express their gratitude to Jonas Spohr at Åbo Akademi University and all the experts at the Norwegian Public Roads Administration and the Swedish Transport Administration, for their valuable input for this study.

### 4 Background and Aim

Previous studies of the Parainen-Nauvo bridge project<sup>56</sup> has shown that a Public Private Partnership-based delivery and financing model, combined with toll fees (later: PPP3 model) would make the project financially feasible. The aim of this study was to further evaluate the feasibility of the proposed PPP3 model through active dialogue with local/regional actors as well as both domestic and foreign market players. This study also aims at providing input for the Finnish Government when making decisions regarding the potential introduction of toll fees in Finland (see Figure 1 below)

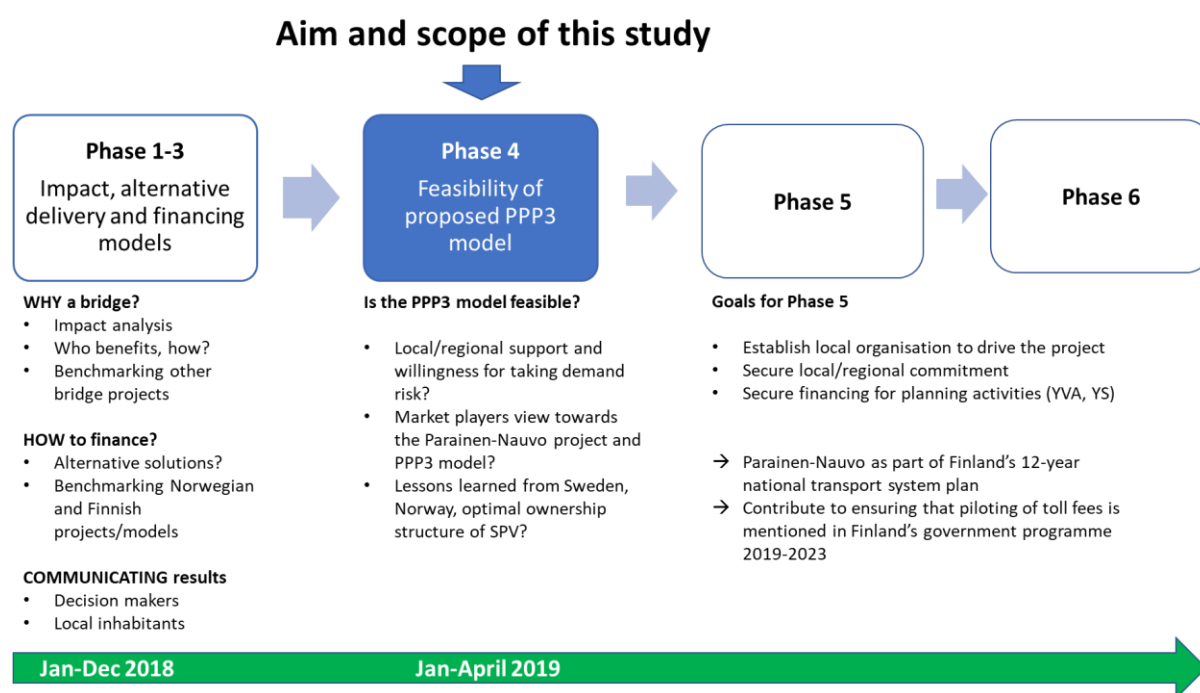


Figure 1 Journey for developing an alternative delivery- and financing model for the Parainen-Nauvo bridge project

<sup>5</sup> Effektanalys, fast vägförbindelse mellan Pargas och Nagu, Foundation for project research, 2018.

<sup>6</sup> Alternativa leverans- och finansieringsmodeller för Pargas-Nagu fast vägförbindelse, Foundation for project research, 2018.

More specifically, this study aims at answering the following three key questions:

1. How do local and regional actors perceive the feasibility of the proposed PPP3 model for the Parainen-Nauvo project, especially in relation to the proposed regionally/locally owned toll company? What is the current level of commitment and challenges foreseen?
2. How do market players (investors, construction companies) perceive the Parainen-Nauvo bridge project in general? What is the feasibility of the proposed PPP3 model from the market players' perspective?
3. What is an optimal ownership structure for Special Purpose Vehicles (SPVs) in PPP projects based also on lessons learned from e.g. the Nya Karolinska Solna (NKS) hospital project in Sweden? What have been the experiences from toll fees in Norway and Sweden?

## 5 Feasibility of the proposed PPP3 model for Parainen-Nauvo bridge

### 5.1 Local and regional actors' view

As part of this study discussions were held with selected local/regional stakeholders, who could benefit locally/regionally from the new Parainen-Nauvo bridge. The three main questions asked from the stakeholders were:

1. *What are the perceived benefits and motivational factors from engagement of being a shareholder in a locally/regionally owned toll fee company for Parainen-Nauvo bridge?*
2. *What perceived challenges are foreseen?*
3. *What are topics that would need further clarification?*

The table below summarizes the feedback received.

Organisation	Benefits and opportunities from involvement in a local/regional toll company	Key challenges	Things to be clarified?
City of Parainen/ Mayor Patrik Nygrén	<ul style="list-style-type: none"> <li>- The City of Parainen and Paraisten seurakuntayhtymä have many similar interest</li> <li>- More local inhabitants, increase tax revenues</li> <li>- Better opportunities for developing business in the archipelago (e.g. tourism)</li> </ul>	<ul style="list-style-type: none"> <li>- Where to find financially sufficiently strong shareholders for the local/regional toll company</li> <li>- Boundary conditions for the City of Parainen set by 'kriisikuntakriteerit'</li> <li>- Must be able to present the PPP3 model in a simple and convincing way to local politicians, why this model would enable the investment</li> </ul>	<ul style="list-style-type: none"> <li>- Clarify major real estate owners in the</li> <li>- Legal status of the toll fee company, should not be a part of the 'Konsernistruktuuri' of City of Parainen</li> </ul> <p>Involve into discussions also:</p> <ul style="list-style-type: none"> <li>- Skärgårdsdelegationen /Elina Auri, MMM</li> <li>- Turku Business Region</li> <li>- Ahvenanmaan maakuntahallitus (also The Åland Islands could benefit from a bridge?)</li> </ul>
Paraisten seurakuntayhtymä/ talousjohtaja Jean-Mikael Öhman,	<ul style="list-style-type: none"> <li>- More local inhabitants, increase tax revenues</li> </ul>	<ul style="list-style-type: none"> <li>- Many other development projects ongoing</li> </ul>	<ul style="list-style-type: none"> <li>- Local inhabitants/summer cottage owners in the archipelago as</li> </ul>

