Shift
Sustainable Horizons in Future Transport

Shift Policy Brief
2019/2020

Stronger policy measures to decarbonize Nordic long-haul and urban freight transport

Authors: Julia Hansson, Erik Fridell, Inger Beate Hovi, Daniel Ruben Pinchasik, Sara Sköld, Christian Mjøsund, Martin Jerksjö, Jardar Andersen, Karin Fossheim and Raffaele Salvucci, WP1 and WP3, Shift

Passenger cars and freight transport by road (including both long-haul and urban freight) are significant causes of CO_2 emissions as well as other emissions in the Nordic countries. Policy measures have started to decrease emissions from passenger cars, but not to the same extent from freight transport. The demand for freight transport in the Nordic countries is expected to increase also in the future, particularly by road.

In studies funded by the Nordic Energy Research project Shift and the Nordic Council of Ministers, researchers at IVL Swedish Environmental Research Institute and the Institute of Transport Economics (TØI), have assessed the potential to reduce CO_2 and in some cases other emissions from freight transport by different means but also the effect of different polices for modal shift.

Key findings

- In case of no further actions than planned policies, all Nordic countries will face large gaps in their transport sectors emissions compared to their CO_2 reduction commitments for 2030.
- Reducing transport demand, improving the efficiency of transport modes, and stimulating modal shifts in the freight sector will likely only contribute to limited emission reductions. There is a need for alternative fuels and propulsion technologies.
- The relative contribution to emissions of heavy goods vehicles compared to light goods vehicles may increase due to more electrification of light vehicles.
- There is a need for measures that increase the take-up of low- and zero-emission vehicles both in long-haul freight and in urban freight traffic.
- Emission reduction contributions from logistics improvements are rather limited as compared to emission reductions by increased introduction of zero-emission vehicles in urban freight.
- Allowing longer freight trains for border-crossing transports has a larger impact on mode choice than the eco-bonus schemes, but the costs are expected to be (much) higher for governments. The reduction in CO_2 emissions is estimated at 2.5 percent.
- An eco-bonus scheme for rail seems to have a much higher impact in number of tonnes transferred from road transport, compared to a similar scheme for sea transport. The change in CO2 emissions is also different, with a minor increase in total under the sea scheme and a decrease of 0.5 percent under the rail scheme.
- Combined measures have the highest influence on transferring goods from road to rail and sea transport and also on the estimated CO_2 reduction. However, the reduction in CO_2 emissions does not exceed 3 percent in any of the scenarios analyzed.
- Due to transit traffic and border-crossing effects, policy measures aimed at modal shifts may benefit from a more internationally coordinated approach.
- There are at least three mega trends that strengthen the position of the truck and that have not been covered sufficiently in the assessment: Establishment and use of Nordic distribution centers, increased use of transport firms from lower-wage countries for border-crossing transports, and an increase in vehicle dimensions.

Nordic Energy Research

Background:
Policy measures in the Nordic countries to reduce emissions

The report *Reducing CO_2 emissions from freight* maps current initiatives to reduce CO_2-emissions from freight in the Nordic countries. In Norway, those emissions are expected to further increase towards 2030, while in Denmark they are expected to stay at the current level and reduce in Sweden and Finland.

Policy measures taken

The main means for reducing CO_2-emissions can be grouped into reducing transport demand, increasing transport mode efficiency, modal shift, switching to fuels with lower carbon content and moving towards lower-carbon vehicle technologies.

These policy measures to reduce transport demand are used in the Nordic countries:

- Toll/road pricing (NO, SE)
- CO_2/NO_X taxes on fuel (all)
- Road infrastructure fees on fuel (NO)
- Energy tax on fuel (SE, FIN, DK)
- Reduced taxes for biofuels (all)
- The Eurovignette (SE, DK)
- Environmental zones for reducing local pollution (SE, DK)

Other Nordic measures include relaxed restrictions on weight and length of heavy goods vehicles (FIN, SE) and extensions of the road network for 25.25-meter-long vehicles (NO, DK). Another way of reducing CO_2 emissions is through modal shifts, shifts to transport modes with lower CO_2 emissions per transported unit (mainly from road to rail and waterborne transport).

