EAST WEST TRANSPORT CORRIDOR

REPORT

Traffic forecast Sydostlänken

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List of content

O. Summary

In Blekinge there is a need to improve the railway connection between the main trunk railway (Södra Stambanan) at Älmhult to the Port of Karlshamn, since there is "a missing link" between Olofström and Karlshamn, which has been identified in several studies.

The purpose of this study is to make a forecast for future potential rail freight and passenger transports on the railway link "Sydostlänken" (the South East Link) in 2015 and 2020, with an outlook to 2030.

To be able to evaluate the potential effects of the Sydostlänk for freight transports, different scenarios have been defined, implemented and tested in the EFM-STAN simulation model for the years 2015 and 2030. These scenarios have been structured with three main alternatives: Medium ferry transport service supply, High ferry transport service supply and High ferry transport supply combined with truck-fee.

The simulation results indicate that the maximum freight potential for the Sydostlänk is estimated to 1,8 million tonnes in 2015 in the scenario with high ferry transport service combined with truck-fee. In the scenario without truck fee, the potential is estimated to 1,3 million tonnes and in the scenario with medium ferry transport services, the potential is estimated to 0,4 m tonnes.

In 2030 the maximum potential is estimated to 2,6 million tonnes in the scenario with high ferry transport service combined with truck-fee. In the scenario without truck fee, the potential is estimated to 1,9 million tonnes and the scenario with medium ferry transport services, the potential is estimated to 0,7 million tonnes.

The study underlines the importance of combined truck and rail ferry connections in the Port of Karlshamn for the potential volumes for the Sydostlänk.

The potential volumes for the Port of Karlshamn is estimated to be in the range of 12-15,5 million tonnes, excl. transit oil volumes, for the period 2015 to 2030. The transit oil volumes for the corresponding period are estimated to be in the range of 2-5 million tonnes. The tested different ferry alternatives have a limited effect on the potential total handled port volumes. The tested truck-fee also has a limited effect on the total handled port volumes.

The potential net effect of the Sydostlänk on Port of Karlshamn's transhipped volumes is estimated to be in the range of 0,3-0,5 million tonnes. The comparison has been made for 2015 between the high ferry service supply alternatives with truck-fee, with and without an implemented Sydostlänk. It is important to underline that these alternatives include a high supply of RoRo-truck ferries in combination with RoRo-truck and RoRo-train ferries.

The potential impact on the transport work (tonkm) in Sweden of the implementation of the Sydostlänk by 2015, is estimated to be a reduction in the range of -0,20 mdr tonkm for rail transports and -0,40 mdr tonkm for truck transports. This is most likely an effect of shorter transport distances to the Baltic and south east European region.

In order to test the potential effects of capacity restrictions along the Southern main trunk rail line (Södra stambanan), a special scenario has been defined and tested in the simulation model. In this scenario the future capacity level on the Southern main rail line (between Hässleholm-Malmö) in 2015, has been reduced by -20%. With this reduction of the future theoretical capacity level, the simulation indicates an increase of the rail freight flows on the Sydostlänk by 5% This means that the relation between the increase of freight flows on the Sydostlänk is 5% compared with a capacity reduction on the Southern main line by -20%. This relation indicates an elasticity value of -0,25.

For passenger transport four scenarios have been studied. One alternative is set up with no Sydostlänk but bus traffic as a scenario for

comparison. Two scenarios have regional train traffic with different frequencies between Älmhult and Karlshamn and with a good changing point in Karlshamn to Blekinge kustbana in both directions. Another scenario has apart from the regional traffic also some interregional trains between Karlskrona and Göteborg via the Sydostlänk.

The number of trips per train made by people living in Blekinge will increase by 13-14% respectively in the two scenarios compared to the bus scenario. Most of the passengers have switched from buses. About 10% of the increased number of train passengers consists of former car users.

The number of passengers on the Sydostlänk will vary between 900 and 1200 per day in the scenario with only regional traffic and between 1100 and 1400 when there also is some interregional traffic. With less frequent, but more realistic, regional traffic the number of passengers will vary between 950 and 1200. For this scenario data are produced as input to a cost-benefit analysis. The link between Olofström and Karlshamn has the most number of passengers and the link between Olofström and Lönsboda the least. There will be a reduction of train trips on the links Karlshamn-Hässleholm-Älmhult. The route Karlskrona-Emmaboda-Växjö will have a minor reduction when interregional traffic is changed to the Sydostlänk.

Calculations have been made to see the effects on population and employment after 15-20 years after the Sydostlänk has been built. If all potential is used, the effect of both population and employment in Olofström will be an increase of about 7% compared to the situation with no Sydostlänk. Älmhult will gain about 3% in both population and employment and Karlshamn will gain about 2%.

Introduction

1.1 Development in the South Baltic Sea Region

The South Baltic Sea area provides entrances to vital European and neighbour region corridors. The sustainable development of the South Baltic area depends on meeting the following requirements:

- Providing an interconnected land-and-sea network of multi-modal transport corridors. Conveying, as a priority, unitised cargo transport, including crucial port connections.
- Provision of smooth inter-modal transport in ports, along transport links and across borders. Thereby securing fast, reliable and safe transport services of high quality.
- Securing a high level of interoperability between modes of transport, with increased emphasis on railways and short sea shipping. Innovative solutions in cargo logistics, especially in port operations.

Figure 1: Trade and traffic connections through the South Baltic Sea region

The Baltic Sea Region is a strongly integrated area. In 2003, the total intra-Baltic Sea Region trade accounted for more than 30% of total exports and 44% of total imports. The respective shares are expected to increase slightly until 2020. The total intra-Baltic Sea Region trade amounted to 327 million tonnes in 2001.

The trade volumes of the Baltic Sea Region countries are expected to develop positively, but the trade dynamics differ. The growth in exports of the Baltic Sea Region countries 2003 to 2020 is expected to be slightly higher than the growth in imports. Exports of the Baltic Sea Region countries are expected to increase by 48%, and imports by 41%. In absolute terms trade volumes resulting from imports and exports with countries outside the Baltic Sea Region are likely to increase more than the volumes within the Baltic Sea Region.

However, the intra-Baltic Sea Region trade volumes are expected to grow faster than the total trade volumes in relative terms: 56% versus 54%. This reflects the ongoing integration process in the Baltic Sea Region, resulting in more goods exchange and higher dynamic growth rates of intra-Baltic Sea Region trade volumes, compared with

volumes from trade with other trading partner regions outside the Baltic Sea Region.

This expected development leads to increasing demand on good hinterland connections with the ports to facilitate the increasing freight and passenger transports, especially towards Poland, the Baltic States and Russia.

1.2 The Sydostlänk

In Blekinge there is a need to improve the railway connection between the main trunk railway (Södra Stambanan) at Älmhult to the Port of Karlshamn, since there is "a missing link" between Olofström and Karlshamn, see map below. This link would increase the rail and intermodal transport accessibility to the Port of Karlshamn, the planned intermodal terminal there and to the Port of Karlskrona.

Figure 2: Rail connection Olofström-Karlshamn

A number of studies have been carried out earlier with the aim of investigating the potential and conditions for the railway connection "Sydostlänken". Example of studies are:

- Älmhult-Olofström-Karlshamn, Järnvägsförbindelse mellan Södra stambanan och Karlshamns Hamn, 1995
- Banverkets systemplan Småland och Blekinge (25.4.1997)
- Blekinges bidrag till regional utveckling inom transportsektorn, Blekinge Länsstyrelses yttrande till SIKA,1999
- Idèstudie Sydostlänken, 2000.

These studies indicate effects in the form of:

- more rail freight in Blekinge
- more freight via the Port of Karlshamn

- reduced rail freight traffic on the Blekinge coast railway as well as on the railway line Kristianstad-Hässleholm.

To be able to describe the consequences of the potential effects of the planned new railway connection between Olofström and Karlshamn, there is a need to make an assessment of the future freight and passenger potential on this rail link.

1.3 Study purpose

The purpose of this study is to forecast future potential freight and passenger transports on the railway link "Sydostlänken" in 2015[1] with an outlook to 2030. Thereby have a number of different scenarios been defined and tested to estimate the sensitivity of different influencing parameters (e.g. with/without the Sydostlänk, with/without the railway line Emmaboda-Karlskrona, with/without truck-fee, with/without rail ferries to/from the Port of Karlshamn)

1.4 Methodology

The project consists of the following different steps:

- Trade forecast of future demand 2015 and 2030.
- Update of existing and future infrastructure development in Southern Sweden (Blekinge, Skåne), mainly rail development projects and implementation in the simulation model.
- Collection of relevant calibration values (port data, rail data).
- Definition of scenarios together with the commissioner which should be tested.
- Carrying out interviews with important actors of relevance for the planned Sydostlänk to get these companies' estimations of future trade volumes with Russia, the Baltic States and China. (IKEA, Aarhus Karlshamn AB, Volvo VCBC, Railog AB and the Port of Gothenburg). The interview results have then been analysed and estimations made of future potential volumes, which have been implemented in demand matrices in the simulation model. With this methodology, the existing trade demand matrices have been adapted and improved.
- Carrying out simulations, comprehensive interpretations and analysis.
- Final report.

1.5 Project organisation

The project has been carried out by a project team consisting of BMT Transport Solutions GmbH, Temaplan AB and Inregia AB. Peter W. Cardebring, BMT-TS has been project co-ordinator, Dr Matts Lundin, Temaplan, has made the freight simulations and Dr. Siv Scheele with her team at Inregia, has been responsible for the passenger simulations.

2 Forecast and simulation assumptions

2.1 Transport demand[2]

The development of Swedish trade has been analysed in the context of the Baltic Sea Region developments. The Baltic Sea Region (BSR) is a strongly integrated area. In 2003, the total intra BSR trade of the relevant countries accounts for more than 30% of the total exports and 44% of the total imports.

[1] The passenger forecast is made for 2020 due to data availability.

[2] Baltic Maritime Outlook, 2006

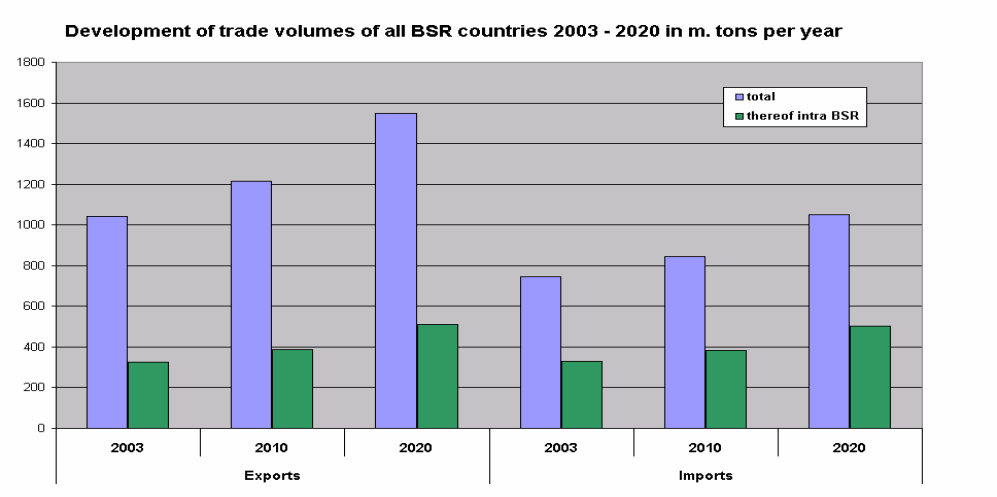
The respective shares are expected to increase slightly until 2020.

In terms of trade volumes, both intra BSR as well as total import and exports are expected to increase for the BSR countries. However, trade volumes resulting from imports and exports with countries outside the BSR are likely to increase more than volumes within the BSR.

Figure 3: Forecast trade development, total and within the Baltic Sea Region

Table 1: Forecast trade development[3] Baltic Sea Region, m tonnes

	Exports						Imports					
	2003		2010		2020		2003		2010		2020	
	total	intra BSR	total	intra BSR	total	intra BSR	total	intra BSR	total	intra BSR	total	intra BSR
Sweden	73,8	34,7	82,6	37,2	97,2	43,6	68,7	47,2	80,3	53,2	100,2	67,0
Norway	242,3	54,9	257,6	61,0	279,4	67,3	30,4	15,5	34,7	18,1	40,7	21,8
Finland	35,2	14,3	41,4	17,0	52,4	22,4	55,0	43,8	66,4	51,9	86,8	69,9
Denmark	41,2	21,6	49,7	24,6	65,1	32,9	50,0	29,9	57,0	33,0	68,7	40,7
Germany	293,6	27,9	334,5	33,2	421,5	46,0	419,4	121,2	453,0	137,1	534,0	171,8
Poland	70,4	34,2	85,5	40,1	112,9	55,5	75,5	37,5	95,0	47,8	131,9	68,5
Lithuania	12,6	7,0	15,9	9,1	22,9	13,1	17,9	14,7	24,1	19,7	36,7	30,1
Latvia	14,5	9,4	18,6	11,8	27,5	17,1	6,0	4,0	7,7	5,2	11,3	7,5
Estonia	11,8	7,1	15,4	9,1	23,0	13,5	7,6	6,2	10,1	8,2	15,1	12,3
Russia	248,3	116,1	313,5	143,4	446,6	198,4	13,6	7,7	16,1	9,0	23,8	13,5
total	**1.043,6**	**327,2**	**1.214,8**	**386,5**	**1.548,3**	**509,8**	**744,1**	**327,6**	**844,2**	**383,1**	**1.049,1**	**503,0**



[3] Incl.oil and oil products, approx. 30% of total trade volumes.

The growth rates of the trade volumes of the BSR countries are expected to develop positively but the trade dynamics differ significantly, as shown in the table below.