kiinteistöjohtaja Jim Karlsson	- Increase value of real estate properties (especially in the main village of Nauvo)		shareholders in toll fee company, discount on toll fee as shareholder?
Turun Seudun Kehitys Oy/CEO	- Interesting model (PPP3) that could be applied also in other infrastructure projects	- Municipalities/owners of Turun Seudun Kehitys Oy probably little interest in the model, benefit for them?	Involve following organisations: - City of Turku/Pekka Sundman - Visti Turku/Anne-Marget Hellén Present the PPP3 model to TSEK Oy's Board. Could the model be applied in other infrastructure projects?

Based on this analysis, efforts are still needed to ensure the required local/regional commitment for the PPP3 model. A variant of the PPP3 model needs to be proposed that better considers the financial capabilities of local/regional actors such as the City of Parainen. Also, the expansion of the shareholder base for the toll company is needed, considering also the fact that toll fees is a totally new concept in Finland.

## 5.2 Market players

As part of this study discussions were held with market players i.e. selected financiers and construction companies. In total seven different market players (3 construction companies, 4 investors) were approached. The two main questions discussed with market players were:

- *What is your general view of, and interest towards, the Parainen-Nauvo bridge project?*
- *What is your view on the feasibility of the proposed PPP3 model?*

The feedback from market players can be summarized as follows:

- Overall highly interesting project overall, especially the new concept with toll payment with local/regional ownership.
- No major issues regarding the bridge project itself at this point. One investor expressed potential concern about environmental aspects (bridge significantly changes landscape which could present a challenge considering the strong sustainability selection criteria for investments)
- Questions were raised also regarding when the Parainen-Nauvo bridge project will move forward, e.g. when can an official decision on the bridge versus tunnel alternative be expected?
- 100% availability-based PPP was considered a good starting point. Market players were not in favour of carrying demand side risks.
- The conservative approach when estimating the business case for both public and private actors was acknowledged. According to one financier, promoters of infrastructure projects often tend to overestimate positive impact in the development phase to drive the project and secure public funding.

- The milestone payment in the PPP3 model may introduce a risk/challenge from a taxation point of view. This same risk has also been identified in the Hailuoto project<sup>7</sup>. Consequently, applying for a preliminary ruling (FI: ennakkopäätös) from the Finnish Tax Authority would probably be needed if the PPP3 model is pursued.
- Key will be to get local/regional support for the PPP3 model (toll company).

*"How much appetite is there to create a regional toll company?"*  
Market player X

## 6 Benchmarking of Swedish and Norwegian experiences

### 6.1 Optimal ownership structure for SPV and lessons learned from the Nya Karolinska Solna hospital project

The NKS project has become one of the most debated topics in Sweden during the past years. The public debate has become increasingly politicized and overall, NKS is by some scholars seen as a national failure for Sweden when it comes to the ability to be innovative in important societal sectors<sup>8</sup>. The Swedish Government has commissioned a public investigation of the NKS project<sup>9</sup> and results are due to be published in the summer of 2019. The NKS project is highly complex and providing a thorough analysis of the lessons learned is beyond the scope of this study. Some initial conclusions can, however, be drawn based on findings so far. It is important to note that the entire healthcare organization at NKS and the Owner Stockholm's County Council (Stockholms Läns Landsting, SLL) was reorganized while building and taking the new hospital into use<sup>10</sup>.

The NKS project in Stockholm is delivered and operated through as PPP (SWE: Offentlig Privat Samverkan, OPS), with Owner Stockholm's County Council (SLL) and Swedish Hospital Partners as contractual partners. Shareholders in the SPV are Skanska (50%) and Innifree (50%), see Figure1 and Figure2. The concession is for 30 years (2010-2040) with a total value for the construction phase of 14,5 billion SEK for the original scope<sup>11</sup>. Skanska is responsible for the construction, whereas Coor Service Management is responsible for the coordination, development and delivery of a portfolio of facility management services during the 30-year contract term<sup>12</sup>. Out of scope of the concession are the actual health care activities (doctors, nurses, laboratory services etc). The original total value of the concession was 61 billion SEK (year 2010 contract) but as a result of renegotiating the financing and price adjustments in 2018, the total costs for the Owner is now 57 billion SEK.

The construction phase has been completed on time and on budget as per the original concession agreement worth 14,5 billion SEK. Additional scope during construction have included ~50 additional orders from the Owner worth 1,7 billion SEK and other construction costs not included in the original agreement worth 2,3 billion SEK, thereby raising the total construction costs by a total of 4 billion SEK

<sup>7</sup> Discussions with Seppo Toivonen, Finnish Infrastructure Transport Administration

<sup>8</sup> Discussions with Björn Hasselgren, Swedish Transport Administration

<sup>9</sup> <https://www.regeringen.se/pressmeddelanden/2018/02/statlig-granskning-med-anledning-av-fallet-nya-karolinska-solna/>

<sup>10</sup> Discussions with Björn Hasselgren, Swedish Transport Administration

<sup>11</sup> <https://www.skanska.se/om-skanska/press/nks-i-media/>

<sup>12</sup> <https://www.coor.com/about-coor/our-customers/customer-stories/new-karolinska-solna/>