The main policy instruments include taxation, subsidies, and facilitating infrastructural measures. Nordic examples include eco-bonuses, schemes for waterborne transport (NO) and for rail (SE, NO). The mode of choice for border-crossing determines to some extent the modal choice also later in the transport chain. This influences the freight transport in transit countries, e.g. Sweden and Denmark.

All Nordic countries have biofuel blending requirements. The EU promotes more efficient conventional propulsion and development of alternative technologies, as binding targets for reduced CO_2 emissions in new heavy-duty vehicles. Policies promoting the uptake of lower carbon vehicle technologies for freight need to be strengthened in all Nordic countries. There are some demonstration projects (e.g. platooning and electric roads in Sweden). In Norway, a support scheme started in 2019 gives purchasers of electric vans a subsidy of 15 000 to 50 000 NOK, depending on the vehicle's engine power and also provides subsidies to energy and climate measures within land transport.

National policy focus

Most of the current Nordic policy measures are directed at the national markets, implying that they might result in unintended outcomes or a sub-optimal effectiveness due to spill-overs. When compared to the national CO_2 reduction commitments for 2030, it is concluded that current and planned policies will not lead to the required reductions. Measures aimed at reducing transport demand, improving the efficiency of transport modes, and stimulating modal shifts in the freight sector will likely only contribute to limited emission reductions. There is a need to further promote alternative fuels and propulsion technologies. However, incentives are needed, at least in an early phase, both for freight transfers through modal shifts, and for low-carbon fuels or alternative propulsion systems.

The modal shift potential

Assessments of domestic modal shift for freight (from road to rail and waterborne transport) might underestimate the full modal shift potential. If more goods enter the Nordic countries by rail or sea, this can increase the likeliness of domestic transports by these modes.

A study by TØI and IVL assesses the impact of existing and strengthened policy instruments for modal shift in the Nordic countries for import to Norway (and Nordic transit countries) and their environmental effects.

The analysis of policy scenarios for 2030 indicates that a Norwegian eco-bonus scheme for sea transport replacing road transport might have a much larger impact in number of tonnes transferred from road transport, compared to a similar scheme for sea transport. Allowing longer freight trains between Norway and Sweden has a larger impact on mode choice than the eco-bonus schemes, but will likely require large government investments.

Significant increases in the Eurovignette rates will result in reduced road transport, but to a limited extent, mostly through shifts from road to rail transport. This policy measure can also affect route choice and reduce road transport related to Norwegian transit through Sweden, and result in increases in domestic road transport in Norway.

Shift
Sustainable Horizons in Future Transport
Shift Policy Brief

Allowing longer freight trains and better access to rail terminals in Europe will increase transport by rail in model simulations, but transports are mainly shifted from sea, than from road. New infrastructure connections, as the Fehmarnbelt-connection, give a weak increase in road transport, and an even smaller increase in rail transport, both at the expense of sea transport.

Scenarios where measures are combined yield the largest effects on transferring goods from road to rail and sea transport. Harmonizing policy instruments between the Nordic countries might lead to stronger effects.

Most scenarios reduce greenhouse gases, nitrogen oxides (NO_X) and particles, particularly with a combination of policies and considering the effect also outside of Norway. However, in several scenarios there are increased emissions, for example of NO_X and particles, due to increases of sea transport, where the emission limits are less strict.

The role of modal shift for 2050

The specific role of modal shift in decarbonizing the Scandinavian transport sector is assessed by Salvucci et al. (2019). The assessment is made by implementing long-term substitution elasticities for modal shift from the literature for passenger and freight transport in a model depicting the national energy systems of Denmark, Norway and Sweden.

