Institute of Transport Economics
Norwegian Centre for Transport Research

ENGLISH Summary

Strategic choices for a realistic and goal-oriented transport plan

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In this report, we discuss and provide recommendations on important choices that should be made early when preparing the next National Transport Plan (NTP) to achieve a realistic and targeted plan, with the transition to a low-emission society in 2050 as a starting point. The choices concern four main topics: (1) Use of policy instruments that contribute to better utilisation of existing capacity in the transport system, particularly pricing. (2) Division of roles between the different modes of transport. (3) Prioritization of operation, maintenance and renewal and documenting their economic benefits, based on a new methodological framework outlined in the report. (4) A decision-making basis that facilitates informed decisions through a clearer structure and link between goals and instruments, highlighting the alternatives to large investments that often have low profitability and contribute relatively little to goal attainment.

Transport and communications take up a large and increasing share of public budgets. Nevertheless, there seems to be an impression that the resources are insufficient, and that ambitions are not met. This raises the question of whether the needs could be solved in a more efficient way. In this report, we account for and provide recommendations on important strategic choices that should be made early in the work on the next National Transport Plan (NTP) in order to achieve a realistic and targeted plan. The choices are linked to four main topics.

The National Transport Plan (NTP) 2029–2040 will set the course for transport policy in a time of great uncertainty and demanding requirements. Norway is to achieve the goal of being a low-emission society by 2050, while at the same time giving greater priority to defence and security and reducing the financial leeway. At the same time, there is considerable uncertainty about the economic and security situation, as well as technological developments. All this indicates that it will be necessary to set hard priorities.

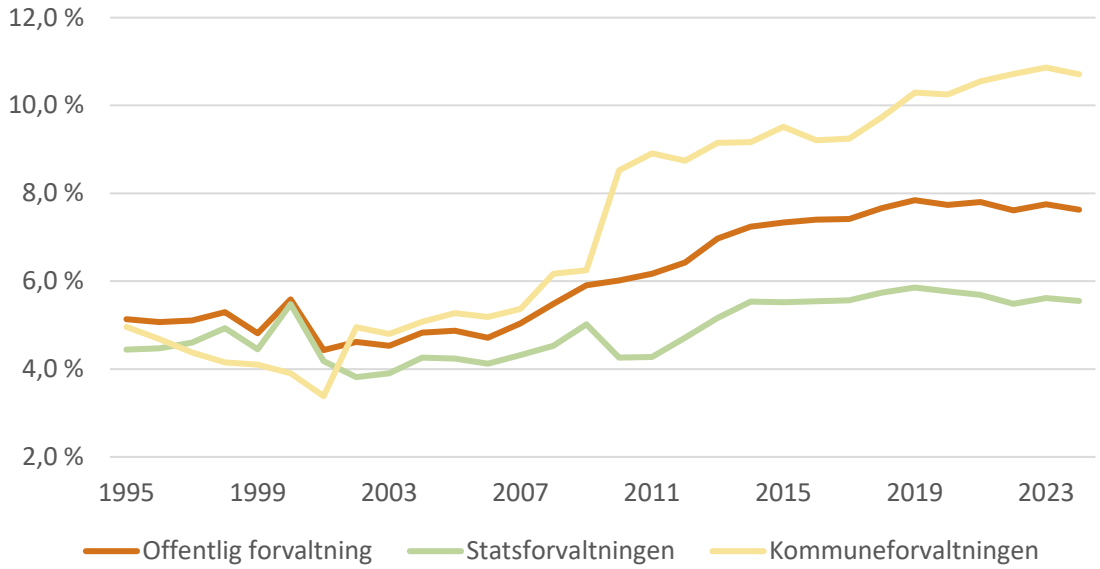

Figure S1: Public expenditure on transport as a share of total public expenditure. The increase in local government's share in 2010 is related to the transfer of parts of the national road network to the counties. (Source: Statistics Norway Table 14669)

The goal of a low-emission society can be seen as a constraint that all sectors, including the transport sector, must adhere to. The cost of the transition will be lower if one takes advantage of the opportunities that lie in the transport system and the economy in general to choose new solutions that utilise resources efficiently. The transport sector must take into account that stricter policies in other sectors, for example related to taxes and land use, may also affect transport demand and the benefits of transport measures.