## Overview ownership structure

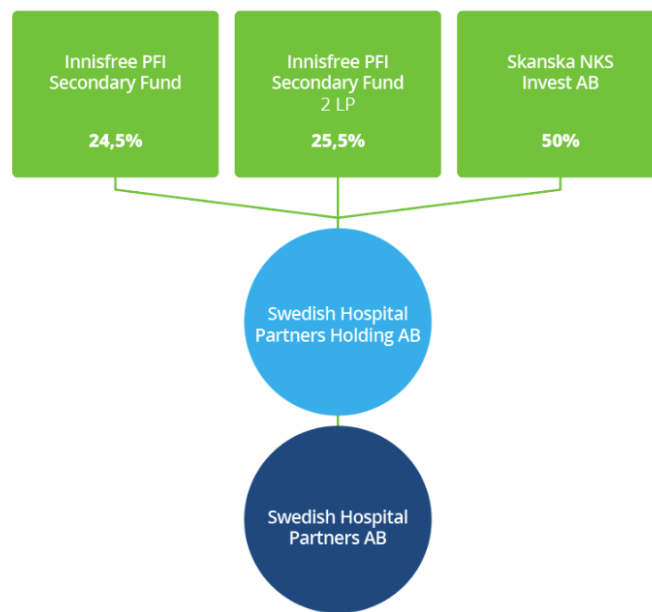


Figure 2 Ownership structure of Swedish Hospital Partners<sup>13</sup>

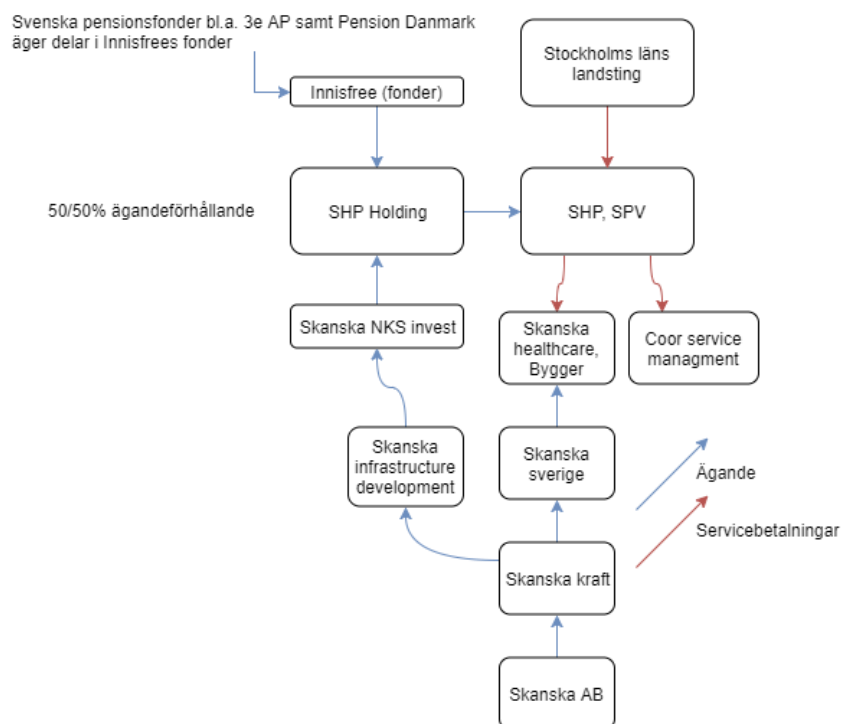


Figure 3 More detailed ownership structure of Swedish Hospital Partners<sup>14</sup>

<sup>13</sup> <https://www.shpartners.se/en/about-us/>

<sup>14</sup> <https://www.solidinfo.se/>

Despite the major public debate around NKS, there is still a need for alternative financing models for infrastructure in Sweden<sup>15</sup>. It should be noted that the Swedish Parliament passed a law in Nov 2018 enabling mutual pension funds (Första-Fjärde AP fonderna) to increasingly invest directly into e.g. infrastructure projects. Also, the new law requires these funds to invest in assets contributing to a more sustainable society<sup>16</sup>.

Based on this analysis, the following lessons learned from can be drawn:

- **PPP is not suitable for all types of infrastructure projects.** International research indicate that the PPP model is more suitable for less complex infrastructure projects (e.g. roads, bridges) where the required service level can be defined and measured. For highly complex social infrastructure projects such as hospitals, defining the required service level is challenging<sup>17</sup>.
- **The importance of a highly qualified and strong Owner**, capable of running a transparent PPP procurement process<sup>18</sup>. The importance of a strong Owner in PPP projects has been highlighted also previously<sup>19</sup>.
- **The problematic decision by the Owner to enter into the PPP contract despite only one official quotation** from Skanska<sup>20</sup>.
- **Strong commercial interests driving the idea of PPP** and the proclaimed existence of competition through non-existing “shadow quotations” during the procurement process<sup>21</sup>:

*”Resultaten från detta delprojekt visar att organiseringen av NKS-projektet i landstinget, och särskilt olika managementkonsulters relationer till NKS-förvaltningen, hade avgörande betydelse för legitimeringen av OPS-idén. Inte minst visar rapporten att beslutsblindhet i många avseenden präglade processen för att upphandla och finansiera Nya Karolinska enligt OPS-modellen. Denna blindhet visar sig i att processen att utreda förutsättningarna för en OPS-upphandling samt att besluta om ett OPS-avtal och sedan förhandla fram ett avtal, alltsammans under mandatperioden mellan 2006 och 2010, var synnerligen forcerad och legitimerades via externa parter med egna kommersiella intressen, som vare sig redogjordes för på ett transparent sätt eller hanterades på ett sakligt sätt i processen. NKS-förvaltningen kom att präglas av elitism, vilket bland annat innebar att anställda på lägre nivå i NKS-förvaltningen upplevde sig varken ha tid eller möjlighet att lyfta och utreda problem, att peka på risker och villkor för OPS-modellen eller att arbeta igenom detaljer i avtalet när det väl tecknades. Centralt i processen med att legitimera OPS var också att påvisa förekomsten av konkurrens, vilket tog sig uttryck i att omförhandla regler och villkor för upphandlingen så att de passade rådande omständigheter.”*

---

<sup>15</sup> Discussions with Björn Hasselgren, Swedish Transport Administration

<sup>16</sup> [https://www.riksdagen.se/sv/dokument-lagar/arende/betankande/andrade-regler-for-forsta-fjarde-ap-fonderna\\_H601FiU14](https://www.riksdagen.se/sv/dokument-lagar/arende/betankande/andrade-regler-for-forsta-fjarde-ap-fonderna_H601FiU14)

<sup>17</sup> Spohr, Wikström, Eriksson: The collaborative model in practice – identifying the challenges, Paper approved for the EPOC 2019 conference in Colorado, US.

