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Governance Schemes for Major Public Investment Projects

A comparative study of principles and
practices in six countries

Concept report No 47



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Governance schemes for major public investment projects: A comparative study of principles and practices in six countries

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SYNOPSIS:

This report compares the Norwegian scheme for quality assurance of major public projects, also referred to as the State Project Model, to similar schemes in five other OECD countries, i.e. Denmark, Sweden, the Netherlands, the UK and Canada (Quebec). The schemes have many features in common – all of them were introduced after the turn of the millennium and place governance responsibility at a high level in the political system. There are also a number of differences, for example with regard to who performs quality assurance, the delineation between technical matters and politics, as well as the scope of such schemes. The study shows that Norway and the Nordic countries have opted for schemes that are fairly simple, with intervention points in the front-end phase only and not during implementation, unlike the other countries. The study is primarily an overview, and it is too early to say anything about the effects of the other schemes, which are more recent than the Norwegian scheme.

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The report series

The Concept research program is based at NTNU and conducts research into the development and quality assurance of large investment projects in Norway. This is interdisciplinary research within the fields of project management, public finance, political science, economic analysis and evaluation. The report series presents research findings within the fields covered by the program and is approved as a level-1 scientific publication channel by the Norwegian Association of Higher Education Institutions. The primary target group is researchers within the respective fields and professionals in the public sector and in reporting institutions.

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Preface

Governments in many countries are struggling with massive cost overruns and delays in major public sector investment projects. A number of international studies have put this problem under the spotlight, and several countries have introduced governance regimes for such projects.

Norway was an early mover and introduced a scheme for quality assurance of the basis for decision making on such projects in 2000, also known as the State Project Model, presented in Concept report no. 36. The current general objective of the scheme is to achieve good cost and progress control, and not least to obtain high economic benefits from such investments. The Concept research program has for a number of years been conducting trailing research on the projects encompassed by the Norwegian scheme.

This study starts out from the Norwegian model and examines schemes introduced in Denmark, Sweden, the Netherlands, the UK and Canada (Quebec). It is reasonable to compare Norway to these five countries, all of which have introduced schemes aimed at solving the same problems. This study is principally concerned with outlining the various models and how these are practised.

The study was carried out by the program's own researchers.

Trondheim, September 2016

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Summary

This study concerns governance schemes for major public sector investment projects and how these are currently organised and practiced at the central government level. Starting with the Norwegian scheme, often referred to as the State Project Model or the Quality Assurance scheme (Samset and Volden, 2013), similar schemes in five other countries are explored: the Netherlands, the UK, Sweden, Denmark and Canada (Quebec). Some countries have more than one governance scheme depending on, for example, the sector. The Danish scheme applies, for example, only to road and rail projects, and there is a separate scheme for ICT projects. By contrast, Norway and the UK have schemes that apply to all types of infrastructure investments. The UK scheme even applies to government transformation and service delivery projects. Common to all schemes investigated is that these are used for the governance of large investment projects funded by central government, and applied to projects that involve high costs and/or complexity, or that are highly innovative.

This report starts out by defining key concepts and principles related to project governance at the central government level, and explains the importance of the front-end phase and the role of central government. Thereafter, we present the governance scheme in each of the six countries and the underlying stage-gate model, as well as the involved parties and their roles, with a special focus on the use of independent quality assurance in the process. We also present one project case per country to illustrate the application of the schemes. It should be noted that the study does not go further into the use of guides and standards or templates that normally also exist on a more detailed level in the agencies involved.

There are many similarities between the governance schemes in these countries. For example, the respective governments have a central role, not least in making the choice of project concept. The number of project phases and decision points in the stage-gate models varies somewhat between the countries. In the Scandinavian countries, the requirement for independent quality assurance applies only to the front-end phases, before the projects are formally approved. In the

UK, central government may require independent quality assurance throughout the project and even in its operational phase.

In most of the countries a third party – which is independent of the political decision-maker and the agency responsible for delivering the project – has the role of adviser or quality assurer. In Norway and Denmark, private sector consultants are used for this purpose, whereas in the Netherlands, Canada (Quebec) and the UK a separate public agency has been established for such purpose. By contrast, in Sweden quality assurance is mainly an internal activity practiced in the existing agencies.

All schemes are of a fairly recent date, and it is too early to explore their effects and degree of success, which will have to be the topic of future studies.

1. Public sector investment project governance

Terminology

The term «governance» generally refers to what happens at the government level in society. It concerns the role of government in facilitating the attainment of societal objectives. The policy tools are, on the one hand, financial, for example in the form of incentives and investments, and, on the other hand, regulatory measures, for example in the form of policy frameworks and sanctions.

The term «project governance» is used, more specifically, in the context of projects to be planned and implemented. It then refers to the overarching responsibility of the project owner in relation to measures that are implemented under the auspices of subordinate agencies.¹ This study will use the term for responsibilities and activities at ministry level to clarify the general project framework, in the sense of societal objectives and immediate objectives, budgets, contract regimes, control regimes, etc. (cf. www.regjeringen.no)²

The term «project management», on the other hand, is focused on what happens at the subordinate level, on the part of those responsible for project implementation

¹ Good corporate governance comprises, according to the OECD, a set of relations between an organisation's management, directors, shareholders and other stakeholders. Moreover, good corporate governance requires a structure defining how the organisation's goals shall be determined, how such goals shall be realised and how this shall be followed up (OECD, 2006).

² A key project governance issue in both the public and the private sector is that the interests of the implementing agent will not necessary be aligned with those of the owners. In projects, the implementing agent is represented by the project manager. Project governance seeks to ensure that an implementing agent will act in conformity with the interests of the owners (Tirole 2001).

at the project level, whether such responsibility lies with a government agency or the project as a whole has been outsourced to the private sector. It pertains to the planning and implementation of the project within the defined framework. Success is measured, as far as implementation is concerned, in the form of the timing, cost and quality of delivery.³

This study is concerned with «project governance» and how it is currently organised and practised at the overarching level, as limited to major public sector investment projects. We have, based on a review of applicable systems in six different countries,⁴ sought to relate these to each other. What are the differences and similarities? What can Norway learn from the other countries? What can they learn from us?

The point of departure is the Norwegian quality assurance scheme established by the Ministry of Finance in 2000, which currently applies to all central government investments with a budget in excess of 750 NOK million (about 100 mill EUR). The said system is well documented by the Concept research program, which has conducted trailing research on its activities since 2002. Relevant reports are Samset, Berg and Klakegg (2006), Christensen (2009), Samset and Volden (2013) and Volden and Samset (2013).

Project governance – general observations

Major public sector projects are the outcome of a political tug-of-war between stakeholders in society, whose needs and priorities will concur or conflict to varying degrees. The authorities at different administrative levels are involved, both centrally and locally, as are also the general public, the media, as well as private sector advisors and contractors. Such processes are often complex, and partly opaque, and their outcomes are not always predictable. A study of 60 international projects provides a good illustration of this (Miller and Lessard, 2000). Moreover, such processes may also be characterised by repudiation of liability and hidden agendas, rather than transparency, altruism and social responsibility (Miller and

³ A common criterion for a good project is that it consistent with, and supports, the strategy of the investor, including the existing project portfolio. There are often a large number of stakeholders involved in public sector projects, and it is not obvious that these share a joint strategy in relation to a specific project.

⁴ Norway, Denmark, Sweden, the UK, the Netherlands and Canada (Quebec).

Hobbs, 2005), (Flyvbjerg et al., 2003). Another characteristic is that the authorities, here represented at the level of ministries, will by definition want to limit their involvement to the strategic perspective and the facilitation of a structured, responsible and effective preparation and implementation of the investment measure in question.

