

Summary of "High-speed Railways – a Climate Policy Sidetrack"

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Main Conclusions in Brief

Through all shades of political opinion in Sweden there seems to be a perception that large-scale investments in high-speed railways is a climate policy necessity. Against this background this report studies whether “Götalandsbanan” – a high-speed railway between Stockholm and Göteborg *via* Skavsta, Jönköping and Landvetter – is a cost-effective way of reducing carbon dioxide emissions. Our work is based on a report that the Swedish National Rail Administration commissioned from the WSP consultancy.

Our examination of the supporting material that has been prepared leads to three main conclusions:

- Investment in Götalandsbanan in the form studied is not socially efficient. This does not rule out that implementing other and less costly project forms could be justified.
- Rail investments are in general not a cost-effective climate policy instrument. The reason is that despite great investment costs it is only possible to affect a very small part of carbon dioxide emissions from the transport market. One way of illustrating this conclusion is that the benefit must be SEK 8 per kilo carbon dioxide that the Götalandsbanan would contribute to eliminating, for the project’s social net-value to be changed from minus to plus. This corresponds to a petrol price of more than SEK 30.
- The economic analysis of Götalandsbanan that has been presented by the Swedish National Rail Administration is of a high standard in many respects. Nonetheless, some shortcomings remain. We have pointed out deficiencies in statistical reporting of rail transport, calculations of initial capital expenditure and calculations of the costs of accidents,

environmental impact and wear as well as corresponding taxes. It is not a good state of affairs to approve investments in the region of SEK 100 billion on the basis of analyses that are unclear on these points. Consequently, results reporting must be developed to make the decision-making data more transparent. This applies to both analyses of Götalandsbanan and infrastructure projects in general

Summary¹

To substantially reduce the threat of future climate change there must be international cooperation to reduce global emissions of carbon dioxide (CO₂) and other greenhouse gases. Both internationally and in Sweden there are discussions as to the measures that must be taken. In Sweden one proposal is to use large-scale railway investments as such a policy instrument (see for example SOU 2008:24). Across all shades of political opinion the idea is also being put forward that investments in high-speed railways are a climate policy necessity (see for example Björklund 2009 and Svensson-Smith 2008, as well as the Swedish National Rail Administration 2008). The purpose of our report is to discuss in the light of this whether a partly new railway for high-speed trains between Stockholm and Göteborg *via* Skavsta, Jönköping and Landvetter, “Götalandsbanan”, is a cost-effective way of reducing carbon dioxide emissions.

In 2008 three different economic assessments of investments in Swedish high-speed tracks were presented. Two of them showed high social net-value while benefit and cost were about the same in the third. Based on the standard analysis model used for evaluating road and rail projects, in 2009 the Swedish National Rail Administration commissioned the WSP consultancy to carry out an economic analysis of Götalandsbanan. Our report is an examination of the work of the Swedish National Rail Administration/WSP-report that we refer to below simply as the Rail Administration Report.

The Rail Administration Report shows that Götalandsbanan is not socially efficient. The benefit of the project comes to only

¹ We are grateful for valuable comments and views from a reference group consisting of Per-Ove Hesselborn, Jan Owen Jansson and Bo-Lennart Nelldal. All interpretations and conclusions are of course our own and any errors are solely attributable to us.

about 80 per cent of the estimated initial capital expenditure. Two subsidiary aims of our report are therefore to answer the following questions. Is there reason to believe that a higher environmental benefit should be attributed to Götalandsbanan than in the Rail Administration Report? Is there reason to believe that there is a systematic under (over) estimation of the investment's benefits (costs) in any respect?

The investment would mean that CO₂ emissions from aircraft, trucks and passenger road traffic would decrease by almost 150 000 tonnes, which is equivalent to about 0.7 per cent of annual transport sector emissions. Increased emissions during the construction period are not included in this estimate.

The economic evaluation of Götalandsbanan, as in the infrastructure sector in general, currently uses a value for reduced emissions of CO₂ of SEK 1.50 per kilo. This value is considerably higher than (a) the carbon dioxide valuation made in the EU Emissions Trading System, (b) the international carbon dioxide prices expected to be the result of ambitious international agreements and (c) the estimates made of the value of the damage to the climate that further carbon dioxide emissions will give rise to. Consequently, our assessment is that there is nothing to indicate that the CO₂ value used underestimates the cost of achieving emission reductions and that a more reasonable value may be about SEK 0.40 per kg.

Using the assumptions otherwise made by the Swedish National Rail Administration, a simple reverse calculation shows that CO₂ emissions would have to be valued at more than SEK 8 per kilo for Götalandsbanan to be profitable for the society. In terms of taxation of petrol this corresponds to almost SEK 19 per litre or a petrol price of more than SEK 30 per litre. In light of this it is difficult to see railway investments as a cost-effective climate policy instrument.

The cost-benefit ratio of Götalandsbanan is not solely nor even mainly dependent on the environmental benefit of the project but of course also on its benefit to passengers and transport companies and on the estimated investment cost. The Swedish National Rail Administration has used the parameter values and followed the guidelines developed in the sector to calculate these effects. But apart from these standard assumptions, the calculation results are also due to a number of project-specific choices.

