Summary

In February 2022, the Norwegian Ministry of Transport (Samferdselsdepartementet) asked the Norwegian Railway Directorate (Jernbanedirektoratet) to prepare a feasibility study for the Oslo–Stockholm route. The aim of the feasibility study would be to provide the basis for a decision on whether – and, if so, how – further work should be conducted in order to improve the rail service between Oslo and Stockholm, including whether a concept study should be initiated for the section. The Swedish Transport Administration (Trafikverket) was commissioned by the Swedish Government in June 2022 to report on the requirements for measures on the same section.
This commission largely corresponds to the Norwegian commission, though with some exceptions.

The work has been conducted in four working groups, working both in parallel and in cooperation, in accordance with the instructions in the letter of award. The four working groups have been responsible for:

- Market assessments
- Capacity assessments
- Cost estimates
- Socioeconomic assessments

The work has been conducted as a feasibility study. The work was to take place in collaboration with the Swedish Transport Administration. During this process, Bane NOR has also been involved in part of the working groups.

Given the short period of time available for the investigation, and given that the Swedish Transport Administration has recently investigated possible measures in Sweden, the feasibility study has concentrated on the Arvika–Ski/Lillestrøm section and the continuing section to Oslo. The Arvika–Ski/Lillestrøm Line is referred to here as the *Cross-Border Line (Gränsbanan)*.

It should be noted that this is just a feasibility study, and that there is high uncertainty attached to all figures shown. Nevertheless, the Norwegian Railway Directorate and Swedish Transport Administration share the view that this feasibility study will help to shed some light on this project.

It became apparent during the work that, by laying a new route between Arvika and either Lillestrøm or Ski, as well as conducting some minor infrastructure works between Arvika and Karlstad, it would be possible to travel the route between Oslo and Stockholm in somewhat less than four hours using a total of 12 pairs of trains per day. This indicates a saving of approximately 77 minutes on the journey time between Oslo and Arvika compared with the current travel time. Further measures would need to be taken in Sweden in order to reduce this journey time further; these have not been included in this feasibility study. Possible measures of this kind have previously been investigated by the Swedish Transport Administration. See Chapter 6.1.

Market assessments have been conducted in which the project has examined the current service and compared the new service with choices of means of transport between other cities with comparable journey times. The conclusion was that, using the service outlined, the number of rail travellers between the two capitals would exceed one million.

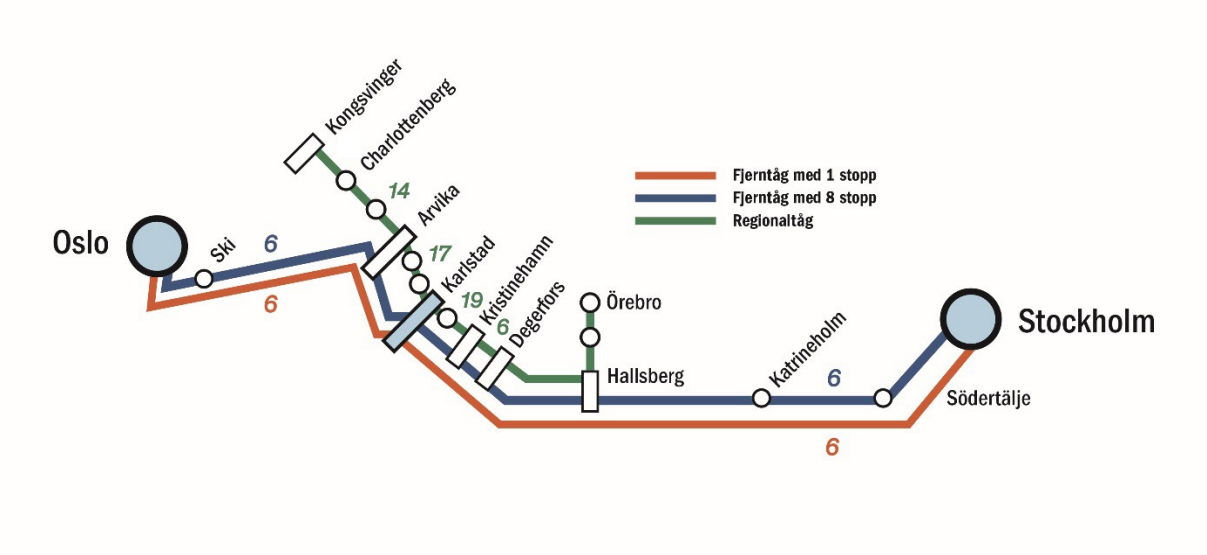
Summary 1: Number of travellers (in thousands) and proportion of travellers with new service

	Rail journey time	Number of runs	Delayed trains	Rail travellers	Air travellers	Travellers car/bus	Total
After development 2040	05:13	5	26%	362	1,838	1,079	3,278
After development 2040	03:55	12	24%	1,045	1,360	976	3,381
Difference	23%	140%	10%	From air	From road	New	
Elasticity	-5.0	50%	30%	70%	15%	15%	
Increase in rail travellers	116%	70%	3%				189%

Of these, approx. 70 per cent will have been former air travellers and 15 per cent will have previously travelled by car, while approximately 15 per cent will be new travellers compared to the reference situation.

A service concept has been drawn up in the investigation based on six of the pairs of trains operating a regional train service with a number of stops en route, while six of the pairs of trains will operate an express train service stopping only at Karlstad between Oslo and Stockholm. This service would allow the section to be built mainly as a single track railway. It is considered that the line will be used for freight traffic at times of spare capacity (late evenings and nights).

