

Highway investment planning: Why CBA scarcely affects the prioritization of projects in Norway

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***Abstract:** It is well documented that the benefit/cost ratio is virtually uncorrelated to the likelihood of a Norwegian classified road project entering the list of projects selected for investment in the National Transport Plan. All candidate projects are cost-benefit analysed, so the parliamentarians have the information required to take social net benefits into account, should they want to. As the politicians have requested the cost-benefit analyses, their modest use of the results calls for an explanation. The paper describes the steps of the priority setting process, and for each step outlines procedural characteristics and political mechanisms that have the effect of pushing the results of cost-benefit analysis into the background. The points dealt with are of a general nature and do not pertain only to Norwegian conditions. For example:*

- *Perverse incentives: Local influence is not related to responsibility or cost coverage*
- *Agencies expected to give professional advice may be too keenly listening to political signals*
- *Equal allocation of projects to various counties trumps implementation of the economically best investments*
- *Choosing the project with the highest benefit/cost ratio is supplemented by so many other assessment criteria that the difference between professional and political judgment is dissolved*

The prioritization effect of the formidable revenues to the Norwegian state from oil and gas production, is also considered.

1 Introduction on cost-benefit analysis in Norwegian national transport planning

It is well known and documented that economic net benefit to society plays a very modest role in setting priorities among investments on classified roads in Norway (Eliasson et al. 2014, Odeck 2010, Sager and Sørensen 2011, Welde et al. 2013). Correlation of 1 between the size of the benefit/cost ratio of projects and their likelihood of entering the list of prioritized investments in the National Transport Plan (NTP) would be unreasonable, as it would be an indication of technocratic and bureaucratic power strong enough to make parliamentary politics virtually superfluous. A certain positive correlation between the result of a project's cost-benefit analysis (CBA) and its appearance on the list of selected investments could however be perceived as reasonable from a democratic point of view. The positive correlation would indicate that the Directorate of Public Roads puts a certain weight on the analyses for which it is responsible. Instead, the factual situation is that a positive correlation has not been found. Surely, the politicians take into account some of the benefit items included in the CBA, especially time savings and reduced number of traffic accidents, but the aggregated consequences measured in monetary units means little to their priority setting (Odeck 2010). Eliasson et al. (2014: 2) survey the varying degree of CBA-influence on the prioritization of road projects in several countries of Western Europe and the Americas.

The Norwegian experience is the point of departure for the present paper, which explains how characteristics of the planning and decision-making process can lead to low emphasis on economic outcome. The process starts with the local project proposals put forward by municipalities and counties, continues via project assessment in the regional and central offices of the Norwegian Public Roads Administration (NPRA), and moves on via the political adjustments of the Ministry of

Transport and Communications (MoT), to the final political comments and subsequent decisions made by the Storting (Parliament).

In 2010, 17 200 km of formerly classified roads were converted to county roads. The remaining classified roads are European highways, main connections with neighbouring countries, or important roads between provinces. On matter pertaining to classified roads, the NPRA is under the direction of the MoT. The list of prioritized investments on the national road network is worked out by the Directorate of Public Roads every fourth year. It is an important part of the transport administration's common proposal for the National Transport Plan, which is handed over to the MoT for political treatment. The big difference between what the results of the cost-benefit analyses suggest, and the actually proposed investments, emerges during the NPRA's work on priority setting; that is, precisely the political treatment of the NTP at the national level. It is therefore a point of discussion whether the recommendations of the Directorate of Public Roads are sufficiently freely given on a basis of professional knowledge and research.

The National Transport Plan presents the Government's visions and plans for the transport sector over the coming ten-year period; it is a rolling plan that is revised every fourth year. Proposed investments are listed each time, and unfinished road projects from the previous list are included in the next one. Nearly all candidate projects are economically assessed using CBA. The Storting has instructed the NPRA to prepare such analyses in accordance with guidelines from the Ministry of Finance (Direktoratet for økonomistyring 2014, Finansdepartementet 2014).

The priority setting among road projects in the NTP discloses some features deserving critical debate. First, the national politicians in the Storting (the Parliament) have a clearly stated aim of steering strategically at the coordinated and superior level. It is not clear, however, which principles of priority setting make up their platform, and whether they stick to principles and criteria at all. Second, the transport bureaucracy loyally complies with the political demand for cost and benefit estimates for every investment project in the network of classified roads, but without demonstrating the importance of these calculations in its own selection of recommendable projects. The Directorate of Public Roads recommends instead an investment portfolio that seems partly politically motivated and rests in part on professional considerations that are foreign to CBA.

The purpose of the cost-benefit analysis is not to tell the decision-making authority what to do. The analysis does not provide a complete foundation for making political decisions, and it should not aim to do so. The aim should be the more modest one of informing the politicians of which planning alternatives are the best, seen from the economic point of view. It seems reasonable to claim that the list of selected road projects should reflect that net benefit to society is an important consideration, as this importance has been laid down repeatedly by the MoT and by the Storting's standing Committee on Transport and Communications (Samferdselsdepartementet 2014: 12, Transport- og kommunikasjonskomitéen 2013: 54). Nevertheless, it cannot be demonstrated that CBA has got a breakthrough in practical politics judging from the four white papers on national transport plans that have been published since year 2000.

It could be regarded as bureaucratic steering if priority setting in the NTP was in line with a technical or economic criterion, for example, the benefit/cost ratio. On the other hand, political arbitrariness can be suspected if neither professionals nor lay people are able to identify the criteria sustaining political decisions. CBA can – just as other analytical evaluation methods – be given a comprehensive and technically complicated design making it very hard for politicians and the general public to grasp how results are generated. However, without publicly known criteria, the choice processes taking place in the heads of decision-makers will be just as inaccessible as the algorithms of a formal model. Black-box problems can be caused both by extended use of mathematical modelling and by diffuse subjective decisions. In both cases it is difficult for interested groups and individuals to get involved in meaningful ways, and the legitimacy of the political decisions is weakened.