Utilization of capacity

Our first main topic is about efficient utilisation of capacity in the transport system, across modes of transport. This means that the capacity that is limited is prioritised for the purposes that provide the greatest benefit and that available capacity is utilised, rather than expanding capacity. In general, price is a good tool for achieving efficient utilisation of capacity, by setting a price that provides the "right" level of traffic overall based on available capacity, while at the same time giving road users flexibility to adapt within this.

Examples of low capacity utilisation are roads with little traffic, vehicles and vessels with low passenger occupancy, and a passenger car fleet where the use per car is low and declining over time. At the same time, there are capacity limitations during rush hour on some of the road sections around the major cities, in public transport and on the railways. There have also been reports of queues on several ferry connections during the tourist season, a problem that has probably increased after some connections were made free.

Price is rarely used to spread traffic and utilise spare capacity. Only some of the toll rings in the large cities have a significant degree of congestion pricing, and on the busiest roads during rush hour, traffic is clearly underpriced in relation to the economic costs it entails. At the same time, there are several examples of high tolls on new roads outside the city, which can lead to lower utility and traffic being diverted to side roads. The road use tax on fuel is not very accurate as a means of utilising capacity, and also does not apply to electric cars. Cheap monthly passes in public transport stimulate more travel during rush hour. Travel deductions for long work trips, free ferries and maximum fares on regional air routes are also policy

instruments that can contribute to increasing the burden on the transport system. The charging system for freight transport only to some extent reflects the external costs of the transport.

In general, there are signs that transport is increasingly subsidised with public funds. This can lead to both capacity problems, because one stimulates increased use of limited capacity, and that one invests in capacity that is poorly utilised. Transport is a large and growing expense item for the public sector, and public transport is increasingly financed by public funds. Revenues from car and fuel taxes have also decreased. Schemes such as travel deductions, duty-free shopping and subsidised parking spaces stimulate more travel and use of transport resources. Billions in investments in infrastructure with negative socio-economic profitability can also be seen as subsidising mobility, at the expense of other purposes. There is reason to ask whether transport can become a smaller expense and to a greater extent a source of public revenue.

Internationally, urban road tolls are to a greater extent presented and used as a tool for traffic regulation, while the scope of tolls outside cities is smaller. New Zealand and Iceland have introduced a state-based kilometre-based tax for electric cars, and Australia and the UK are considering a similar system. Denmark has recently carried out a major trial with road pricing. Peak hour pricing and distance-based pricing in public transport are less common, but there are some examples.

We recommend that the state stimulate more **targeted pricing of capacity** on roads, public transport, ferries and FOT routes through tax policy, city packages, urban growth agreements and various support schemes. Cheap monthly passes on long-distance trains with limited capacity should be avoided. Policy instruments for freeing up and better utilisation of capacity should **be analysed and assessed** in the NTP work as an alternative to costly capacity increases. **Distance-based road pricing** should be investigated further. If the goal is to reduce traffic, as in urban areas, one should **not only use price**, but also consider reductions in infrastructure capacity, parking area and speed limits. In general, restrictive measures should be used **rather than subsidies** if the goal is to reduce emissions or traffic. The NTP should contain a clearer overview of public **expenditure and revenues** related to transport.

Division of roles and interaction between modes of transport

The different modes of transport have natural advantages in different markets, which are related to differences in land use, density, travel distances and time costs. For passenger transport, walking and cycling are suitable for the shortest distances where flexibility, accessibility and low costs provide natural advantages. Public rail systems have significant economies of scale, high capacity and low marginal costs per passenger within available capacity. Car transport is flexible and time-competitive in low-density areas but lacks economies of scale. Increased traffic results in increased marginal costs in the form of congestion, land use and environmental impact. Aviation reduces travel time over long distances and in areas with challenging topography, which often lack travel alternatives within an acceptable travel time. The advantages of freight transport follow an even clearer scale and distance logic than passenger transport, where sea transport has the greatest economies of scale in the entire transport system.