In principle, the public sector has three types of policy instrument at its disposal: the stick, the carrot and the sermon (Bemelmans-Videc et al., 1998), which in practice means regulation, economic means and information. The instruments may be either affirmative or negative. Regulation may take the form of either prescriptions or proscriptions. Economic means may be either affirmative in the form of incentives or contracts, or negative in the form of sanctions or fees. The information may be either affirmative in the form of advice and encouragement, or negative in the form of warnings against unwanted or prohibited practices. This is illustrated in Figure 1.1.

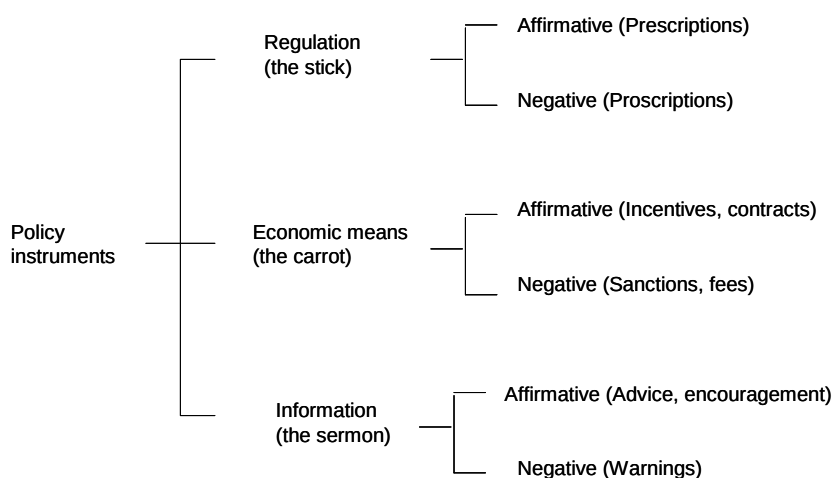


Figure 1.1 Government policy instruments in project governance. Source: Bemelmans-Videc, Vedung and Rist (1998)

This model has its parallel in the regime of the World Bank (World Bank, 2000), in which the regulation element is described in terms of rules and restrictions, the economic element in terms of competition pressure, and the information element in the form of transparency and assistance.

The Organisation for Economic Co-operation and Development (OECD) promotes what it calls the six «Principles of Good Governance» (OECD, 2014). These comprise:

- (1) Accountability – that the authorities have the ability and willingness to show whether decisions and practices are in conformity with clearly defined and adopted objectives.
- (2) Transparency – that decisions and decision-making processes are sufficiently transparent to enable the public sector, as well as civil society, to gain adequate access to information in relation thereto.
- (3) Effectiveness and effect – that government deliverables are of sufficient quality, and delivered cost effectively and in such manner as to realise the purpose of such deliverables.
- (4) Responsiveness – that the authorities have the capacity and flexibility to respond swiftly to the needs of society and in the public interest.
- (5) Vision – that the authorities are able to anticipate future problems and needs based on existing data and trend information, and to take into account any expected changes and the costs associated therewith (for example demographical, financial, environmental, etc.).
- (6) Rule of law – that the authorities ensure that projects are implemented in compliance with applicable laws and regulations.

A much cited project governance textbook is Müller (2009). It describes project governance as encompassing all the requirements, processes and structures established by an enterprise with many projects for the implementation and management of such projects. These may include instruments, templates, project methodology, etc., down to a fairly detailed level. In this study, we are limited to examining the overarching requirements imposed by the wider society, typically via the Ministry of Finance or line ministries. This means that we are only studying the top «layer» of project governance, and not the project requirements imposed, for example, internally by the government agency in question.

Project governance principles

A governance regime for large investment project is here defined as the processes and systems employed by the funding party to ensure that investments succeed. These are normally regulatory measures intended to safeguard the quality of the basis for decision making at an early stage; that the financial framework is realistic, that the goals are clearly defined, that responsibilities are allocated in such a manner that any problems that may arise can be resolved along the way, that the quality of the basis for decision making is sound, etc.

Earlier studies show that it often works best to impose *overarching requirements* with regard to structures, processes, outcomes, etc., but not to intervene in actual project implementation (Samset et al., 2006). This is in line with the reform processes otherwise observed in the public sector over the last few decades, towards more «freedom with responsibility», goal and performance management, client/provider models, etc., often referred to as New Public Management, with subsequent variants being labelled as Post-New Public Management (Christensen, 2009). This is based on the premise that such approach will enhance effectiveness and efficiency.

Miller and Hobbs have discussed which criteria should underpin megaproject governance regimes (Miller and Hobbs, 2005). They observe that large complex projects will require a governance system that is not static and hierarchical, as is commonly used for smaller projects. There needs to be scope for changes along the way, since both the planning phase and the implementation phase last for a long time. Governance will therefore assume different forms in the various phases of the project cycle.

Flyvbjerg has discussed the ambitions, the risks and the effects of megaprojects on the basis of data from a large number of projects (Flyvbjerg, Bruzelius, Rotengatter, 2003). The authors find that the main problem with these projects is that the stakeholders have a self-interest in their implementation, whether financial or political, that they underestimate the risk, and that they are not held accountable to central government, which adopts a more overarching perspective of maximising public benefits. The authors talk about the «megaproject paradox», and propose the following alleviating measures:

(1) That risk and accountability must be accorded much more of a key role in decision-making processes, (2) that risk analysis and risk management requirements must be imposed, (3) that the authorities should remain at «arm's length», and not become involved in promoting the project, but limit their role to formulating overarching objectives and ensuring that such objectives are attended to by the project. In order to (4) bring about responsible decisions, one should (a) ensure transparency, (b) specify performance requirements, (c) impose clear requirements for the construction and operation of the project and (d) involve venture capital from private investors, since their willingness to invest will be a project viability test. This is discussed in more detail in a study on perverse incentives, i.e. unfortunate situations that arise where central government funds local projects without imposing any obligations on the recipient, whether financially or otherwise (Samset et al., 2014).

The importance of the front-end phase

The *front-end phase* is the stage when the project only exists conceptually, before being operationalised; cf. Figure 1.2. This encompasses all activities from the idea is conceived until a final implementation decision is made. A distinction is commonly made between *concept development* and *planning*. Concept development is based on an assessment of the overall framework conditions to clarify what is the most appropriate project strategy, and thus the key premises underpinning the project, as well as its characteristics and objectives. Consequently, this encompasses both the overarching technical solution and the various concept alternatives.

Research shows that what happens during the front-end phase, from the idea is conceived until the project budget is adopted, is of absolutely fundamental importance to achieving favourable outcomes (Heijden, 1996). A key reason is that this is the phase in which the most important and overarching issues are decided, the first and foremost of which are the purpose of the project and the choice of conceptual solution.

Planning is, on the other hand, the detailed project design with regard to budget, activities, scope, schedule and quality. Concept development provides a description of the project as a whole, whilst the plan is primarily focused on how it shall be implemented. In other words, the *implementation phase* encompasses, from this perspective, anything that happens after a final funding decision has been made, and includes the more detailed planning of the project.

