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The Nordic State Road and Railway Infrastructure Market

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Keywords: Market, Nordic countries, state roads, state railways, investment, operation and maintenance, strategy

Summary

This report gives snapshot of the general market situation with regard to state owned roads and railways in Denmark, Finland, Norway and Sweden at the end of 2012 and partially the beginning of 2013. The report has been commissioned by the Director Generals of the different Nordic transport administrations.

The content of the report is based on information available at the time of writing. The main sources for the information are all publicly available. Figures on expenditures on state roads and railways are based on amounts that have been decided upon, and are in force at this point of time. This includes longer term plans.

Chapter 1 gives an introduction and some background to the topic of the report. Chapter 2 covers some basic background information such as personnel in the administrations, and road and railway lengths. It also shows a few interesting ratios. Chapter 3 gives an overall picture of the market and procurement trends and Chapter 4 contains the basic financial data. This data pictures current (2012) and future investments levels as well as operation & maintenance volumes up to 2015 based on what is available publicly today as explained above. A few key ratios such as euros per km are also shown and examples and lists of current and planned major projects for each country.

The four Nordic countries covered here, Denmark, Finland, Norway and Sweden, seem similar from an external perspective, but each country has its own specific characteristics. There are differences in the procurement, although similar trends in all of the countries. There are also differences in the way longer term financing plans are discussed and approved. The extent of the infrastructure, state roads and railways, that each of the countries cover also differs. As an example the state roads in Denmark amount to 3 786 km whereas in Sweden they amount to 98 500 km. The differences have of course geographical explanations but also administrative in terms of on whose responsibility public roads are: state, regional or municipal. These differences can also be seen in the charts and tables in this report and, as all ratios cannot be pictured separately, it is important to bear in mind both geographical differences, such as Norway's topography, and the differences in the national road and railway networks. In addition, the current technical state of these networks in terms of possible back-log, design differences, and physical extent in comparison to the neighbouring countries is not discussed in this report and may be a subject for further analysis.

Peter Molin, Emil Matintupa: Pohjoismaiden valtiollisten teiden ja rautateiden markkinat. Liikennevirasto. Helsinki 2013. Liikenneviraston tutkimuksia ja selvityksiä 19/2013. 34 sivua. ISSN-L 1798-6656, ISSN 1798-6656, ISBN 978-952-255-297-6, ISSN 1798-6664 (pdf), ISBN 978-952-255-320-1 (pdf)

Avainsanat: Pohjoismaat, markkinat, valtion tiet, valtion rautatiet, investoinnit, hoito ja ylläpito, strategia

Tiivistelmä

Tämä selvitys antaa yleiskuvan valtion ylläpitämien teiden ja rautateiden markkinoista Norjassa, Ruotsissa, Suomessa ja Tanskassa vuoden 2012 lopulla ja vuoden 2013 alussa. Raportin toimeksiantajina ovat toimineet pohjoismaiden tie- ja ratavirastojen pääjohtajat Suomen Liikenneviraston kautta.

Raportin sisältö perustuu olemassa olevaan ja julkisesti saatavilla olevaan materiaaliin. Esitetyt kustannukset ja lukumäärät perustuvat tätä kirjoitettaessa päätettyihin budjetteihin ja voimassa oleviin suunnitelmiin. Tähän kuuluvat myös pitkän tähtäyksen suunnitelmat.

Luku yksi kertoo selvityksen taustat ja tavoitteet. Luku kaksi esittelee taustatietoa kuten henkilöstömääriä, sekä teiden ja rautateiden pituuksia maittain. Luvussa kolme käsitellään yleisesti markkinoita ja hankintastrategioita. Luku neljä sisältää investointisekä hoito- ja ylläpitokustannuksia vuodelta 2012 ja suunnitellut luvut vuoteen 2015 saakka. Luvussa neljä on esitetty myös muutamia suhdelukuja em. lukuihin perustuen, kuten hoidon ja ylläpidon osalta euroa / km maittain. Lisäksi luvussa esitellään esimerkinomaisesti suurempia käynnissä olevia ja suunniteltuja tie- ja rautatiehankkeita erikseen kunkin maan osalta.

Tässä esitellyt neljä pohjoismaata, Norja, Ruotsi, Suomi ja Tanska, näyttävät ulkopuolisen silmin samankaltaisilta, mutta jokaisella maalla on omat erityispiirteensä. Hankintastrategiat ovat samansuuntaisia mutta käytännössä eri sisältöisiä tai eri kehitysvaiheessa. Myös päätöksenteossa on selviä eroavaisuuksia, esimerkiksi miten pidemmän tähtäyksen suunnitelmia hyväksytään tai miten ne toteutetaan. Itse infrastruktuuri eroaa myös. Esimerkiksi valtion tieverkko Tanskassa on 3 786 km kun se Ruotsissa on 98 500 km. Eroavaisuuksilla on tietenkin maantieteellisiä selityksiä mutta myös hallinnollisia. Hallinnon osalta eroa löytyy mm. vastuiden osalta: mitkä julkiset tiet ovat valtion hallinnoimia, mitkä aluehallinnon ja mitkä kuntien. Nämä erot näkyvät kuvissa ja taulukoissa. Kaikkia eroavaisuuksia ei ole ollut mahdollista analysoida tarkemmin tässä raportissa, joten on tärkeä pitää mielessä esim. Norjan erot topografiassa verrattuna muihin maihin ja tie- ja rautatieverkkojen laajuudet eri maiden kesken. Raportissa ei oteta kantaa lähtökohtien eroihin kuten ylläpidon jälkeenjäämään tai liikenneverkon tekniseen tasoon ja laajuuteen eri maiden välillä.

Peter Molin, Emil Matintupa: Den Nordiska statliga väg- och järnvägsmarknaden. Trafikverket. Helsingfors 2013. Trafikverkets undersökningar och utredningar 19/2013. 34 sidor. ISSN-L 1798-6656, ISSN 1798-6656, ISBN 978-952-255-297-6, ISSN 1798-6664 (pdf), ISBN 978-952-255-320-1 (pdf).

Nyckelord: Nordiska länder, marknad, statliga vägar, statliga järnvägar, investeringar, drift och underhåll, strategi

Sammanfattning

Denna studie ger en generell bild av marknaden inom statlig väg- och järnvägshållning i Danmark, Finland, Norge och Sverige vid slutet av 2012 och början av 2013. Rapporten har beställts av generaldirektörerna i de Nordiska väg- och järnvägsförvaltningarna.

Rapportens innehåll baseras på befintligt och offentligt material som varit tillgängligt i skrivande stund. Siffror på kostnader och antal som presenteras är baserade på ikraftvarande beslut avseende budgeter och planer. Detta inbegriper långsiktiga planer.

Kapitel 1 beskriver bakgrunden till och syftet med rapporten. Kapitel 2 innehåller viss bakgrundsinformation såsom personal inom förvaltningarna, väg och järnvägslängder och täthet. Kapitel 3 ger en generell bild av marknaden och av upphandlingstrender. Kapitel 4 innehåller finansiella uppgifter såsom investeringar samt drift och underhållsutgifter dels för 2012, dels för kommande år t.o.m. 2015. En del nyckeltal presenterar t.ex. euro/km för drift och underhåll. I kapitlet presenteras även exempel på större pågående och kommande projekt för varje land.

De fyra nordiska länderna, som beskrivs i denna rapport, ser rätt lika ut ur ett utomstående perspektiv, men varje land har sina egna särdrag. Man ser skillnader i upphandlingsstrategier, trots likartade målsättningar. Även i beslutsfattandet ses skillnader dvs. hur långsiktiga planer godkänns samt hur de förverkligas. Själva infrastrukturen skiljer sig även länderna emellan. Som ett exempel kan nämnas det statliga vägnätets längd i Danmark, 3 786 km, vilket kan jämföras med Sveriges 98 500 km. Skillnaderna har förstås geografiska förklaringar men även administrativa; vem ansvarar för trafikförbindelserna, vilken del av ansvaret ligger på staten, vilken på en regional förvaltning och vilken på den kommunala. Skillnaderna ses även i tabellerna och diagrammen i rapporten. Då man inte kan beskriva alla särdrag är det viktigt att komma ihåg t.ex. skillnader i topografi (Norge) samt i det statliga väg- eller järnvägsnätets utsträckning. I rapporten tas inte ställning till skillnaderna i utgångslägen såsom möjligt eftersläp i underhåll, skillnader i utformning och den tekniska nivån samt nätverkets utsträckning jämfört med grannländerna.

Foreword

This report has been commissioned by the Director Generals of the different Nordic transport administrations.

The report gives snapshot of the general market situation with regard to state owned roads and railways at the end of 2012. Ms. Kristiina Laakso, Mr. Ari Huomo and Ms. Miia Asikainen from the Finnish Transport Agency have supervised the preparation of the report. The report has been written by Peter Molin and Emil Matintupa from Ramboll Finland Oy.

Helsinki, May 2013

Finnish Transport Agency
Investments

Contents

1 Introduction

This report presents a snapshot of the road and railway infrastructure market in four Nordic countries, Denmark, Finland, Norway and Sweden, at the end of year 2012. The report is limited to the state owned infrastructure in these countries. Municipal or regional transport networks such as roads, private railways, metros are not covered unless they form an integral part of the national network. Airports, seaports and fairways are equally excluded as is also traffic control and operation. The focus is on planning and design, construction and operation and maintenance of the aforementioned road and railway networks

The report is based on information available at the time of writing. No separate market inquiry has been made. A large extent of the information is publicly available such as the planned investments for the coming four years. Also background data as presented in this chapter is available publicly.

There have been changes in some countries regarding what is state responsibility and what is on a regional or local level. Notes in connection to the figures explain what has been included and why. Examples of changes are e.g. ca. 44 000 km of roads that were transferred from the state level to the regional level in Norway in 2010. These roads have been included since the Norwegian road administration still administers the roads on behalf of both the state and the regional authority.

2 Background information

2.1 Nordic road and rail administrations

The structure and personnel in the different national administrations vary as can be seen in table 1. Regarding roads and railways Denmark and Norway have separate administrations and Denmark also a state owned company running the large bridges and tunnels (Sund & Bælt Holding A/S), whereas Sweden and Finland have combined their roads and railway administrations into one agency. These agencies also cover fairway administration. As the EU regulates the safety administrations are separated in the EU member states and also in Norway with regard to railways. A detail regarding the areas of responsibilities is also that the Danish rail administration, Banedanmark, also covers the Copenhagen metro. The other countries' administrations do not cover other municipal infrastructure except of course the local trains as they are an integral part of the railway network.