Table 2 Trade volume growth per country

	Export Growth 2003 - 2020 in %		Import Growth 2003 - 2020 in %	
	total	to BSR	total	from BSR
Sweden	31,7	25,6	45,7	41,9
Norway	15,3	22,6	34,0	40,7
Finland	49,1	56,6	57,8	59,6
Denmark	58,1	52,3	37,6	36,1
Germany	43,6	64,9	27,3	41,7
Poland	60,2	62,3	74,7	82,7
Lithuania	81,5	86,6	104,4	104,8
Latvia	89,9	82,5	88,3	89,7
Estonia	94,9	90,7	98,0	98,5
Russia (EU 25 trade)	79,9	70,9	75,0	75,0
total	**48,4**	**55,8**	**41,0**	**53,5**

The total exports of the BSR countries are expected to increase by 48%, and imports by 41% till 2020. The intra BSR trade volumes are expected to grow faster: exports by about 56 % and imports by 54 %. The relative importance of the BSR as trade partner for the countries neighbouring the Baltic Sea in terms of volumes is increasing. This reflects the ongoing integration process in the BSR, resulting in more goods exchange and higher dynamic growth rates of intra BSR trade volumes compared to volumes from trade with other trading partner regions outside the BSR. The driving force behind this development seems to be the expected relative and absolute increase, in the already high volumes, of especially German and Finnish import and export volumes with the BSR.

For the simulations 2015 and 2030, an adaptation of the trade forecast has been made to these years. For 2030 somewhat lower trade growth rates have been used, indicating an uncertainty about the future development after year 2020.

To summarize:

- The intra BSR trade volumes are expected to grow about 55% on average till 2020.
- The relative importance of the BSR as trade partner is increasing.
- Swedish total export (tonnes) is forecast to increase by 32% till 2020 on average.
- Swedish total import (tonnes) is forecast to increase by 46% till 2020 on average.

2.2 Rail infrastructure development

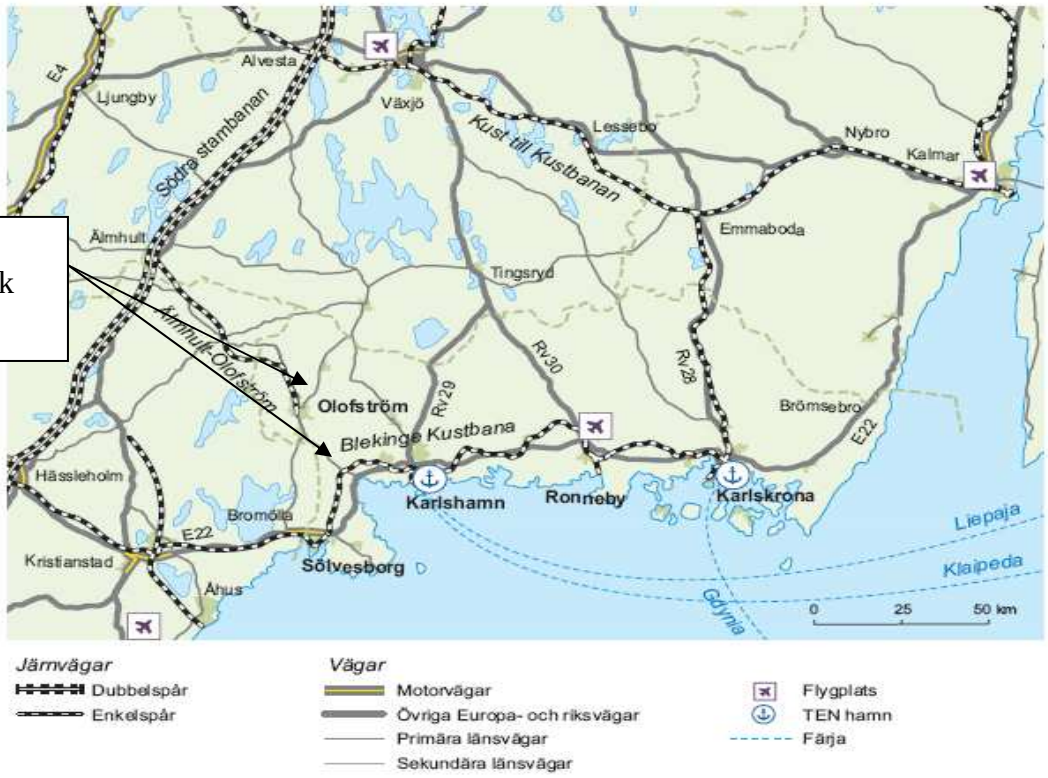
The planned improvements under consideration to the rail infrastructure in Blekinge till 2015 include electrification of the Blekinge coast line as well as improvement of the Emmaboda-Karlskrona line. The ongoing rail capacity improvements in the Swedish rail network till 2015 have been considered on a general level by increasing the available rail network capacity by +20-25%[4]. For the period 2015-2030 a general capacity increase by 10-15% has been assumed[5]. Available port capacity has been assumed to follow the forecast trade development.

[4] Kapacitetsanalyser i Skåne, Indetifiering av kapcitetshalsar i järnvägssystemet, Banverket 2006,

Framtidsplan för järnvägen, Effektbeskrivning 2004-2015, Banverket 200

[5] Estimated, based on discussions with M. Fahl, Banverket, Södra Regionen

Figure 4 Existing tansportsystem in Blekinge



Dagens transportsystem i Blekinge

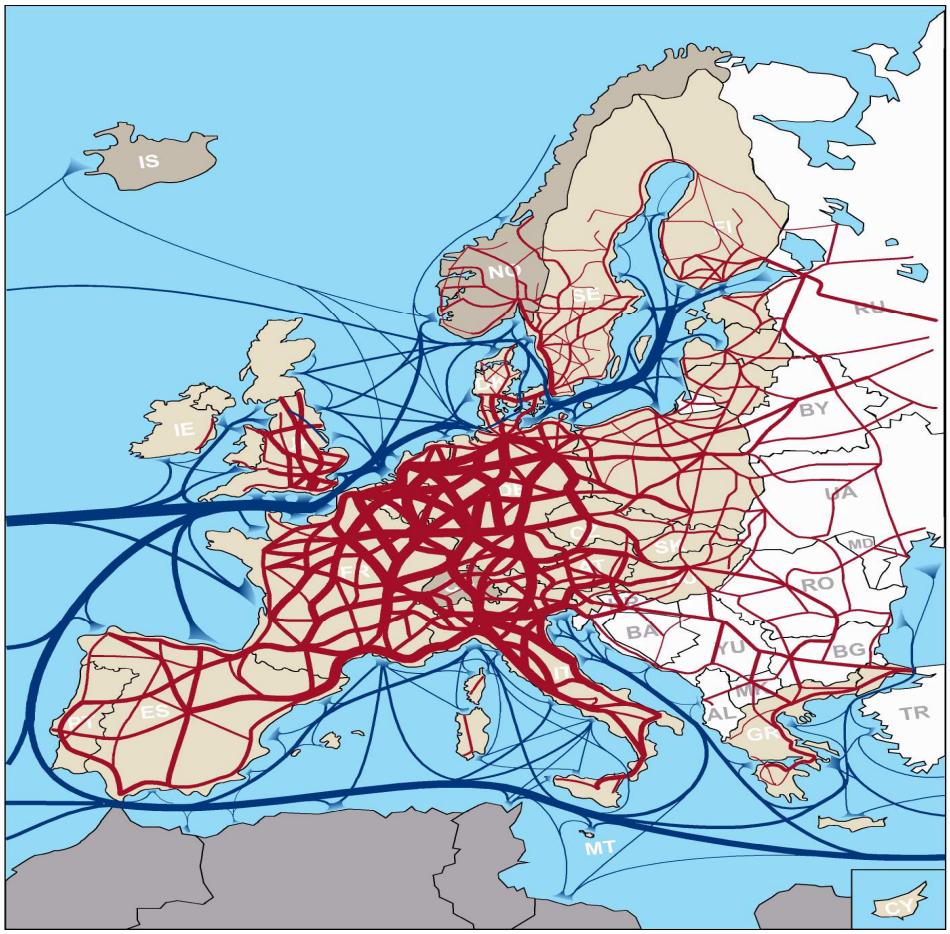
2.3 Model description

The methodology in this project is based on the usage of an advanced freight model (EFM-STAN). The simulation model is based on the SAMGODS-model (SIKA) which has been further extended and developed. The model enables measuring and estimating the existing freight flows and the distribution of the freight flows on the existing infrastructure for different transport modes. This methodology allows measuring changes in route and modal split on the different transport infrastructure network, if there will be changes in transport demand and transport supply (e.g. a new port, new RoRo-links, improvement of a certain road link, rail link etc).

The EFM-STAN simulation model environment brings together trade flows between regions. The trade flows are then distributed on the available freight transport network infrastructure including different port and inland terminals (see figure 5). The model finds an optimal solution to distribute all relevant transport flows on transport links and transport modes (truck, train, and ship) with minimised transport cost. The estimation of the transport cost in the model consists of operative costs (e.g. fuel, salary, insurance), quality cost (e.g. risk of delay, value of transport time) and frequency cost (e.g. waiting time for ferries).

The methodology has been used in several different national and international projects; examples of customers are Port of Trelleborg, Port of Karlskrona, Port of Saßnitz, Port of Kiel, Port of Amsterdam, Stena Line, Scandlines, Colorline and the DG TREN, EU Commission. For more references, please see www.bmt-ts.com

Figure 5: EFM-STAN model – distribution of international freight flows.



3 Scenario description

To be able to evaluate the potential effects of implementing the railway link the Sydostlänk, different scenarios have been defined and implemented in the simulation model then tested for the years 2015 and 2030.

Basic assumptions for the simulations are the following:

Railway and intermodal terminal relevant assumptions are:

- No restrictions have been assumed for the terminals/stations at Alvesta, Älmhult and the intersection to Blekinge coast line (BKB).
- Apart from the general assumed rail capacity improvements 2015 and 2030 (see above), the rail capacity for the corridors Kristianstad-Karlskrona and Karlshamn-Älmhult have been assumed to increase by 50% till 2030.
- By the term high combi-transport capacity is meant that Port of Karlshamn is connected to the existing intermodal terminal network (incl. the terminals Olofström, Nässjö, Älmhult, Gothenburg, Hallsberg, Malmö, Copenhagen and Esbjerg).
- In the scenarios with combined rail/truck ferries, no rail capacity restrictions have been assumed for the links Älmhult-Karlshamn and Blekinge Coast Line between Hässleholm-Karlskrona.

There are three main groups of scenario groups that have been tested:

Alternative 1. Medium ferry transport service supply

Alternative 2. High ferry transport service supply

Alternative 3. High ferry transport supply combined with truck-fee

By the term **medium ferry transport supply** is the following supply of RoRo-services to/from Port of Karlshamn meant (scenario 1-7) :

- A standard RoRo-vessel of 1 800 lane meter has been implemented in the simulation model. The following number of departures have been defined:
- Karlshamn-Ventspils – 3 dep/day/direction
- Karlshamn-Klaipeda - 3 dep/day/direction
- Karlshamn-Gdansk – 2 dep/day/direction
- Karlshamn-Kaliningrad – 1 dep/day/direction

By term **high ferry transport service supply**, combined road and rail ferries have been additionally defined (scenario 8-9):

- A standard combined rail/truck ferry with a total of 3 200 lane meter (Rail capacity of 1 200 lane meter) has in addition been implemented in the model on the routes Karlshamn-Klaipeda and Karlshamn-Gdansk. For the rail ferries, the following number of departures have been defined[6]:
  - Karlshamn-Klaipeda – 1 dep/day/direction
  - Karlshamn-Gdansk – 1 dep/day/direction

The third category that has been tested is the **high ferry transport service supply**, **combined with truck-fee.**

The tested truck-fee is defined to 0,20 €/truck-km

The Sydostlänk rail characteristics and assumptions are:

[6] No restrictions have been assumed concerning the differences in rail track width between Sweden and Lithunaina

- 14 km length, distance signalling system (fjärrblockering), connects at Gustavstorp/Sandbäck, west of Karlshamn
- A total rail line capacity of 36 trains/day/direction (total of 72 trains/24 hours)[7]. This would allow 18 freight trains/day/direction.

The assumptions above have been implemented in the EFM-STAN simulation model (in the network and in the cost functions) for the relevant years. All simulated values for 2015 and 2030 are estimated values and should therefore be used with a confidence interval of (+/-) 10%.

The tested scenarios are shown in appendix 1.

[7] This implies that 3 extra meeting tracks on the route Älmhult-Olofström are built, which not are part of the National Rail Adminstration`s investment plans till 2015 (A. Berggren Tyrrens Infrakonsult)

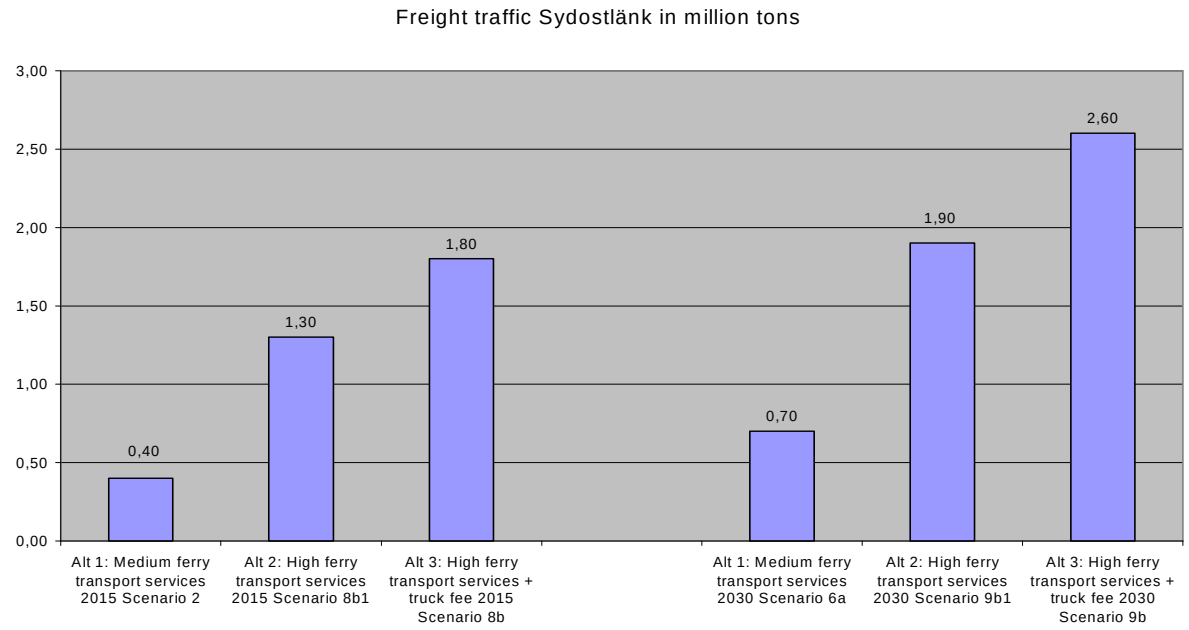
4. Simulation results 2015 and 2030

The Sydostlänk

The simulation results indicate that the maximum freight potential for the Sydostlänk is estimated to 1,8 million tonnes in 2015 in the scenario with high ferry transport service combined with truck-fee. In the scenario without truck fee, the potential is estimated to 1,3 million tons. In the scenario with medium ferry transport services, the potential is estimated to 0,4 million tons.