The following sections describe the decision process and show that downgrading of CBA-results takes place even before the candidate list of road projects reaches the Ministry. It is then argued that the Norwegian state's ample oil revenue is an unlikely explanation for the low CBA influence. In the search for alternative explanations, the remaining sections analyse political signals, process characteristics, and critique of CBA.

2 The planning and decision-making process for investments in classified roads

This section follows the prospective road projects from local politicians, via bureaucrats and planners, to politicians at the national level. Planners at various levels of the bureaucracy affect the selection of road projects by contributing to the political agenda; for example, by making traffic forecasts identifying future congested areas, by reporting on serious lag in road maintenance, and by estimating the extra costs to private business due to traffic jams. Planners also gain power from describing and evaluating possible investment projects. The portrayal of strong and weak sides can affect attitudes to the project. The politicians also form the agenda of the day. They affect priority setting by deciding on the goal hierarchy that planners must take into account, and obviously by allocating money to projects. The balance of professional and political knowledge and the interplay of bureaucratic and political power are essential for the priority setting of the NTP.

Political signals about important themes and planning tasks are emitted very early in the national transport planning process, as guidelines from the Ministry of Transport and Communications. These are general instructions that are unrelated to particular projects. Far more concrete and project-oriented preferences are expressed by local actors at the level of municipalities and counties. The need for uniform road quality over longer distances and the wish for road capacity matching the traffic volume and corresponding to road guidelines and standards, are much used reference points for new project proposals. The counties in a region can find it opportune to launch common demands and proposals. Counties and municipalities often get involved in the planning through a Regional Transport Forum or an interim board working for improvement of the road standard in a particular corridor crossing several municipalities or counties.

The five regional offices of NPRA convey wishes from local political actors and put forward ideas of their own. The Directorate of Public Roads receives proposals from the regional offices about which road projects to include in the National Transport Plan. The CBAs conducted by the regional offices of NPRA or their hired consultancies are checked and controlled for inconsistencies as part of the assessment process. Ideas for new projects are seldom launched by the central offices of the road administration. The Directorate makes a list of prioritized road projects based on the local input. The list is an important part of the transport administrations' common proposal for the

The list of recommended projects on classified roads is submitted to the Ministry of Transport and Communications. The MoT adjusts the list according to all the political considerations that have to be made by the Government. The Ministry also requests comments on the proposal from the counties and the four biggest city municipalities. The Government's NTP is sent as a report (white paper) to the Storting. This is common procedure when the Government wants to raise a matter in the Storting without a draft resolution. The white paper is handled politically by the Storting's standing Committee on Transport and Communications. The Committee aims to visit all counties to prepare for its deliberations on the NTP. The politicians thus have extensive local information to their disposal, in addition to expert analysis, when considering the plan and making budget decisions later on. Extra input is received through open hearings organized by the Committee, in which 74 organizations and political bodies aired their views on NTP 2014-2023. All the largest political parties are represented in the Committee and comment on the plan. Comments and recommendations are put forward in a report to the Storting.

The full Storting debates the report on the NTP and votes over the proposed comments to the plan. It is not voted over the NTP itself, though, as it is the Government's plan and not the Storting's. The Storting can nevertheless ask the Government to change the economic frame of the plan or to

distribute funds in a different way, as the Progress Party proposed during the parliamentary debate in 2013. Usually, the elected representatives also advance several so-called loose proposals to the matter, drawing attention to actions which the Storting should ask the Government to implement in the planning period. No loose proposals passed in 2013, not even any of the 27 proposals that were listed in the report from the Committee on Transport and Communications. The only proposal that passed under the Storting's treatment of NTP was that Report no. 26 to the National Transport Plan 2014-2023 is enclosed with the minute book.

It is not up to the parliamentarians to pass or discard the Government's transport investments in the NTP are not formally approved until funds have been allocated over the national budget, or a motion about road tolls has been carried by the Storting. Moreover, the Storting can comment on the plan and put forward requests and appeals to the Government, which may send strong signals about the action plans to be made for each transport sector to follow up the NTP. The Storting's political discussion of the National Transport Plan is therefore an important priority setting for projects in the network of classified roads.

3 Marginalization of CBA takes place in the pre-Ministry stages

It is important to the overall argument of the paper that the downgrading of the CBA-results does not start with the Ministry's political work on the NTP, but is well under way much earlier in the process, already when the regional offices of the NPRA adopt many of the project suggestions from local politicians.

Surely, the Ministry of Transport and Communications may expand the road investment budget compared to the economic framework on which the Directorate's recommendations are based (Martinsen et al. 2010: 8). In the current plan, NTP 2014-2023, the increase is due to new rules for VAT calculation and, moreover, the fact that detailed planning of some projects revealed underestimation of costs. When the budget ceiling is lifted, many projects will be supplied with more money in the Government's plan than in the proposal from the transport administrations, a few will suffer small cuts and thus slower progression. With changes of this kind, the Government makes certain economic reallocations, while the social profitability of the project portfolio stays virtually the same as in the proposal from the Directorate.

It is, by and large, the same set of road projects that is proposed by the Directorate, considered politically by the Ministry, sent to the Storting by the Government, and funded by the parliamentary majority. The consistency between the prioritizations of the road bureaucracy and the Government can be documented for the planning period 2014-2023. This is done by comparing the maps showing the location of the projects on classified roads in the transport administrations' proposal and the Government's plan (Samferdselsdepartementet 2013: 248-249, Sekretariatet for Nasjonal transportplan 2012a: 182-183). Protection against avalanche and landslide is specified as a separate category in both sources, which is useful, as a significant part of the differences between recommendation and final plan pertains to such projects. The maps in the Government's plan display 155 projects on classified roads, of which 24 are of the protection kind.