<sup>18</sup> Discussions with Björn Hasselgren, Swedish Transport Administration

<sup>19</sup> <https://www.regeringen.se/rattsliga-dokument/statens-offentliga-utredningar/2017/03/sou-201713/>

<sup>20</sup> <https://www.statsvet.su.se/om-oss/nyheter/andra-delrapporten-klar-om-nya-karolinska-solna-1.431116>

<sup>21</sup> <https://www.statsvet.su.se/om-oss/nyheter/andra-delrapporten-klar-om-nya-karolinska-solna-1.431116>

- Considering the complexity and uncertainty of the NKS hospital project, an **Integrated Project Delivery model (IPD)**<sup>22</sup> **would probably have been more suitable.** Recent project research indicates that IPD is more suitable for capital intensive, highly complex infrastructure projects. Examples of successful infrastructure projects delivered using IPD include e.g. the Heathrow 5 Terminal<sup>23</sup> and Suttern Health Hospital projects in the US. The push for fixed-priced contracts in environments with high uncertainty freezes design at an early stage thereby limiting innovation.

No general conclusions can be drawn on the double role of Skanska (as both main contractor and financier role) based on this analysis. A double role can, in fact, contribute to doubled financial incentives to cost-efficiently build a high-quality asset<sup>24</sup>. It should be noted that Skanska has laid down their department responsible for developing new PPP business in Sweden as a result of the strong criticism towards the NKS project<sup>25</sup>.

Despite NKS and the PPP model (SWE: Offentlig Privat Samverkan, OPS) receiving much public criticism, there is still an active discussion ongoing, and need for, alternative financing models for infrastructure in Sweden<sup>26</sup>.

## 6.2 Norway's experience from toll fees

The Norwegian model of toll charge companies (Bompengeselskap) is well established and toll fees have been in use in Norway since the 1980s. The Norwegian toll charge companies are set up to finance the part of the project that is to be financed through fees by taking up credit that is to be paid down by collection of fees. The company is to be majority owned by public actors. The principle has been to start a new company for each new toll road project but lately the toll fee companies (Bompengeselskap) have been consolidated and regionalized for better control and economics<sup>27</sup>.

A key principle has been that the initiative for a new project must come from *local actors* (not the Norwegian state) and that the local actors incl. users understand that they pay for a benefit/better service level. To ensure the connection between the user and the perceived benefit from the project there must be no cross subvention, i.e. the toll fees collected are to be earmarked for a specific project.

The toll fee companies need to have competence in three key areas:

- Financing, i.e. capability to secure an as cost-effective financing solution as possible. The toll charge company often hires professional loan negotiators for this purpose.
- Capability to purchase IT and related infrastructure required for toll charging
- Customer service, as the toll charge company is in continuous contact with its customers (users of the road/bridge/tunnel). In the majority of cases, the toll fee company has in-house customer service.

The demand risk is taken by the owners of the toll fee company (Bompengeselskap), most often the county municipality (Fylkeskommun) and in some cases the municipality, as the loan is guaranteed

<sup>22</sup> <https://leanipd.com/integrated-project-delivery/>

<sup>23</sup> See e.g. <https://sloanreview.mit.edu/article/five-rules-for-managing-large-complex-projects/>

<sup>24</sup> Discussions with Björn Hasselgren

<sup>25</sup> <https://www.svd.se/efter-nks-skandalen--tvarstopp-for-liknande-projekt>

<sup>26</sup> Discussion with Björn Hasselgren

<sup>27</sup> Discussions with Norwegian Public Roads Administration / Nina Lysfjord, Brita Bye



by the owner. The demand risk can be managed by lengthening the toll charging period, raising the fee and using conservative financial calculations, rates and traffic forecasts. Most complications in initiating and executing the projects typically stem from local actors. The level of toll fee is often debated and can be difficult to agree on. The debate on fees can stop a project by not being possible to finance on locally accepted fees<sup>28</sup>.

New models for toll fees are constantly under development where individual users' preferences and various times of day, amount of usage and so forth are considered.

### 6.3 Sweden's experience from infrastructure fees

The Swedish infrastructure fee (SWE: infrastrukturavgift) is different to the Norwegian model of toll charge companies, primarily by the way project financing is set up. In the Swedish model the Swedish Transport Administration (STA, Trafikverket) receives a mandate from the Swedish Government to raise loans through the Swedish National Debt Office (SWE: Riksgälden) to finance part of projects that are to have infrastructure fees. The Government decides which projects are to be financed through fees. No publicly owned company is set up to take on debt or collect fees as in Norway. Hence, the affected municipality(ties) does not take on any demand risk associated to the traffic volumes. The Swedish state, through STA, takes on all of the demand risk and risk of not being able to pay down the loan. The STA can utilize the same methods as in Norway to mitigate the demand risk by raising fees or-/and lengthening the period for fee collection. The minimum period for fee collection is 20 years<sup>29</sup>.

In Sweden there are only two projects currently funded by toll charging, namely the Motala and the Sundsvall bridge. These projects are both in operation with infrastructure fees being collected since 1.2.2015. The fees are lower than can be seen in e.g. Norway. Motala bridge is 5 SEK/pass for light traffic (11 SEK/pass for heavy traffic) and Sundsvall bridge 9 SEK/pass (20 SEK/pass) with no quantity discount or upper limit. A central IT-system makes for cost effective administration with a recorded cost of 1.57 SEK/pass for Motala bridge through 2018.

Overall, the experiences from infrastructure fees have been positive so far. However, there are currently no official plans for extending the use of infrastructure fees to other projects<sup>30</sup>. There is also a fundamental difference between the Swedish model with infrastructure fees and the Norwegian Bompengeselskap model; in Sweden, the demand risk lies fully on the Swedish state whereas local/regional actors bear the demand risk in the Norwegian model. With regards to introducing toll fees on individual projects, local initiative and commitment is key in Norway.