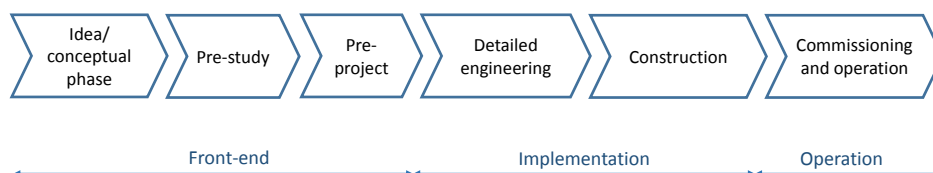


Figure 1.2 Project phases

A study of more than 1,000 projects, conducted by the World Bank, may provide the best evidence for the importance of the front-end phase (*World Bank, 1996*). A thorough review of the scope and quality of prior checks, prior assessment and project design before the implementation of projects, was linked to whether these turned out to be successful or not when examined in retrospect. The study concluded that no less than 80 percent of the thoroughly prepared projects were successful, whilst as much as 65 percent of those initiated without proper preparation turned out to be unsuccessful. A corresponding study of 23 Norwegian projects delivered similar findings (Whist and Christensen, 2011).

The role of central government

In major public sector projects, central government has, as the funding party, a need for arrangements or regimes that attend to the interests of society, from the initial idea is conceived until the project is finalised and enters an operational phase. Central government, represented by the ministry in charge, will normally have neither the necessary expertise, nor any desire, to be involved in dialogues on organisation and management of projects at the tactical or operational level. One has, as mentioned, a strategic objective and seeks to pave the way for structured and effective preparation and implementation, to ensure the maximum possible benefits from public investments.

The *implementation phase* involves such challenges as ensuring:

- A sound project design to ensure high quality and to limit costs
- Competent, effective and efficient management
- That the implementing party has the requisite qualifications and capacity

- Effective handling of uncertainty and sufficient flexibility to handle changes in prerequisites and requirements, as well as unforeseen events, etc.

The primary policy tool is the use of various types of contract regimes, along with ensuring that the responsible government agency has the necessary qualifications and capacity.

The *front-end phase* until the decision to implement a project, involves handling a number of fundamental issues, such as for example:

- Counteract tactical budgeting in the central and local public administration to enhance the prospects for obtaining central government funds for future projects
- Ensure that the most relevant project concept is chosen
- Prevent undesirable outcomes of stakeholder influence and political tug-of-war, but ensure a rational planning process and a transparent democratic process
- Achieve predictability over time, since the front-end phase often extends over more than one parliamentary cycle

The Ministry of Finance's quality assurance scheme is an example of a regime designed to attend to the interests of the funding party in the front-end phase. This implies that:

1. specific requirements are imposed with regard to the quality of the public administration's basis for decision making
2. that said basis is checked by external experts
3. the main decisions concerning choice of concept and budget be placed at the highest political level

The existing scheme is only one of several possible regimes that might have been applied. Theoretically, different models and typologies are used to characterise regimes, which may potentially also be used to analyse 'major public sector investment project governance'. Bemelmans-Videc et al. distinguish, for example, between instruments employing, to varying degrees, regulation, economic means or information. The Norwegian quality assurance scheme uses regulation and control as its key policy instruments, but is also attaching increasing weight to information to achieve a dissemination effect. In practice there has, after the first

fifteen years of the regime, been a clear tendency for the policy instruments to be internalised within the public administration, which indicates that one is succeeding in the attempt to improve governance in the front-end phase.

It will be useful for both the Ministry of Finance and the Concept research program to consider the Norwegian quality assurance scheme in a broader perspective, both theoretically and in relation to practice in other countries. What we knew prior to the commencement of the study was that there are government schemes in the UK, the Netherlands and Denmark, and that efforts are pursued on these issues in Canada (Quebec) (Miller and Hobbs, 2005).

2. This study

We have in this study examined which overarching governance systems are used for government investment initiatives in six selected countries, i.e. Norway, the Netherlands, the UK, Sweden, Denmark and Canada (Quebec). We have sought to compare the systems in these countries, starting out from the Norwegian scheme, which is also referred to as the quality assurance scheme.

Table 2.1. Demographic, economic and natural conditions in the selected countries

Countries	Gross domestic product per capita	Topography	Climate	Population density, persons per sq.km	Road investment 2011 EUR/capita
Netherlands	47,000 (14)	+	+	407 (4)	136
UK	40,000 (27)	+/-	+	262 (51)	86
Denmark	44,000 (21)	+	+	131 (88)	190
Sweden	46,000 (17)	-/+	-/+	22 (196)	200
Norway	67,000 (6)	-	-	16 (206)	550
Canada	45,000 (20)	-	-	4 (230)	420

All the five other countries are countries with which Norway is commonly compared. These are OECD countries at a high level of economic development, as illustrated in Table 2.1. The said countries are also at the forefront in developing a public sector investment project governance system, with schemes introduced not long after the turn of the millennium. There are, at the same time, significant differences in demographic and natural conditions between the countries, such as climate and topography, which means that these differ in their economic prospects for developing infrastructure. It is obvious that countries with high population density, a flatter landscape and milder winters enjoy an advantage over a country like Norway (shown in green in the table). Consequently, the Netherlands are in a special position, with an extremely high degree of urbanisation and hardly any unpopulated land areas, whilst Norway is in a completely different position with a small population, long distances and areas that are virtually uninhabited (indicated

in red), but nonetheless a broad political consensus that people shall live in such locations as well; see Figure 2.1, which shows that Norway is the country with the lowest degree of urbanisation.

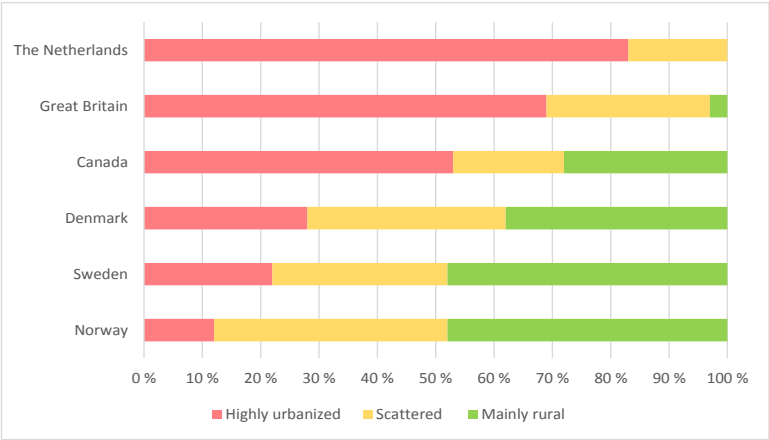


Figure 2.1. Degree of urbanisation in the selected countries. Source: OECD⁵

This study is principally based on document reviews, but we have also been in contact with informants in the relevant countries and/or with special knowledge of the various schemes, to obtain documentation and verify the descriptions of the schemes. The documentation to which we have had access has been variable; in some countries the authorities have provided thorough descriptions of their scheme, as in the UK, whilst very limited descriptions are provided in other countries and we have had to seek out other sources. The information concerning the scheme in the Netherlands is partly obtained from a doctoral dissertation (Shiferaw, 2013).

Some countries have more than one scheme, for example depending on sector. The Danish scheme, for example, applies only to road and rail projects, whilst

⁵ As far as Canada is concerned, this includes the country’s ten provinces, but not the three northernmost, extremely sparsely populated, territories of Yukon, Nunavut and Northwest Territories.

there is a separate scheme for ICT projects. Some schemes are cross-sectoral, such as for example the UK and Norwegian ones, which apply to all types of infrastructure investments. The UK scheme also encompasses transformation and service delivery projects. However, a joint feature of all schemes is that these are used for large investment project governance purposes, and that the projects in question entail high costs or are highly complex.