Table 1. Personnel in the public administrations covering all transport infrastructures

Country	Administrations	Employees
Denmark	Vejdirektoratet (The Danish Road Directorate)	900
	Banedanmark (Rail Net Denmark)	2200
	Trafikstyrelsen (The Danish Transport Authority)	350
	Sund & Bælt Holding A/S	140
	Søfartsstyrelsen (The Danish Maritime Authority)	190
	Kystdirektoratet (The Danish Coastal Authority)	110
Finland	Liikennevirasto (Finnish Transport Agency)	740
	Trafi (Finnish Transport Safety Agency)	530
	ELY liikennevastuu (Centre for Economic Development, Transport and the Environment, Transport and infrastructure)	580
	Finavia (Finavia Corporation)	3000
Norway	Statens Vegvesen (The Norwegian Public Roads Administration)	6500
	Jernbaneverket (The Norwegian National Rail Administration)	3980
	Jernbanetilsynet (The Norwegian Railway Authority)	40
	Luftfartstilsynet (The Norwegian Civil Aviation Authority)	170
	Avinor AS	3000
	Kystverket (The Norwegian Coastal Administration)	1000
Sweden	Trafikverket (The Swedish Transport Administration)	6500
	Transportstyrelsen (Swedish Transport Agency)	1650
	Sjöfartsverket (Swedish Martime Administration)	1168
	Luftfarstverket (Civil Aviation Administration)	1300
	Swedavia AB (Swedavia Corporation)	2500

Figure 1 shows the amount of personnel in the four countries covering roads and railways although as noted above, in the case of Sweden and Finland these figures also include personnel covering other areas of transport. Both of these countries have merged the sector based organisation into an organisation covering the value chain.

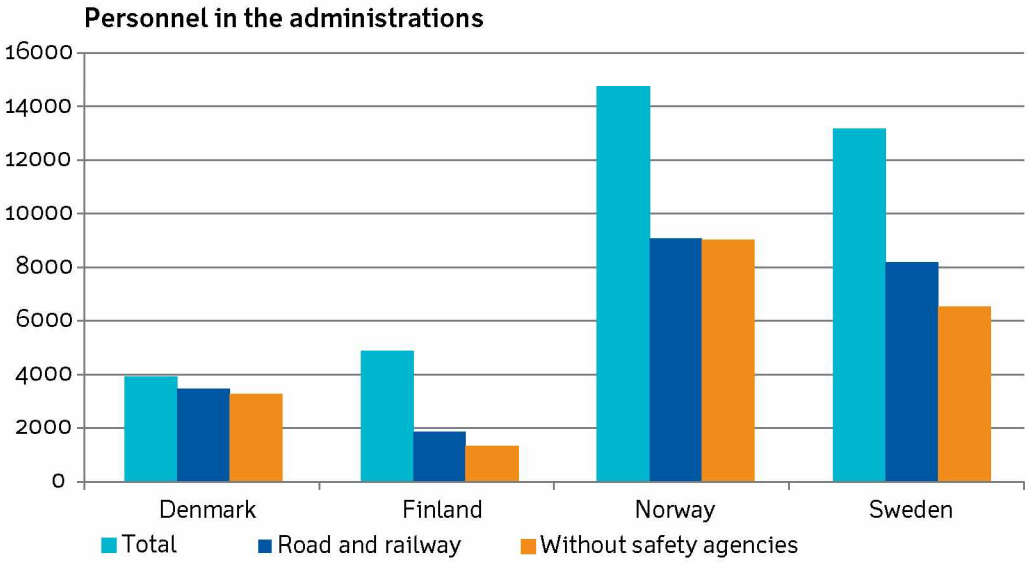


Figure 1. Personnel in national administrations covering roads and railways.

An estimate of the amount of personnel dealing with investments in the road and rail administrations and also in most cases with planning and design related to the investments can be seen below in table 2. One explanation to the low amount of investment personnel in Finland is that a large portion of the client function has been outsourced to procurement consultants and client's engineers.

Table 2. Estimate of personnel dealing with investments in the transport administrations

Country	Administration	Employees, investments
Denmark	Vejdirektoratet (The Danish Road Directorate)	466
	Banedanmark (Rail Net Denmark)	250
Finland	Liikennevirasto (Finnish Transport Agency)	75
Norway	Statens Vegvesen (The Norwegian Public Roads Administration)	1050
	Jernbaneverket (The Norwegian National Rail Administration)	550
Sweden	Trafikverket (The Swedish Transport Administration)	NA

2.2 Nordic roads and railways, basic facts

As explained in the introduction the basic facts on roads and railways have some differences due to changes in the administration. This is mainly for Norway where, as said, a large portion of national roads were transferred to the regional level. The opposite happened earlier in Denmark when regional roads were transferred to the national and municipal level.

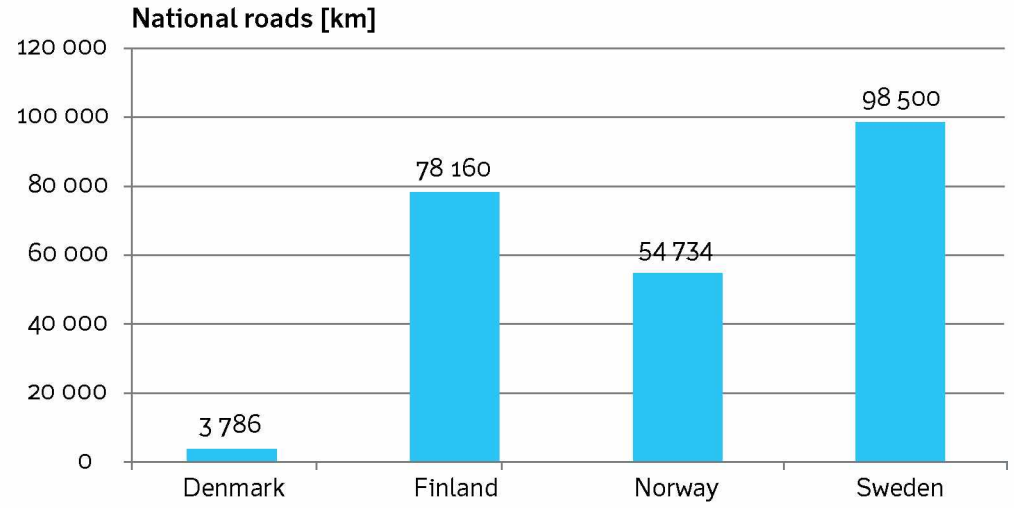


Figure 2. Road network lengths in the four Nordic countries. Norway's figure includes the regional roads.

Figure 3 shows the railway network length of railway **lines** (FI: ratapituus, SE: banlängd). This number is of course different from the railway **track length**.

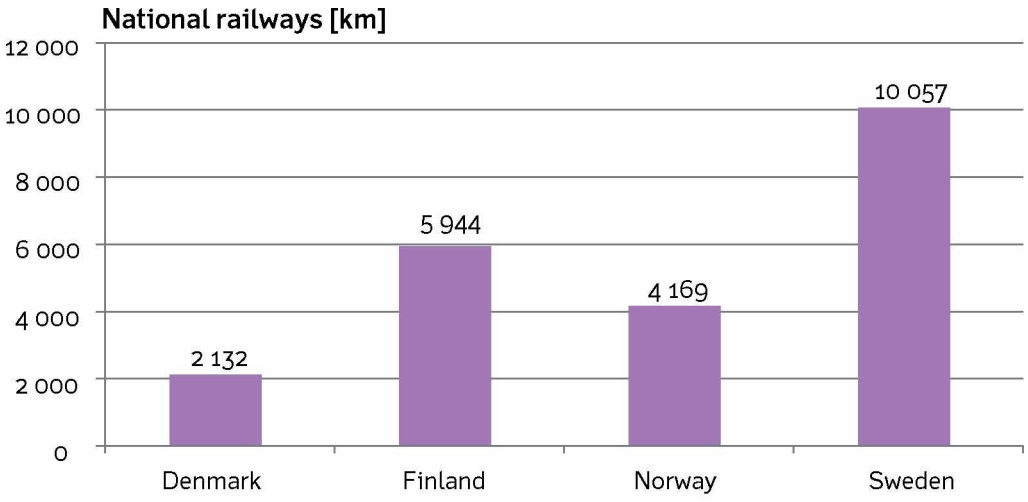


Figure 3. Railway line lengths

Some different types of road lengths are shown in figure 4: the overall road network length as in figure 2, the length of motorways and the length of motor-traffic ways, i.e. roads where slow vehicles, pedestrians and bicyclists are not allowed. The motor-traffic ways may or may not be four-lane roads, but they usually include grade-separated junctions with other roads.

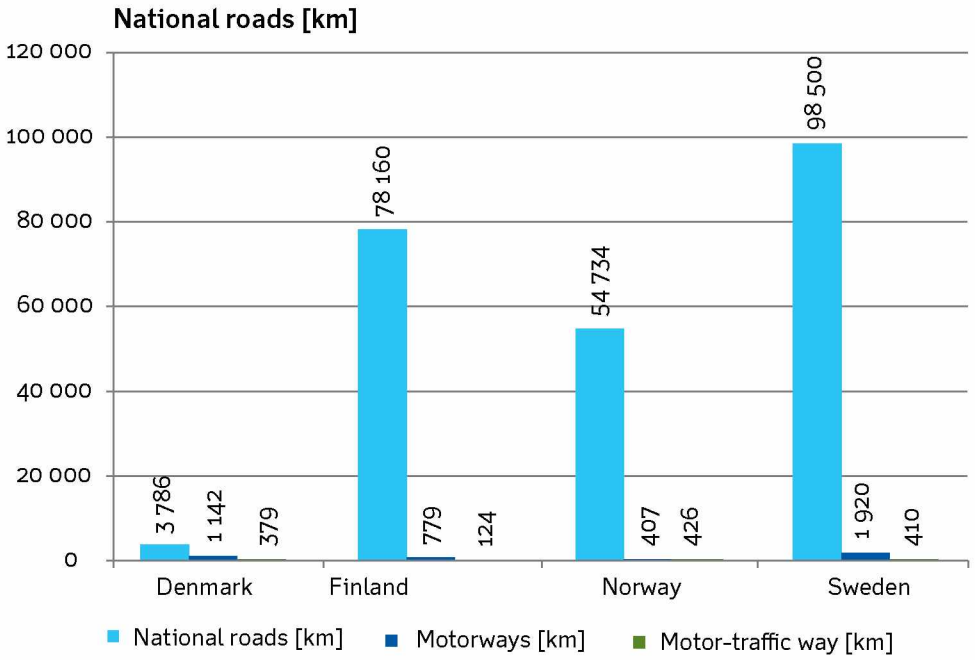


Figure 4. Road, motorway and motor-traffic way lengths

Figure 5 shows the ratio of public and private roads per square kilometre in the four Nordic countries. The figure indicates the density of the private and public road network in the different countries. The density of the road network is by far highest in Denmark. Finland has the largest portion of private roads per square kilometre.