Within passenger transport, private cars are the dominant mode of transport, with the exception of parts of the largest urban areas. Nationally, passenger car traffic has had a slower growth, with the exception of a significant growth in 2025. Public transport has experienced significant growth over the past 20 years, with the exception of the pandemic years. On the longest journeys, airplanes have a significant market share along with cars. The growth in air

travel is now driven by travel in and out of the country, not domestic travel, and only the largest airports have seen growth. Within freight transport, sea and road account for the largest volumes. The railway still has a high market share on the longer corridors where freight trains operate, but competition from road transport is strong and volumes are declining. Air freight in and out of the country has increased.

The private car is the dominant mode of transport in passenger transport in other selected countries as well. This is also true in Switzerland, for example, despite a significantly higher share of train travel. At the same time, we see that the transport plans in Sweden and Denmark entail a higher prioritisation of railways in relation to roads than previous Norwegian plans do. This includes both new investments and substantial funds for operation and maintenance.

When assessing the division of roles between modes of transport in the future, the importance of tighter constraints related to climate and nature should be taken into account. Stricter climate policy is likely to result in higher costs for modes of transport such as air and sea, which are more challenging to transition to zero emissions. However, this depends on technological developments and the availability of alternative fuels. Restrictions on land use will limit further growth in road transport. At the same time, it is important to emphasise that the natural advantages of the modes of transport still apply, and that one will not necessarily see major changes in the distribution of roles. Automation can change the economies of scale in public transport by road and the role of the private car.

We do **not recommend a given distribution** of resources between modes of transport in the NTP process, but that this should follow from how much the modes of transport contribute to economic benefits and goal attainment in different markets. Based on what we already know about benefits and goal attainment, rail investments for passenger transport should be targeted at the **largest passenger volumes** in central areas, and on longer distances, the **needs of freight transport** should be prioritised. Investments in metros, railways and other high-capacity public transport require **a coordinated use of policy instruments** to safeguard the traffic base and the benefits of the investments. Here, the urban growth agreements are central. Furthermore, we recommend that opportunities be looked at for **streamlining the airport structure** and reducing passenger train services by rail on routes with low demand. The NTP process should include **systematic surveys** of the business case, overcapacity and opportunities for efficiency improvements for all modes of transport.

Prioritisation between operation and maintenance, renewal and major investments

The maintenance backlog is large and has grown over the past decade for large parts of the transport infrastructure. The cost of eliminating the maintenance backlog is estimated at NOK 33–54 billion NOK_{2021} for national roads and 60–100 billion NOK_{2021} for regional roads. At the same time, the NTP contains a number of large investment projects with significant negative estimated net benefits, according to the analyses. These projects, if built, will in turn contribute to increased maintenance obligations in the future. Although the share going to large investments decreased somewhat in the current plan, the level is still high. The use of road tolls has also increased over time, most of which is earmarked for larger investments in infrastructure.

A main problem is that the decision-making basis is better developed for large investments than for maintenance and renewal. For maintenance, the analysis methodology is less developed. One challenge is how to handle the reference alternative, which cannot be "no measures" as long as the infrastructure is to be kept in operation. In practice, the reference

alternative must therefore be understood as a minimum strategy, where necessary maintenance is postponed until a defined trigger point for functional failure is reached (see point $T_{utsettelse}$ in Figure S2). An important part of the benefit of timely maintenance is that you avoid cost escalation and more extensive interventions later. In addition, maintenance can provide benefits in the form of better traffic safety, lower user costs, fewer road closures and better accessibility.

We outline a methodology for analysing maintenance strategies based on cost-benefit analysis and making them more comparable to large investment projects. The descriptions are based on the road sector, but the principles are also largely relevant for railways, ports and airports. Although the methodology needs further development, there are clear indications that there may be great economic profitability in increasing maintenance efforts and catching up on maintenance backlogs, especially on links with relatively high traffic.