In order to underpin the statement that the national Government tends to make only small changes in the investment proposals from the Directorate of Public Roads, the following demands should be satisfied:

- The maps in the proposal and the final NTP show almost the same set of projects; that is, the Ministry discards only a small number of the projects recommended by the Directorate, and it includes few new ones.
- Nearly all projects that are included in the Directorate's proposal only under the current framework (main budget alternative plus 45 %), must be selected by the Government for start-up in the second part of the planning period (that is, 2018-2023).

- Nearly all projects recommended by the Directorate even within a narrow economic framework (the main budget alternative), must either be under construction already or be planned by the Government for start-up in the first part of the planning period (that is, 2014-2017).

Comparison of the maps marking the location of the Directorate's and the Government's projects respectively, shows that the number of projects that enter or leave the list of prioritized road projects is less than 4 % of the total. The share of projects proposed by the Directorate even under a narrow framework, but still placed late in the planning period by the Government, is around 8 % (13 projects). More than half of this share (8 projects) protects against avalanche or landslide. In the NTP white paper, projects of this kind are more frequently moved to the second part of the planning period than other types of projects. Six projects that were prioritized by the Directorate only in the case of a wide budget limit, are nevertheless planned by the Government to be started in the period 2014-2017. Thus, this goes for less than 4 % of the total set, and none of the projects are of the protection kind.

It can be concluded from these quantifications that the set of prioritized projects on the classified road network undergoes only small changes on its way from the Directorate to the Storting via the MoT. It is by no means self-evident that the technical-economic experts and the politicians should make very similar judgments as to which road projects deserve priority. The results above thus justify a closer look at the relationship between the Ministry and the Directorate in a later section.

Each regional office of the NPRA is allotted an economic framework, which the regional NTP coordinator can fill up with desired road projects. Consequently, the Directorate of Public Roads can construct its list of prioritized projects on classified roads mainly by adding up the five regional lists. The Directorate does not have to remove many suggested projects to prevent breaking the total budget limit decided by the MoT. Available data does not allow quantification of the alterations made by the Directorate to the regional lists, as these lists are not made public. Based on interviews with project managers and the regional NTP coordinators, Strand et al. (2015: 10) nevertheless infer that the central level [the Directorate] makes only small changes in the regional proposals that the portfolio of prioritized road projects is not changed much throughout the planning and decision-making process starting with the political-technical proposals generated locally, and ending with the set of projects receiving state funding.

Influence runs in both directions between the actors at the local and national levels. This section nevertheless indicates that the local level, represented by municipalities, counties, and the regional offices of the NPRA, holds a strong position in the planning process leading up to the final selection of road investments in the NTP. The judgment of the Norwegian Productivity Commission is that the decision-making system seems to have a weakness, in that it does not clearly lay down that unprofitable projects desired by special local interests, should not be built (Produktivitetskomisjonen 2015: 364). The local level is powerful even if the NTP portfolio is made up of projects on classified roads including European highways; that is, roads satisfying national needs. Some consequences of the national politicians and the national competent authority's willingness to comply with local interests and demands are discussed in a later section.

4 Does the abundant petroleum income cause indifference to CBA-results?

The extraction of oil and gas from the North Sea has given the Norwegian state huge revenues and permitted the build-up of the Government Pension Fund Global, which exceeded 7 000 billion NOK by the first half of 2015. One might suspect that the good financial situation is what makes Government and Storting downplay the criterion of maximizing the benefit/cost ratio when selecting road investment projects. The idea is that the country is so materially well off anyway, that it does not matter much if politicians place political, social, and unpriced environmental benefits above the realization of economic gains. A more specific hypothesis is that Norwegian politicians at the national level do not have to set aside the many projects with negative expected net benefit to society, as enough money can be allocated over the national budget to implement both the profitable and the

unprofitable proposals. Generous budgets diminish the need to set priorities and can weaken the incentives to top-rank the most cost-effective projects. It is necessary to scrutinize this idea in order to motivate for the subsequent discussion of alternative explanations of the modest weight given to CBA-results.

In this context, it is essential to know that the Storting has restricted the transfer of petroleum income from the Fund to the national budget. All political parties except the rightwing Progress Party voted for the Budgetary Rule of 2001, according to which a maximum of four per cent can be allocated to the national budget yearly. This corresponds to the Fund's effective rate of return, which has averaged 3.7 per cent annually since 1998. Even if the limit prescribed by the Rule has been somewhat overstepped in several years, the current rightwing government with a Minister of Finance from the Progress Party transferred only 2.33 % in 2014 and is budgeting with 2.9 % for 2015. This means that one in nine NOK spent by national and local government this year is transferred from the Fund (Ministry of Finance 2014: 9). The arguments below give reasons to doubt that the prosperity of the state is the crucial variable explaining the Norwegian reluctance to invest in roads according to CBA-results.

First, as far back as the second half of the 1980s, when income from the Norwegian petroleum sector was modest, investment priorities were not set in accordance with the benefit/cost ratio. Odeck (1991) studied the selection of road projects for the Norwegian Road and Road Traffic Plan 1990-1993. The projects were assessed politically in the late 1980s and were located in six counties from the eastern, western and northern parts of the country. It is known that the distribution among counties of state funds for classified road investments was influenced much more by regional politics and fairness than by CBA-results (Elvik 1995). But the internal priority setting of each county was expected to be relatively disconnected from distributional politics and thus thought to give more room for priority setting in line with CBA. Nevertheless, for candidate road projects in each county, the conclusion was that the probability of being selected for the plan did not increase with higher value of the benefit/cost ratio. Net economic benefits to society thus turned out to be held in low political regard even when Norway had barely begun to harvest the riches of the North Sea reservoirs. By 1988, the state's net cash flow from the petroleum sector had exceeded 50 billion 2011-NOK annually for only seven years (Norwegian Government 2012).