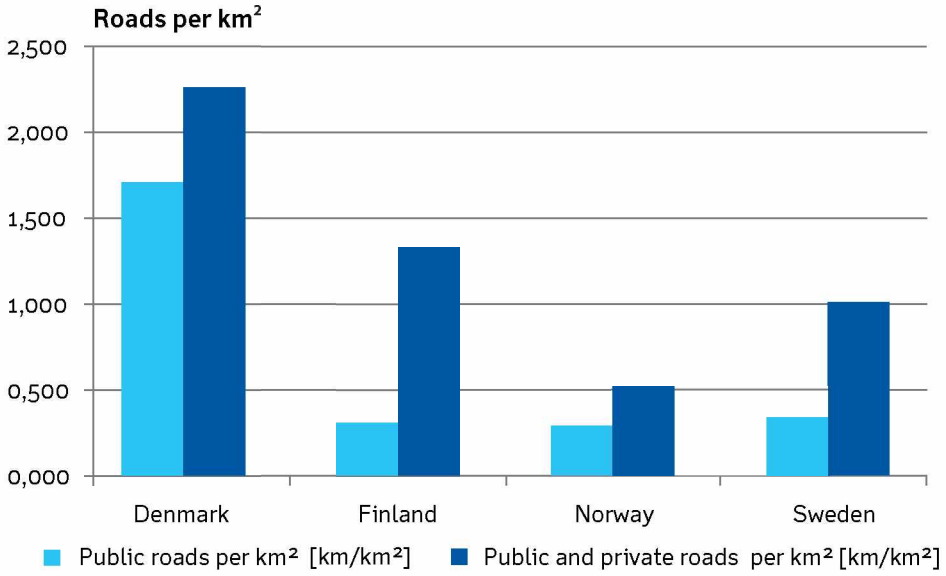


Figure 5. Roads per area (km/km²)

Figure 6 shows the portion of electrified and double-track railways in the four countries.

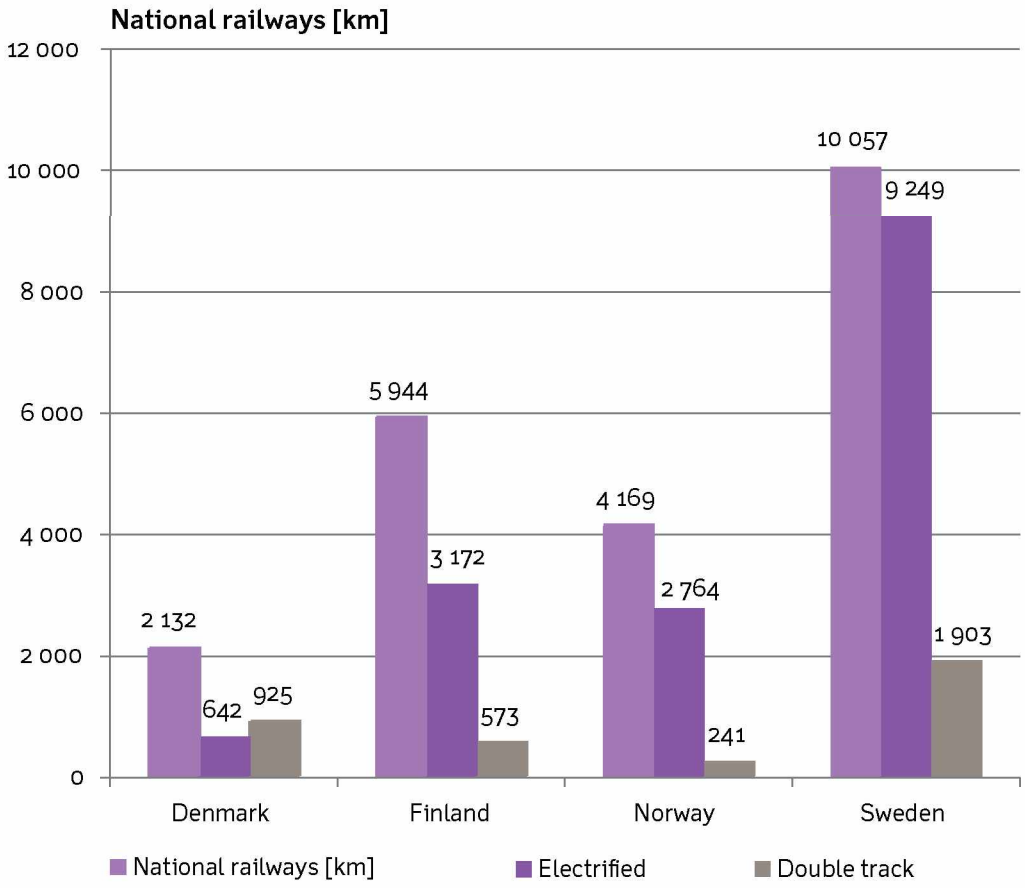


Figure 6. Total rail line length and electrified and double-tracked line lengths

Figure 7 shows the ratio of railways per square kilometre in the four countries. The figure indicates the density of the railway network in the different countries. The density of the railway network is clearly the highest in Denmark.

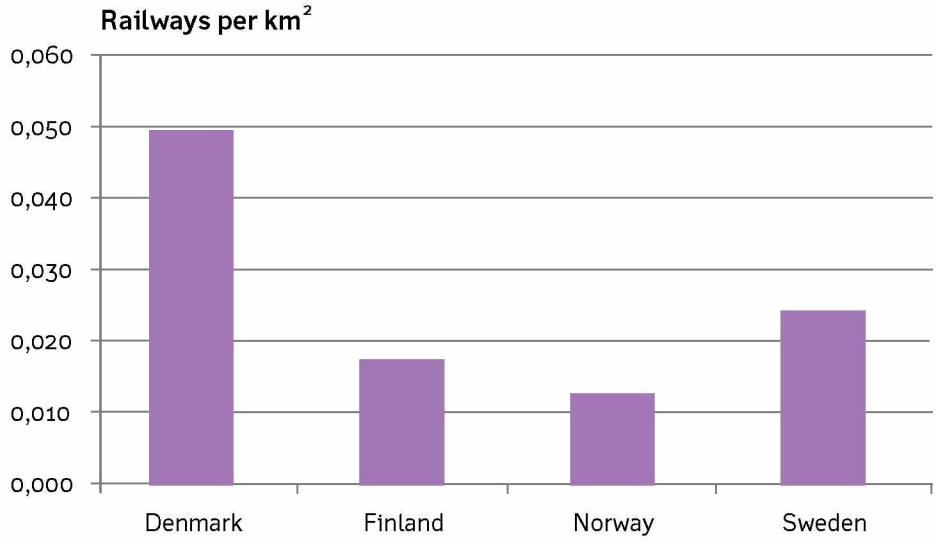


Figure 7. Railways per area (km/km²)

3 Current situation and future trends

3.1 Major companies operating in the market

The attractiveness of the Nordic market is clearly seen in recent year in the increased efforts by large international contractors and design consultancies. Denmark has actively sought international companies both in railways and roads by e.g. providing procurement documentation in English. The same applies to Norway and Finland with respect to the PPP projects. Sweden has also successfully attracted new players into the market by providing documentation in English. The language issue is naturally key to attract foreign companies. Here the large Nordic companies obviously have an advantage as skills both in the Scandinavian languages and in the way of working can be found in-house. Skanska and NCC operate in all Nordic countries, and have strong regional organisations. Lemminkäinen from Finland has also successfully been operating in the other three Nordic countries, starting out with road maintenance (paving) and continuing with tunnel construction and general infrastructure.

Many of the state owned infrastructure companies have already ventured into the neighbouring countries such as the contractors Infranord to Denmark and VR-Track to Sweden. Also the state-owned designers have crossed the border to neighbouring countries but to a lesser extent. For example Vectura from Sweden has been successful in entering Denmark and Norway. One clear reason for being successful in entering these markets is the difference in price levels as the hourly rates in Denmark and Norway are clearly higher compared to Sweden and Finland that have similar rate levels. The difference is partially explained via the higher general cost level in the two countries compared to Finland and Sweden. This difference of course levels out as the business grows and with more local personnel.

Table 3. Major service providers in the Nordic countries

	DK	FI	NO	SE
Existing contractors	NCC, Arkil, Pihl & Søn, MJ Eriksson, MT Højgaard, Aarsleff, Barslund	Lemminkäinen, YIT, NCC, Skanska	Veidekke, NCC, Skanska, Hæhre Entreprenør, AF Gruppen, Risa	Skanska, Peab, NCC, Strukton Rail
"New" contractors	Salini, Strabag, Züblin, Van Gelder, TBI	Strabag/Züblin, Peab	Bilfinger Berger, Hochtief, Alpine Bau, Implenia, Pihl&Søn, IAV, Lemminkäinen, Marti, Infranord, Strabag	Veidekke, Mesta, Lemminkäinen, VR
Designers	COWI, Rambøll, Niras, Atkins, Grontmij	Ramboll, Sito, WSP, FCG	Norconsult, Multiconsult, Rambøll, Aas-Jakobsen, Asplan Viak, COWI, Sweco	Sweco, WSP, ÅF, Ramböll, Tyrens, COWI
"New" designers		Sweco	Atkins, Mott MacDonald, Vectura, Arup	Atkins
State owned contractors		Destia, VR	Mesta Konsern as	Svevia, Infranord
State owned designers		Destia, VR		Vectura, Sweroad

3.2 Contractors market share in roads

The market share in **roads** of contractors operating in the Nordic countries can be seen in the figures below. The share of "others" is the largest in Norway and Denmark. This implies that the market is covered by a larger number of contractors than in Finland and Sweden. The size of road construction markets is also implied by the figures; a single project in Finland, the Hamina by-pass, stands for 49% of the road construction market in 2011.

The figures below also show that there are a few international contractors operating in these countries but the majority are obviously domestic.