The maximum potential in 2030 is estimated to 2,6 million tonnes in the scenario with high ferry transport service combined with truck-fee. In the scenario without truck fee, the potential is estimated to 1,9 million tonnes and the scenario with medium ferry transport services, the potential is estimated to 0,7 million tonnes, see appendix 4.

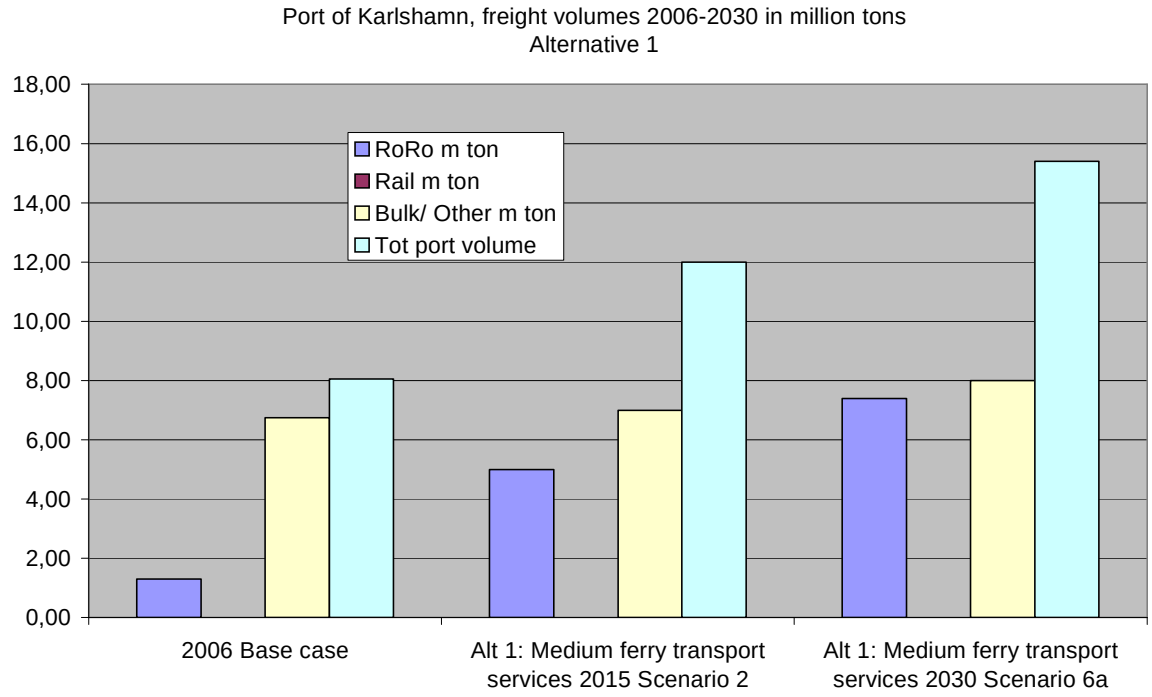
Figure 6 Simulated freight volumes on the Sydostlänk



Port of Karlshamn

The potential volumes for Port of Karlshamn in the medium ferry transport supply are estimated to 12 million tonnes in 2015 and to 15,4 million tonnes in 2030. The distribution between different categories is shown in figure 7 below. To this estimated volume in the category bulk/other, should also potential transit oil volumes be added in the range of 2 -5 million tonnes

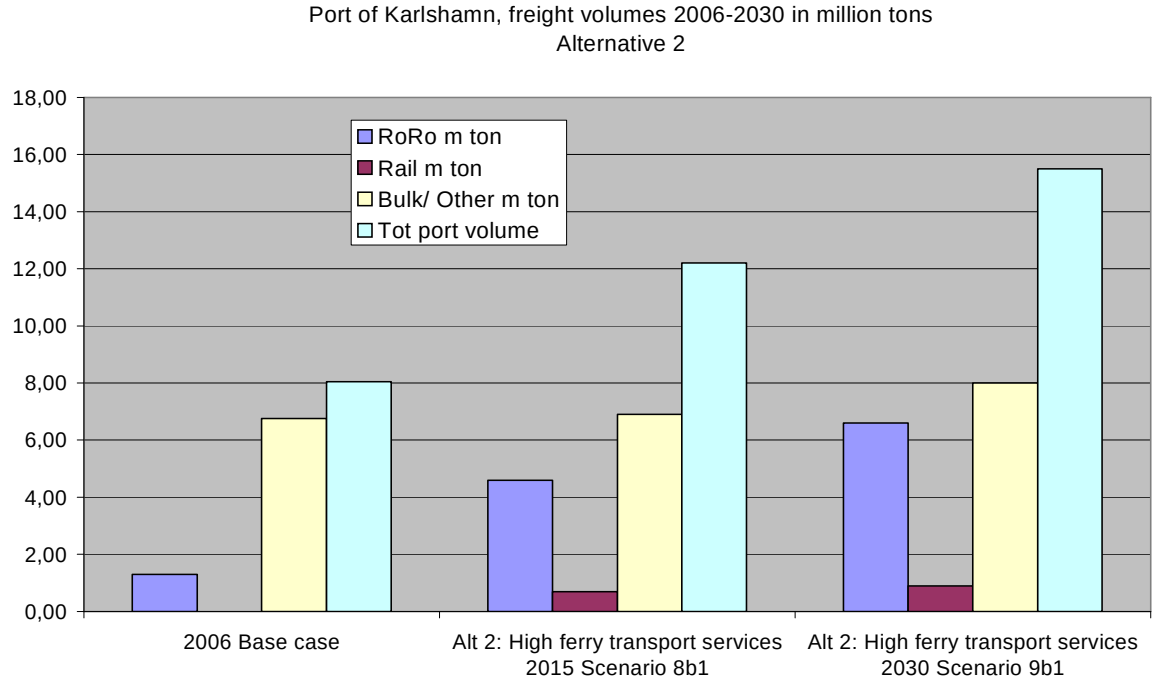
[8].*Figure 7 Potential volumes in Port of Karlshamn, alternative 1 (medium ferry supply)*



In the alternative with high ferry transport supply, the potential volumes for Port of Karlshamn are estimated to 12,2 million tonnes in 2015 and to 15,5 million tonnes in 2030. The distribution between different categories is shown in figure 8 below, including potential rail ferry volumes in the range of 0,7-0,9 million tonnes. In addition to the estimated port volumes, should also potential transit oil volumes be added in the range of 2 -5 million tonnes

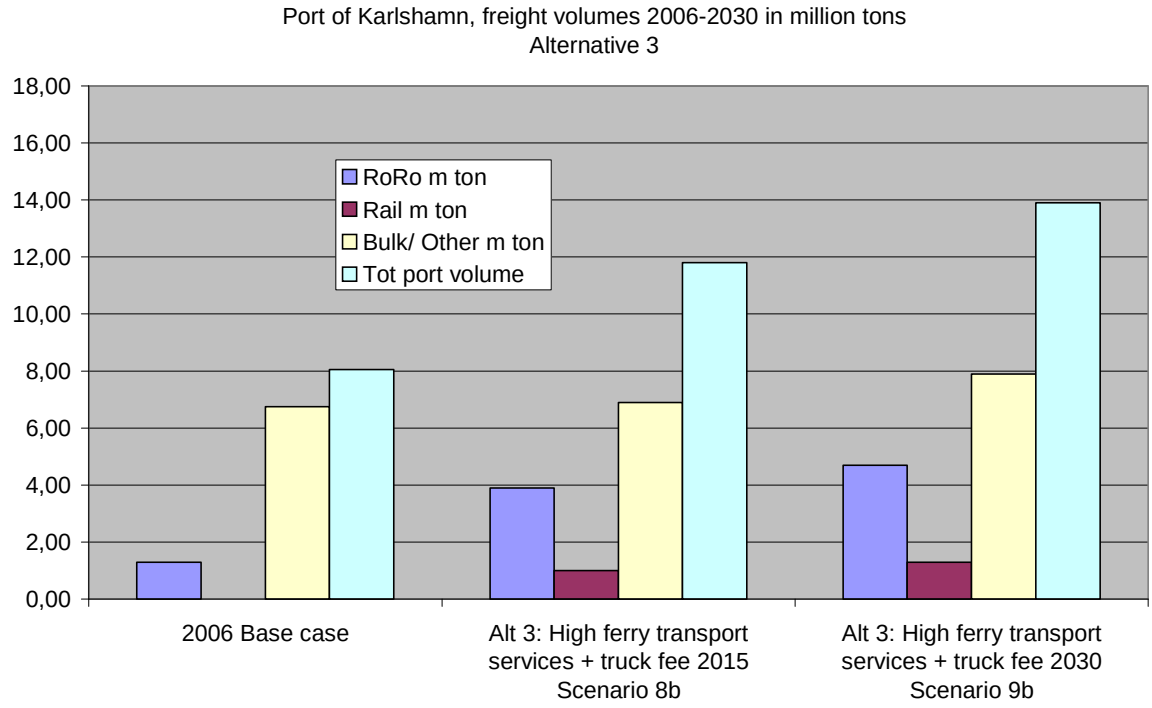
[8] These oil and oil product volumes are stored intermedtiately in the port for further distribution by sea transport to other destinations.

Figure 8 Potential volumes in Port of Karlshamn, alternative 2 (high ferry supply)



In the alternative with high ferry transport supply combined with truck-fee, the potential volumes for Port of Karlshamn are estimated to 11,8 million tonnes in 2015 and to 13,9 million tonnes in 2030. The distribution between different categories is shown in figure 9 below, including potential rail ferry volumes in the range of 1,0-1,3 million tonnes. In addition to the estimated port volumes, should also potential transit oil volumes be added in the range of 2 -5 million tonnes

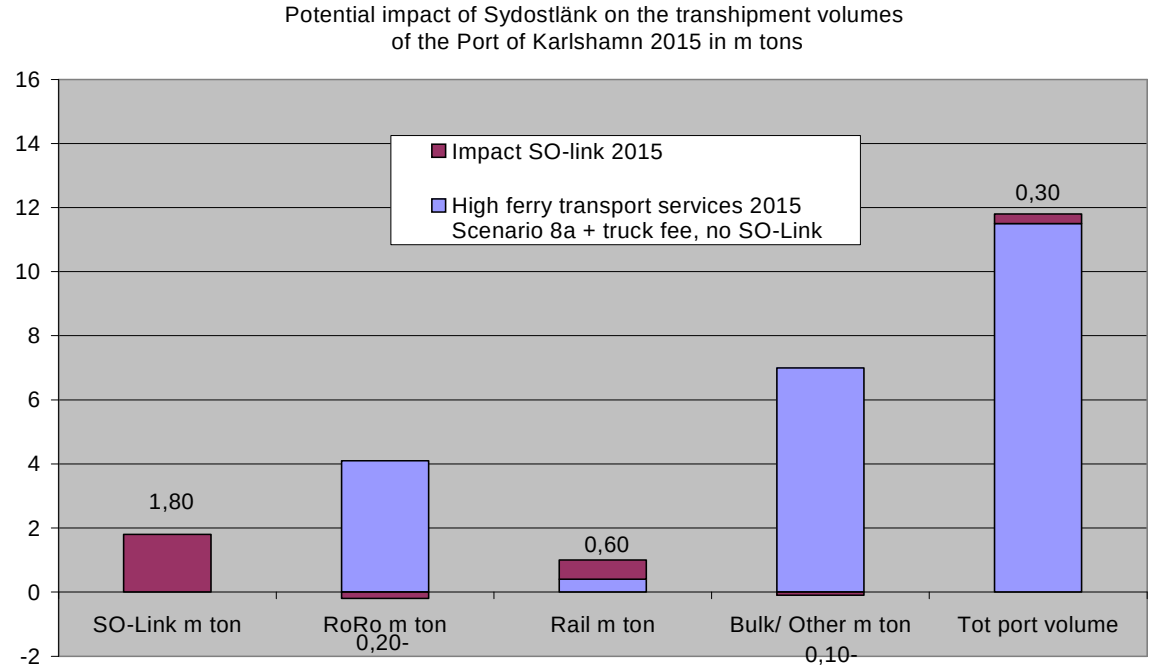
Figure 9 Potential volumes in Port of Karlshamn, alternative 3 (high ferry supply, combined with truck-fee)



Potential impact of the Sydostlänk on port volumes

The potential net effect of the Sydostlänk on Port of Karlshamn's transhipped volumes is estimated to be in the range of 0,3 million tonnes, see figure 10 below. The comparison has been made for 2015 between the high ferry service supply alternatives with truck-fee, with and without an implemented Sydostlänk. It is important to underline that these alternatives include a high supply of RoRo-truck ferries in combination with RoRo-truck and RoRo-train ferries. The high level of defined truck and rail ferry supply in the tested scenarios, reduces the effect of the implementation of the Sydostlänk on the total port volumes. To this estimated 0,3 million tonnes another 0,1-0,2 million tonnes of bulk volumes could be added, due to a higher uncertainty in the estimations of bulk volumes.