---

<sup>28</sup> Discussions with Norwegian Public Roads Administration / Nina Lysfjord, Brita Bye

<sup>29</sup> Discussions with Swedish Transport Administration, Birgitta Olausson

<sup>30</sup> Discussions with Swedish Transport Administration, Birgitta Olausson



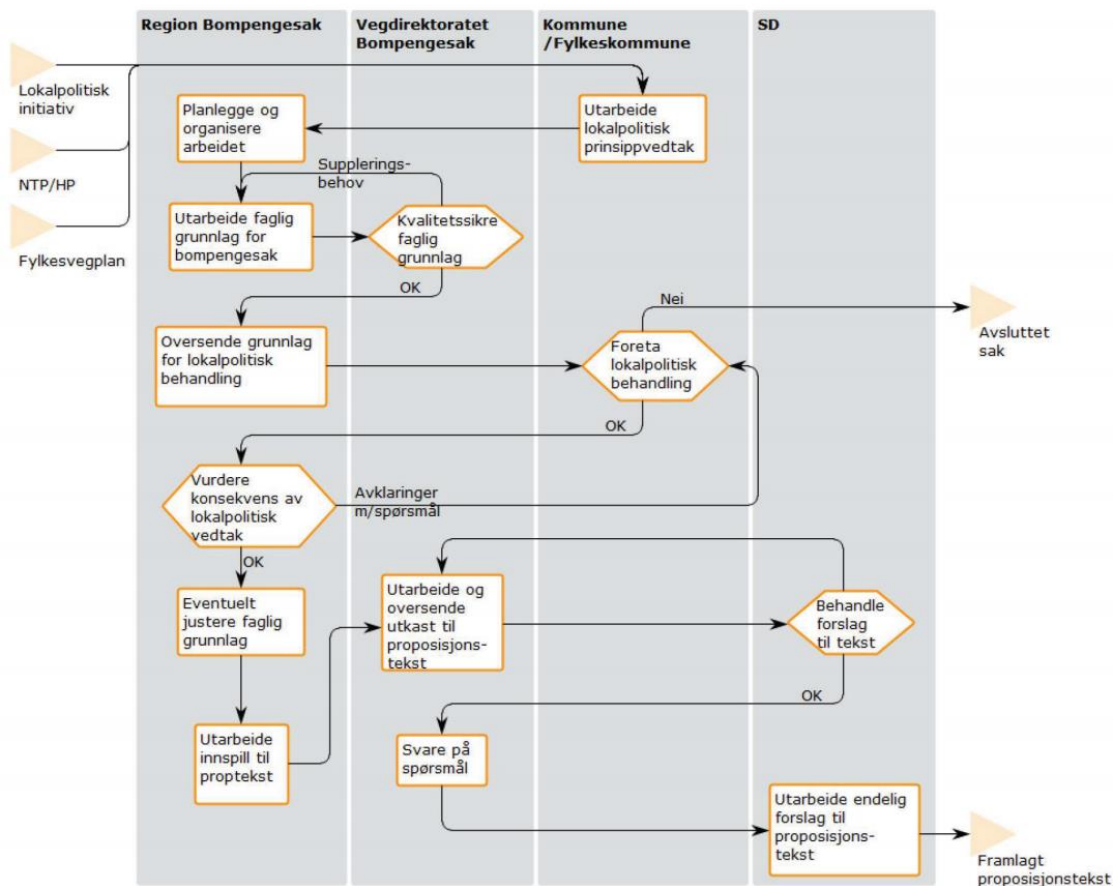
## 7 Description of a local/regional toll fee company for the Parainen-Nauvo bridge project

This chapter describes in more detail the locally/regionally owned toll fee company and modus operandi. It also outlines the potential role the Finnish state could have in the local/regional toll fee company.

### Starting point and basic principles

- The basic principles for the Parainen-Nauvo toll fee company would lean heavily on the Norwegian model for toll fee companies (Bompengeselskap).
- Step away from 'gift economy' thinking, a model for applying the 'beneficiary pays' (FI: Hyötyjä maksaa) principle in practice.
- Demand risk management by those with the best ability to handle the demand risk. Demand risk, which can be both downside and upside, is here defined as the risk that traffic volumes, and thereby revenues from toll fees, are smaller/larger than planned.
- Toll fees used to cover *a part of the investment costs*. In essence, toll fees should be seen as a 'vitamin injection' to enable the investment.
- The initiative for the toll fee company must come from local actors in order to show willingness and commitment for the project, See also Figure 4 below.
- Toll fee company would be a limited company (Ab/Oy) and majority owned by the public.

Figur 2 viser en oversikt over delprosesser, aktører og ansvarlige i en bompengeprosess.



Figur 2: Prosedyre for utarbeidelse av forslag til bompengeproposisjoner iht. Statens vegvesens kvalitetssystem

Figure 4 Bompeng process of Norway. Note that the initiative to start the process must come primarily from local actors. NTP = Nationell Transport Plan.

## Role and key responsibility

The role and responsibility of Parainen-Nauvo toll fee company must be simple and straight forward: finance the cofinancing part of the investment, enforce payments and dispose of funds.

## Organisation and governance

The toll fees and toll fee companies need to be integrated into the existing infrastructure planning by the Finnish state. E.g. toll financing would need to be studied in the early planning phases of a project.

The toll charging company's finances is dependent on the opening of the bridge. Therefore, there needs to be some security for the toll fee company not to stand without reimbursement if the road is not opened on time.

There would be full insight into the operations and finances of the toll fee company for the Finnish state, including meeting minutes of the board as well as meeting invitations and documents to the same extent as all the shareholders. The toll fee company must not conduct operations that are not included in agreements with the Finnish Transport Infrastructure Agency (FTIA).

## Key competence requirements

The toll fee company needs to possess competence in the following main areas<sup>31</sup>

- Technical competence
  - The toll fee company needs to have the competence to procure the necessary IT-technology (e.g. Autopass system used in Norway as well as IT-system for invoicing of users) as well as secure that the contracts with IT-service providers are adhered to
  - Capability to handle backoffice IT issues
- Financial competence
  - The toll fee company must have the capability to negotiate favourable loans. Norwegian Bompengeselskap's typically hire professional loan negotiators for this purpose.
- Customer service
  - The toll fee company is the 'interface' towards users of the bridge. Therefore good quality customer services is crucial, capability to handle different types of customers. In Norway, customer service is typically handled by the Bompengeselskap's own workforce.

## Financing structure and rough estimate of annual operating costs

The local/regional toll fee company is marked with a green box in the picture below.