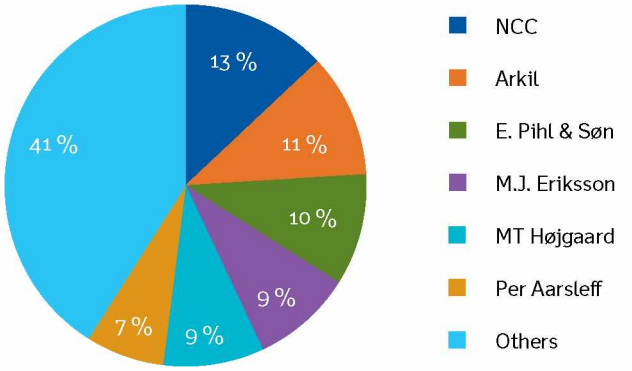


Figure 8. Contractors' market share, roads, 2011 [%], Denmark

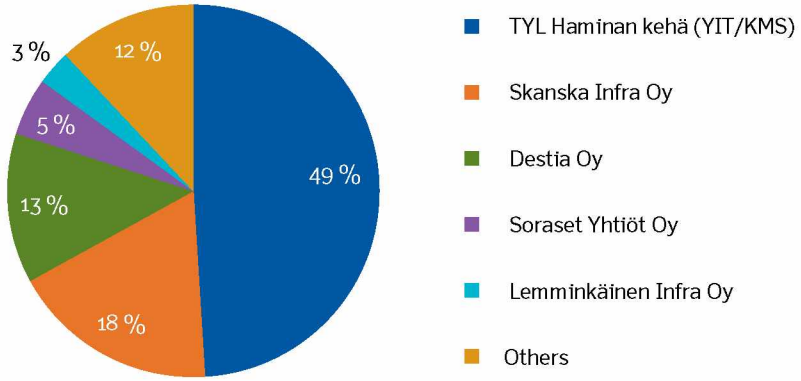


Figure 9. Contractors' market share, roads, 2011 [%], Finland

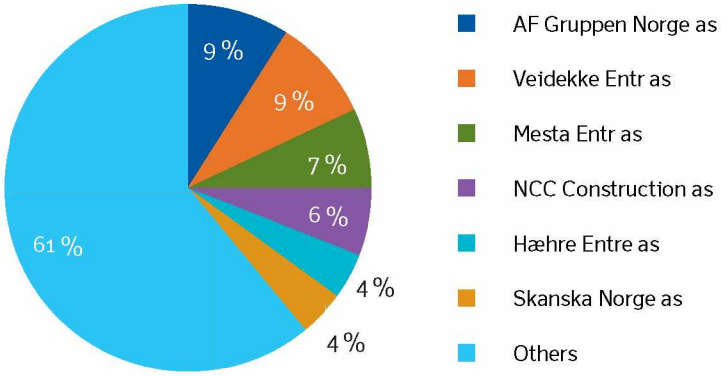


Figure 10. Contractors' market share, roads, 2011 [%], Norway

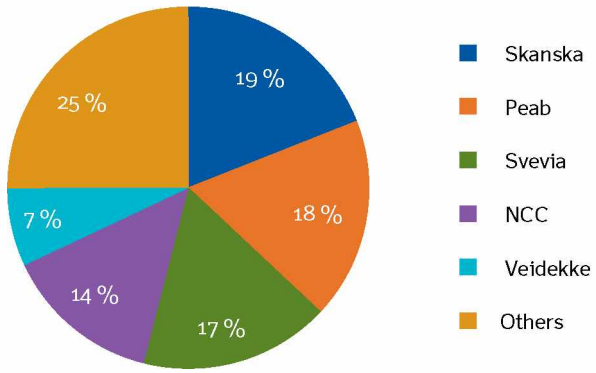


Figure 11. Contractors' market share, roads, 2011 [%], Sweden

3.3 Outsourcing of public services

The service providers market has undergone quite major changes during the last 5-10 years. Most of the different administrations production parts have been separated into limited liability companies, but are still 100% state owned and the ownership control is handled by a ministry. The main differences being that Norway and Denmark have in general outsourced only their construction whereas Finland and Sweden also have outsourced the design part to state-owned companies. The Danish administrations have not had construction production of their own for over 10 years, but within roads still employ some 200 designers. In railways the Danish administration sold off the design part to the British company Atkins but still has operation and maintenance in-house with some 740 persons.

Norway has outsourced most of its construction production equally to Finland and Sweden in both railways and roads, but retains design capabilities in roads. Almost half of the Norwegian roads design is made in-house. The railway operation and maintenance in Norway is kept in-house with some 2000 employees, i.e. a large portion of the rail administrations personnel. The contractor Mesta is a state-owned company, but no state ownership exists in design.

Finland and Sweden have both formed state-owned companies of their own production. Finland formed a state-owned company in railways already in 1995, VR Group. The company provides design services, construction, maintenance and is currently the only passenger and cargo operator on the Finnish railways. The construction and design of roads were outsourced to a state-owned company in 2010, before which it was a state enterprise.

Vectura is the former design part of both the rail and road administrations in Sweden. Infranord is the administration's former railway construction part and Svevia the former road construction part.

3.4 Procurement trends

Procurement trends vary a bit between the four Nordic countries, but one main trend can clearly be seen: the increase of Design and Build, D&B, contracts (totalentreprenad, ST-urakka) and at the same time the reduction of traditional Design-Bid-Build, DBB, contracts. Finland started this trend strongly in ca. year 2000 and has thus over 10 years of experience in D&B contracting, especially in the roads sector. The railway sector in all countries is still perhaps more in favour of DBB contracts.

Sweden has voiced a strong target of procuring up to 50 % D&B contracts with functional demands by the end of 2018. This is a big change as most of the current contracts are DBB. The purpose is to enhance the development of technical solutions that reduces costs by letting the close cooperation between designers and contractors complete with others.

Another clear trend in contracting is the use of functional requirements and including a longer period of operation and maintenance, O&M, in the contract. In O&M the trend is clearly towards regional contracts, especially in the daily operations, but also in maintenance. This applies for both roads and railways, but in railways mainly in the daily operation due to the nature of transport.

Other trends include the use of Public-Private Partnerships, PPP, with contracts including up to ca. 30 years of responsibility of the road or railway for the selected service provider. The use of PPP varies between the countries, both in terms of contract contents and the service period. Finland is the first country in Europe having had a road, the Lahti motorway (main road 4, E75), returned to the state after a 15 year long PPP concession period. In addition Finland has two more PPP contracts in place and one more planned. Norway has three contracts in place and Denmark one as described in table 4. No railway-PPP contracts have yet been awarded with the exception of the Arlanda express train in Sweden, but as a project it is not comparable as it will not become a state railway.

Table 4. Road PPP-projects in the Nordic countries

	Name	Length [km]	Concession period [years]	Concession value (Million EUR)
Denmark	M51 Sønderborg-Kliplev	26	26	227
Finland	E75 Järvenpää-Lahti	70	15	252
	E18 Lohja-Muurla	51	24	700
	E18 Koskenkylä-Kotka	53	15	650
Norway	E39 Klett-Bårdshaug	22	25	NA
	E39 Lyngdal-Flekkefjord	17+17	25	NA
	E18 Grimstad-Kristiansand	38,2	25	NA

The development of project delivery contracts has accelerated in the last few years. Sweden is increasingly making use of partnering and is also moving towards D&B-contracts with operation & maintenance periods (such as E4 at Sundsvall). Finland has two alliance-contracts in place using early contractor involvement or partnering (the Lielahti-Kokemäki railway section and main road 12, the Tampere shoreline road). Norway has an expressed intention of moving towards design and build contracts but progress has been slower than in Sweden and Finland. Denmark has used partnering especially in operation and maintenance contracts for a longer time.

4 Future investment projects and plans

4.1 Introduction and the basic decision process

The figures in the following diagrams are based on publicly available information, mainly from ministerial level. These figures **represent plans, not approved budgets**. The following main sources have been used for the figures below:

Denmark:	Forslag til Finanslov 2013, En grøn transportpolitik
Finland:	Liikenneviraston toiminta- ja taloussuunnitelma 2012–2015, kehyssuunnitelman pohjalta tehty investointiohjelma
Norway:	National Transport Plan 2014-2023
Sweden:	Nationell plan för transportsystemet 2010-2021, Transportsystemets behov av kapacitetshöjande åtgärder

The decision on the funding is very similar in all four countries: in practice no funding exists before the yearly budget is approved by the parliaments. However, there are differences in the planning of the future expenditures. Norway, Finland and Sweden all have national transport plans covering the near future as well as further ahead. Norway approved its new National Transport Plan, NTP, for 2014–2023 in April 2013 and Sweden is currently preparing the revision of its national transport plan for the years 2014-2025. Denmark has a deal among all leading parties (both government parties and the opposition) on developing a greener infrastructure from 2009. This deal has been renewed in March 2013 with several new projects listed and it differs from the other countries as it is an agreement across the political scene. Denmark also opened the debate on the outlook for the transport system for 2020 (Fremtidens trafik by the Ministry of Transport) looking at the large projects needed. In addition, Denmark has an Infrastructure Fund (Infrastrukturfonden) that was established in 2009 to fund large infrastructure investments on a longer terms basis. The Infrastructure Fund is financed partly by tax revenues and partly by other sources such as returns from the sale of public assets, road pricing including toll from the Oresund and the Great Belt fixed link, and tax financed means.

4.2 Total state investments in roads and railways

The total amount of expenditures for the years 2012-2015 are shown in figure 12 below. Denmark and Finland seem to have the same level of expenditures even though the difference in network lengths is substantial. Norway's and Sweden's expenditures are clearly higher, almost double, and again with clear differences in their respective transport infrastructure. Norway's new NTP gives an increase of the overall funding with ca 50 % for the years 2014–2023. The figures for Norway also include the regional (fylke) funding for roads, i.e. the funding sources differ from the other countries, but are still state expenditures.

The expenditures per GDP are common key figures that are widely used to compare the share of funding used for transport infrastructure in a country. Figure 13 shows the portion of expenditures out of GDP as a percentage for the year 2012. An important thing to remember is also the effect of the currency rates on the GDP while doing a comparison. In any case it can be noted that the total Norwegian (390 billion EUR) and Swedish (408 billion EUR) GDPs are clearly larger than those of Denmark (244 billion EUR) and

Finland (194 billion EUR). This fact evens out the differences in figure 12. On the other hand the lengths of the road and railway networks also have a large variation as shown in chapter 2. The investments and operation & maintenance expenditures in relation to road and railway lengths and other key figures are shown in chapter 4.5.

Figure 12. Total expenditures in state owned roads and railways

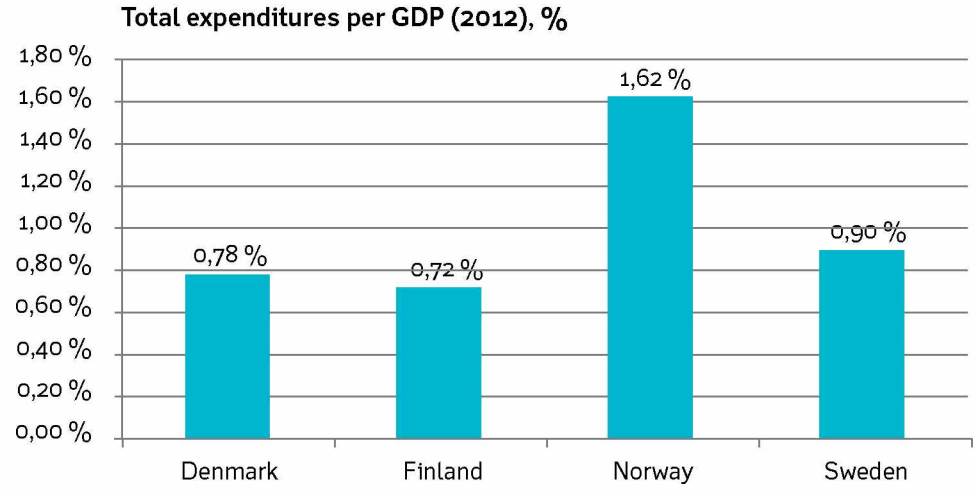


Figure 13. Total road and railway state expenditures in relation to total GDP (2012)

4.3 Road Investments and Operation & Maintenance 2012-15

The total planned investments and operation & maintenance expenditures for **roads** can be seen in figures 14-16. The Danish decline in road investments is not a planned decline but merely shows the decision process that is mainly based on the yearly budgeting. The decline in operation & maintenance costs is partially due to the strong increase Denmark had during the last couple of years in order to reduce the maintenance backlog, especially concerning bridges. This has also created a boom in the bridge repair market that will decline in a year or so. Norway and Sweden show their figures for a period of years and as an average sum per year which explains the evenness of the columns over the years. Finland has clearly the lowest level of expenditures, especially considering the length of the road network. There is also a difference in the share of O&M costs of the total expenditures: Finland and Sweden seem to have a larger relative focus on O&M compared to Denmark and Norway.