In order to compare governance in the various countries, we have examined which objectives countries have defined for their schemes, which internal and external parties are involved, their duties and responsibilities, and, not least, how decisions are made at the political level. Furthermore, how the schemes are structured at the project level, and which stage-gate model is used. This includes how project ideas are generated, when the formal processes commence, when the choice of concept is decided, what type of analyses are included and the extent to which external quality assurance or advice is involved. Finally, the findings are discussed and compared to the Norwegian model. A brief case study is also included for each country to gain a better understanding of rationales, practices and experiences.

Guidance to readers

The next six chapters present the schemes in Norway, the Netherlands, the UK, Sweden, Denmark and Canada (Quebec), respectively. Investment project governance is described at both the government level and the project level for each country, before being compared to the Norwegian equivalent. A project case is included at the end of each chapter.

The final chapter brings this together in a synthesising analysis, and presents our assessments and conclusions.

3. Norway - the State Project Model

Background

The countries in this study are, as mentioned, a selection of OECD countries with high GDP/capita. Four countries are oil and gas producers, all have stable regimes and all achieve high scores for their absence of corruption. However, Norway differs from the others in being favoured by one of the highest GDP/capita levels, and in a large portion of its GDP having its origin in exports of oil and gas, as well as fish. It also benefits from virtually all electricity being based on renewable hydropower. However, there are also considerable challenges. Norway has a very low population density, long distances between centres and highly challenging topography and climate. This means that it is more difficult to achieve profitability for investments, for example in the transport sector, because development costs are particularly high and there are very few users. On the other hand, Norway has experienced strong and sustained economic growth since the petroleum age started in the late 1960s, and has thus far suffered little from the international financial crisis in 2007-08. Expectations on the part of politicians and voters have increased continually during the decades, and the willingness and ability to fund large and partly spectacular public investment initiatives has been high. The Dutch disease has eventually come knocking on the door.

This problem is aggravated by most large public sector investment projects being funded via the fiscal budget in their entirety, with the exception of some road projects that are partly funded by user charges. It is, at the same time, the case that the local level, i.e. municipalities and counties, has considerable influence on the planning of central government projects. Since the initiative often comes from below and the funding comes from above, without entailing any obligations on the part of the recipient, it is a set-up that permits perverse incentives to arise. The outcome is a more indiscriminate attitude to what money is spent on, or the extent to which such spending offers public benefits. This situation reinforces the need

for measures at the overarching level to assure the quality of the basis for decision-making in these cases, such as the Norwegian quality assurance regime.

Parties and roles

The Norwegian scheme is referred to as the State Project Model, but also as the Ministry of Finance's scheme for the external quality assurance of large investment projects, or the quality assurance scheme. Its background was negative experiences with certain public investment projects in the form of major cost overruns, delays and limited economic benefits. In the autumn of 1997, the Government appointed an inter-ministerial committee chaired by the Ministry of Finance (Berg et al., 1999), which analysed 11 projects to clarify (1) whether the basis for decision making was adequate at the time of the approval of the projects, and (2) whether project implementation was satisfactory. It was concluded that the basis for decision making was inadequate in several of the projects, and that failure in the introductory phases of the projects, prior to a commencement decision, was generally the main reason for large cost overruns during implementation. This included matters like:

- Absence of satisfactory need/function analyses of alternatives
- Projects being presented to the Parliament before having been thoroughly analysed
- Inadequate use of cost-benefit analyses, based on partly inappropriate assumptions
- Failure to adequately assess uncertainty with regard to assumptions and computations
- A number of issues relating to procedures, qualifications, division of responsibilities, etc., during implementation of the projects.

An official report on investment developments on the continental shelf was published around the same time (Norwegian Official Report NOU 1999:11), which examined 13 large projects and also found major cost overruns. Based on the findings from these two studies, the situation in the 1990s was that deviations from budgeted cost of between 20 and 40 percent could be expected.

The Norwegian scheme was introduced in 2000 as the result of these reports, and was expanded in 2006. The purpose was to achieve more successful projects and

more benefits for each Norwegian krone spent through, *inter alia*, improved cost control and conceptual solutions.

The Ministry of Finance is responsible for the administration of the scheme. In principle, it is a very simple model with only two decision gates. The principle is «business as usual», in the sense that no specific changes to the procedures of ministries and agencies are required, thus enabling these to implement their projects as before. However, current requirements are somewhat stricter with regard to the planning documents intended to assure quality and the comprehensiveness of analyses. It is also a requirement that more than one alternative be analysed in addition to the zero option. This is intended to counteract the tendency to path dependency, which has largely characterised established practice. One opts, as a matter of principle and from the very beginning, for the same solution as was used the previous time, which has not always turned out to be the best choice, since circumstances, underlying premises, user groups and priorities tend to change over time.

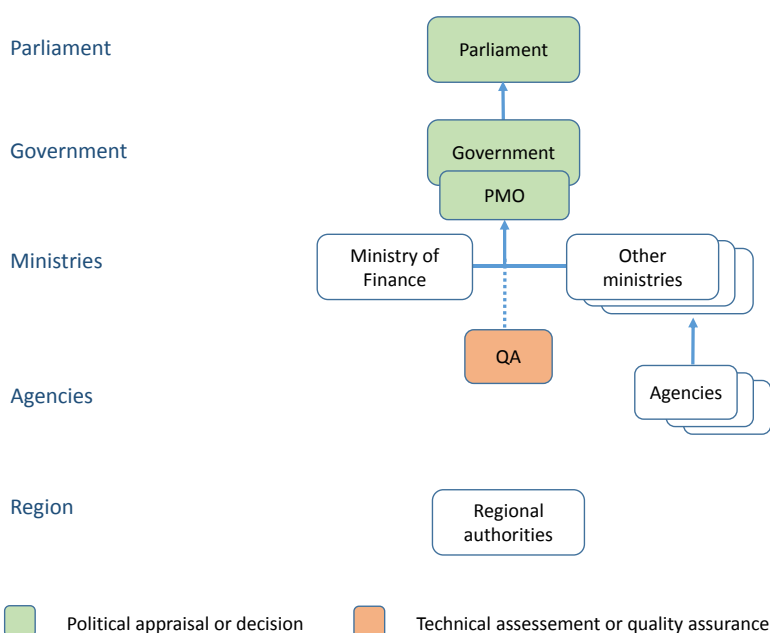


Figure 3.1. Investment project governance

What is novel about the scheme is that the documents prepared by the agencies (in some cases by the ministries) shall be quality assured by external advisors before being submitted for appraisal at the political level. The quality assurers are consortia of consultancy firms and experts that have framework agreements with the Ministry of Finance. These have a limited mandate that requires them to examine the *quality* of the documents and not to address the political issues relating to the choice of project. They are also required to perform a separate independent analysis of the uncertainty associated with the investment cost and of economic profitability.

Figure 3.1 illustrates the principle. Individual ministries are responsible for new investment initiatives, the vast majority of which are analysed and implemented under the auspices of a subordinate agency. Any initiatives with a presumed budget in excess of the NOK 750 million threshold value must be analysed in accordance with the requirements and formats stipulated by the Ministry of Finance. These analyses are thereafter subjected to external quality assurance on behalf of the relevant ministry. The ministry will thereafter submit its analysis and the quality assurance report to the Ministry of Finance, and summarise the findings in a memorandum, which will be submitted to the Government for political appraisal before the matter is presented to the Parliament for its approval and final decision.

This involves two stages. The first stage concerns the actual choice of concept. The agency's evaluation is called a Conceptual Appraisal⁶ (CA) and the independent assessment of the document is termed quality assurance of the choice of concept (QA1). At this stage it will be decided at the Government level whether to reject the project or to move on to the pre-project phase, and in such case which alternative to choose. This is, as mentioned, done by reference to a memorandum to the Government from the ministry, which is based on the two reports.