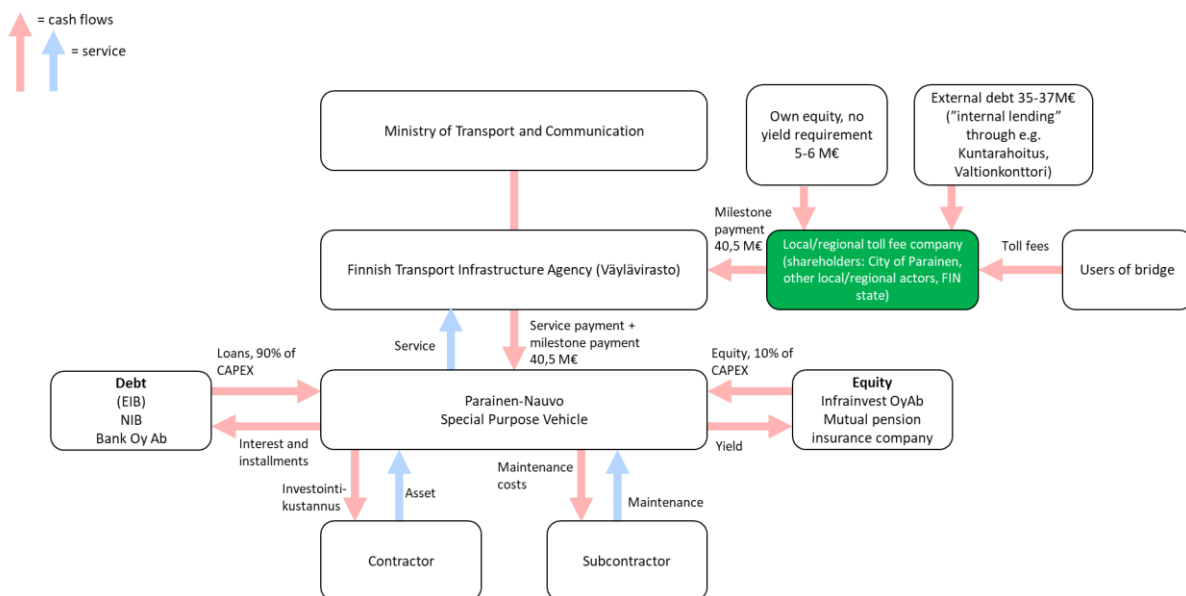


Figure 5 Overall financing structure for PPP3 model, case Parainen-Nauvo

<sup>31</sup> Discussions with Vegvesenet experts

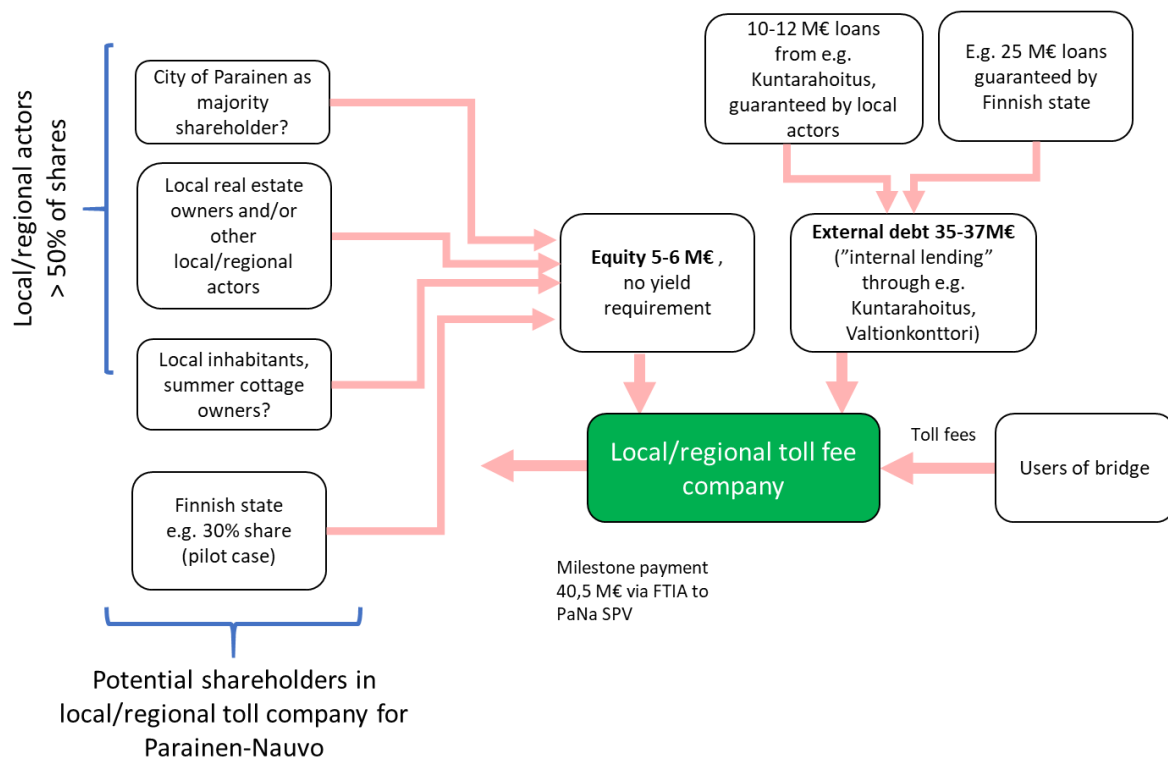


Figure 6 Financing structure and potential shareholders in local/regional toll fee company, case Parainen-Nauvo bridge.

Based on benchmarking numbers from Norway, a rough estimate of the operating costs for the toll company is in the range of 300-500 000 EUR/year with 500-600 000 vehicles/year traffic volumes. In the previous analysis for the Parainen-Nauvo bridge project<sup>32</sup>, assumed operating costs were in total 600 000 EUR/year for the local toll company, which hereby can be deemed realistic.