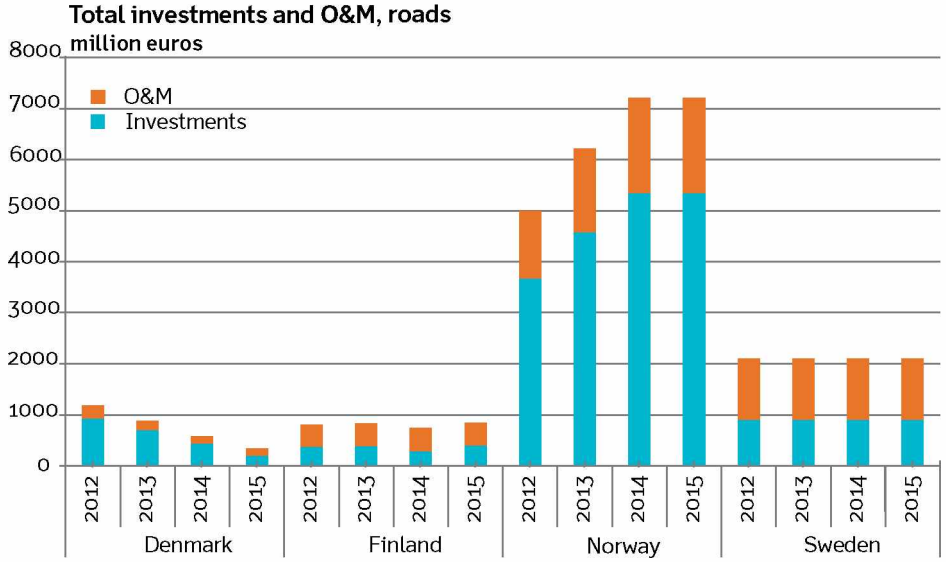


Figure 14. Total road expenditures

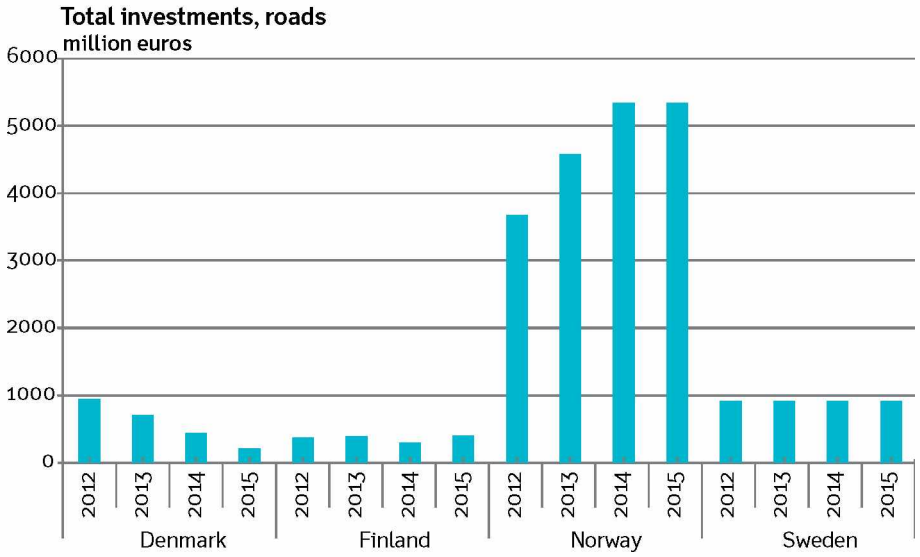


Figure 15. Road investments

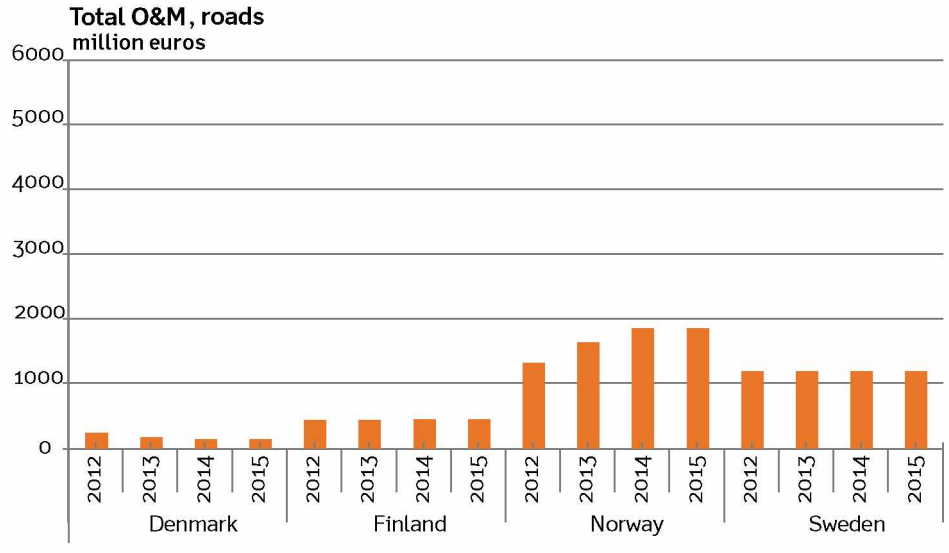


Figure 16. Roads, operation & maintenance costs

4.4 Rail Investments and Operation & Maintenance 2012-15

The same explanations of the columns in the figures for railways apply as for roads. Some differences should be noted though: the Copenhagen metro is a part of the overall expenditures of the Danish railways, whereas this is not the case for Finland even though the government covers 30% of the Helsinki-Espoo metro extensions costs.

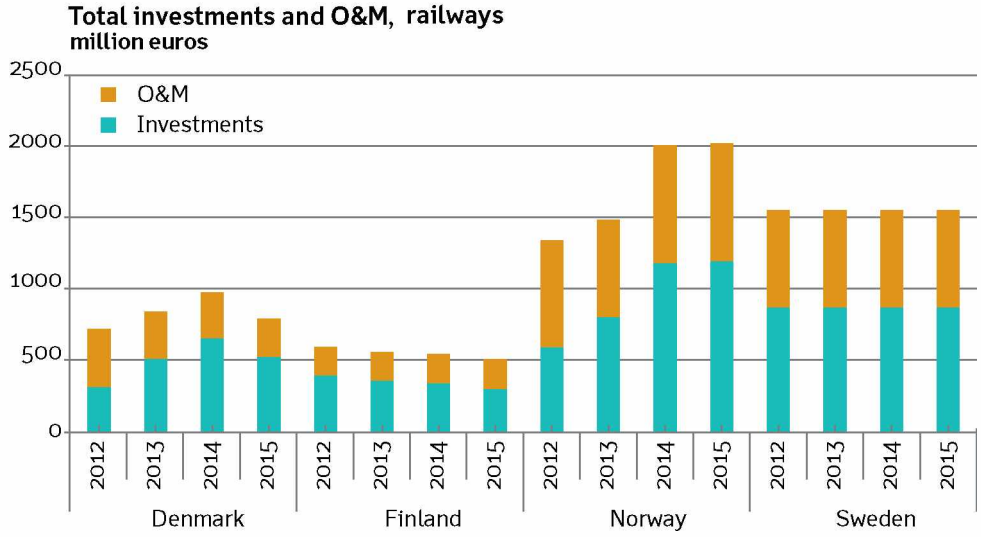


Figure 17. Total railways expenditures

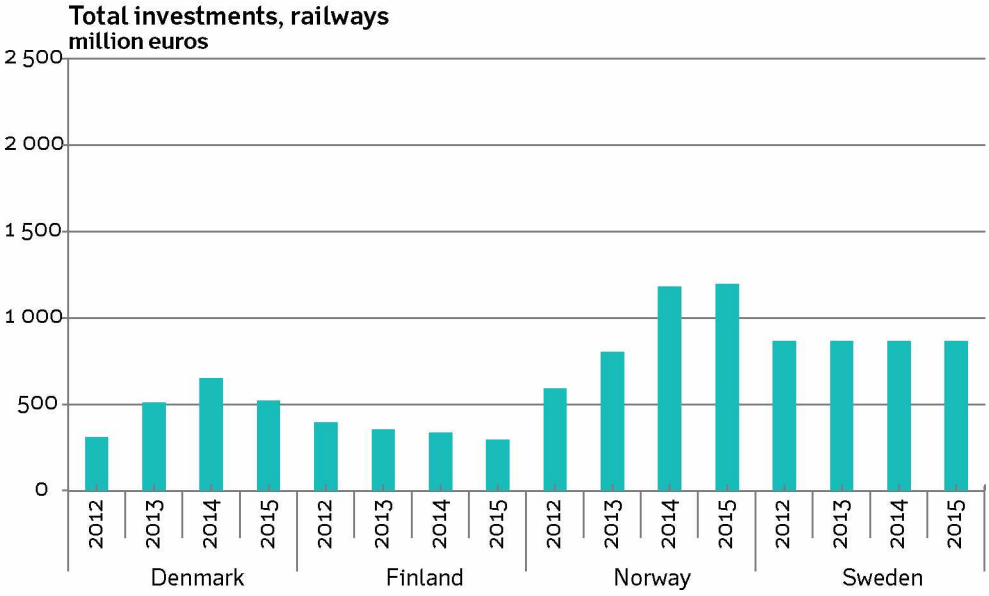


Figure 18. Total railways investments

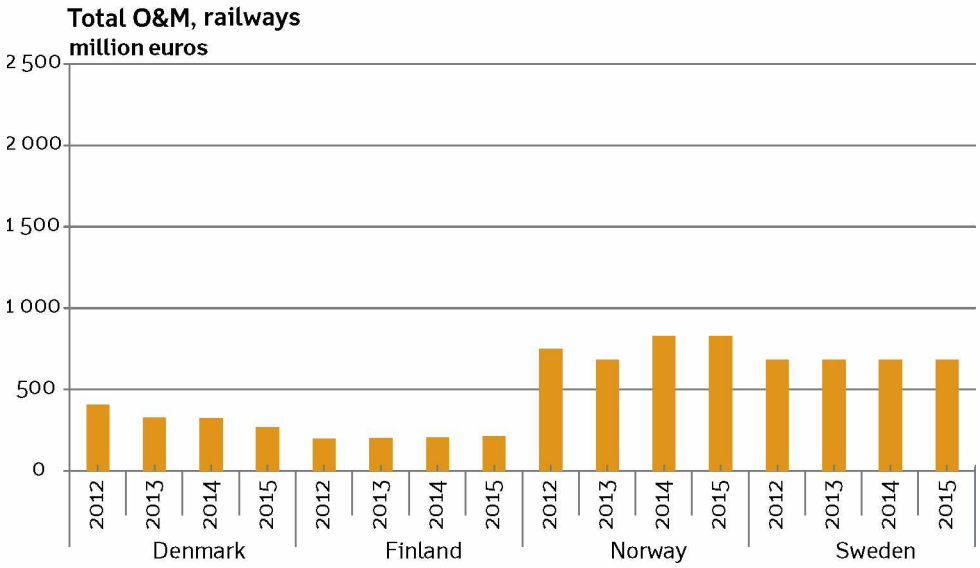


Figure 19. Railways, operation & maintenance costs

4.5 Comparative analysis

A few ratios describing the similarities and differences between the countries are shown in the following figures.