At the next stage, when the pre-project has been finalised, there shall have been prepared a so-called Overall Strategy Document, which provides information on objectives, budgets and target cost, implementation strategy, contract strategy, etc. This document is then subjected to external quality assurance of the cost estimate and management documentation (QA2). The ministry will then submit these

⁶ Termed Conceptual solution (CS) in the defence sector.

documents to the Ministry of Finance, which will summarise these in a memorandum to the Government, in which special prominence is given to the proposed budget. The Government will thereafter submit the matter to the Parliament, which makes the final decision and stipulates the budgeted cost that commits the responsible ministry, and the target cost that commits the agency. The Parliament may of course also reject the project.

The requirement for external quality assurance is formally laid down in the Regulations on Financial Management in Central Government, Chapter 5.3.8; Major Procurement. The scheme applies to projects in all sectors in excess of a defined threshold value, which is NOK 750 million as at 2015. The number of such projects is limited in a small county like Norway, and has been in the region of 20 projects per year. Offshore oil and gas investment under the auspices of the State's Direct Financial Interest (SDFI)⁷ is subject to separate quality assurance schemes and is exempted. The same applies to state enterprises and state-owned corporations, which decide and manage their own investments (including health enterprises). Purely financial transactions like equity acquisitions are also excluded, since these fall outside the scope of the investment concept. In practice, the scheme primarily encompasses transport projects (excluding aviation), defence projects and central government construction projects, as well as major ICT projects.

The stage-gate model

It follows from the above that quality assurance in Norway is external and that decisions are made at the highest level, i.e. the Government and the Parliament. This is a scenario that can hardly be practised in larger countries or economies with a much larger number of individual projects of this magnitude, cf. the schemes in the UK and the Netherlands.

In Norway, there are currently six consultancy consortia which have, based on tenders, framework agreements with the Ministry of Finance regarding quality assurance for a fixed period of years. These consortia have a high level of expertise

⁷ SDFI is a portfolio of the government's directly owned exploration and production licenses on the Norwegian continental shelf.

within project planning, cost estimation and economic analysis. There have been four such calls for tenders since commencement in 2000. The requirements under the current tenders are stipulated in the framework agreement; Ministry of Finance (2015).

A stage-gate project model is a standardised classification into project phases, with specifies decision points and appurtenant documentation requirements. The decision points are introduced at especially important junctions, and the project cannot move into the next phase until a positive decision to that effect has been made. Such project models are common in both private and public enterprises, but it is not equally common for the wider society to introduce a cross-sectoral model to ensure successful projects from a societal perspective.

Figure 3.2 presents the State Project Model. The Norwegian scheme is very simple when compared to practice in the business sector, and involves only two decision points with appurtenant documentation requirements. This reflects that it is an overarching model introduced by the wider society. It applies only to the front-end phase, i.e. from the project idea is conceived until a final funding decision is made, and not to the implementation of the project. This is based on the assumption that individual agencies have sound procedures for safeguarding actual project implementation. This is not described here, but is examined in a separate study; see Andersen et al. (2016).

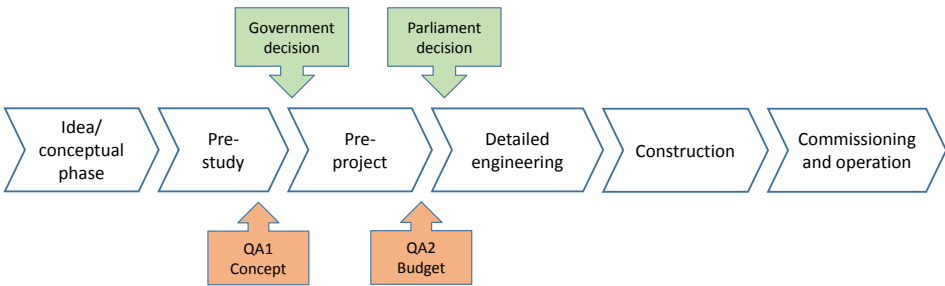


Figure 3.2 The Norwegian project model

Taken together, the two checkpoints are intended to make ministries and agencies enhance the technical quality of the basis for decision making in the front-end

phase. It is important to observe that the two points relate to completely different types of decisions, and therefore differ fundamentally in their contents and technical basis. CA/QA1 is intended to ensure tactical and strategic success, and is concerned with evaluating effects and societal objectives, as well as purpose and allocation effectiveness.

Quality assurance of the choice of concept (QA1)

This shall be performed upon completion of the pre-study phase, before the Government decides whether to bring the chosen concept into the pilot project phase. By concept is meant which conceptual solution one chooses to meet a societal need. A need for linking an island region to the mainland may, for example, be met by a bridge, a subsea tunnel or a continuation of the existing ferry service (zero option alternative), i.e. three concept alternatives. The quality assurer shall assist the ministry and the Government in ensuring that the choice of concept is subjected to genuine political control. Ultimately, the actual choice of concept is a political process in which the quality assurer has no role to play. The quality assurer's function is limited to supporting the need of the principal for checking the technical quality of the basis for decision making.

The ministry's/agency's appraisal

There shall be prepared a Conceptual Appraisal (CA) as the basis for quality assurance. Responsibility for preparing this document lies with the ministry/agency. The CA shall be structured with the following chapters:

1. **Needs analysis**, which shall identify stakeholders and examine normative (political) guidelines and demand-based needs in the relevant field.
2. **Strategy chapter** shall define societal objectives and project objectives.
3. **Overarching requirements**, for example other societal objectives that serve to define the scope of the project.
4. **Possibilities study**. Needs, objectives and requirements will jointly define an opportunity space. It is important that this is not approached too narrowly.

5. **Alternatives analysis**, which shall encompass the zero option alternative and at least two other conceptually different alternatives. The alternatives analysis shall encompass an economic analysis.
6. **Guidelines for the pre-project phase**, including implementation strategy for the chosen alternative.

Duties of the quality assurer

The quality assurer shall check CA with regard to consistency in and between chapters, and with regard to whether the specified alternatives are relevant and valid in terms of needs, strategy, overarching requirements and utilisation of the opportunity space. Furthermore, the quality assurer shall conduct a separate uncertainty analysis and economic analysis, as well as make a recommendation on decision-making strategy. A recommendation shall be made on ranking of the alternatives on the basis of effects with and without a price tag, the decision-making flexibility offered by the alternatives, as well as the funding plan. Quality assurance involves a new and independent technical assessment by experts in the relevant fields, in addition to serving as a check on agencies that may, for example, conceivably find it in their interest to overestimate the benefits and underestimate the costs of certain preferred solutions.

Finally, the quality assurer shall appraise the implementation strategy, and make its recommendation on guidelines for the pre-project phase, including contract strategy, and advise on which elements from QA1 should be included in the management document for the project. Hence, this final part of QA1 relates to project implementation, and shall represent a transition to the next decision point; QA2.

Quality assurance of the management documentation (QA2)

The management document/QA2 is intended to ensure operational success, and is focused on realistic budgets and on ensuring that delivery takes place in a time- and cost-effective manner.

Quality assurance of the management documentation, as well as the cost estimate, shall be carried out upon completion of the pilot project, prior to any appropriation decision by the Parliament and prior to commencement of the project. Control is the dominant consideration in this phase. Partly, it shall serve as

a reappraisal of whether the basis for proposing approval of the project at the budgeted cost is adequate. Partly, the analysis shall look ahead by identifying management challenges in the implementation of the project. Efficiency is, in other words, an important underlying goal; the specified deliverables shall be obtained in the most time- and cost-effective manner, as measured against other comparable projects. QA2 is intended to ensure the operational success of the project.