Prosjekt	Sum passeringssinnt ekter	Lønnskostna der	Administrasj onskostnade r	Innkrevingsk ostnader	Tap på krav	Avskrivninge r på varige driftsmidler	Andre driftskostna er	Sum driftskostnad er, ekskl avskrivninge r	Sum driftskostnad er, inkl avskrivninge r på varige driftsmidler	Totalt antall passeringer	Antall bomstasjon er
Fv 108 Ny Kråkerøyforbindelse	65.824.658	102.747	1.591.368	3.202.105	704.241	581.780		5.600.461	6.182.241	4.048.079	2
Rv 80 Løding - Viken (Tverlandsbrua)	40.775.985	93.885	30.805	1.843.191	892.258	103.108		2.860.139	2.963.247	3.485.208	1
Vossapakke	93.886.222	155.600	931.763	8.032.004	192.574	160.254		9.311.94	9.472.195	2.718.562	2
Rv 19 Kirkebakken - Re grense	69.064.215	118.664	747.677	4.855.089	-287.586	0		5.433.844	5.433.844	2.148.634	1
E136 Tresfjordenbrua/Vågstrandtunnelen	81.052.234	470.217	464.240	2.927.220	0	0		3.861.677	3.861.677	1.926.686	4
Fv 255 Jørstad - Segelstad bru	28.474.630	30.808	722.733	1.561.549	334.720	483.227		2.649.810	3.133.037	1.742.730	2
Fv 78 Tøntunnelen m/tilførselsveger	62.228.042	7.373	529.051	3.747.871	997.528	512.200	58.40	5.340.23	5.852.431	1.617.971	3
Fv 47 T-forbindelsen	35.450.454	46.781	267.361	2.214.042	748.635	0		3.276.819	3.276.819	1.540.411	1
Bæmløpakken	57.665.644	410.954	1.001.217	2.486.411	365.300	0		4.263.882	4.263.882	1.418.426	1
Rv 7 Sokna - Ørgenvika	93.431.970	38.336	620.630	3.088.894	405.330	7.941		4.153.190	4.161.131	1.278.431	1
Rv 80 Røvika - Strømsnes	30.003.819	121.990	43.574	1.709.271	123.120	75.459		1.997.955	2.073.414	1.258.936	1
Fv 714 Stokkhaugen - Sunde	70.888.018	0	1.407.690	604.214	862.805	0		2.874.709	2.874.709	1.166.936	2
Kvammapakken	30.638.926	243.224	340.190	3.551.553	-177.205	0	76.84	4.034.604	4.034.604	977.802	2
F16 Enghus - Raan, F16 Raan - Bjarne	30.308.724	32.805	578.043	1.429.644	246.019	4.465		2.286.511	2.290.976	953.783	1
Fv 71 Sykkylvsbrua	18.299.283	278.174	309.180	1.941.233	235.927	0	2.200.00	4.964.514	4.964.514	706.830	1
Rv 7/Rv 13 Hardangerbrua	99.913.188	417.404	696.961	3.720.490	934.809	0		5.769.664	5.769.664	698.526	1
E134 Stordaltunnelen	25.338.559	0	15.000	2.653.632	226.415	0		2.895.047	2.895.047	664.914	1
Fv 13 Skreifjella - Totenveika	16.476.979	33.000	415.493	986.159	120.768	86.167		1.655.518	1.741.677	512.031	1
Fv 34 Grime - Vesleelva	13.617.813	30.808	471.925	811.213	120.397	19.920	0	1.434.343	1.434.263	449.374	1
Fv 519 Finnfast	40.155.050	61.936	249.876	1.519.081	258.655	0		2.089.548	2.089.548	442.040	1
Fv 45 Gjesdal	18.097.736	0	773.689	2.322.326	203.719	0	0	3.299.734	3.299.734	408.639	1
Fv 544 Halsnøysambandet	21.424.934	115.473	729.575	2.308.893	6.173	0	0	3.160.114	3.160.114	383.444	1
Fv 858 Ryafjorden	13.380.408	361.774	338.048	1.312.864	342.872	98.446	60.680	2.416.238	2.514.684	228.789	1
Fv 107 Jondalstunnelen	17.394.176	195.367	407.782	1.585.829	40.888	0	0	2.229.866	2.229.866	209.241	1

Figure 7 Benchmarking of operating costs for operating local/regional toll fee companies in Norway (ref Vegvesenet/Brita Bye and Nina Lysfjord)

<sup>32</sup> Alternativa leverans- och finansieringsmodeller, Pargas-Nagu fast vägförbindelse, Foundation for project research, 2018.

## Finnish state as minority shareholder in the local/regional toll company

The Finnish state could be a minority shareholder in the toll company considering that toll fees is a completely new concept in Finland. The Finnish state could take e.g. a 30% ownership share as per Table 1 summarizes the implications for the Finnish state in this case.

Role of Finnish state in local toll company	Financial implications for the Finnish state	Advantages/opportunities for the Finnish state	Disadvantages/risks for the Finnish state
<b>Assumptions:</b> <ul style="list-style-type: none"> <li>- 30% of shares in toll fee company</li> <li>- Guarantee 25 M€ of the external loans with a 10% probability that demand risk materializes on loans guaranteed by the Finnish state</li> <li>- Board membership in toll company</li> </ul>	<b>Additional costs</b> <ul style="list-style-type: none"> <li>- <math>30\% \times 6 \text{ M€} = 2 \text{ M€}</math> (own equity)</li> <li>- <math>10\% \times 25 \text{ M€} = 2,5 \text{ M€}</math> (only if demand risk materializes)</li> <li>- 0,5 M€ (additional transaction costs, resourcing Board position)</li> </ul> <b>Total 5 M€</b>	<ul style="list-style-type: none"> <li>- 1<sup>st</sup> pilot project for toll fees in Finland to create nationally, new, important competence.</li> <li>- Enabling the bridge investment and thereby get rid of annual costs for maintaining current ferry traffic</li> <li>- Limited impact on Cost Benefit Analysis (H/K) and total lifecycle costs for the Finnish state</li> <li>- Full insight into local toll fee company through Board membership</li> <li>- Demand risk limited as no alternative route for users of the bridge.</li> </ul>	<ul style="list-style-type: none"> <li>- Some of the (limited) demand risk moved from local/regional actors to the Finnish state.</li> <li>- 'Pandora's box' syndrome, i.e. risk that local/regional actors in other infrastructure projects in Finland (with toll fees) also require involvement from the Finnish state.</li> </ul>

Table 2 Implications for the Finnish state of becoming minority shareholder in local/regional toll company, case Parainen-Nauvo bridge as Finland's first pilot project for toll fees.