Second, use of petroleum revenue has not raised the standard of Norwegian roads to a quality level from which further improvement will add little economic welfare. The density of the network and the percentage of roads with motorway quality are among the lowest in Europe (IRF 2014). The Norwegian network of classified roads has undergone a long period of deterioration. Sund (2012: 29) shows that it will cost around 25-40 billion NOK to eliminate the maintenance backlog. Furthermore, NPRA's cost estimate is 1000 billion NOK for bringing the entire classified road network up to the quality prescribed by the highway standards and specifications, in addition to implementing the most significant shortenings of classified routes and the building of important bridges to substitute ferries (Statens vegvesen 2015: 7). The upgrading would take more than thirty years with the current rate of investment. The marginal net benefit of proposed road projects is not low in general. The number of candidate projects on the Norwegian classified road network that is profitable according to CBA, is high enough to fill the entire NTP-budget for roads (Sekretariatet for Nasjonal transportplan 2012b).

Third, even an unlikely confirmation of the hypothesis that Norwegians feel sufficiently well-off to be more or less indifferent to further economic gains, would not give reason for political disinterest in CBA-results. Investment policy in line with the criterion of maximum benefit-cost ratio is only partly about accumulating extra wealth. It is to a higher extent about appropriating travel time savings and traffic safety gains. For a large part of the road projects in the NTP, these are the main components on the benefit side of the CBA-account. For a sample of 32 classified road projects in Norway, Welde (2009) found that the value of time savings and safety gains made up 70 per cent of the social benefit, but it is not known how representative this is for the full portfolio of NTP-projects. For a German sample ten times the size of Welde's, Holz-Rau and Scheiner (2011) demonstrate that the share of time savings and reduced fatality risk in total benefit varies widely with project type. Only a part of each

component is directly related to increased monetary income. A large portion of the travel time savings will not be transferred to working time. Concerning car travelling in Norway, 59 % of the trips by car take place during leisure time, and the occupancy is higher than for work-related trips (Vegdirektoratet 2014: 82). Moreover, around 80 % of the value of a statistical life in Norway does not reflect loss of income, as it is a willingness-to-pay measure including loss of welfare and quality of life (Veisten et al. 2010: 1). There is no evidence that safer travelling and faster journeys outside working hours are less appreciated in high-income countries. On the contrary, the income elasticity of the value of travel time is positive (Börjesson et al. 2012), which is also the case for the income elasticity of the value of a statistical life (OECD 2012: 69).

Fourth, Norway is not alone in giving low weight to cost-effectiveness when setting priorities in the road sector. The UK has a much smaller petroleum sector than Norway relative to GNP, but Nellthorpe and Mackie (2000) still found that benefit/cost ratios did not seem to impact decisions on road investments. Nilsson (1991) reported very limited correlation between CBA-results and road investment decisions in Sweden. More recently, Eliasson and Lundberg (2012) found that the politicians in Sweden, without a significant petroleum sector, put very little weight on CBA-results when ranking road projects.

The reason why the Government and the great majority of the Storting do not want extra money for national road investment (and numerous other good purposes) to be readily available from the Fund, is the need to protect competitive industries from the higher wages and product prices that would result from increased overall domestic demand. Instead of heating the Norwegian economy by spending more oil revenue, the state weakens private purchasing power by making motorists pay around half of the investments on classified roads in user charges (Norheim et al. 2013: 16). If it were unproblematic to collect the money from another source, it would be politically futile to annoy potential voters by withdrawing nine billion NOK in road tolls from them in 2014 to improve the classified roads.

This section strongly indicates that the high income from the petroleum sector is not the main reason for national politicians' deviation from the maximum benefit/cost ratio as the criterion for selecting road projects. It is even less likely that bureaucrats and planners in the NPRA should let the alleged cash availability interfere with their professional principles for setting priorities. Yet this would be an implication of the hypothesis that oil revenue makes Norwegian politicians indifferent to CBA-results, as it was established in the previous section that the list of road projects selected for the NTP deviates little from the collection of projects proposed by the road experts. A search for other political and procedural explanations is thus required to understand the virtual indifference to cost-benefit results in the Norwegian road sector.

5 Political signals as reason for low emphasis on CBA-results

Public agencies with political superiors have to listen to signals from above. This applies to the Directorate of Public Roads when it considers projects on classified roads for the National Transport Plan. Even though professional independence is a main aspect of the Directorate's administration, it receives signals from the Ministry, which is the secretariat of the political leadership. It is less obvious that political signals from *below* should be influential, even if this is the case in the prioritization process of Norwegian road projects. Bottom-up signals usually express a preference for particular projects, while signals from the MoT tend to be about issues that are currently important, and about the balancing of political goals.

Bottom-up political signals

Consider now the early phase of the priority setting process, in which local demands and ideas are conveyed to the offices of the NPRA at the county and regional levels. Classified road projects that are singled out for implementation in the first four-year period of a revised NTP, have usually been politically deliberated as part of a municipal sector plan and been recommended by the municipal council (city council). A wide range of actors with conflicting points of view are involved in the planning processes at this stage. Projects sanctioned by the representative bodies are most often

compromises between local interests, where economic gain to society at large seldom has a prominent place.

The regional offices of the NPRA are in touch with transport politics at the local level through the common road administration in each county. On matter pertaining to county roads, the Regional Director is subordinated the county legislature. This arrangement implies that the county branches of the regional offices of NPRA co-operate with the transport department of the county administration regarding county road issues. The NPRA is the expert agency of the counties on these matters. The strategic management in each regional office receives many opinions on how the classified roads in the district should be improved in order to provide better services in interaction with the county road network. The purpose of the suggestions is often removal of bottlenecks or achieving uniform road standard over longer sections to enhance safety and smooth traffic flow.

Road plans are worked out, treated politically, and decided on in line with the Planning and Building Act. This means that responsibility for the plans lies primarily with the municipal council, implying that local government has decision power even over infrastructure meant to satisfy national needs. The exact alignment of the road is shown in a municipal sector plan, or possibly a community plan or a regional plan. Projects on classified roads are funded wholly or partly over the national budget, placing few if any obligations on local authorities and interest groups, except toll-paying motorists. The municipalities have weak motives to let net benefits to society influence which national projects they go for. They are not responsible for the project and do not pay for it. The municipality will, however, have a strong motive for maximizing local benefits. In some cases, this can be achieved by constructing bridges to substitute for car ferries; in other cases it requires costly road design, such as tunnels to avoid noise. Projects that are with a sober design defensible in terms of net benefit to society, are in some cases inflated and oversized, because the extra quality comes at zero price to local advocates (Samset et al. 2014). The costs are carried by the state or by drivers through road tolls. To the extent that municipalities and local branches of political parties influence the selection of projects on classified roads, significant differences between CBA-results and political priorities are to be expected (ibid).