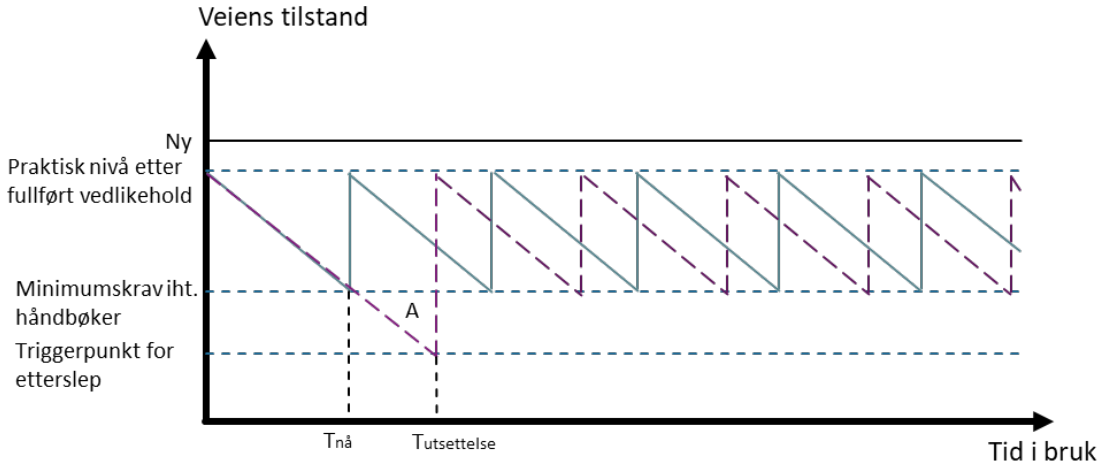

Figure S2: Evolution of road condition when maintenance projects are sequenced according to minimum requirements in manuals (green lines) and in zero/minimum option (purple dotted line) when at time $T_{nå}$ it is decided to postpone maintenance until it reaches a trigger point for backlog in $T_{utsettelse}$ and then return to a maintenance sequencing according to manuals.

Further developing such a methodology and using it actively will help to strengthen the life cycle perspective in resource prioritisation. This will help to highlight the consequences of postponing maintenance, and to be able to assess specific measures based on overall benefits and costs over time. Combined with systematic analyses of infrastructure condition and future maintenance needs, it will be possible to plan resource use more long-term and socio-economically efficiently.

Optimal management of the overall NTP budget will thus imply that the net benefit per NOK spent (NNB) should be the same for maintenance projects and investment projects. This implies a significant re-allocation compared to the current allocation. Maintenance and renewal measures also normally have lower complexity and less cost uncertainty than large investment projects. A portfolio with a high proportion of large investment projects will therefore typically have greater overall budget and implementation risk. When uncertainty about future technology, geopolitics and transport demand is high at the same time, this strengthens the argument for prioritising flexible measures in the existing network rather than irreversible investments with a long lock-in period.

The proposal for the next national plan for transport infrastructure in Sweden points in this direction. Here, operation, maintenance and renewal are given higher priority than new investments, especially for roads. The benefit calculations made for maintenance measures that address unevenness in the road surface (IRI) have a calculated Net Present Value per Cost

Krone (NNK) of between -0.15 and 0.29. It is pointed out that the profitability of these maintenance measures is probably underestimated, because they lack estimates of the effect rutting depth has on travel time and traffic safety.

We recommend a **re-allocation of resources from unprofitable investment projects to maintenance**, combined with an optimised maintenance effort over time. This will involve more emphasis on condition-based and preventive maintenance, particularly to reduce cost escalation and the likelihood of breakdowns. Furthermore, there is a need to **develop and standardise methods** for making good and comparable analyses of maintenance and other smaller measures, and **to look analytically at established standards for both maintenance and capacity requirements** for the infrastructure. One should limit the growth in tolls and other schemes earmarked for new investments and instead **ensure financing of maintenance**, either through earmarked taxes or user financing or general road and rail charges. **Future maintenance obligations** should be described in the NTP.

Decision-making basis and use of policy instruments

There are several weaknesses in previous NTP processes. One is unrealistic plans and a lack of predictability, both in the form of a shifting political support and the fact that many projects are not carried out as planned. Another is the unclear link between goals and instruments, where the large investments dominate the plan despite the apparently low contribution to goal attainment. There are also many indications that expert advice and the factual basis for decision-making is given little weight in the decisions, especially cost-benefit analyses.