*How essential is the financial impact of this additional 5 M€ cost for the Finnish state?* The difference ('delta') between estimated costs for continued ferry operations (yellow bars, Low scenario) and the PPP3 model (green bars) is shown in Figure 8 below. Assuming a discount factor of 3,5%, the total discounted costs for the Finnish state is 177,8 M€ for continued ferry traffic (50 years with cash flows discounted to opening year of bridge = year 2028). In the PPP3 alternative the comparable costs for the Finnish state is 153,7 M€. The difference of 24M€ (177,8-153,7) is significantly larger than the additional 5 M€ costs that a 30% ownership in the toll company would imply. Note that the additional costs of 5M€ is based on a 10% probability that the demand risk materializes. Again, the difference between Benefits and Costs in the CBA<sup>33</sup> (H/K ~1.1) are in the range of 12 M€. In practice, H/K would still be above 1, even when considering the additional 5 M€ costs for the Finnish state.

**The conclusion is that a 30% ownership by the Finnish state in the local/regional toll company does not have any significant impact on the 'business case' from the Finnish state's point of view.**

<sup>33</sup> Effektanalys version 1.0, Pargas-Nagu fast vägförbindelse, Stiftelsen för projektforskning, 2018.

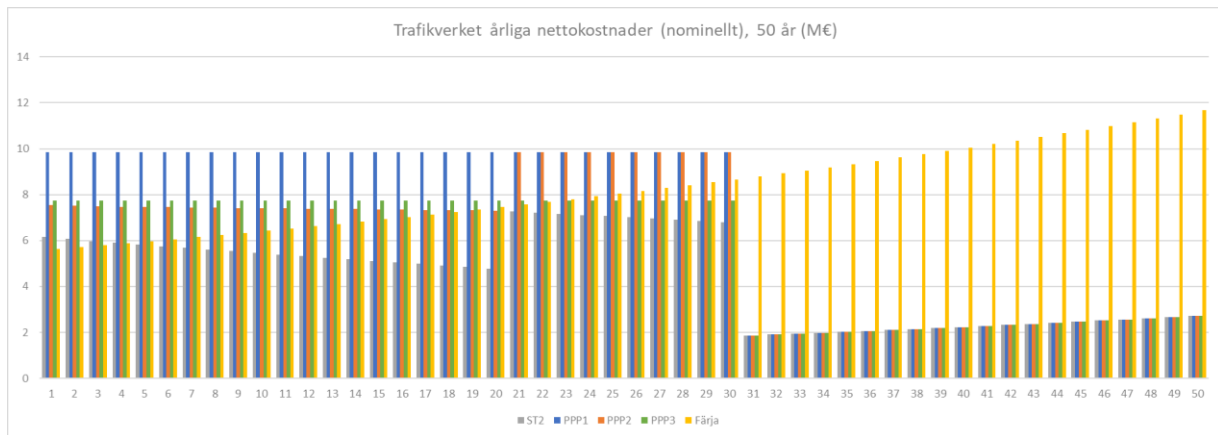


Figure 8 Yearly nominal costs for the Finnish state in various alternatives. Ferry = yellow bars (note. Low scenario for how costs are expected to develop<sup>34</sup>), PPP3 = green bars. Year 1 = bridge opens = year 2028

### Dispose of funds

Surplus liquidity would, as in Norway, first and foremost go towards paying down the loan. If the toll fee company is not bound by the size of the payments on the loan it can avoid the cost of excess cash liquidity. The funds need to be clearly earmarked for the project to ensure acceptance among users. The toll fee company is not to return a profit or pay a dividend but funds from toll fees can be used to pay back the equity.

### Loans

If possible, the toll fee company is to avoid loans with set instalments. The liquidity should rather go towards continuous down payments if possible. The toll fee company should also seek to limit its risk of rates rising to levels that hinders the company to service its debt. This can be done using interest rate swaps or by loans with fixed interest.

To receive better interest rates on the loans, the owner of the company can guarantee the loan by promising to assume the debt obligation in case of default of the company. The company can pledge its right to enforce toll payments towards the creditor and-/or guarantor as safety.

Out of the total need for external debt of 35-37 M€. Loans could be in two categories:

- Loans of 10-12 M€ guaranteed by local/regional actors
- Loans of 25M€ guaranteed by the Finnish state

### Demand risk management

The toll fee company assumes the risk of few payments. This risk can be handled and mitigated by the following main mechanisms:

- conservative estimates in rates and traffic forecasts
- raising of the toll fee (with the acceptance of the Finnish state) or
- lengthening of the toll charging period (with the acceptance of the Finnish state).

### Potential technical solutions for collecting toll fees

<sup>34</sup> Alternative leverans- och finansieringsmodeller, case Pargas-Nagu, Stiftelsen för projektforskning, 2018.

There are various existing technical solutions for collecting toll fees. Below is a selection of existing systems:

1. GNSS (satellite based). This system has previously been discussed in Finland.
2. Vignette (this system to be installed on trucks and lorries in Finland). Same system in use in e.g. Austria.
3. Transponder (Autopass/EasyGo/(ETS?))

According to data from the Norske riksrevisjonen (see Figure 9 below), the most cost-effective system for collecting toll fees is AutoPASS together with 'myntautomat'. AutoPASS is the Norwegian system for the collection of road tolls. It is owned by Statens vegvesen [Norwegian Public Roads Administration)<sup>35</sup>

Tabell 11 Gjennomsnittlig effektivitetsscore etter ulike bakgrunnsvariabler			
Bakgrunnsvariabel	Effektivitet (snitt)	Tal på observasjoner	Signifikans (ANOVA)
<b>Total</b>	<b>75</b>	<b>75</b>	
Brikkedel i fem grupper			0,00
Inga brikke	45	9	
Opp til 65 prosent	67	14	
65–75 prosent	72	22	
75–85 prosent	90	16	
Over 85 prosent	92	14	
Type innkrevjing			0,00
Manuell	45	9	
Manuell + AutoPASS	34	6	
Manuell + myntautomat + AutoPASS	85	11	
Myntautomat + AutoPASS	87	22	
AutoPASS	81	27	
Tal på år sidan innkrevjinga starta			0,14
3 år og under	65	11	
4–6 år	82	24	
7–9 år	72	29	
10 år og over	81	11	
Tal på passeringar i 4 grupper			0,00
Under 500 000	74	18	
500 000–1 500 000	68	15	
1 500 000–7 500 000	66	21	
Over 7 500 000	92	21	

Figure 9 Cost effectiveness of different models for collecting toll fees according to the Norske riksrevisjonen.

<sup>35</sup> See e.g. [www.autopass.no/en/about-autopass](http://www.autopass.no/en/about-autopass)