In general terms, the reasons why local initiatives and decision rights pull the selection of classified road projects away from CBA-criteria are the following (Ostrom et al. 2001, Samset et al. 2014):

- Political institutions have created a kind of gift relationship in the road sector, with the state as donor and municipalities as recipients.
- To the extent that the state does not evaluate all assumptions and calculations of traffic, costs and benefits, an information asymmetry arises and favours the local recipients.
- In cases of local/national conflict of interest, some key politicians and other stakeholders at the donor side either have their own agenda (such as campaigning), or their loyalty is with the recipient rather than the donor (society).

Elected members of both local and national political assemblies expect that the assessment of road projects considers effects for the district traversed by the relevant road section. Equally important, there seems to be political consensus on not applying any decisive criterion for rejecting a proposal, and on the need for regional balance in the prioritization of projects. Such balance has been observed over a number of years (Elvik 1995). It follows that a particular road project is very likely to be implemented sooner or later, even with a low benefit/cost ratio, provided that the local agreement to back up this project persists over a few four-year planning periods. The political will to regional fairness and thus geographical dispersion of investments leads to a selection process where the seniority of the project idea takes precedence and trumps the consideration of net economic benefit to society at large. This seniority principle plays an important role in the regional offices of the NPRA propose to the Directorate of Public Roads.

The required compliance with municipal plans in combination with the political desire to ensure progress in all regions gives local authorities a strong hand in the process of selecting road projects for

NTP. Some projects can even jump the queue if the local administrative unit offers to co-fund the road improvement by collecting user fees. This is increasingly common in Norway. In 2013, 47 per cent of the investment costs related to classified roads were covered by road tolls. From 2003 to 2013, the contribution from tolls to investments on national and county roads has increased fourfold (Samferdselsdepartementet 2013: 93). The rationale of user payment is most convincing where traffic is considerable. High traffic does in itself strengthen the utility side of the cost-benefit account, when the project gives motorists more attractive trips. Taken by itself, an increased share of toll-financed projects should therefore bring the selected portfolio of investments more in line with the CBA-results. On the other hand, toll-funded projects are often realized after massive local pressure. Experience from the five biggest urban areas in Norway shows that local funding comes with strong influence on the local package of transport projects (Norheim et al. 2013). This may lead to more expensive solutions.

Top-down political signals

Signals from the Ministry help the Directorate foresee the response to recommended road investments. The Directorate may find it less than useful to propose projects that are likely to be dismissed by the superior authority. Such anticipated reaction has, over an extended period, been analyzed several times in Norwegian civil service and is a useful aspect of how the Directorate perceives its role (Christensen 1991, Egeberg 1995, Jacobsen 1960). The Directorate may fear doing futile work and perhaps consume political goodwill if neglecting signals from the Ministry when working on the list of recommended projects. However, if the Directorate tends to regard ministerial signals as directives, the Government will not receive professional advice built on an independent expert basis. The Directorate might then furnish some political wishes concerning construction and improvement of classified roads with a veneer of undeserved technical-economic desirability.

When a political decision has been made by the Ministry, the Directorate must act loyally, whether or not the decision is in accordance with the agency's recommendation. The Norwegian Agenda reports that the MoT sees the Directorate of Public Roads as very loyal to the Ministry's decisions and signals. In light of the problem dealt with in this section, which is the infiltration of politics into technical-economic expert selection of projects on the classified road network, an extended quotation from Agenda's report is warranted:

On one point, the Ministry expresses the wish that the NPRA takes a closer look at its own practice. The problem area is the relationship between expert recommendation and necessary compromise in political-administrative decision processes. Professional expert recommendations will often be adjusted and modified in the planning processes they are going through at the local, regional and national levels. It is the judgment of the Ministry, that the NPRA could, on some occasions, articulate a clearer expert position, and then leave it to the subsequent process to determine the final outcome of the deliberation on the case. The NPRA sometimes anticipates certain adjustments in the process to come, and incorporates these into the agency's own expert assessment and conclusion. (Agenda 2006: 103-104)

The anticipated reaction can thus be too strong, even as seen from the perspective of the superior actor. In the preparatory work for NTP 2018-2027, it seems like the rightwing government under Prime Minister Erna Solberg's leadership is pushing to make CBAs more influential. The Ministry instructs the four national transport administrations to develop a system for presenting variables, other than estimated economic effects to society, that are underscored in priority setting (Samferdselsdepartementet 2014: 12). The gradually stronger emphasis put on the obligation to explain departures from profitability, indicates that the Ministry's Directorate's possibly insufficient professional independence of political signals, may have increased.

Over several periods, a tendency in the NTP guidelines from the Ministry of Transport and Communications has been to more clearly underline the need for a profitability strategy. This tendency also involves demands for clear explanations from the national transport agencies why massive divergences from maximum benefit/cost ratios are the rule rather than the exception, as in the

guidelines for the NTP period 2014-2023: It is important that the proposed plan makes the setting transparent, and makes visible the criteria that really counts in the decision-making (Samferdselsdepartementet 2011: 17).

6 Process characteristics counteracting cost-effectiveness

Some planning tools, such as CBA, have the potential to affect both the process and the product of planning. CBA is product-oriented, but affects the information collected in the process, the deliberation of investment criteria, and the discussion of transparency and the role of experts. The influence goes both ways, though, as the organization of the planning process affects the attention directed to CBA and its possibility of bringing about projects with positive net benefit to society. The section first deals with some consequences of a multi-goal planning process, and then briefly mentions some other process features challenging cost-effectiveness.