The ministry's/agency's appraisal

The following shall have been prepared by the commencement of quality assurance:

- **Overall Strategy Document** for the project. This shall provide an overview of all key features of the project; its objectives, scope, project strategy and project management framework. There are few detailed requirements as to contents, as the main priority is to ensure that the document is integrated into the agency's project management system and is actually used as a project management tool.
- **Complete base estimate for costs** (as well as any revenues)
- Complete appraisal of at least two fundamentally different **contract strategies**

Duties of the quality assurer

The quality assurer shall review and check these documents, as well as prepare a separate analysis of success factors/pitfalls and the overall uncertainty scenario. The cost uncertainty analysis shall start out from the base cost estimate and supplement this with expected additions to arrive at the expected cost and the uncertainty associated therewith. The quality assurer shall thereafter make its recommendations on:

- Budgeted cost, including necessary contingency reserves, and target cost for the executing agency.
- How the project shall be managed in order to keep within the budgeted cost, including the organisational structuring of authorisation to draw on the contingency reserves.

The recommendation on budgeted cost is an important part of QA2 and its technical basis is stochastic (probability-based) cost estimation. The background to this is that simple, deterministic cost estimates are often systematically skewed and also do not provide sufficient assurance that the budgeted cost approved by the Parliament will not be exceeded. By means of stochastic estimation, based on either mathematical-analytical methods or simulation tools, one arrives at a cumulative probability distribution for the investment cost as illustrated in Figure 3.3.

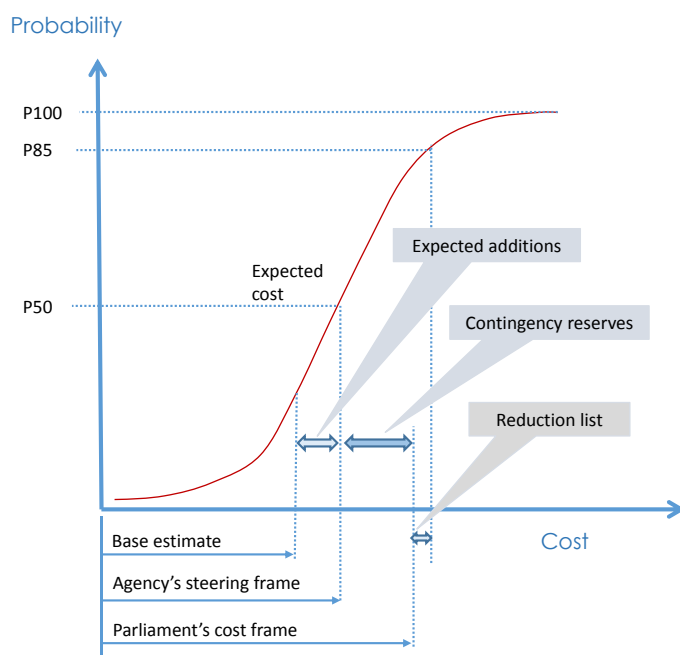


Figure 3.3 Stochastic cost estimation. Definition of key terms

The budgeted cost is normally set at P85, less potential simplifications and reductions («reduction list») that can be made during project implementation if there is a risk of overshooting the budget. The target cost defined for the executing agency shall be lower, normally at the P50 level, in order to avoid incentives to «spend the contingency reserves». (The agency should stipulate a cost allocation for the project manager that is even lower).

Experience with the scheme

Over the 15 years since the scheme was introduced, there have been more than 70 CAs/QA1 reviews and close to 160 QA2 reviews (as at March 2015). All projects represent major central government investments and most of these fall into the interval between the threshold value and NOK 3 billion. Some come with a much larger price tag. The most expensive is new fighter planes, estimated at NOK 50 billion (2008). About half of the projects fall under the auspices of the Ministry of Transport and Communications, which thus has more experience with the scheme than any other ministry. Next in line is the Ministry of Defence, which has also been involved in a significant number of quality assurance processes, especially in relation to the procurement of materiel (fighter planes, armoured vehicles, weapons systems, etc.).

Although one has accumulated considerable experience with the Quality Assurance scheme in a number of sectoral areas, it has thus far been too early to say anything about the effects of the scheme. It is only now and in the years to come that one is starting to accumulate the information needed to say anything about this. The reason is that it takes a long time to plan and implement large investment projects. The first projects subjected to QA2 in 2000 have subsequently been through a detailed planning and construction phase that typically lasts 5-10 year. About 70 projects had been finalised and entered the operational phase as at 2015.

The outcomes of the first 67 projects which have been subjected to QA2, and the final cost of which has been established, show that close to 80% of the projects now stay within the budgeted cost. This is a notably strong performance compared to what could previously be expected. Cost deviations from the target cost are distributed almost symmetrically around the expected value. This means that central government has achieved very good control over costs in the largest investment projects at the portfolio level.

The budgeted cost approved by the Parliament is largely based on the recommendations from QA2, which uses stochastic cost estimation. This indicates that the quantitative uncertainty analysis delivers robust results. The current practice of establishing a target cost for the agency that is less than the ministry's budgeted cost has probably also been important in terms of incentivising cost efficiency.

As far as the tactical and strategic success of the projects is concerned, it is too early to say anything about the effect of the QA1 scheme. The effects of the projects can only be evaluated a few years into the operational phase, and no QA1 projects have entered that stage yet.

Table 3.1 Status of the Norwegian so-called QA projects as at October 2015

External quality assurance	Quality assured	Of which completed	Of which to be evaluated *)	Of which evaluated
Total number of QA-projects as per Mars 2015	219	89	30	11
Of which have only been through QA2	147	89	30	11
Number of projects that have been through QA1	59	0	0	
Projects that have been both QA1 and QA2	11	0		

However, there is a long way to go. We still know that path dependency, i.e. doing the same as was done in the past, is amongst the key challenges when it comes to finding good conceptual solutions. This was documented in a review of progress in the quality-assured projects thus far (Grindvoll, 2015).

A majority of the 65 projects in the study (79 percent) have proceeded to the pilot project phase, with one or more concepts, as shown in Figure 3.4. Of these, 9 percent were sent back for further examination, whilst about 10 percent were rejected or put on hold. That the vast majority proceeded to the next phase may be interpreted in two different ways: either that the scheme has a significant positive effect, or that the project proposals were sound to begin with.⁸ We will not know the correct answer until these have been evaluated, and that will as mentioned be several years from now. However, it seems evident that such early appraisal of the choice of concept is beneficial. Planners are forced to adopt a broader perspective and discuss societal objectives, rather than delving straight into issues such as the choice of route or technical solution. It also increases the probability that the most effective alternative will be included in the analysis.

⁸ It should be mentioned in this context that the recommendation of the quality assurer deviated from that of the Conceptual Appraisal in two thirds of cases, with the former typically being somewhat cheaper or less unprofitable, which may be taken as an indication that not all of the proposed concepts were particularly good.

Moreover, it turns out that the quality assurer's recommendation as to the choice of concept is adhered to in many cases, although these are not a majority. It is evident that Norwegian politicians do not have a strong tradition for choosing on the basis of the cost-benefit ratio, which may reflect regional policy considerations and high oil revenues.