Initial capital expenditure is a case in point. It is not possible to see from the National Rail Administration Report how initial capital expenditure for Götalandsbanan has been calculated. It should also be possible to compare the National Rail Administration's cost estimates with the cost outcome reported for investments in high-speed railways in other countries. In the same way, in line with both Swedish and international recommendations, sensitivity analyses should be presented on the basis of experience of cost overruns in the National Rail Administration's other investment projects. Our analysis shows that a cost estimate that also highlights these aspects would reduce Götalandsbanan's social net-value.

Another choice that needs to be developed refers to the formulation of a realistic alternative for comparison. In a railway network that already today exhibits problems with delays, and where not all requests to operate trains can be met, it is likely that capacity-increasing measures will be carried out before 2025 regardless of whether Götalandsbanan is built or not. In our opinion this has not been taken sufficiently into account, and therefore the present estimates in this respect are to be regarded as exaggerating the benefit of Götalandsbanan.

A third choice is tied together with how the infrastructure will be used in the future. Not infrequently it is upheld that new infrastructure can facilitate commuting, which could contribute to increasing production. There is a line of debate indicating that this should be part of the benefit analysis. However, there are no established methods for clarifying whether such effects would mean that housing and workplaces would be relocated or if genuinely new benefits would be created.

The Rail Administration Report contains an account of how the social profitability of Götalandsbanan is affected by changes in individual variables, such as travel demand. The results indicate that variations in individual values would not conclusively affect the project's cost-effectiveness. The conclusion concerning the project's lack of a positive social net-value therefore appears to be robust.

In many respects it has been easy to follow the calculations commissioned by the National Rail Administration, for example as regards assumptions on economic growth, which costing and forecasting methods were used etc. In several other respects the examination has shown insufficient transparency. For example, it was

not possible to discover how costs and charges for accidents, environmental impact and wear were calculated. Nor is it satisfactory that it is so difficult to obtain data on current travel on the routes in question and thereby also determine the plausibility of the forecasts made. A natural ingredient of results reporting should be to establish how many people travelled on a particular route fifteen years ago and “today” and the assessment being made concerning travel fifteen years in the future. We have already pointed out deficiencies as regards developing a reasonable alternative for comparison as well as the calculation of the size of the initial capital expenditure.

The lack of transparency has not led us to believe that the calculations underestimate the benefit of the project or exaggerate its costs. Consequently, the main conclusion is that there is little to indicate that an investment in Götalandsbanan would be profitable for the society under the conditions studied.

In the general debate railway investments are put forward as socially valuable and as a suitable method of reducing emissions of carbon dioxide. The question is why the Swedish National Rail Administration’s analysis does not confirm this view.

Efficient traffic projects are characterised by that they at reasonable cost generates (small) benefits for a large number of people or considerably increase the utility for a small number of people, or a combination of these aspects. Despite a large passenger base by Swedish standards, in this perspective Götalandsbanan is a costly investment that will not be used by a sufficient number of passengers.

The limited net-gain of the project for the environment is first and foremost because investment is a weak policy instrument for achieving significant changes in emission volumes. A few years ago road traffic made up about 85 per cent of total transport while railway travel represented about 10 per cent. A better railway will only attract certain road users and air passengers, while the majority will continue to travel by road or air. An effective environmental policy requires general policy instruments (for example fuel taxes) that target all passengers, not only the few who travel on a specific route. Railway investments are generally therefore not an effective policy instrument.

Another explanation for the limited environmental utility is that the Rail Administration/WSP assume that the Swedish Parliament will substantially increase fuel and vehicle taxes and that there will be a considerable percentage of hybrid vehicles around 2020. The

consequence is that the future environmental gains from railway investments are lower than if current fuel and vehicle taxation continues as it is.

If it is decided to build Götalandsbanan the national economy would be shouldering a deficit equivalent to SEK 16 billion in discounted present value in order to achieve a reduction in emissions of 110 000 tonnes per year over a 40 year period. At a discount rate of 4 per cent this present value would be equivalent to an annual cost of SEK 808 million. By instead using the corresponding amount to buy emission rights that today cost about SEK 150 per tonne, it would be possible to reduce global emissions by 5 400 000 tonnes per year; almost 60 times more than with Götalandsbanan. This illustrates why a new railway between Stockholm and Göteborg is an expensive way of reducing emissions of climate gases.

Despite the fact that Götalandsbanan in the form studied by the Swedish National Rail Administration does not deliver social net-gains, one cannot draw the conclusion that all investments in high-speed railways would be unprofitable for the society. It could, for example, be possible to find cheaper technical solutions for Götalandsbanan that nevertheless could contribute to realising most of the beneficial effects. It is also possible that other railway routes would produce greater utility per krona invested. At the same time it should be remembered that the Stockholm to Göteborg route probably has the best potential in Sweden for attracting a large number of passengers.