Economic results fall out of sight in broad expert assessment

Similar to Agenda, the Agency for Public Management and eGovernment (DIFI) also analyzes the relationship between ministries and directorates in a report about the professional expert role of the directorates (DIFI 2008). Directorates must adapt to the fact that they are part of the political apparatus serving the minister. They therefore base recommendations on a somewhat broader perspective on professional skill in their respective fields; for example, by incorporating their own expert viewpoints into a more comprehensive societal perspective (ib: 10). Some of the informants to Agenda (2006: 131) also mentioned this, and opined that the Directorate of Public Roads should to a greater extent consider environmental effects, land use, and wider economic impacts to industry and commerce in the assessment of big road projects. Taking this advice would mean continuing a long-lasting trend towards expansion of the CBA, for example, by adding new entries concerning consequences to environment, climate, and health. More comprehensive CBAs contain an increased number of items with highly uncertain monetary estimates, and this does not necessarily improve the scientific quality of the analysis. Neither are there clear indications that higher comprehensiveness has made application of CBA results more attractive to the politicians, as discussed by Sager (2013).

The Norwegian Productivity Commission (Produktivitetskommissjonen 2015) follows up on the theme of comprehensive project assessment. The unranked political main goals of the NTP-period 2014-2023 concern traffic safety, climate and environment, universal design, and accessibility; competitiveness and reduced transport costs being part of the latter. The task of the national transport administrations is to transform Government policy to practical action. When desired economic gains do not have a prominent place in the main goals and thus in the politics of the Ministry of Transport and Communications, the priorities of the Directorate of Public Roads are likely to be less marked by cost-effectiveness as the overriding guiding principle (ib: 368).

Low correlation between final political priorities and economic net benefit to society does not necessarily mean that professional considerations are superseded by political judgment. It might equally well entail that purely economic criteria take a secondary position compared to other professional criteria neglected by the CBA. When selecting projects for the maximum profitability strategy of the transport administrations, the NTP secretariat notes that the project portfolio has to satisfy legal requirements, such as protection against pollution, and in addition has to further the goals of improved environment, safer transport system, and accessibility for all (Sekretariatet for Nasjonal transportplan 2012b: 2). A shift in the project selection process away from the criterion of maximum benefit/cost ratio and towards these other criteria can be partly professional and partly political. A broad basis for taking decisions, supplementing the benefit/cost ratio with a range of other quantitative and qualitative criteria for setting priorities, affects the balance between politics and professional considerations when composing the prioritized portfolio of road projects. Such a shift would not necessarily mean more influence for party politics, as there is a high degree of consensus in the Storting on the goals favouring environment, safety and general accessibility.

In other words, the broader the professional assessment, in the sense that more decision criteria have to be balanced against each other, the more difficult it becomes to determine what is a professional and what is a political ranking of the projects. When more professional criteria are taken into account, more political trade-offs between them must necessarily be made. In a comprehensive assessment of what best serves society, planners cannot have the one without the other. The application of a number of professional evaluation criteria makes a purely professional priority setting impossible. This is so because the criteria have to be balanced, which means setting social values off against each other, and such trade-offs are unavoidably political.

It might well be that the Ministry of Transport and Communications includes purely political considerations among its project assessment criteria, even if the political judgment criteria are never mentioned in planning reports or official documents. Priorities may be set in accordance with, for example, what was promised in the latest election campaign, the wishes of powerful local party organizations, the agitation of protest movements against certain road projects, or what central county politicians insist is necessary for the local production industry. It is rarely possible to determine whether a decision in line with one of these interests was made on the basis of politics or a broad set of professional criteria. Every political actor builds a collection of professional and matter-arguments indicating that it will serve society best to realize exactly the project alternative favoured by the political player in question. In order to move an old and difficult road to a new and costly tunnel farther from the town centre, the local party organization may invoke, for example, threatened natural habitats, protection of farmland, safety against avalanche and landslide, more room for future development of the centre, and better competitive situation for local, export-oriented businesses depending on faster transport of fresh food, such as salmon. The national Government can use the same arguments. It would be very difficult for potential critics to prove that these professional arguments are not what really motivate the Government's decision to move the worries about the voter support of the local branch of the party, and its chances of getting the mayor in the next municipal election. Political reasons can very often be hidden under a cover of professional arguments that gain higher acceptance among political adversaries and in the public opinion. CBA-results may thus be substituted by political considerations in the prioritization of road projects without giving the impression of leaving the professional sphere.

Other process features challenging cost-effectiveness

A partisan planning process, in which political decision-makers tend to allocate projects to the districts of their supporters, would clearly invite significant differences from CBA-ranking. Eliasson et al. (2014) found a positive relation between Government project allocation and voter support in Norway, but did not find such a relation in the Directorate's selection. In a preceding paper, it was shown that the road project portfolio recommended by the planners for NTP 2014-2023 did not deviate much from the set of projects selected by the Government. This means that a possible partisan bias in project allotment cannot be strong.

Some effects of toll roads are already mentioned. The point here is that national politicians may be affected by the fact that more new road per budget-million is achieved with user charging. They may tend to give higher priority to partly toll-financed projects than to projects fully funded over the national budget. The projects heavily backed by local politicians applying for toll-funding are not necessarily those providing the highest net benefits for the society at large.

The planning process can be designed as a search for optimal solutions taking cost-effectiveness into account, or be more rule-based or guided by heuristics. Prioritization according to rules sometimes follows from international agreements. A recent example is the EU Directive 2004/54/EC on minimum safety requirements for tunnels in the trans-European road network. This document has a bearing on the current and the next NTP, bringing tunnel projects higher on the agenda. A planning heuristic with some practical thrust says that one should invest to comply with official guidelines and standards for classified roads, starting with road sections lagging most behind.