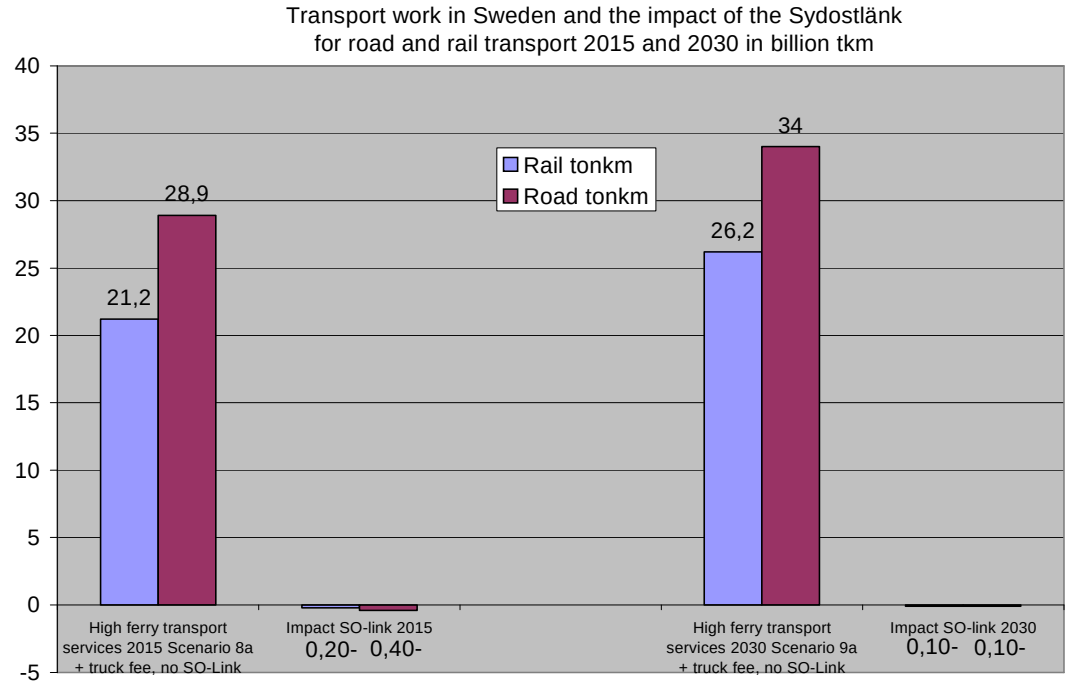
Figure 10 Potential impact of the Sydostlänk on port volumes (high ferry supply, combined with truck-fee)



Potential impact on transport work of the Sydostlänk

The potential impact on the transport work (tonkm) in Sweden of the implementation of the Sydostlänk, is estimated in 2015 to be a reduction in the range of -0,20 billion tonkm för rail transports and -0,40 mdr tonkm for truck transports. This is most likely an effect of shorter transport distances to the Baltic and south east European region.

Figure 11 Potential impact of transport work of the Sydostlänk



Sensitivity analyses of the effects of capacity restrictions along the Southern main rail line

In order to test the potential effects of capacity restrictions along the Southern main trunk rail line (Södra stambanan), a special scenario has been defined and tested in the EFM-STAN simulation model. In this scenario the future capacity level on the Southern main rail line (between Hässleholm-Malmö) 2015, has been reduced by -20%. With this theoretical reduction of the future capacity level, the simulation indicates an increase of the rail freight flows on the Sydostlänk by 5% This means that the relation between the increase of freight flows on the Sydostlänk is 5% compared with a capacity reduction on the Southern main line by -20%. This relation indicates an **elasticity value of -0,25.**

5 Passenger transport

5.1 Scenarios

Three scenarios are analyzed for the year 2020.

Demographic data are the same for all three scenarios. These data are taken from the national passenger transport models Sampers.

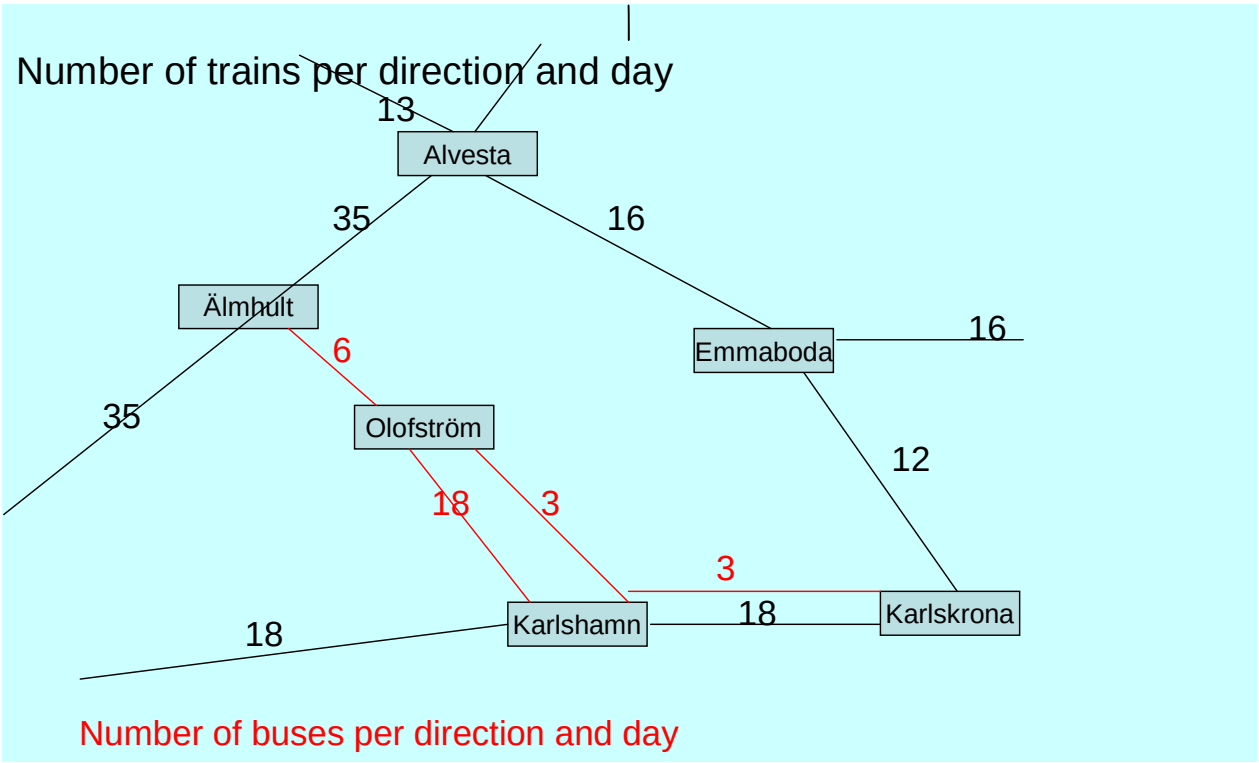
Table 3 Population and employment the year 2020 in municipalities near the Sydostlänk

	Population	Employment	
Växjö	85 601	39 586	
Älmhult	15 487	7 436	
Olofström	12 194	6 034	
Karlskrona	64 022	26 476	
Ronneby	27 964	10 603	
Karlshamn	31 353	9 469	
Sölvesborg	16 704	5 324	
Osby	12 216	5 029	
Kristianstad	78 027	29 367	

Olofström is assumed to lose about 1200 inhabitants compared to the population in 2006.

The scenarios are built up by different public transport lines. These are outlined below.

Figure 12 Scenario JA Frequency of Passenger traffic lines



Apart from these lines in Blekinge the trains and buses in other parts of Sweden are taken from Banverket (Ostlänken).

Figure 13 Scenario UA 1 Regional trains Karlshamn - Älmhult

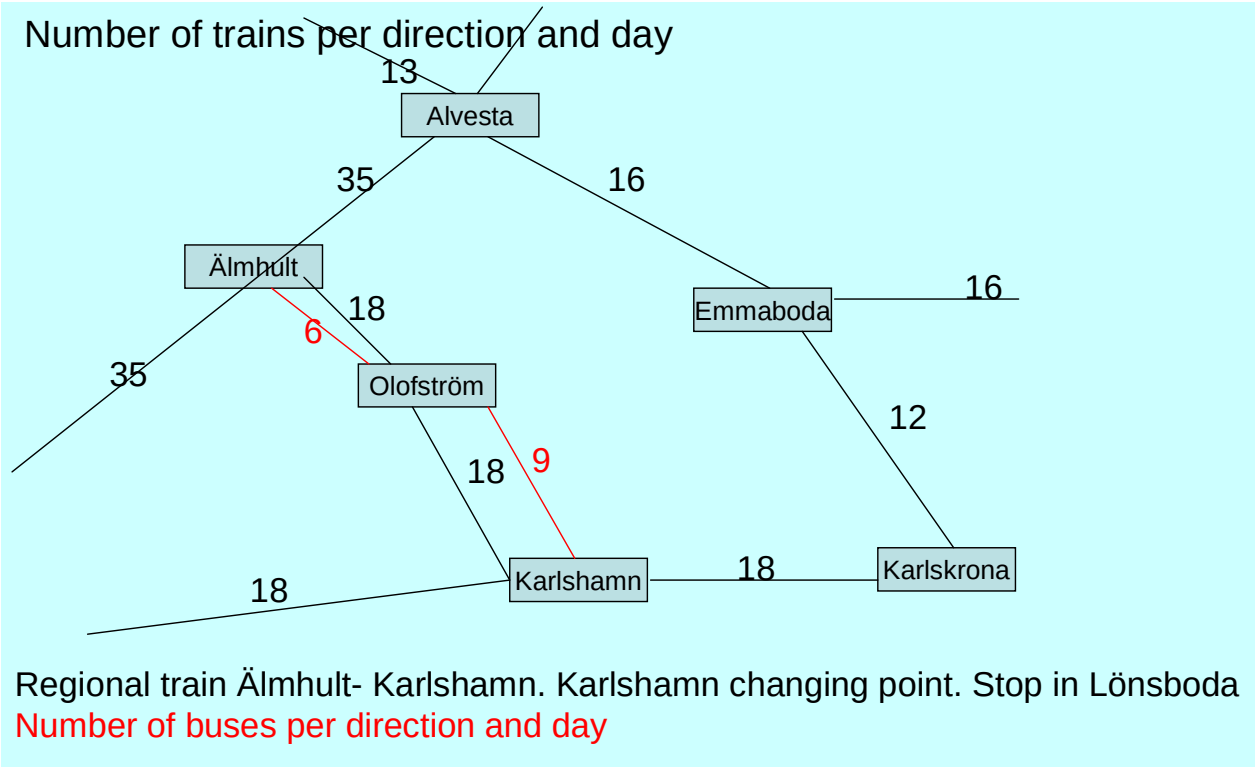
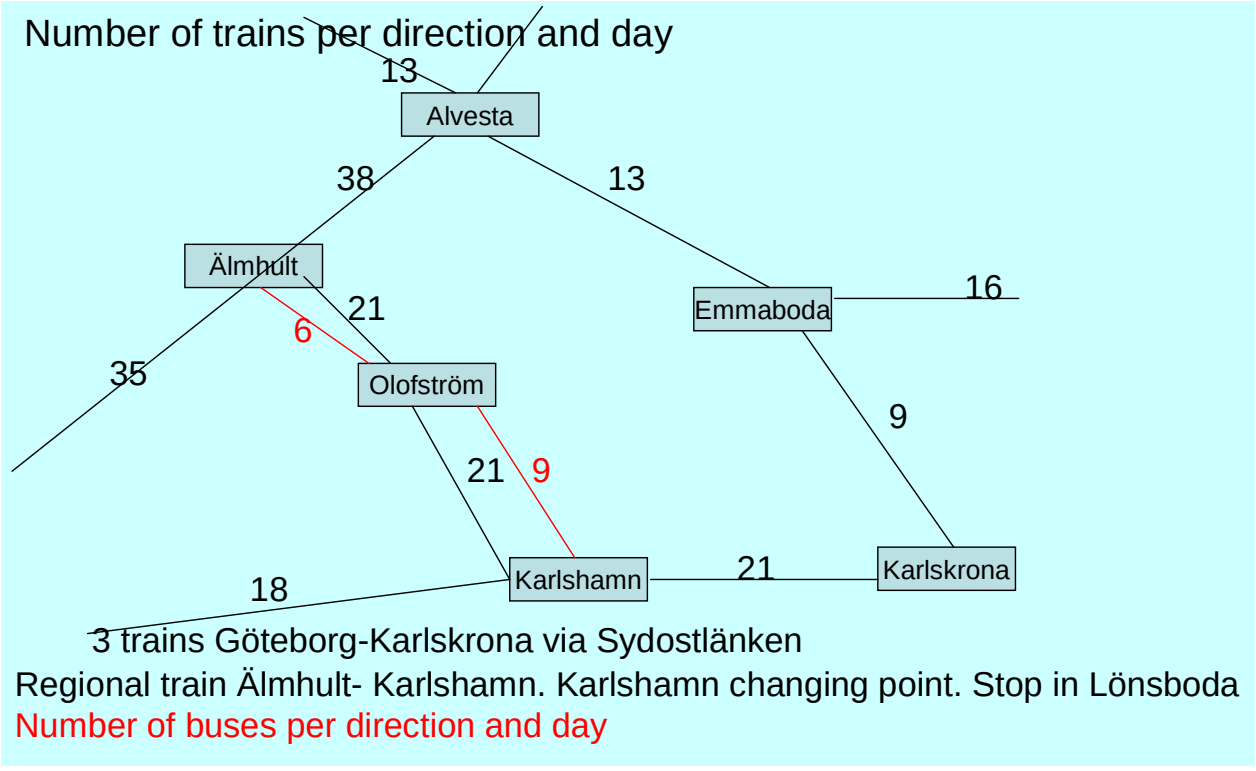


Figure 14 Scenario UA2 Regional trains Karlshamn – Älmhult and three interregional trains Karlskrona- Göteborg via Olofström



The different public transport lines are given in more details below.