One question that arises is the extent to which the objectives of transport policy are perceived as binding. This is particularly a concern related to climate policy, which requires planning for a cross-sectoral transition and introducing policy instruments to support this. If the climate goals are not considered binding, there is a risk that these will have to give way to other, more short-term considerations. The problem of a lack of commitment over time can be understood in the light of insights from research on monetary policy, which shows that policies based on discretion result in lower goal attainment than policies based on clear, binding rules.

There may be reason to consider a more transparent professional framework for the NTP work. One possibility is to apply the structure of the State Project Model for large investment projects, more specifically the idea phase and the concept phase. This involves the steps (1) Problem description, (2) Needs mapping, (3) Strategic goals, (4), Constraints and requirements for concept selection, (5) Feasibility study and analysis of alternatives and (6) Recommendations. The goals chapter should consist of societal goals and impact goals derived from these, which can be used to assess the plan's contribution to goal attainment. The analysis of alternatives should show both socio-economic profitability and goal attainment, so that potential goal conflicts can be taken into account.

A number of policy instruments are relevant to the NTP in the sense that they directly or indirectly affect the transport sector. This applies both to economic instruments such as pricing and purchase of transport services and to administrative instruments such as regulations, standards and organisation. We review relevant policy instruments related to the five NTP objectives and show that there are a number of policy instruments that are relevant to goal attainment, and that could have been analysed and assessed in the NTP process to a greater extent.

Cost-benefit analysis is currently perceived as not very relevant as a basis for decision-making in the transport sector. One possible reason for this may be that one often only uses this to show that the large investments are often unprofitable, and not the benefits of alternative measures. If it is possible to document to a greater extent that there are also profitable

measures, it can strengthen confidence in the analyses. There may also be a need to strengthen the quality of and confidence in the analyses themselves and to make the trade-off between socio-economic profitability and other relevant considerations clearer.

It is often claimed that geographical equity concerns are important, but it is currently unclear what role these concerns play. Analysing existing inequalities in transport services and geographical distributional effects of measures more systematically may make it easier to emphasise such considerations in a transparent manner. There is also a need to rethink compensatory measures to increase acceptance of climate and environmental policy.

The review of practice in other countries shows that several countries to a greater extent have binding climate targets for the transport sector in the form of specific caps on emissions. Sweden in particular has a stronger focus on economic net benefits as a basis for decision-making. In connection with the Swedish infrastructure plan, analyses of geographical differences in accessibility have also been carried out, which can provide a basis for assessing geographical distribution considerations.

We recommend that **the objectives of the NTP be specified** to a greater extent, so that the degree of goal attainment can be assessed. Furthermore, we recommend that a **clearer structure** be established for the work with a clear link between goals and instruments, preferably inspired by the state project model. **Portfolio management in the** sector should be strengthened, and projects should be reassessed if conditions change. All **relevant instruments** should be analysed and assessed. In particular, one should demonstrate which policy instruments can be **alternatives to large and often unprofitable investments** and carry out **cost-benefit analyses** of more types of policy instruments than are currently the case. Furthermore, **geographical equity concerns** and other decision-relevant considerations should be made visible, so that any emphasis on these can be made in a more transparent manner.

Need for more knowledge

In this report, we have tried to provide specific recommendations based on existing knowledge. At the same time, the work has highlighted that there is a considerable need for knowledge in many of the areas. Among other things, there is a need for:

- Better overview of what households and businesses pay for transport, compared to the total costs to society
- Well-established future scenarios for the role of transport modes under different trajectories in terms of technology, economic development and emergency preparedness
- Methodology for systematic mapping of the business case for the different modes of transport in different markets and opportunities for efficiency improvements
- Further development of methodology for cost-benefit analysis of operations, maintenance, renewal and other smaller measures
- Models for transport analysis that can be used to analyse, for example, policy instruments for better capacity utilisation and new forms of mobility
- Clearer operationalisation of climate and nature considerations in the NTP
- A better understanding of the considerations that in practice govern priorities when socio-economic profitability is given little weight
- Better methods for highlighting the geographical distribution of benefits
- More knowledge about how to compensate for undesirable distributional effects

Overall, there is a need for a broader knowledge boost about impacts, operationalisation of goals and analysis methodology, so that future transport plans can be based on a more comprehensive and transparent basis for decision-making.