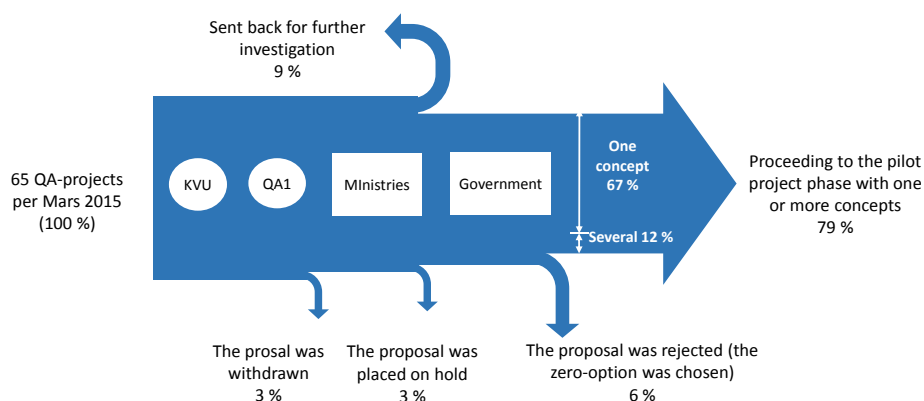


Figure 3.4 Overview of what has happened to the first 65 projects subjected to QA1

There are also certain negative issues that merit attention, which are partly concerned with time and resource use, as well as, more fundamentally, the relationship between analysis and advice, on the one hand, and democratic processes as the basis for decisions, on the other hand.

We are, at the same time, starting to observe some secondary effects of the scheme, in the form of, inter alia, the establishment of voluntary schemes of the same type in other sectors that fall outside the scope of the central government scheme.

A project case

The National Museum of Art, Architecture and Design is a project with a long gestation period, which at the outset involved an expansion of the National Gallery in its original location of Tullinløkka in Oslo. It subsequently came to encompass co-localisation of several museums. However, this would require more space and the issue of choosing a different location arose. In 2000, the Parliament resolved to establish the Norwegian Museum of Art, subsequently referred to as the National Museum.

After a turbulent period with several leadership changes, the National Museum was established as a foundation, and in 2005 the Ministry of Culture submitted a Conceptual Appraisal CA for a new building prepared by a private consultant, which proposed six alternatives, plus the zero option. The report was quality assured in 2006. The consultants noted, inter alia, that the document lacked a needs analysis that could explain the relevance of the project, and that the alternatives were not conceptually different, but only variants of the same concept in the same location, which thus had not been subjected to any CA.



Figure 3.5 Model of the new National Museum of Art, Architecture and Design

The Ministry re-examined the project and submitted a new revised document later the same year. The fiscal budget for 2007 proposed to launch an architect competition and to initiate the zoning process. However, this was postponed. The following year, Statsbygg⁹ and the City of Oslo concluded an agreement for the acquisition of the part of the Oslo West Station property owned by the City of Oslo for purposes of constructing a large cultural complex to house the Oslo Public Library, the Stenersen Collection, as well as a cinema and conference centre. In the subsequent debate, the Minister of Culture expressed a desire for the National Museum to be built on that property.

The ministry now submitted a new detailed supplementary report, again with the assistance of a private consultant, which compared earlier concepts to the Oslo West Station alternative. The report was quality assured and the QA1 supported the recommendation for a new museum on the Oslo West Station property. The Government endorsed this alternative in 2009 and announced an architect competition. One month later, Statsbygg was instructed to assume responsibility for the further planning, following which the Parliament consented to Statsbygg concluding a contract with the City of Oslo for the purchase of the property. The architect competition was held the same year, and the Parliament made the first appropriation for the planning of a new building on the Oslo West Station property.

A new quality assurance report (QA2) was submitted in 2013, based on the draft management document prepared by Statsbygg. QA2 concluded with a recommended budgeted cost for the project (P85) of NOK 5.3 billion. The situation as at September 2015 is that the Parliament has appropriated NOK 5 billion and that the project is in a start-up phase.

This project is characterised by a front-end phase that deviates from the norm in several respects:

- The process has lasted for a full 15 years
- There have been four different Governments over this period

⁹ Statsbygg is the Norwegian government's key advisor in construction and property affairs, building commissioner, property manager and property developer.

- The basis for QA1 was not prepared by a central government agency, but by private consultants on behalf of the Ministry, which does not have any appraisal capacity or expertise of its own in this field
- The initial report was rejected and had to be prepared anew
- No decision was made at that stage, because the Minister of Culture proposed a new localisation alternative
- This resulted in a new appraisal and new quality assurance (QA1)

Hence, this example also illustrates that there is flexibility and room for manoeuvre, and that the politicians are still in the driving seat, although one would be justified in labelling this an expert-driven process. Both the appraisals and the quality assurance were performed by private consultancy firms, in this case by so-called QA companies that had concluded quality assurance framework agreements with the Ministry of Finance.

The front-end phase process was inordinately lengthy; a full 15 years as compared to a norm of about two to seven years, depending on project size and complexity. This was predominantly caused by political circumstances and difficulties associated with organisational issues concerning co-localisation of several separate institutions. The period from submission of the initial concept evaluation until it had been quality assured was only a few months, but eight years went by before the final one was quality assured.

The example also illustrates that the country's supreme political body makes decisions on individual projects, in this case concerning (1) the strategic co-localisation/amalgamation decision, (2) the purchase of land by central government, and (3) the appropriation of funds to implement the project. In larger economies such as, for example, the UK, Parliament would only in exceptional cases be making decisions at this level of detail. The Government plays a key role in (1) deciding whether an initiative shall proceed to the pilot project phase or not, and (2) which alternative to choose, based on the recommendation of the Ministry of Finance.

4. The Netherlands

Background

As far as infrastructure investments are concerned, the Netherlands enjoy special geographical and population advantages over many other countries, not least in relation to Norway. It is a small country in terms of land area, but at the same time one of the most densely populated in the world (ranked as number 4), with very high GDP/capita (ranked number 13 in 2014, according to the World Bank). Consequently, it is exceptionally well-placed financially as far as the implementation of infrastructure projects is concerned, as distances are relatively short and expenses can be shared across a large number of people. It is also geographically favoured, inasmuch as most of the country is completely flat. However, it is a major challenge that large land areas are located below sea level and need to be protected against flooding by way of dykes along the coast and along the numerous rivers and canals. This requires major investments and the threat of higher sea levels in coming years is taken very seriously in the Netherlands.

Another characteristic of the Netherlands is that the initiating party (local authorities) is largely expected to contribute part of the funding. The argument used is that this will provide swifter access to central government funding. Furthermore, one has in recent years also embarked on various forms of co-funding schemes with the private sector for very large public sector projects.

Parties and roles

The country has a well-established project governance system for major public sector investment projects. Part of the background to this was the recommendations of a parliamentary commission for infrastructure projects in 2004 (TCI, 2004). The mandate of the commission was to reduce the amount of misinformation received by politicians, the media and the general public with

regard to major infrastructure projects (Flyvbjerg, 2014). The recommendations were based on, *inter alia*, a review of two large rail projects and a number of public hearings. There was a special focus on the problem of cost overruns.

The recommendations were not implemented, but a Government-appointed commission was in 2007 charged with proposing how swifter processing and implementation of large investment projects could be achieved. Although the principal issue here was progress, recommendations were also made on strengthening the front-end phase. The idea was to ensure a robust foundation for such projects, with broad participation from contributing and affected parties, commitment at the political level, a clear financial framework, as well as the assessment of several alternative conceptual solutions (Arts, 2010).

As far as central government as a whole is concerned, there is no joint system for large investment project governance that applies to all ministries in the Netherlands. Each ministry has its own processes and procedures for planning, prioritisation and decision making (Shiferaw, 2013).