This is the first time that passenger and freight modal shift are modelled in an energy model for a real case study. Modal shift is found to be cost-effective for decarbonizing the Scandinavian transport sector under an increasing CO_2 tax (one of several cost-effective measures). When rail and to some extent ship replaces trucks the total modal shift (including the passenger sector) results in a reduced fuel use in 2050, and 2.2 percent lower CO_2 emissions from transport.

Comparing alternative scenarios

TØI assessed, through case studies in the Oslo and Akershus region, how emissions from freight traffic in cities might develop to explore how the current policies supports significant emission reductions. The alternative scenarios included improved logistics efficiency and a significant introduction of zero-emission vehicles.

It was found that logistics improvements like better management to limit the overall traffic are important. A general advice is to improve the national guidance for urban freight planning. However, the introduction of zero-emissions vehicles is the game-changer. When compared to them, emission reductions from logistics improvements are rather limited. The relative contribution to carbon dioxide emissions from heavy vehicles can increase compared to light goods vehicles, due to increased electrification of the latter.

Policy recommendations

- The introduction of low-carbon fuels and propulsion technologies in the freight transport sector need to be supported in all Nordic countries, for both long-haul freight and urban freight transport. This will increase demand and give an incentive to companies to prioritize development of these technologies.
- Measures aimed at reducing transport demand, improving the efficiency of transport modes, and stimulating modal shifts in the long-haul freight sector need to be promoted further.
- Logistics improvements, for example better management of freight movements to limit the overall traffic and belonging negative impacts in metropolitan areas, are also important to promote.
- Support schemes such as the eco-bonuses for rail and sea should be designed such, that they are only paid out when the support results in a (new) modal shift away from road transport. If they are harmonized over the borders of the Nordic countries, they will have a higher impact on goods transferred.
- Allowing longer trains may have a higher impact on rail transport than certain subsidy scheme designs.
- Combined measures which stimulate sea and rail transport and reduce the profitability of truck transport will have a greater impact than measures only stimulating one mode of transport.
- While measures such as larger allowances for vehicle dimensions might improve the efficiency of road transport, they also make road transport more competitive versus rail and sea.
- Regulatory measures in urban areas (such as time access regulations, parking regulations, environmental restrictions e.g. low emissions zones, size/load access restrictions, freight-traffic flow management) should be designed in parallel to market-based measures (involve pricing, taxation and tax allowances) to systemize urban freight and control the externalities associated with it.
- For urban freight a combination of measures is needed. A comprehensive urban freight strategy in municipalities need to be drafted by the authorities, a common database mapping the types of urban freight activities and trips in the cities need to be created and there need to be increased coordination between urban freight stakeholders.
- Implemented policy measures should be evaluated and the findings shared between the Nordic countries as this may improve the design of new policies.
- Policy makers aiming at inducing modal shift in order to reduce CO_2 emissions need to consider also other environmental impacts (for example particles and NO_X emissions).

References

Salvucci R, Gargiulo M, Karlsson K, 2019. The role of modal shift in decarbonising the Scandinavian transport sector: Applying substitution elasticities in TIMES-Nordic. Applied Energy 253.

Nordic Council of Ministers, 2018. Reducing CO_2 emissions from freight – Recent developments in freight transport in the Nordic countries and instruments for CO_2 reductions. TemaNord 2018:554.

Pinchasik DR, Mjøsund CS, Hovi IB, Grønland SE, Jerksjö M, Fridell, E, et al. 2019. Modal shift and emission reduction potentials: an assessment for Nordic freight transport, Working document 51515 (TØI).

Fossheim K, Andersen J, Caspersen E, Priya Uteng T. The importance of urban freight logistics – examples and trends from the largest Scandinavian cities. Forthcoming.

Contact

Julia Hansson
IVL Swedish Environmental Research Institute
e-mail: julia.hansson@ivl.se
phone: +46 -10 788 66 51