Table 4 Trains at Olofström

Train type	Route	JA		UA1		UA2	
		day	Peak period	day	Peak period	day	Peak period
Reg	***Karlshamn - Älmhult***	***0***	***0***	***18***	***2***	***18***	***2***
IR	***Karlskrona - Göteborg***	***0***	***0***	***0***	***0***	***3***	***0***

Table 5 Buses at Olofström

Line	Route	JA		UA1 och UA2	
		day	Peak period	day	Peak period
300	***Olofström-Karlshamn-Karlskrona***	***3***	***2***	***0***	***0***
300	***Karlskrona -Karlshamn- Olofström***	***3***	***2***	***0***	***0***
543	Olofström-Knislinge	1	0	1	0
543	Knislinge-Olofström	1	1	1	1
561	Olofström-Bromölla	11	3	11	3
561	Bromölla-Olofström	11	2	11	2
561	Näsum-Olofström	1	1	1	1
562	Olofström-Älmhult via Lönsboda	6	1	6	1
562	Älmhult-Olofström via Lönsboda	6	1	6	1
564	Olofström-Hedentorp	1	0	1	0
564	Hedentorp-Olofström	1	1	1	1
630	***Olofström-Karlshamn***	***15***	***4***	***6***	***1***
630	***Karlshamn-Olofström***	***15***	***4***	***6***	***1***
635	Olofström-Karlshamn via Mörrum	3	0	3	0
635	Karlshamn-Olofström via Mörrum	3	2	3	2
636	Olofström-Gränum-Ljusaryds vägskäl	2	0	2	0
636	Ljusaryds vägskäl-Gränum-Olofström	3	1	3	1
680	Olofström-Svängsta	2	1	2	1
680	Svängsta-Olofström	2	1	2	1
681	Olofström-Kyrkhult	3	0	3	0
681	Kyrkhult-Olofström	3	2	3	2
682	Olofström-Ryd	8	1	8	1
682	Ryd-Olofström	7	2	7	2
686	Olofström-Gränum-Månaskensvägen	3	0	3	0
686	Månaskensvägen-Gränum-Olofström	1	1	1	1

Routes that are different in the scenarios are given in bold.

Between Sölvesborg and Olofström there is no direct route, but a changing point is established in Bromölla.

Travel times

The travel times for the three scenarios are given in tables below. The first table gives the total travel time between some municipality centres. The total travel time includes waiting times except the first one, the in-vehicle time and the time for changing if applicable. As the first waiting time in

the traffic model is taken to be half the headway it might not be the real one. With very long headway the passengers adapt to the timetable.

Table 6 Total travel times, waiting-, in-vehicle and changing, but excluding first waiting time, in minutes, between some municipalities scenario JA

	Stock-holm	Göte-borg	Älmhult	Växjö	Kalmar	Olof-ström	Karls-krona	Karls-hamn	Löns-boda	Kristianstad	Malmö
Stockholm	0	302	383	364	330	476	458	488	443	438	453
Göteborg	300	0	235	206	284	295	291	274	295	238	172
Älmhult	269	229	0	49	129	66	169	133	37	80	92
Växjö	264	204	49	0	79	139	133	162	109	122	134
Kalmar	310	272	124	82	0	207	112	173	184	188	196
Olofström	371	312	73	139	227	0	105	64	31	115	161
Karlskrona	389	293	168	114	101	102	0	52	159	104	149
Karlshamn	372	269	134	162	175	57	45	0	114	71	116
Lönsboda	338	283	52	118	198	36	147	105	0	149	178
Kristianstad	336	231	97	125	206	96	103	71	156	0	88
Malmö	351	171	105	137	217	162	169	137	165	97	0

But to have a measure of accessibility, the first waiting time is important and is included in the table below.

Table 7 Total travel times, waiting-, in-vehicle and changing, in minutes, between some municipalities scenario JA

	Stock-holm	Göte-borg	Älmhult	Växjö	Kalmar	Olof-ström	Karls-krona	Karls-hamn	Löns-boda	Kristianstad	Malmö
Stockholm	0	318	391	374	341	484	470	495	451	446	468
Göteborg	332	0	255	240	318	315	312	298	316	256	201
Älmhult	299	244	0	79	159	106	182	150	77	110	122
Växjö	276	219	79	0	109	169	153	180	139	137	149
Kalmar	333	302	161	112	0	237	142	203	221	218	233
Olofström	403	321	113	179	243	0	125	84	71	127	173
Karlskrona	405	316	184	154	141	122	0	72	179	131	175
Karlshamn	382	279	143	171	185	65	55	0	122	81	125
Lönsboda	378	323	92	158	238	76	187	145	0	169	198
Kristianstad	349	244	110	138	219	123	130	98	165	0	101
Malmö	356	201	115	144	225	166	173	141	175	101	0

The travel times for the alternative scenarios UA1 and UA2 are given in the tables below.

Table 8 Difference UA1 - JA in total travel time including first wailing-time, in minutes

	Stock-holm	Göte-borg	Älmhult	Växjö	Kalmar	Olof-ström	Karls-krona	Karls-hamn	Löns-boda	Kristianstad	Malmö
Stockholm	0	0	0	0	0	-43	-4	-37	-30	0	0
Göteborg	0	0	0	0	0	-17	0	-7	-25	0	0
Älmhult	0	0	0	0	0	-41	-60	-69	-30	6	0
Växjö	0	0	0	0	0	-41	-3	-37	-30	0	0
Kalmar	0	0	0	0	0	-34	0	-1	-31	0	0
Olofström	-56	-27	-45	-51	-35	0	-26	-26	-28	-13	-17
Karlskrona	-16	0	-61	0	0	-23	0	0	-70	0	0
Karlshamn	-36	0	-80	-46	0	-26	0	0	-72	0	0
Lönsboda	-41	-32	-39	-41	-41	-31	-78	-78	0	-38	-42
Kristianstad	0	0	0	0	0	0	0	0	-32	0	0
Malmö	0	0	0	0	0	-9	0	0	-25	0	0

The travel times are diminished to and from Olofström considerably and no relation gets an increase in travel time.

Table 9 Difference UA2 - JA in total travel time including first wailing-time, in minutes

	Stock-holm	Göte-borg	Älmhult	Växjö	Kalmar	Olof-ström	Karls-krona	Karls-hamn	Löns-boda	Kristianstad	Malmö
Stockholm	0	0	0	0	0	-55	8	-50	-35	0	0
Göteborg	0	0	-5	4	2	-27	4	-15	-30	0	0
Älmhult	-5	-6	0	-3	-2	-43	-65	-72	-30	6	0
Växjö	0	5	-4	0	1	-49	10	-44	-33	1	1
Kalmar	0	2	-2	1	0	-39	13	-2	-34	0	0
Olofström	-69	-42	-52	-60	-42	0	-31	-28	-28	-14	-18
Karlskrona	-16	2	-65	9	14	-27	0	-4	-74	-3	-3
Karlshamn	-41	-8	-80	-48	20	-26	-2	0	-72	0	0
Lönsboda	-46	-39	-39	-44	-43	-31	-80	-78	0	-38	-42
Kristianstad	0	0	4	0	1	1	0	0	-32	0	0
Malmö	0	0	0	0	1	-10	0	0	-25	0	0

In scenario UA2 an interregional train is directed via Olofström which will gain even better travel times, whereas Karlskrona will get somewhat longer travel times to Göteborg, Växjö and Kalmar.

5.2 Passenger volumes

The national passenger transport simulation program Sampers has been used to get estimations of passenger flows.

Total number of trips per day starting in Blekinge by mode is given in the table below.

Table 10 Total number of trips per day in Blekinge by different modes

	JA	UA1-JA	UA2-JA
Car	212462	-50	-80
Train	5265	674	759
Bus	14638	-600	-619
Cycle	42305	28	10
Walking	31095	-15	-26
Total	305766	37	45

The total number of trips is slightly increased due to an enlarged supply of public transport.

The number of trips per train will increase by 13-14%. Most of the passengers have switched from buses. About 10% of the increased number of train passengers consists of former car users.

The differences of passenger flows on different train links between UA1 respectively UA2 and JA are illustrated in the following figures. The number of passengers on the Sydostlänk is between 900 and 1200 in UA1 and between 1100 and 1400 in UA2. The link between Olofström and Karlshamn has the most number of passengers and the link between Olofström and Lönsboda the least. There will be a reduction of train trips on the links Karlshamn-Hässleholm-Älmhult. The route Karlskrona-Emmaboda-Växjö will have almost no reduction in UA1 and a minor one in UA2.

Figure 15 Difference in passenger flow per train link UA1-JA

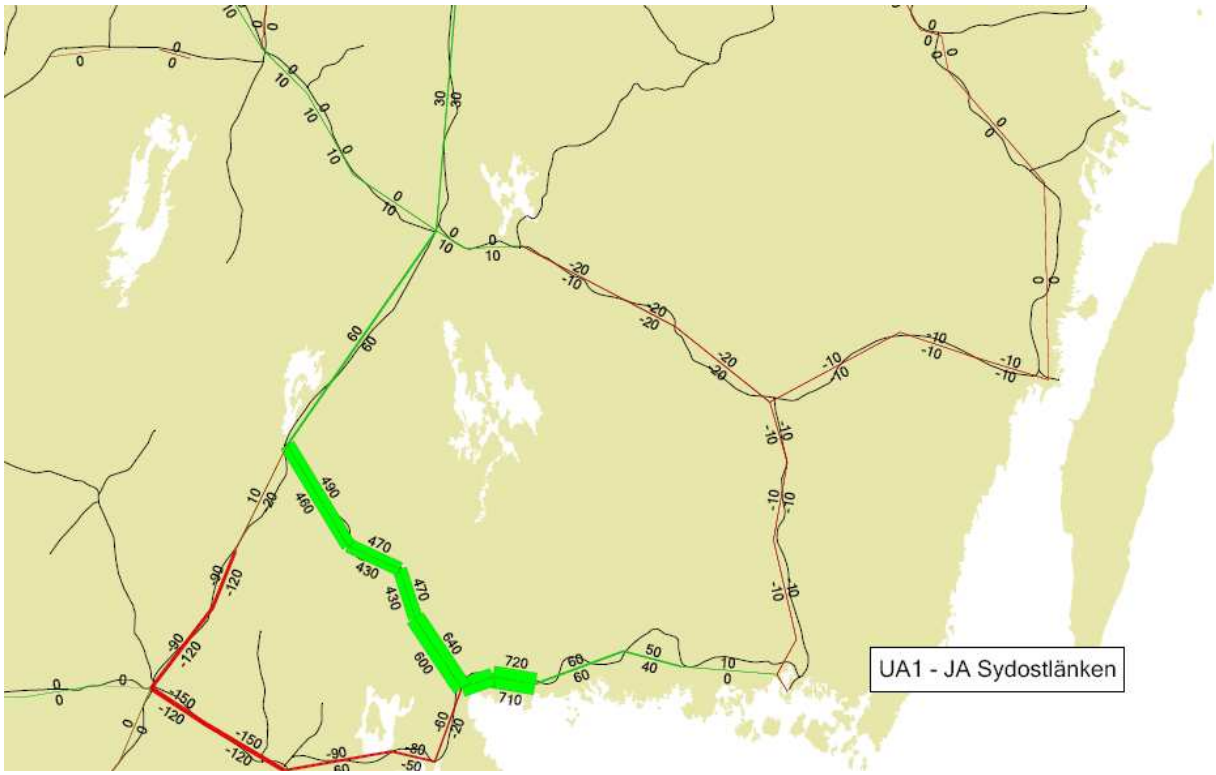


Figure 16 Difference in passenger flow per train link UA2-JA

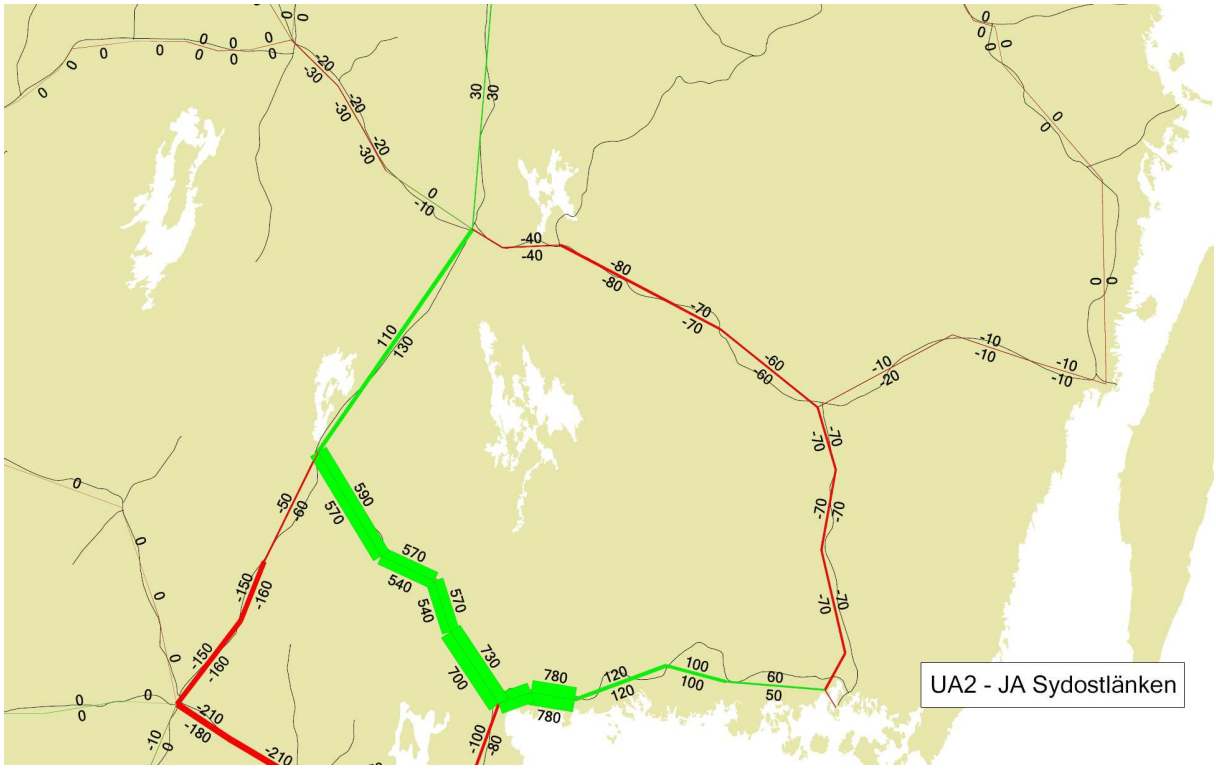


Table 11 Number of boarding and alightings on trains to and from stations along the Sydostlänk