Summary 2: Presumed rail traffic 2040 with the Arvika–Ski Cross-Border Line



For the entry into Oslo S from either Lillestrøm or Ski, it is not considered possible to operate the analysed service concept into Lillestrøm station via the route to the Kongsvinger Line without major measures being required at the station. It has therefore been proposed to lay the route to the north, entering the North Trunk Line at Leirsund. There will additionally be challenges in terms of capacity associated with the Gardermoen Line/Romerike Tunnel, which make this route demanding. The Blix Tunnel (Follo Line) will open in December 2022, making it feasible for trains to get through to Oslo S from Ski. Unless a new National Tunnel (formerly called the Oslo Tunnel) is built, there will also be a number of challenges at Oslo S, given the assumptions in the analysis of the other train service.

Both routes have been cost-estimated, with the route towards Lillestrøm in a northern line entering the Gardermoen Line. Route optimisation models were run in order to find the cheapest possible solution, but one that was also feasible and balanced in respect of nature encroachments. Based on the route, cost figures for each country were used to prepare a cost estimate.

Summary 3: Cost estimate using Norwegian costing figures

Section	Cost range (-30% / +60% of basic cost):
Lillestrøm–Arvika	20–45 bn.
Ski–Arvika	25–60 bn.

Summary 4: Cost estimate using Swedish costing figures

Section	Cost range (-30% / +60% of basic cost):
Lillestrøm–Arvika	20–45 bn.
Ski–Arvika	25–60 bn.

A cost estimate has also been prepared to determine what saving would be possible by not adapting the route for freight traffic. The saving is estimated to be in the region of 5–10 per cent.

Socioeconomic assessments of the project have been conducted, but at a highly general level and only for a small number of relationships/sections apart from Oslo–Stockholm, as well as frequency improvements in Sweden between Karlstad and Stockholm only. The main findings of these assessments are that there is a high degree of passenger benefit, but that the measure will not be profitable from a socioeconomic perspective due to the high costs of investment. The Norwegian and Swedish figures are based on different assumptions, but the socioeconomic present net values will be relatively similar.
The table below shows the results for the Lillestrøm–Arvika option.

Summary 5: Comparison between Norwegian and Swedish sizes in the utility cost analysis (in SEK million and NOK million resp.)

	Swedish method	Norwegian method
Time gains (person)/Passenger benefit	8,802	5,967
Ticket revenue/Market revenue, passenger trains	9,406	5,528
Freight effects	246	183
Climate/Change in CO2 emissions	1,128	1,056
Investment cost[1]	-26,150	-22,036
Operating costs	-3,409	-2,311
Overhead costs	(included in op. costs)	
Net present value	-9,977	-9,507
Net present value quotient	-0.4	-0.57

Calculations have also been performed that show that the operation of the train service is commercially profitable. This means that ticket sales exceed operating costs in such a way that there will be no need for public purchases in order to service the line.

It is also evident that the investment will be climate-neutral after relatively few years. There will be major emissions at the time of construction, but these will be recouped through the switch in means of transport from air to rail.

The main conclusion is that, with a new route between Oslo S and Arvika (along with infrastructure adjustments between Arvika and Karlstad), the journey time will be reduced by so much that the number of passengers will increase greatly. There are challenges in terms of capacity, but the concept appears to be feasible. There will be a high level of passenger benefit, and the measure will help to move closer to the climate goal of more climate-friendly travel. However, the investment cost is high relative to the estimated societal benefit.

[1] *Including cost of financing through taxation*

The sections requiring further measures on the line between Stockholm and Oslo in Sweden differ in terms of the prerequisites for implementation. On some sections, quality assured and up-to-date investigative material is available regarding costs, effects and fulfilment of transport policy goals. High-level studies are available for other sections, while for others no analyses have been conducted within the framework of this assignment; however, we see the need for further investigation here.

The now completed study on the Oslo–Arvika section confirms the Swedish Transport Administration's previous conclusion that measures on the Värmland Line, west of Kristinehamn, are a prerequisite for development of the line. Here can be found the most significant deficiencies that entail negative consequences for development both locally, regionally, nationally and on the cross-border section.

The project recommends further investigation into the improvements to the train service between Oslo and Stockholm, starting with the climate effects, the fact that there are a number of effects for freight traffic and regional travel that have not been sufficiently picked up on in this analysis, and the fact that significant marketing potential has been identified. On the Norwegian side, this should be done in the form of a concept study as this is a natural step forward following a feasibility study. Consideration may be given to whether, as a first phase of the work on a concept study, there is a need to conduct further investigations, for example linked to technical solutions and costs for a route via Lillestrøm before work on a concept study begins. In Sweden, it is recommended that an assignment should be conducted jointly and synchronised with a Norwegian investigative assignment.

On the Swedish side, there are several development options east of Arvika that further reduce the journey time; these, too, have not been analysed in this feasibility study. If the real journey time from centre to centre becomes shorter by rail than by air, a greater switch in means of transport may be expected than is assumed in this feasibility study. This would produce an even greater overall societal benefit. In turn, this will make it possible to achieve the transport policy goals of more climate-friendly travel and better accessibility.

Assessments should also be conducted to determine whether it is possible to reduce investment costs in the form of new technical solutions, e.g. land bridges, or other technological advances.

In order for investigations across national borders to succeed, it is absolutely vital for the transport authorities in the countries to cooperate and work towards a common goal. If a more complete investigation is to be conducted, it will be important for the Ministry of Transport in Norway and the Ministry of Infrastructure (Infrastrukturdepartmentet) in Sweden to work together in preparing a common mandate for the project as a whole.