The total expenditure, both investments and operation & maintenance, is shown in relation to the road and railway network length respectively. Even though there are large differences in both railways and roads, the roads especially draw an interesting picture. Finland seems to have lowest overall level in both, but as there are several new road stretches being built, more analysis is needed with regard to the differences. In railways the figure is more comparable as not many completely new lines are planned for the coming years. Again with some exceptions: Norway has extensive plans for railway improvements and Denmark is currently investing heavily in upgrading their signaling system. Also the improving of connections towards Fehmern Belt show in the figures.

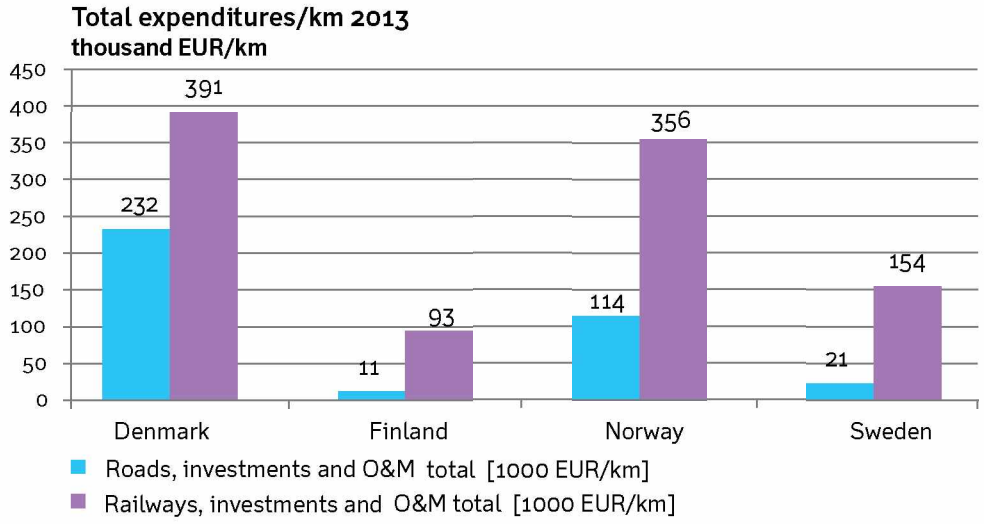


Figure 20. Planned expenditures per km for roads and railway in 2013. Note! Denmark has the metro included in its figures, Finland's figures do not include the metro.

Operation & maintenance is easier to understand and explain as it relates directly to the existing network. Further analysis would be needed to find out whether the differences between the countries have to do with the network itself, i.e. the service level or the backlog of the networks. It seems as Denmark is investing heavily both into their roads and railways compared to the other countries. Norway is investing even more than Denmark in their railways.

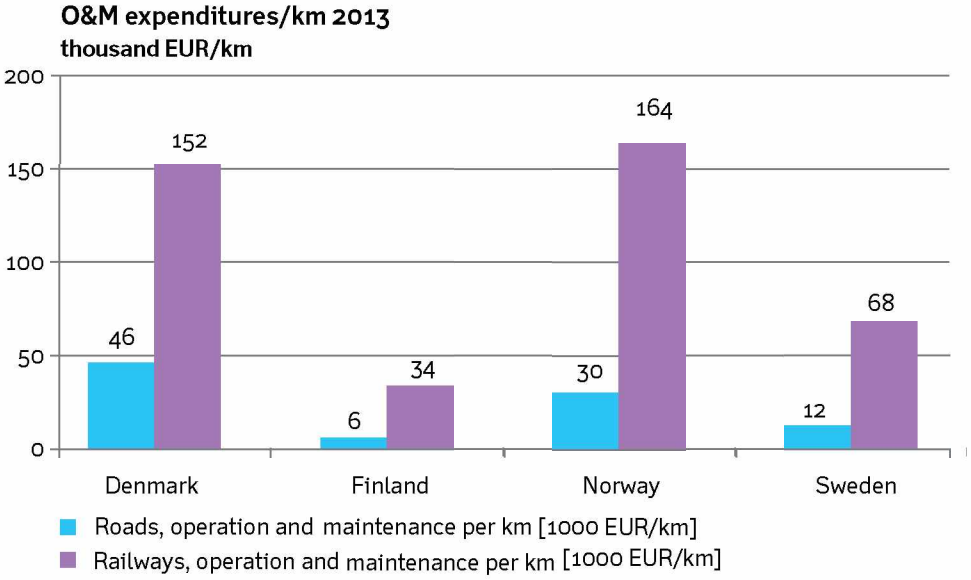


Figure 21. Operation and maintenance expenditures per road and railway-km in 2013 (thousand EUR/km)

4.6 On-going and planned projects in Denmark

Road projects,

- Ongoing
  - Køge bugt motorvejen
  - Motorring 4 – Tværvej N
  - Hørsholm S – Øverødvej
  - Tuse N – Herrestrup
  - Elverdam – Regstrup
  - Slagelse omfartsvej
  - Næstved omfartsvej
  - Nykøbing Falster omfartsvej
  - Nr. Aaby – Middelfart
  - Skærup – Vejle N
  - Riis – Ølholm – Vejle
  - Brande omfartsvej
  - Funder – Låsby
  - Sdr. Borup – Assentoft
- Planned
  - Isterød – Hørsholm S
  - Tværvej – Frederikssund
  - Roskilde fjord forbindelsen
  - Solrød S – Køge
  - Regstrup – Kalundborg
  - Sakskøbing – Rødby havn
  - Odense V – Gribsvad
  - Kolding – Fredericia
  - Søbyvad – Mundelstrup
  - Viborg – Rødkærsbro
  - Herning – Holstebro
  - 3. Limfjordsforbindelse

Figure 22. Major road projects under construction (green), newly constructed (black) and major planned projects (red)

Railway projects

- Signalling programme covering the whole network (until 2021)
- Electrification
  - Esbjerg - Lunderskov
  - Køge Nord - Næstved
  - Roskilde - Kalundborg
  - Fredericia - Aarhus
  - Aarhus – Aalborg
- Copenhagen – Ringstedt
- Fehmern land connections