The heuristic above is likely to give results correlated with the principle of first implementing the projects addressing the most serious problems (Eliasson et al. 2014: 15). However, recognizing an acute problem does not mean that the project under consideration is able to solve it, let alone solve it cost-effectively. The Norwegian front-end governance regime of major public projects tries to amend this by mandatory reports on the choice of a feasible problem-solving concept (Samset and Holst Volden 2015). With regard to island access, for example, bridge, tunnel, and car ferry can be alternative concepts. A rudimentary CBA is an element in the Norwegian quality-at-entry assurance system. For each problem-solving effort costing more than ¼ billion NOK, at least two promising concepts have to be assessed, in addition to the reference alternative (the do nothing option). This procedure has the effect that even if a severe problem is identified and has to be addressed, it is less likely that the decision-makers are led to accept an unnecessarily cost-ineffective project.

Communicative planning has occupied a central position in planning theory for three decades (Forester 1989), and its heavy emphasis on co-operation, dialogue and citizen participation is apparent in the Norwegian Planning and Building Act, which provides the legal framework for road planning. The Act states that the planning authority should arrange for active involvement of affected individuals and groups. Electronic presentation and dialogue should be facilitated in all phases of the planning process. Furthermore, public agencies have an obligation to co-operate, and regional planning forums should be established to coordinate the interests of municipalities and regions with those of the state.

The Norwegian Productivity Commission points to a little-discussed consequence of such communicative planning: Throughout the long-lasting and dialogue-oriented planning and fact-finding process, high expectations are built regarding the subsequent implementation (Produktivitetskommisjonen 2015: 375). The more enthusiasm and positive engagement during citizen participation, the harder for politicians to say no to the realization of the project. Successful dialogue may lock the decision-makers to a cost-ineffective line of action. The start-up of land acquisition and other preparatory work prior to formal political decision – even for projects that have been found to have a benefit/cost ratio less than one – does not make things better. It raises local hopes further, and it complicates the task of making a collective decision serving national interests.

7 Weaknesses of CBA as seen from the Storting

Since the 1990s, the Storting's standing Committee on Transport and Communications (Samferdselskomiteén 1993: 33-34) and the MoT have repeatedly stated that CBA is to be an element in the assessment of road projects: Cost-benefit analyses and the calculation of effects on selected variables will be the fundament of the project assessments (Samferdselsdepartementet 2011: 17). Under the incumbent rightwing government with ambitions to present NTP 2018-2027, the Ministry even proclaims that economic analyses from the perspective of society should be given more weight in the evaluation of the use of resources in the transport sector (Samferdselsdepartementet 2012: 87). This is not self-evident, as many elected representatives express low confidence in the CBA as evaluation method. Researchers have established the existence of such distrust since the middle of the 1990s (Nyborg and Spangen 1996), and reasons for the scepticism are discussed by Sager and Ravlum (2005b). The negative attitude grew stronger on some occasions, when the debate among economists and planners about the estimated value of core parameters and about the comprehensiveness of the analysis revealed to the parliamentarians that CBA does not find its shape on the basis of purely objective considerations alone (Sager and Sørensen 2011: 227-230).

The completeness of the Norwegian version of CBA authorized by the state has been much debated since the millennium shift. One reason is the idea of wider economic impacts, which can follow from new transport infrastructure and would like to see added to the utility estimated as the value of travel time savings. The assumed wider economic impacts are due to more flexible labour markets, productivity gains resulting from increased geographic density, and efficiency-enhancing interplay between transport supply and land use (Finansdepartementet 2012: 87). In the guidelines for NTP 2018-2027, the Ministry instructs the four national transport administrations to clarify whether

wider economic impacts should be analysed and possibly presented as a supplement to CBA (Samferdselsdepartementet 2014: 11-12). It is a drawback that economists are far from reaching consensus on how to estimate the wider impacts in real-world planning cases, so results still vary to a disquieting degree (Graham and van Dender 2011, Mackie et al. 2011, Wangsness et al. 2014). The risk is that calculations of wider economic impacts that give an arbitrary impression, will not corroborate the belief of the parliamentarians in economic analysis as a basis for political ranking of roads, but rather strengthen the suspicion that those ordering such analysis can get results to their own liking.

Many politicians in the Storting are of the opinion that wider economic impacts should be included, that the value of increased punctuality is insufficiently valued, and that the discount rate is still too high (Transport- og kommunikasjonskomitéen 2013: 54-56). The Progress Party wants to delete the item in CBAs of public projects that consists of 20 per cent extra costs due to inefficiencies from taxation (Stortinget 2010). The economic reason for this cost mark-up is that projects funded over the national budget require tax income of the same size as the appropriation, and taxes cause inefficiency in the Norwegian economy, which investors should be forced to take into account.

The requested changes all pull in the same direction, in that they will make a number of projects on classified roads appear more beneficial to society. Representatives both left and right on the political spectrum see a need for upgraded calculation of social benefits; that is, higher values and higher number of positive effects. It can then be less problematic for them to deviate strongly from CBA-suggested ranking, as a higher number of politically motivated projects will seem to be worth implementing with the revised economic calculations, even many projects that are not among the most profitable. Politically motivated project portfolios then become easier to defend. Decision-makers may be tempted to judge an analytic tool more from the method's ability to serve a political purpose than from the method's knowledge-producing capacity.

The demands for methodological improvement of CBA can be observed in practice. The committee report on the first national transport plan NTP 2002-2011 shows that the majority of the members of the Committee on Transport and Communications did not accept that predictions of consequences documenting expected goal achievement, only existed in the road sector. The majority appealed to the Government that such impact models be made operative in all four transport sectors (Samferdselskomitéen 2001: 16). When preparing the Storting's debate of NTP 2006-2011, the Committee requested a better system for economic analysis, demanding more consistent design and use of CBA, making it a tool for meaningful comparison of infrastructure projects for different branches of transport in one and the same corridor (Samferdselskomitéen 2004: 25-26). Four years later, when discussing NTP 2010-2019, the Committee's majority (from the red-green coalition) was of the opinion that the international models, with which the EU has some experience, should be considered (Transport- og kommunikasjonskomitéen 2009: 6). This was a demand for closer study of how to deal with wider economic impacts. The Committee's comments to NTP 2014-2019 stated that the main recommendations in the Official Norwegian Report no. 2012:16 on economic evaluation from the perspective of society, should be implemented (Transport- og kommunikasjonskomitéen 2013: 202). In addition to estimation of wider economic impacts, this concerns mainly (1) real price adjustment of certain goods with strongly deviating expected price changes, (2) forecasting periods that are so close to the expected economic lifetime of the projects as feasible, and (3) use of trajectories for the price development of emission of climate gasses (Finansdepartementet 2012).