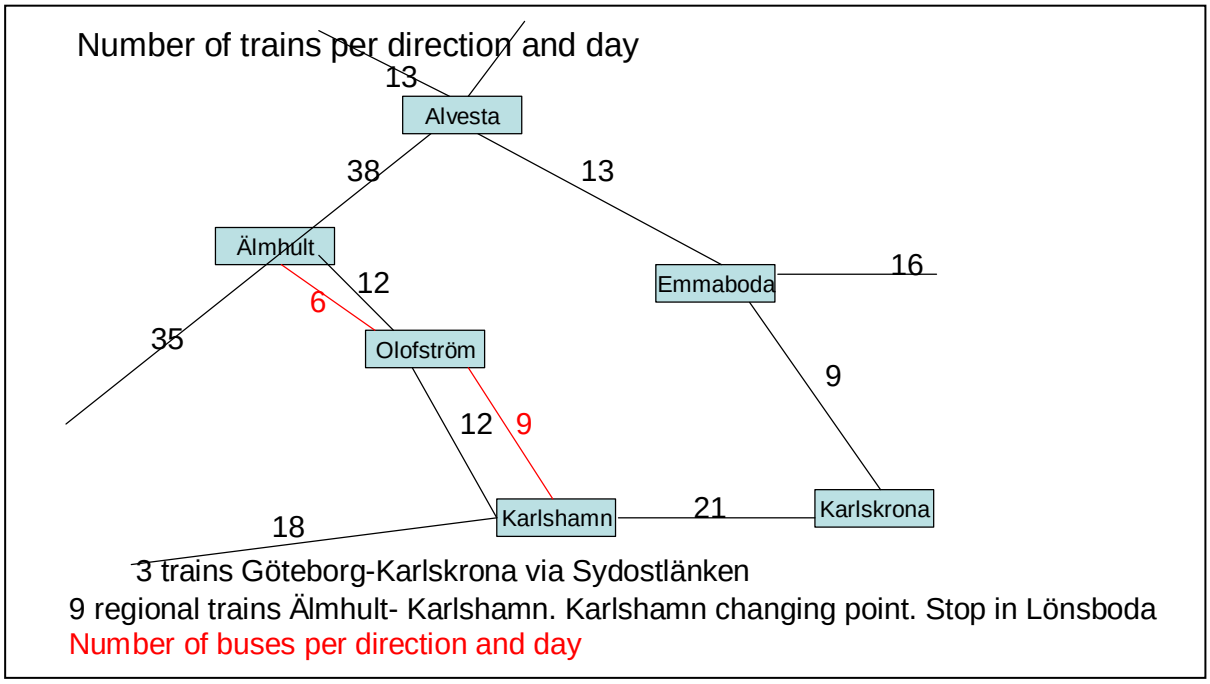
Station	JA	UA1	UA2
Karlshamn	2178	3998	4206
Olofström		1242	1276
Lönsboda		498	498
Älmhult	1574	2966	3168

The station in Karlshamn will almost double the number of boardings and alightings caused by many changes between Sydostlänk and Blekinge kustbana. Also Älmhult will double the number of passengers using the station. Olofström will have about 1200 boardings and alightings and Lönsboda 500. Olofström will be of the same size as Sölvesborg according to the simulation. But Lönsboda will be one of the smallest counting boardings and alightings.

5.3 UA3 Reduced train regional train traffic on the Sydostlänk.

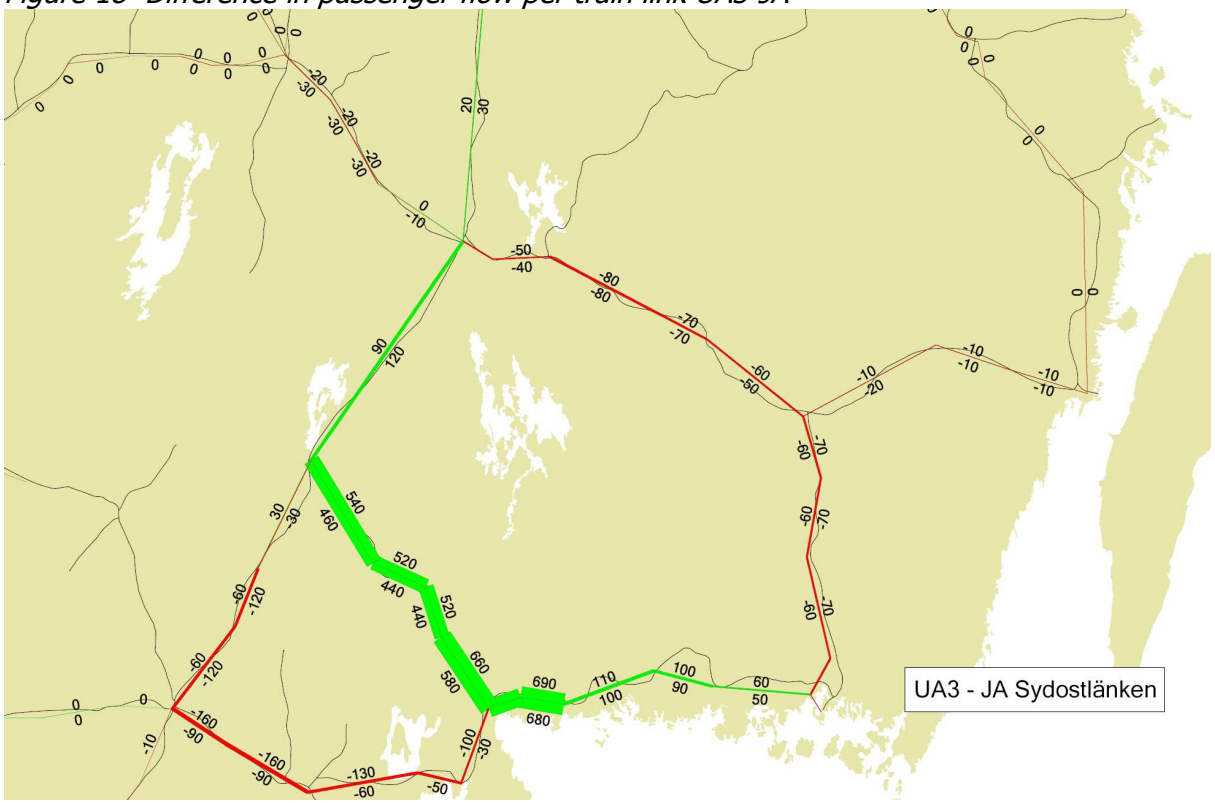
It can be argued that 18 regional trains on the Sydostlänk with the amount of passengers calculated, would not be economically sustainable. An average of 20 passengers per train is too little. Therefore, an alternative, UA3, with half the frequency has been calculated, 9 regional trains per day. As before three interregional trains Karlskrona-Göteborg are using the Sydostlänk.

Figure 17 Scenario UA3



The reduced number of trains will not affect the number of passengers so much, only a reduction of about 15%. Instead of flows on the Sydostlänk between 1100 and 1400 passengers per day, there will be flows between 950 and 1200.

Figure 18 Difference in passenger flow per train link UA3-JA



The reduced number of trains will make the cost-benefit analysis more positive. The variables from the personal transport forecast to be used in the cost-benefit analysis are presented in the table below.

Table 12 The differences between UA3 and JA in times in hours and lengths in km for supply and demand per mode.

Mode	Variable	UA3-JA	Rel
Car	Vehicle km	-2 072	0.0%
Car	Vehicle hours	-18	0.0%
Car	Personkm	-2 582	0.0%
Car	Personhours	-22	0.0%
Bus	Vehicle km	-1002	-7.2%
Bus	Vehicle hours	-20	-5.7%
Bus	Personkm	-21 208	-0.9%
Bus	Personhours	-697	-0.3%
Train	Vehicle km	1626	3.0%
Train	Vehicle hours	13	1.9%
Train	Personkm	43 102	0.5%
Train	Personhours	1 569	0.3%

The total flows for JA and UA3 are given in the following two diagrams. For the flows between Karlskrona and Emmaboda values are taken from another source.