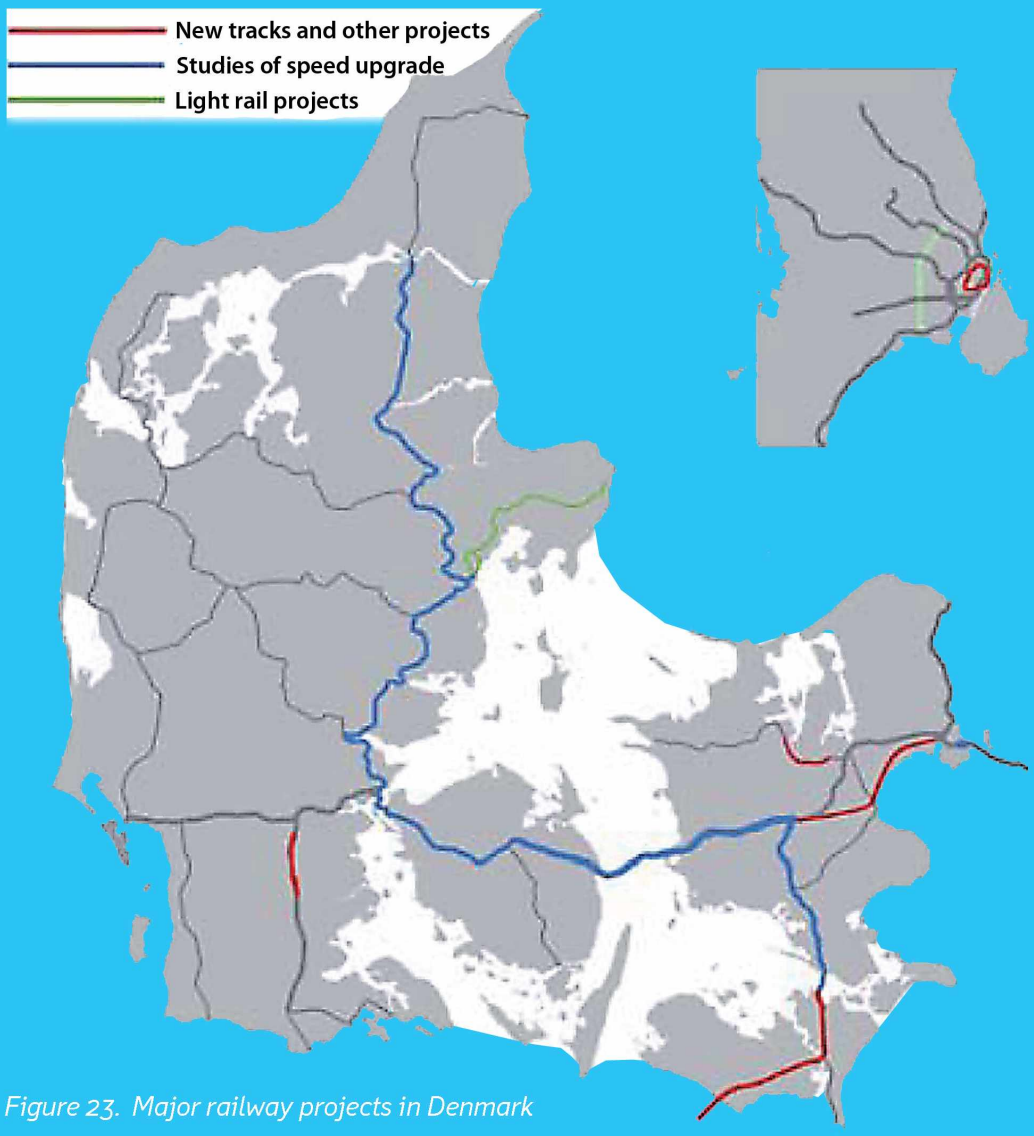


Figure 23. Major railway projects in Denmark

4.7 On-going and planned projects in Finland

Figure 24. On-going road and railway projects in Finland

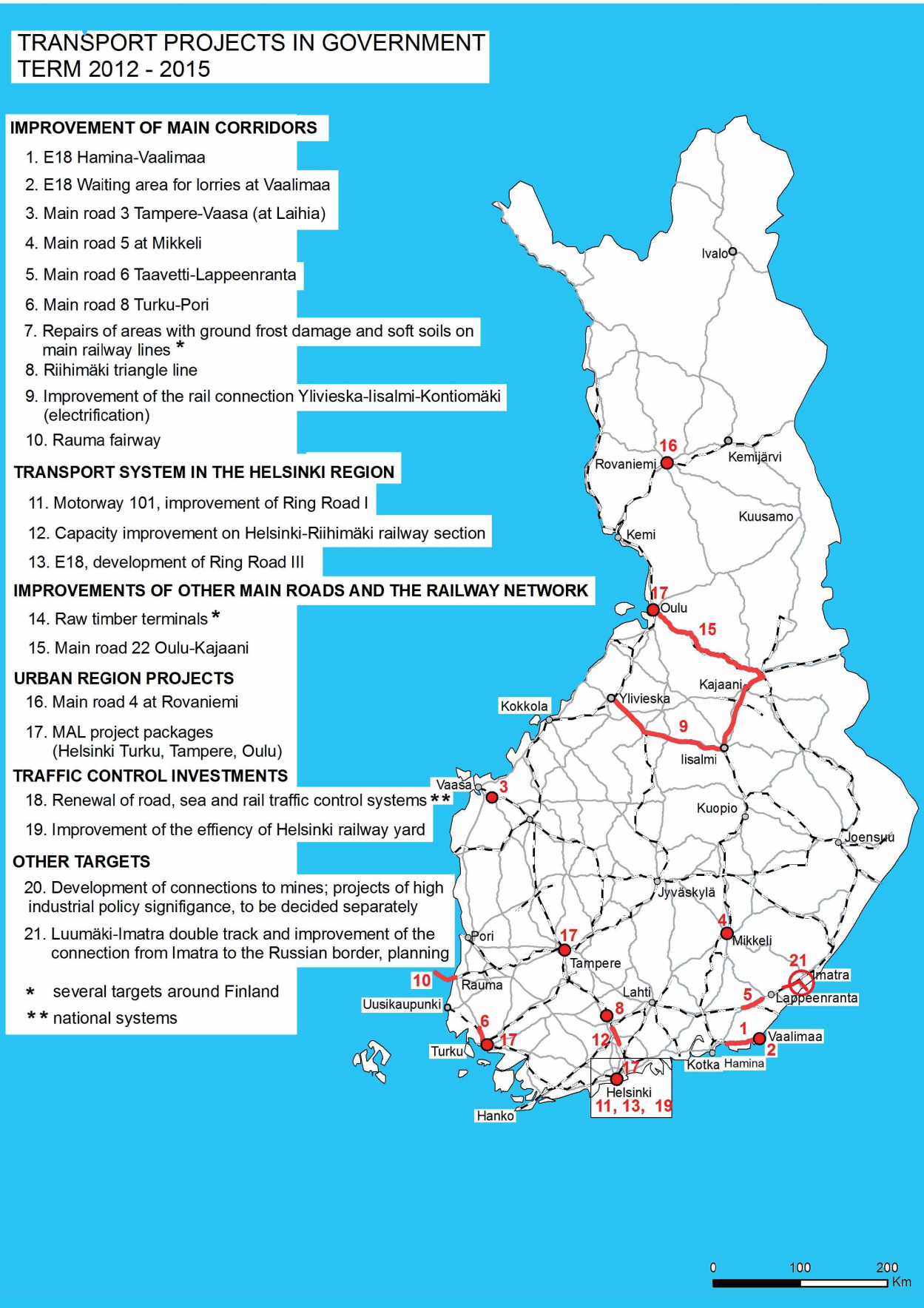


Figure 25. Major planned investment projects in Finland

4.8 On-going and planned projects in Norway

In Norway the Government's White Paper for the period will provide the following Railway development:

- 55 percent increase in funds available for maintenance
- 116 km of new double track
- 28 km of new single track
- 45 new passing loops

Planned railways projects in Norway (as presented in the new National Transport Plan 2014-2023):

- Regional Projects
  - New terminal Narvik
  - Heimdal st.
  - Trondheim cargoterminal
  - Platformextions
  - Parking tracks Kongsberg, Lillestrøm and Eidsvoll
  - Large number of «smaller» projects, 25-300 mill
- Farriseidet – Porsgrunn
- Holm – Nykirke
- Eidsvoll – Hamar
- Follobanen
- Sandbukta – Såstad
- Ulriken Tunnel
- Bergen – Arna
- Hell – Værnes
- Eletrification of Trønderbanen and Meråkerbanen;
- Construction of IC triangle: double tracks Hamar – Oslo, Tønsberg – Oslo and Fredrikstad – Oslo

Road projects in Norway:

- E6 Biri – Otta
- E 18 Bommestad – Sky
- E16 Filefjell
- E39 Svegatjørn – Rådal
- E39 Eiganestunnel:
- Fv 13 / Rv 13 Ryfast:
- E6 The Hålogaland bridge
- E6 Helgeland
- Ferryless E39 Kristiansand-Trondheim

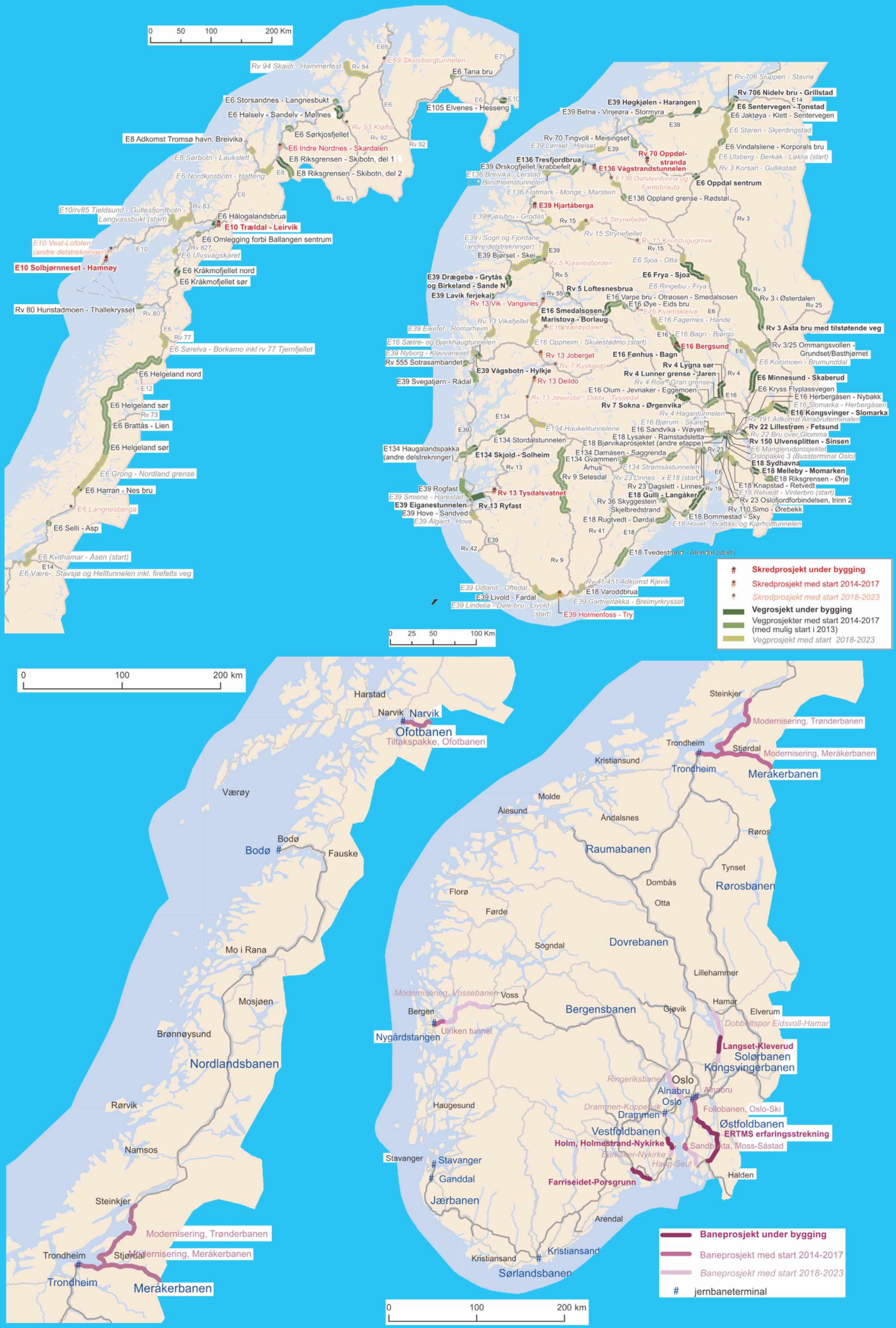


Figure 26. Road and railway projects in Norway

4.9 On-going and planned projects in Sweden

Below a list of the largest planned projects in Sweden from the National Transport Plan 2010–2021:

- Västsvenska paketet 34 billion SEK
- Förbifart Stockholm 27,7 billion SEK
- Citybanan 18,4 billion SEK
- Botniabanan, Nyland–Umeå 15,5 billion SEK
- E20 Norra länken 11,9 billion SEK
- Västkustbanan, tunnel genom Hallandsås 10,8 billion SEK
- Mälarbanan, Tomteboda–Kallhäll 10,7 billion SEK
- Citytunneln och bangårdsombyggnad, Malmö 9,1 billion SEK
- Norway/Vänerbanan med Nordlänken, Trollhättan–Göteborg (Olskroken) dubbelspår (includes stations in Götaälvdalen) 7,2 billion SEK
- Ådalsbanan, Sundsvall–Nyland 7 billion SEK
- E4 Sundsvall 4 billion SEK
- E18 Hjulsta–Kista 4 billion SEK
- Haparandabanan 3,4 billion SEK
- E45 Agnesber–Älvängen and Älvängen–Trollhättan 6 billion SEK
- Södra stambanan, Flackarp–Arlöv 3,1 billion SEK
- Västkustbanan, Varber–Hamra, includes travelling centre 2,7 billion SEK
- Göteborgs hamnbana includes a new bridge in Marieholm 2,7 billion SEK
- The local railway in Stockholm, Älvsjö–Ulriksdal, Sundbyber, Slussen–Hammarby, Sjöstad–Saltsjöbaden 2,6 billion SEK
- The local railway in Stockholm, Älvsjö–Ulriksdal, Sundbyberg, Alvik–Ulvsunda–Solna staion 2,4 billion SEK
- Godsstråket genom Bergslagen, Motala–Mjölby 2,3 billion SEK
- Västkusbanan, Södertunneln Halsingborg 2,3 billion SEK
- Malmbanan, new railway pass Kiruna 2 billion SEK
- E4/E12 Umeå 1,9 billion SEK
- Rv 50 Mjölby–Motala 1,6 billion SEK
- Västra stambanan, Göteborg–Skövde 1,6 billion SEK
- Godsstråket genom Bergslagen, Hallsberg–Degerön 1,6 billion SEK
- Västkustbanan, Ängleholm–Maria 1,6 billion SEK
- Lv 259, Södertörnsleden and Masmolänken 1,5 billion SEK
- Ostkustbanan, Uppsala railway yard 1,5 billion SEK
- Södertälje sluss and shipping lane to the harbours in Mälardalen 1,3 billion SEK
- Svealandsbanan, Strängnäs–Härad 1,3 billion SEK
- Bergslagsbanan, Ställdalen–Kil 1,2 billion SEK
- Rv 40 Rångedala–Hester 1,1 billion SEK
- Stambanan through Övre Norrland, Umeå 1,1 billion SEK
- Kraftförsörjning järnväg, hela landet 5,6 billion SEK
- ERTMS korridor B, hela landet 3,6 billion SEK

In addition to the large projects listed above several smaller projects are also planned. In figure 27 is shown as an example the amount of projects going on in the region of Stockholm.

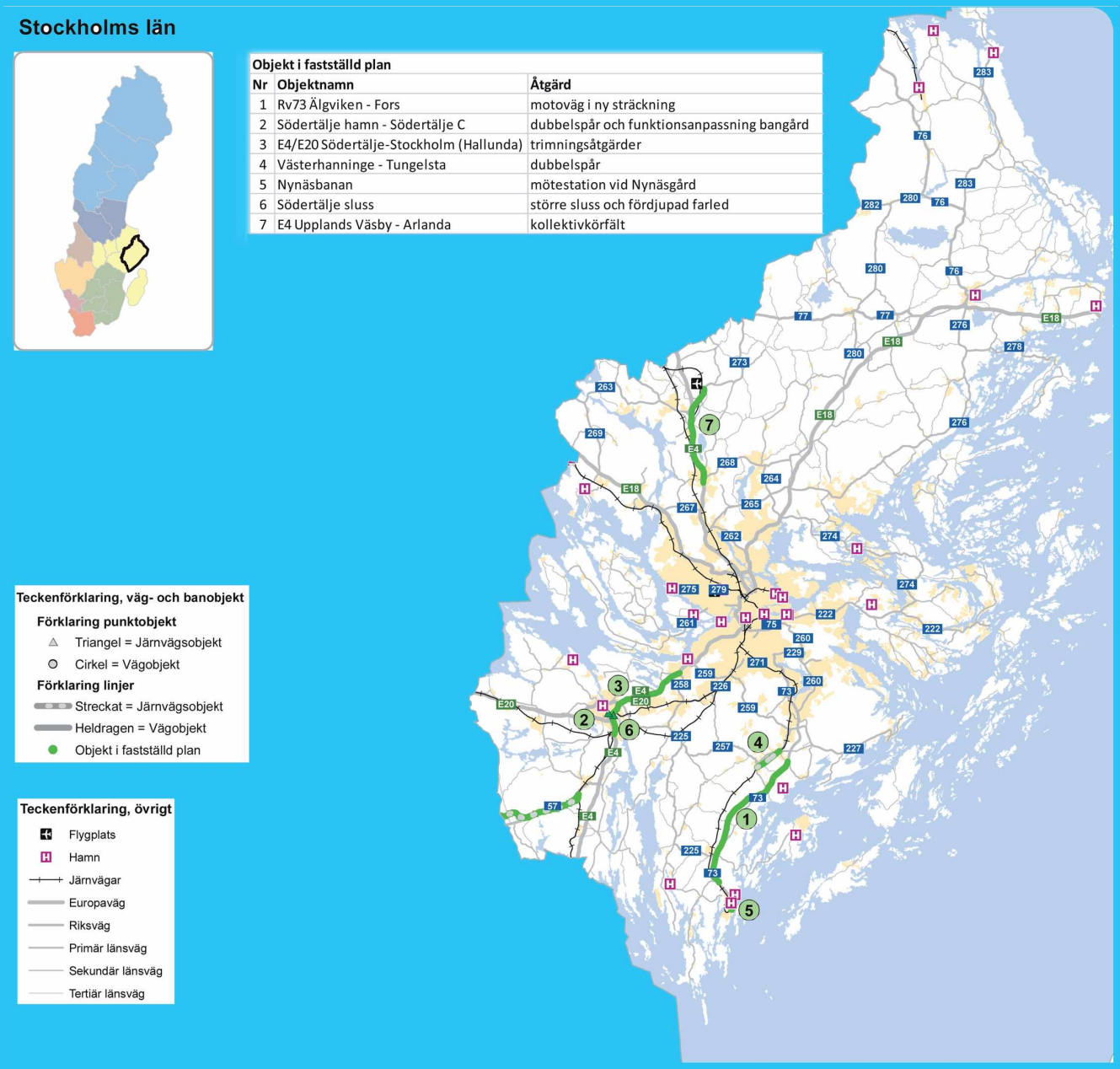
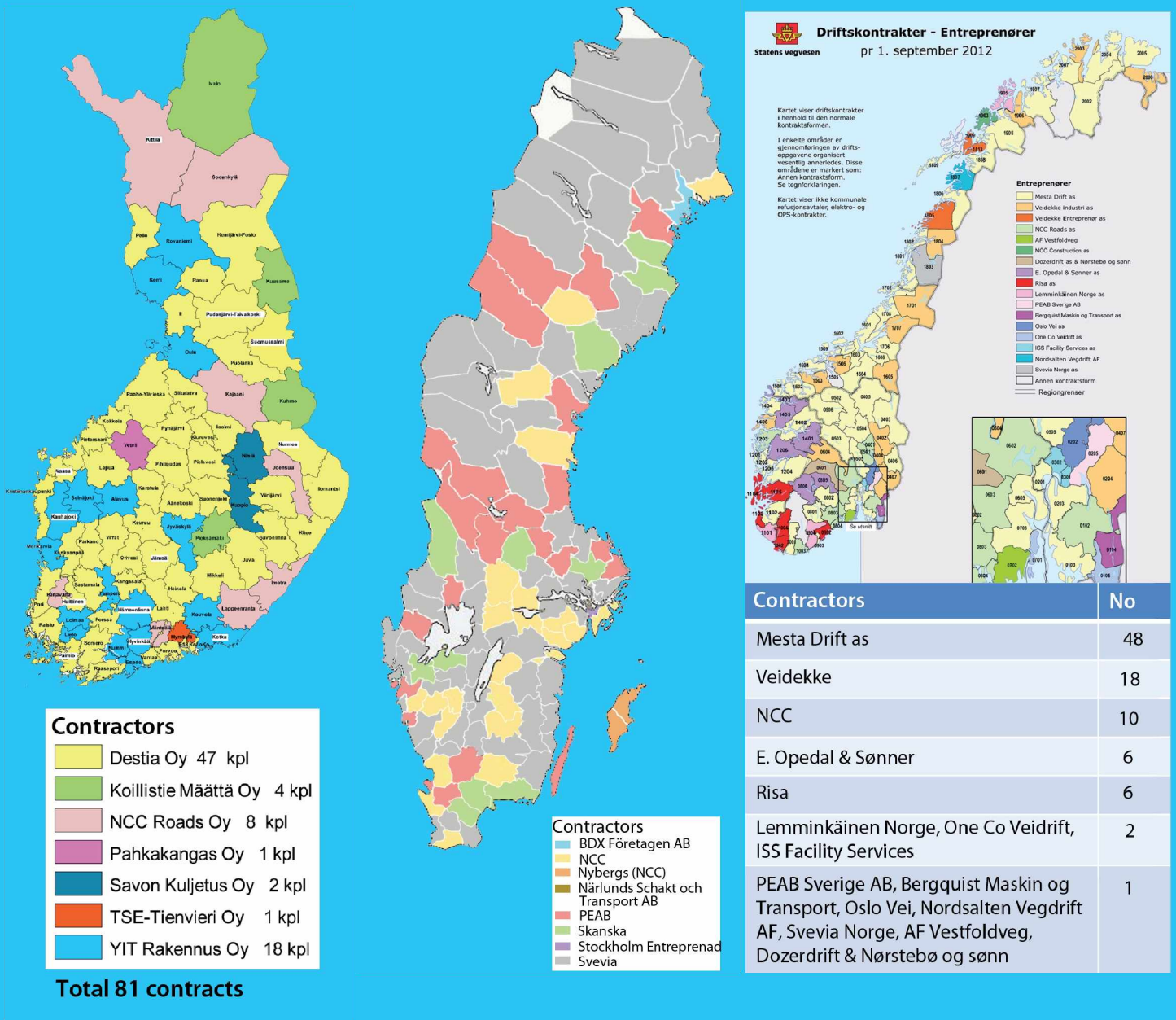


Figure 27. An example of investment projects in Sweden: Stockholm region

4.10 Operation and maintenance

The overall trend in operation and maintenance has been clear during the last decade: opening the market to the private sector - both in roads and railways, longer contracts and several geographical areas for the contractors to tender. Again, there are some differences between the countries and also between railways and roads. In railways, Denmark and Norway still have in-house production as stated in chapter 3 while the road sector is in the hands of the private or state-owned companies.

The administrations' former production entities still have a major role in the markets in Finland, Norway and Sweden. The operation contracts for roads in Finland, Norway and Sweden in 2011 can be seen in the figure below.



Contractors	No
Mesta Drift as	48
Veidekke	18
NCC	10
E. Opedal & Sønner	6
Risa	6
Lemminkäinen Norge, One Co Veidrift, ISS Facility Services	2
PEAB Sverige AB, Bergquist Maskin og Transport, Oslo Vei, Nordsalten Vegdrift AF, Svevia Norge, AF Vestfoldveg, Dozerdrift & Nørstebø og sønn	1

Figure 28. Roads operation contracts in Finland, Norway and Sweden 2011

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