Parliamentarians may be influenced by all the publicity on the omissions and defects of CBA, even if several studies have found cost-benefit analyses to be quite robust (Börjesson et al. 2014, Holz-Rau and Scheiner 2011). If so, they will be apt to look for alternative decision support. Not least the Progress Party houses the attitude that old-fashioned calculation methods lead to systematic downgrading of investment in infrastructure (Stortinget 2010). However, even old-fashioned algorithms, the number of projects on classified roads that increase benefits to society, by far exceeds the number that can be accommodated within the budget limitations.

of NTP (Sekretariatet for Nasjonal transportplan 2012b: 5). When investment in classified roads is not higher, it is predominantly for political reasons and not because calculations underrate benefits.

Consideration for traffic safety, climate, private business, and unique nature (wildlife reserves, national parks, special landscape areas) is actually a weak argument for deviation from the profitability strategy based on CBA. The reason is that project selection according to maximum benefit/cost ratio gives just as good or better results on all these accounts compared to the Government's project portfolio for the NTP period 2014-2023 (Sekretariatet for Nasjonal transportplan 2012b: 7-8). Even if the new roads in the profitability strategy occupy more agricultural land, the negative effect is hardly serious enough to provide a decisive professional reason to forego a net gain of around 40 billion NOK (2011-value), which is what the nation could gain by choosing the profitability strategy instead of the Government's planned strategy (ib: 5). Under the circumstances, the basis for so vast divergences from complying with the CBA-results is very likely to contain a significant political component.

8 Conclusion

The intention has not been to argue that the benefit/cost ratio should be decisive when setting priorities among projects on classified roads, but rather to highlight some circumstances that tend to push CBA-results into the background. The economic loss to society resulting from the current selection procedures in the road sector is too serious to leave the issue undebated. If the Directorate of Public Roads is too sensitive to signals from the Ministry and from local political actors, the Government will not receive recommendations that are sufficiently professional. Some political initiatives concerning building and upgrading of classified roads can then adorn themselves with undeserved professional legitimacy.

The Ministry instructs the national transport administrations to improve their explanations of deviations from the CBA-based profitability strategy. It should be considered if this needs to be followed by an analysis of feasible institutional changes. One should aim for a system in which CBAs are not only carried out, but are also effectively taken into account by decision-makers. CBA should be used in a way that makes an imprint on the prioritization of the NTP and can be easily revealed when studying the portfolios of investment projects on classified roads. The Norwegian Productivity Commission requests a binding principle that requires each national transport administration to put more weight on net benefits to society (Produktivitetskommissjonen 2015: 362). The Commission also suggests that the NPRA should be instructed to discard more of the economically inefficient projects in an early planning phase (ib: 372). These changes and clearer priority-setting criteria can serve democracy through transparency, and serve people in economic terms through implementation of projects that road users have greater willingness to pay for.

The parliamentarians complain that incomplete cost-benefit accounts are used for assessing road projects. They have not yet perceived as problematic that complete CBAs, including every consequence that people care about, may outstrip their own political deliberation on the projects and make democratic treatment of NTP-investments less important. Surely, big projects on classified roads have significant economic impacts, and they engage people from government bodies and civil society at all levels, from neighbourhood to nation. Consequently, decisions about large-scale interventions and use of resources in the road sector should be made on a foundation of combined economic and political reasoning (Diesing 1962, Sager 1999).

Economic decisions are reached on the basis of a means-end analysis, where the goals reflect the economic interests of society, and the means are employed so as to achieve the goals with the least possible waste of resources. Economic problem solving abstracts from the multitude of groups with special interests and from the turmoil of intersecting conflicts. The rational procedure is to compute which planning alternative should be top-ranked, given the weighted goals and the available means, and then adopt the result without further ado. Compromise is irrational in economic problem solving.

Political authorities must look beyond the issue at hand to the maintenance and protection of the decision structure of society. Without a well-functioning system for making collective choices, neither plans for classified roads nor other projects serving society will be democratically enacted. A political decision is therefore not based primarily on the quality of the proposal in itself, but rather on who gains from its implementation, and who opposes the proposal. Communication between the decision-making authority and the affected parties is necessary. A political proposal is not passed just because it comes out as the best in a means-end analysis. Even economically good proposals are rather postponed, discussed, revised, substantiated in new ways, and re-launched – sometimes in several rounds – until the most intense opposition has calmed down. In contrast to economics, compromise is nearly always a rational line of action in politics. This also goes for compromises between road proposals that are good in economic terms – that is, profitable according to CBA – and proposals that are economically weak.

The white papers on NTP, and in particular the reasons offered by the Government for each unprofitable road project that is included, clearly demonstrate that the technical and professional arguments of road experts are in great demand. Apparently, not a single one of the many unprofitable projects is included because of local pressure, political obligation to distribute investments to all parts of the country, horse-trading between the governing parties, or need to satisfy the grass roots of the party organizations. Political explanations of this kind are much too vulnerable to attack by political rivals and critical voices in the general public. Hence, they are not found in the NTP, and obviously, neither are purely political considerations listed in the CBA-accounts. Conflict and loss of support and goodwill are nevertheless real political costs. This gives reason to hypothesize that the parliamentarians' use of CBA, also in the future, will be quite limited when they are dealing with controversial prioritization.

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