Figure 19 Flows on train links JA

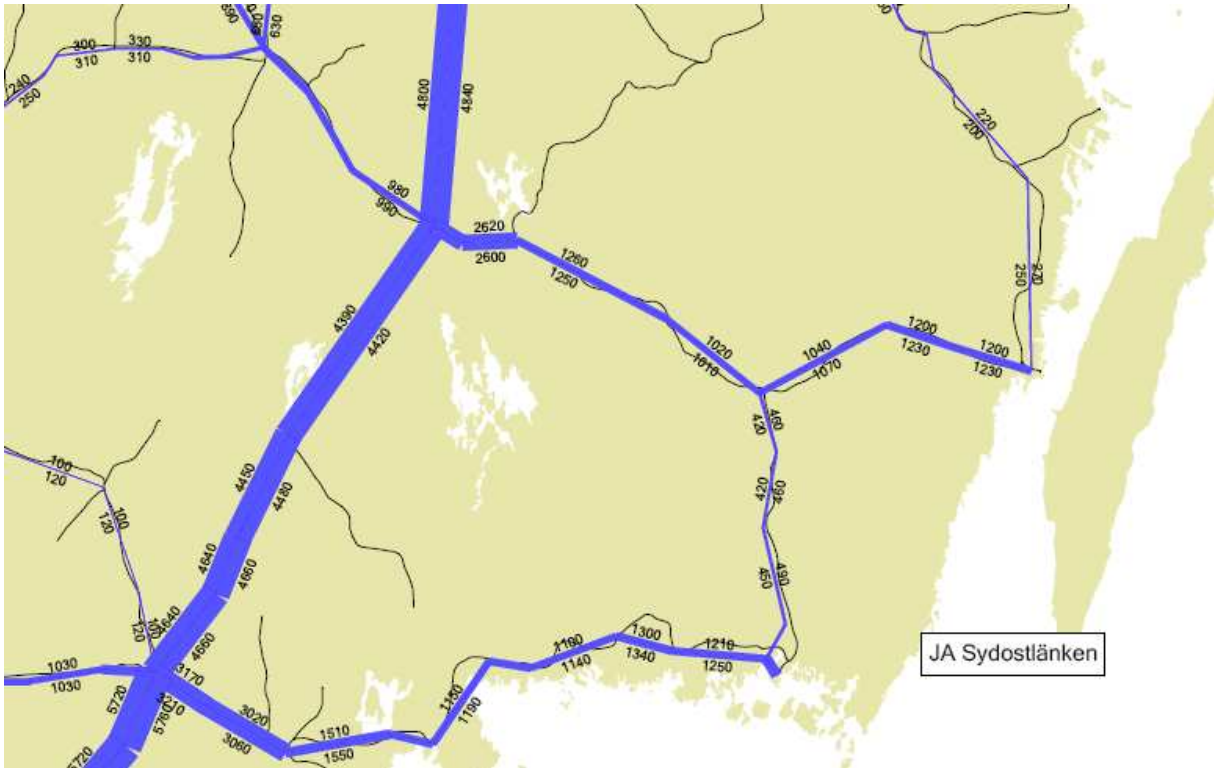


Figure 20 Flows on train links UA3

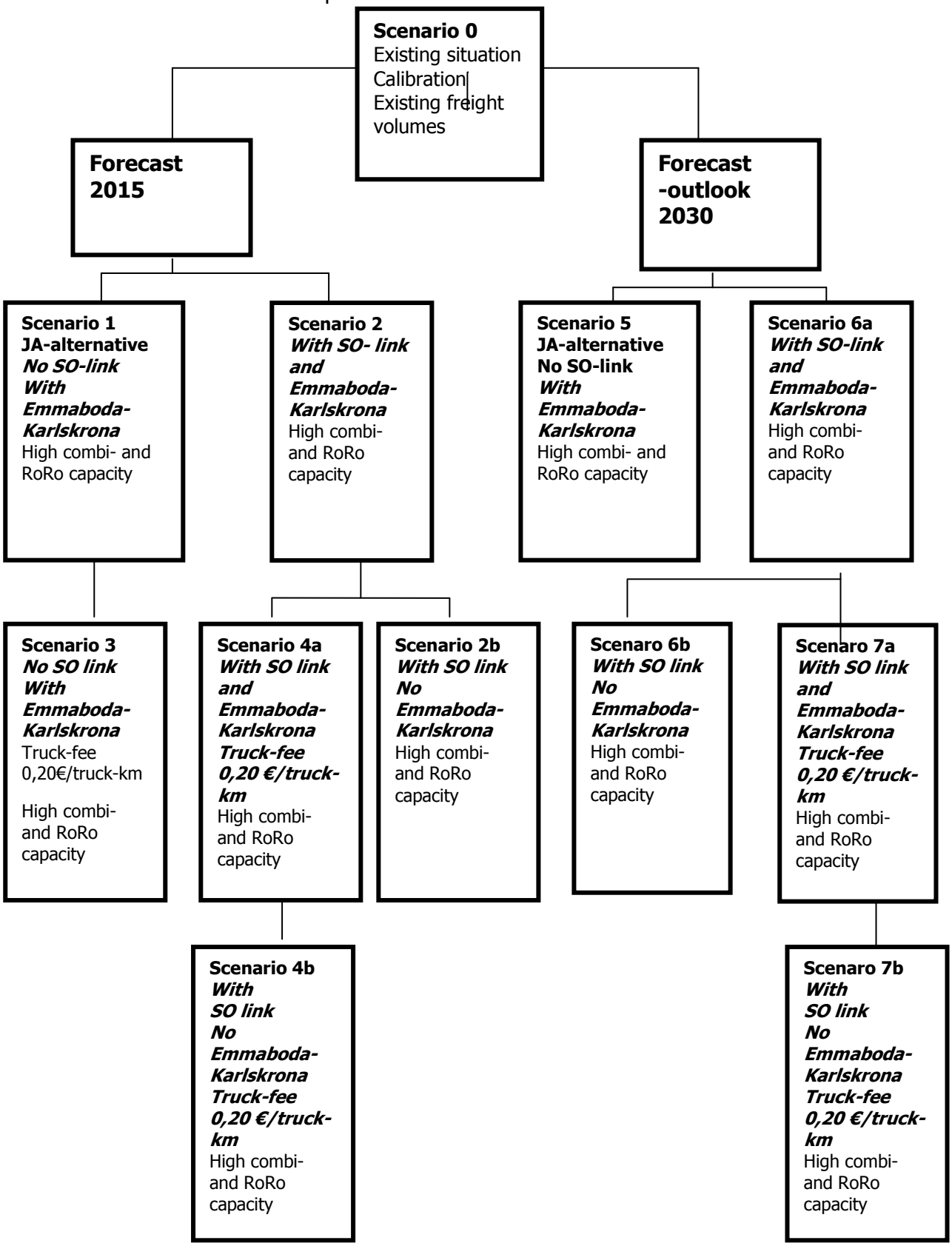
5.4 Regional development as an effect of the Sydostlänk

As shown above the scenarios UA1 and UA2 will give considerably better accessibility by public transport for especially Olofström. Calculations have been made by the SAMLOK model to see the effects on population and employment after 15-20 years after the Sydostlänk has been built. If all potential is used the effect of both population and employment in Olofström will be an increase of about 7% compared to the situation with no Sydostlänk. Älmhult will gain about 3% of both population and employment and Karlshamn will gain about 2%.

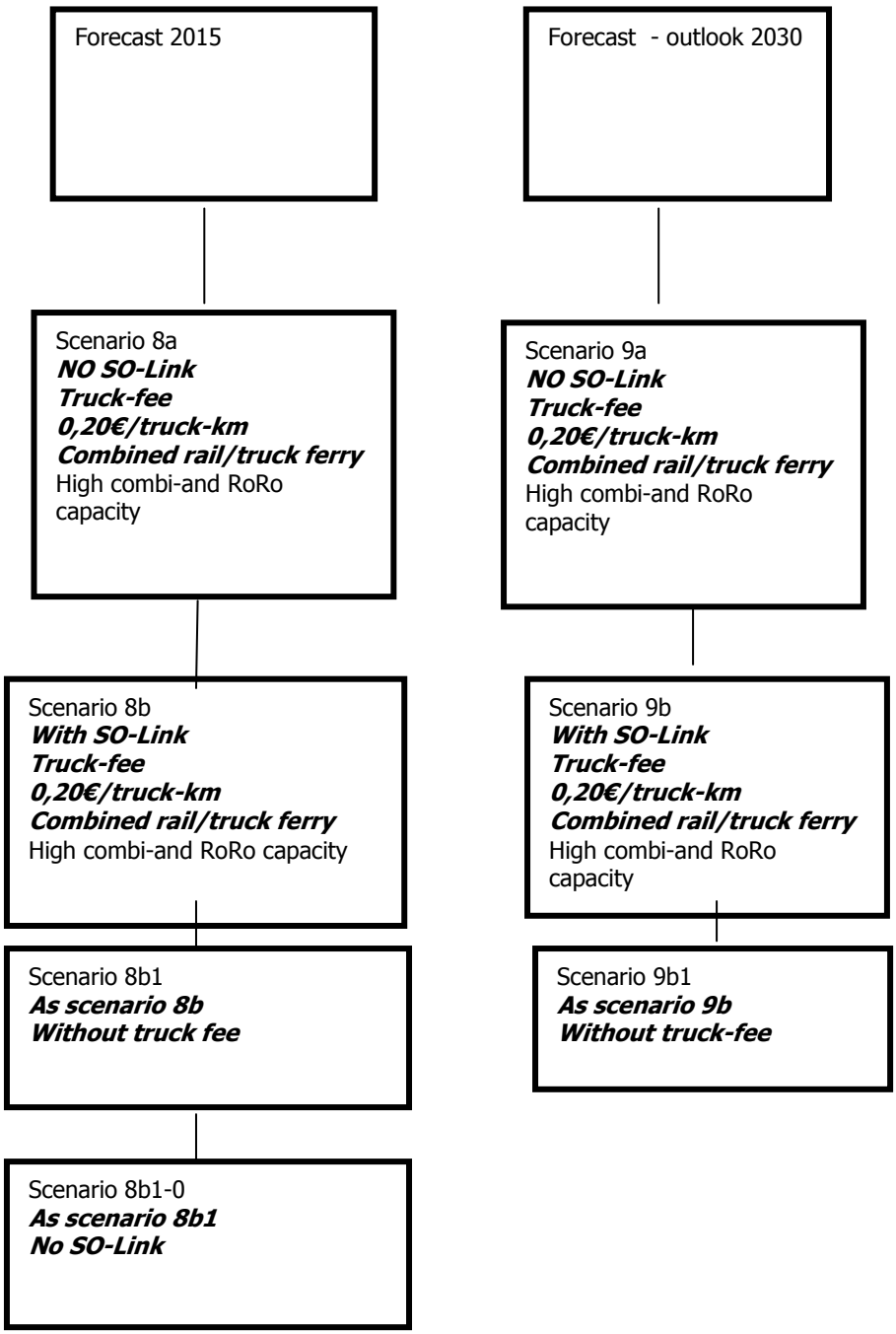
Appendices:

Appendix 1 Scenario structure

Below the used scenario structure is presented for the scenarios 1 to 7b



Below the used scenario structure is presented for the scenarios 8a to 9b (with a combined truck/rail ferry)

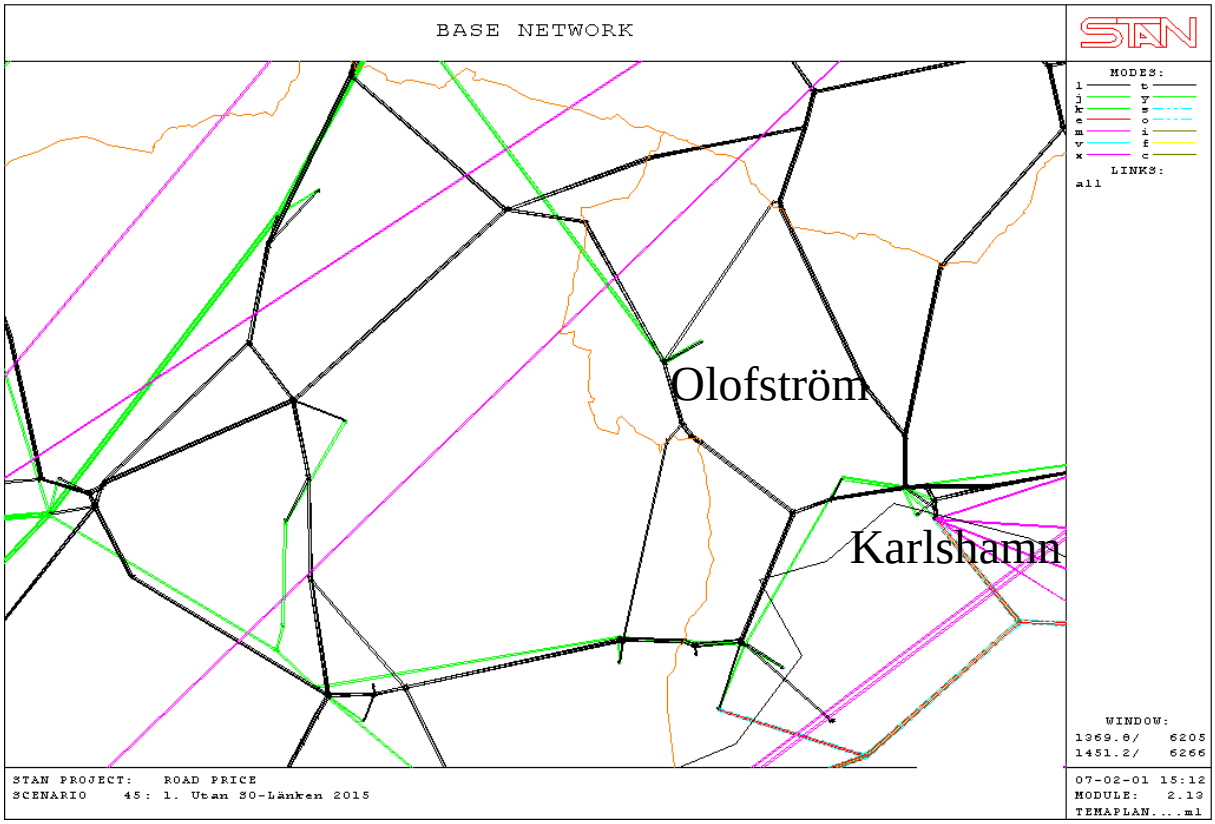


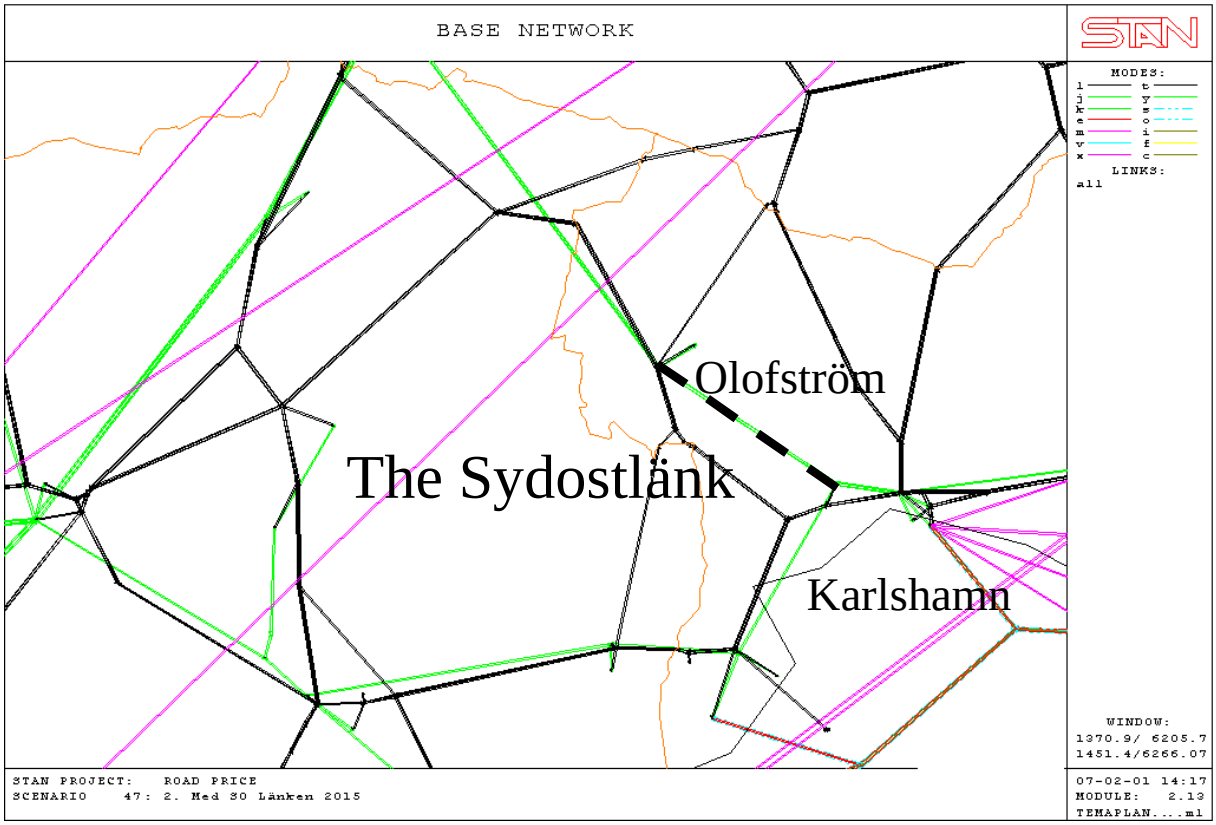
Appendix 2 Market interviews

Company	Name	Import to Sweden,t			Export from Sweden,t			Development till 2015
		Russia	China	Asia	Russia	China	Asia	
IKEA	P. Olofsson	13 000	219 000					Chinese import forecast to increase to 359 000 t 2011. Container to Gothenburg, Helsingborg Transsiberian railway interesting alternative with potential for the future. Russia is favouring Kaliningrad. Administrative problems. Russian import forecast to increase to 55 000t 2011. Potential for intermodal transports of Polish/Baltic States volumes from Karlshamn to Älmhult (Sydostlänk important)
AAK AB	B. Lövgren	0		100 000	15 000	5 000		Export to Russia 40 000 t Export to China 10 000 t (vegetable oil) Import of vegetable oil 150 000 t, ship Sydostlänk important for train and intermodal transports to Gothenburg area and Norway (60 000 t) Sydostlänk important for improving AAKs cometitiveness/market reach (e.g. Norwegian market) The Sydostlänk might also lead to an increased competitiveness of Port of Karlshamn, enabling container feeder lines to service the Port
Volvo (CCBC)	H. Olofsson	0	0			1 000		Export to Russia 1 000 t possible Export to China 2 000 t possible It is good that the Sydostlänk is constructed, improving the acces to Port of Karlshamn Main volumes are transported to Gehnt in Belgium
Railog AB	G. Vollmer	0	50 000		5 000		0	Export volumes to Russia forecast to 100 000 t Import volumes from Russia - difficult to estimate Export volumes to China forecast to 100 000 t Import volumes from China forecast to 200 000 t Important that the Sydostlänk is built to create alternative transport links (additional capacity) Problems using the Transsiberian Railway today. 2015 is the Transsiberian Railway a real alternative. Alternative railway lines are built in Kazakhstan.
Port of Gothenburg	D. Johansson							Intermodal shuttle planned Gothenburg-Karlshamn with start June 2007. 6 departures/week/direction Connection to Karlskrona via truck, later ev. rail Market potential is import container volumes from Asia (US) to Blekinge and container export volumes and truck/trailer volumes from Port of Karlshamn and Port of Karlskrona The planned intermodal shuttle will expand Port of Gothenburg`s hinterland market reach

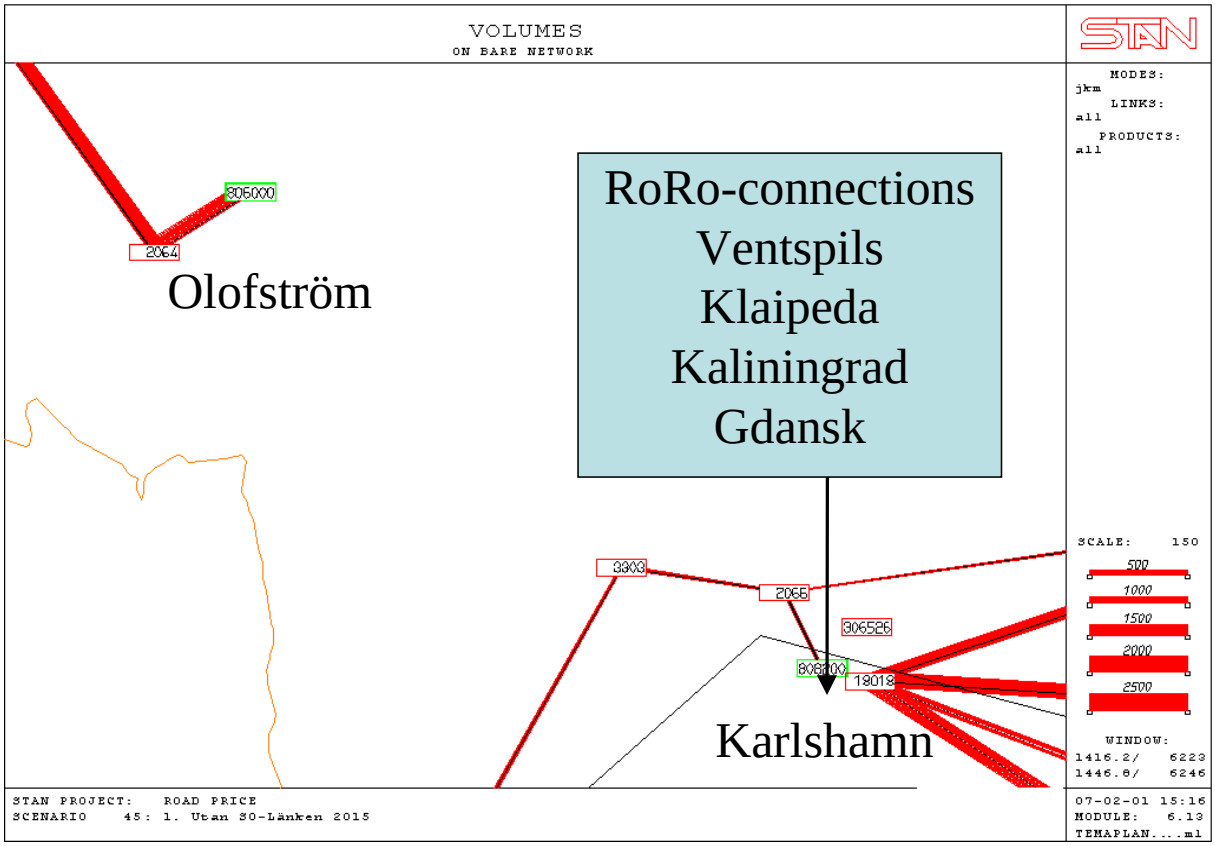
Appendix 3 EFM-STAN model simulations – example

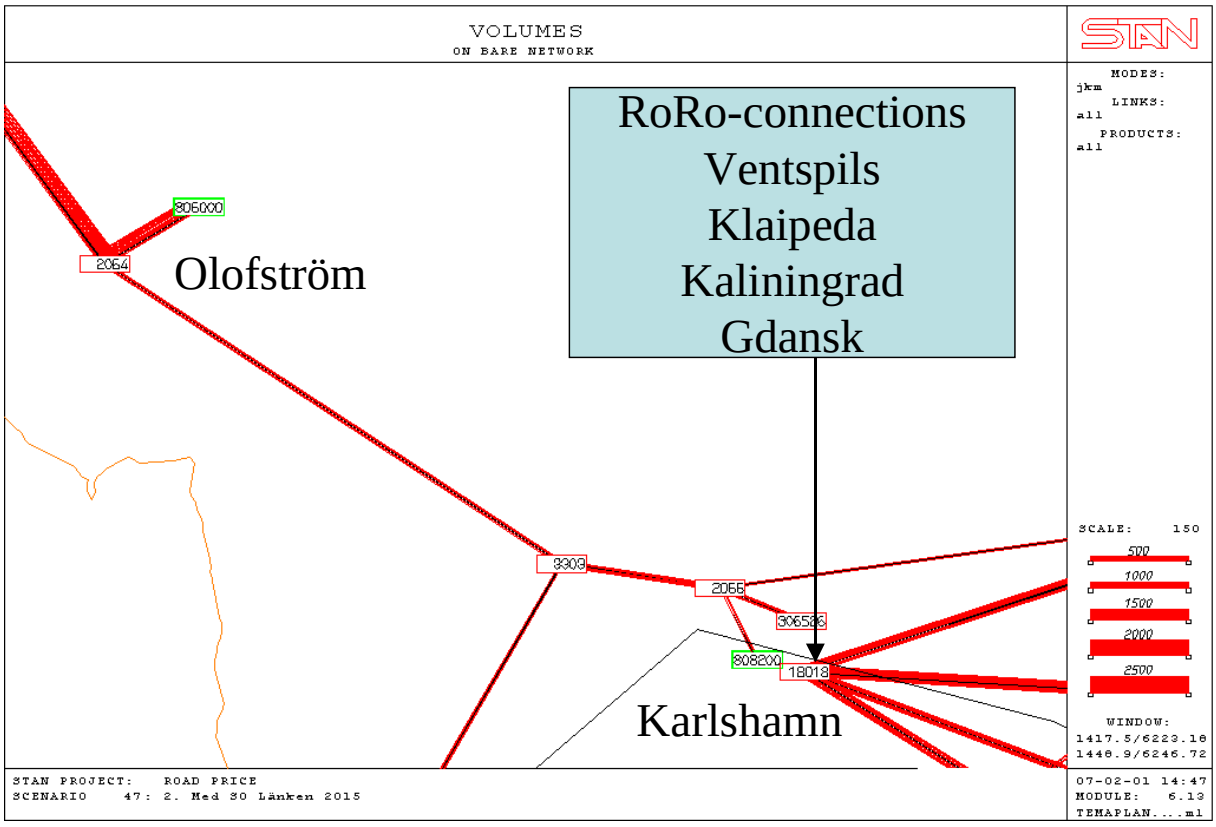
A Infrastructure network without and with the Sydostlänk (Green is rail network)





B. Simulated freight volumes without and with the Sydostlänk





Appendix 4 Simulation results

Sydostlänken, Simulation results 03.04.07	SO-Link	Port of Karlshamn			Transport work, train	Transport work truck
	Train and com	RoRo truck	RoRo rail	Other, bulk	Sweden	Sweden
					Tonkm *10exp9	Tonkm *10exp9
2015						
Scenario 1 JA-alternative	No SO-Link	4,7 m ton		6,3-7,7 m ton	17,30 mdr tonkm	37,21 mdr tonkm
Scenario 2	0,4 m ton	5,0 m ton		6,3-7,7 m ton	17,35 mdr tonkm	37,14 mdr tonkm
Scenario 2b	0,4 m ton	5,0 m ton		6,3-7,7 m ton	17,35 mdr tonkm	37,14 mdr tonkm
Scenario 3 (truck-fee)	No SO-Link	4,2 m ton		5,1- 6,2 m ton	21,4 mdr tonkm	29,0 mdr tonkm
Scenario 4a (truck-fee)	0,5 m ton	4,2 m ton		5,1-6,2 m ton	21,4 mdr tonkm	29,0 mdr tonkm
Scenario 4b (truck-fee)	0,5 m ton	4,2 m ton		5,1-6,2 m ton	21,4 mdr tonkm	29,0 mdr tonkm
Scenario 8a (truck-fee)	No SO-Link	4,1 m ton	0,4 m ton	6,3-7,7 m ton	21,2 mdr tonkm	28,9 mdr tonkm
Scenario 8b (truck-fee)	1,8 m ton	3,9 m ton	1,0 m ton	6,2-7,6 m ton	21,0 mdr tonkm	28,5 mdr tonkm
Scenario 8b1-0 Same as 8b1, no SO-Link	No SO Link				17,5 mdr tonkm	36,7 mdr tonkm
Scenario 8b1 (scenario 8b, ej truck fee)	1,3 m ton	4,6 m ton	0,7 m ton	6,2-7,6 m ton	17,6 mdr tonkm	36,6 mdr tonkm
2030						
Scenario 5 JA-alternative	No SO-Link	6,9 m ton		7,2-8,8 m ton	21,3 mdr tonkm	41,0 mdr tonkm
Scenario 6a	0,7 m ton	7,4 m ton		7,2-8,8 m ton	21,3 mdr tonkm	41,0 mdr tonkm
Scenario 6b	0,7 m ton	7,4 m ton		7,2-8,8 m ton	21,3 mdr tonkm	41,0 mdr tonkm
Scenario 7a (truck-fee)	0,8 m ton	5,2 m ton		5,9-7,3 m ton	26,1 mdr tonkm	34,0 mdr tonkm
Svenario 7b (truck-fee)	0,8 m ton	5,2 m ton		5,9-7,3 m ton	26,2 mdr tonkm	34,0 mdr tonkm
Scenario 9a (truck-fee)	No SO-Link	5,0 m ton	0,6 m ton	7,2-8,8 m ton	26,2 mdr tonkm	34,0 mdr tonkm
Scenario 9b (truck-fee)	2,6 m ton	4,7 m ton	1,3 m ton	7,1-8,7 m ton	26,1 mdr tonkm	33,9 mdr tonkm
Scenario 9b1 (no truck fee)	1,9 m ton	6,6 m ton	0,9 m ton	7,1-8,7 m ton	22,04 mdr tonkm	40,3 mdr tonkm
Estimated values 2020						
Scenario 1 JA-alternative	No SO-Link				18,63 mdr tonkm	39,56 mdr tonkm
Scenario 2	0,5 m ton				18,69 mdr tonkm	39,49 mdr tonkm
Scenario 2b	0,5 m ton					
Scenario 3 (truck-fee)	No SO-Link					
Scenario 4a (truck fee)	0,6 m ton					
Scenario 4b (truck-fee)	0,6 m ton					
Scenario 8a (truck-fee)	No SO-Link					
Scenario 8b (truck-fee)	2,1 m ton					
Scenario 8b1-0 (2020, ej SO-Link, no truck fee)	No SO Link				18,97mdr tonkm	39,05 mdr tonkm
Scenario 8b1 (2020, no truck-fee))	1,5 m ton				19,04 mdr tonkm	38,94 mdr tonkm

Comments

Transitolja-/oljeprodukter som omlastas/largras i hamnen och transporteras vidare med fartyg,
ingår ej. Denna hantering utnyttjar ej landinfrastrukturen via Karlshamn. Svårbedömd volymutveckling,
rysk oljeexport ökar mycket med flera faktorer. Antar att 2,0-(5,0) m ton transitolja tillkommer 2015
(2030) till other bulk

Partners of East West TC

AAK
Aerotech Telub
Baltic State Fishing Fleet Academy
Blekinge Institute of Technology
Coordinating Council on Transsiberian Transportation
County Administrative Board of Blekinge
DFDS Tor Line
DFDS Lisco
EC Gruppen
Esbjerg Business Center
IKEA Sweden
ITS Sweden
Kaliningrad Branch of North West Academy
Kaliningrad Oblast
Kaliningrad State University
Karlshamns Expressbyrå
Klaipeda County Coordination
Klaipeda County Governors Administration
Klaipeda State Seaport Authority
Klaipeda University
Klaipedos Smelte
Lithuanian Road Administration
Municipality of Baltijsk
Municipality of Karlshamn
Municipality of Karlskrona
Municipality of Klaipeda
Municipality of Sölvesborgs
Municipality of Ronneby
Port of Esbjerg
Port of Karlshamn
Railion
Railog
Region Blekinge
Region Skåne
Region Sealand
SC Lithuanian Rail Administration
South West Business Development
Swedish National Maritime Administration
Swedish National Rail Administration
Swedish Road Administration Skåne
Swedish Road Administration South East
University of Southern Denmark
Vilnius Gediminas Technical University
Vinnova