However, this study is limited to the scheme under the Ministry for Infrastructure and Environment (I&E), which is responsible for by far the largest portfolio of investment projects, and which has established a governance system that will be discussed in this chapter. The Ministry is responsible for mobility and transport, the environment, land development and the water sector. The introduction of the scheme is largely based on the recommendations of the Government-appointed commission, and resulted in I&E introducing a programming and budgeting system called MIRT (Multi-year Plan for Infrastructure, Spatial Planning and Transport). All projects funded under I&E need to meet the requirements under MIRT. The program is outlined in further detail below.

In addition, the Netherlands have a central government fund for improvement of the structure of the economy (FES), which has been accumulated over many years through revenues from the country's oil and gas industry. This is an important source of funding for infrastructure projects, but there is nonetheless a shortage of capital. Priemus (2007) notes that the available annual budget is much less than the aggregate estimated cost of proposed investment initiatives, and that strict prioritisation of proposals is therefore necessary.

As far as the spending of FES funds is concerned, the authorities have established a coordination mechanism intended to control how new project proposals are

submitted, evaluated, prioritised and decided. This is the so-called inter-ministerial commission for improvement of the structure of the economy (ICRE); see Figure 4.1. The commission comprises representatives of various ministries, and is charged with advising the Government on the appraisal, prioritisation and progress of major investment initiatives and the spending of FES funds. The Ministry of Finance has a strong position on this commission.

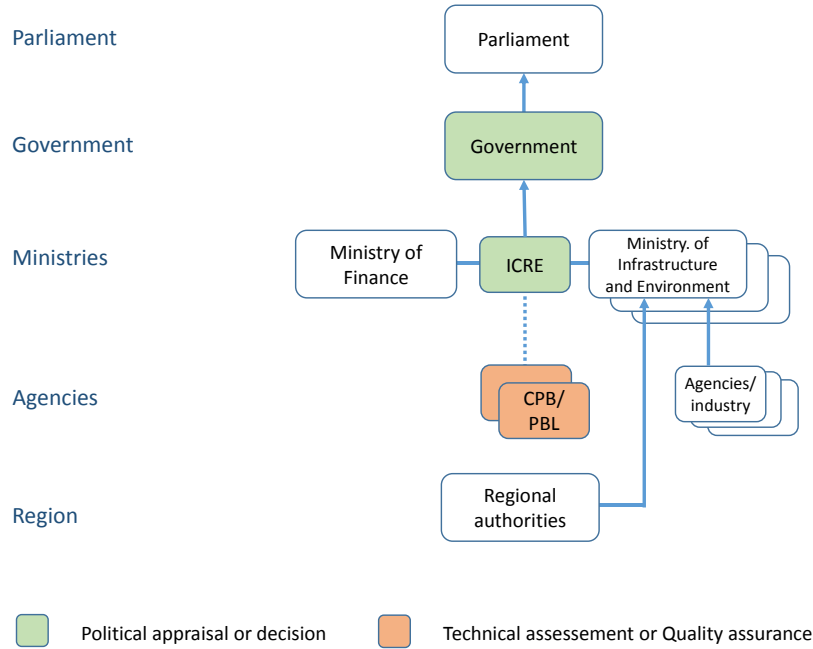


Figure 4.1 The Dutch scheme

The basis for the commission’s efforts is comprised of reports/project proposals prepared by the initiating party, which will also have ultimate responsibility for the spending of central government funds on the proposed investment project. Said party will in many cases be the regional authorities. The commission draws, at the same time, on assistance in the form of appraisals and advice from independent research institutions, for example the Netherlands Bureau for Economic Policy Analysis (CPB) and the Netherlands Environmental Assessment Agency (PBL).

These play, in the same way as the Norwegian quality assurers, primarily a technical role in assessing each project proposal, whilst ICRE plays more of a political role in assessing the project proposals against each other. This is premised on the strategies and policies of the authorities, with weight being attached to financial, environmental and social considerations. The technical advisory bodies assess the soundness of each project, as input into the overarching political and strategic assessment.

ICRE will, on this basis, submit a formal recommendation to the Government as the supreme body for the coordination of public investments. The Government makes a final decision based on the information from ICRE, and submits it to the Parliament, which adopts the budget. The Parliament plays no significant role in most of these cases, according to the parliamentary commission report (TCI, 2004).

Once the budget has been adopted, cases are relegated to the initiating party (ministries, provinces or others), which have delegated responsibility for the planning, governance and implementation of the project.

The stage-gate model. The MIRT program

The overarching objective of the scheme outlined above has been to ensure that large investment projects are implemented in conformity with the policies of the Government and in consultation with regional and local authorities. Its structure is primarily focused on improving the preparations made for decision making, from the initial initiative and until an implementation decision. The Ministry for Infrastructure and Environment has therefore developed a system for faster and better decision making (MIRT), which is discussed above and which aims to, inter alia, reduce the planning period of projects by 50 percent.

This is partly a program for streamlining and coordinating various investment initiatives in different parts of the country, partly a system to guide implementation of the front-end phase of individual projects/initiatives. The program specifies rules, procedures and frameworks for the development of projects that are seeking central government funding and for making the decisions. The program applies to all projects funded by I&E, and has also caught the attention of other ministries, because it represents a unified approach to dealing with a subject matter.

The MIRT program seeks to alleviate some of the problems observed in past projects:

- Biased conclusions on needs that are not premised on any problem analysis
- Conflicts between different stakeholders
- Lack of political backing
- Failure to analyse alternatives
- Absence of well-defined decision gates
- Inadequate needs analyses and unclear prioritisations

The implementation of the MIRT process is intended to result in improved project proposals. One aims to achieve the participation of affected parties, to start out from existing policies and priorities, to perform a problem analysis, to generate a maximum number of realistic alternative solutions, as well as political backing for the preferred solution before it is submitted for approval; see Figure 4.2.

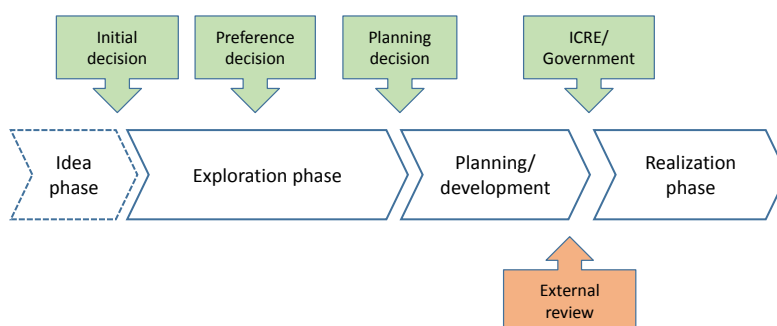


Figure 4.2 The project process

The MIRT process is based on the assumption that a political process has taken place regionally/locally (termed an idea phase in Figure 4.2), with participation

from all affected parties and discussion of various problems and priorities, as well as how these are related to general policies and current strategies in the region, and ultimately leading to a specific decision to request the initiation of a formal process.

The MIRT process comprises three phases and four reviews/decision gates (Klakegg et al., 2015). The first decision gate is termed MIRT1, and is a technical/political decision on the part of the Ministry to initiate an MIRT process to identify the solution to a given problem. The basis for the MIRT1 decision is documentation of the problem and the need for solutions for specific groups, as well as documentation to the effect that this has been examined in relation to general strategies and opportunities for the region, and that there is agreement to such effect amongst affected parties.

This triggers the first phase (exploration), which is comprised of an analysis element and an evaluation element. Its objective is to identify the three best alternatives amongst all relevant options. Analytically, this involves the performance of a problem analysis and needs analysis, the identification of alternative project concepts, as well as an analysis of their effects. The three alternatives are appraised by technical experts in collaboration with the Ministry's people, on the basis of the prepared documentation. The evaluation element involves a more comprehensive analysis of the three alternatives, which is to a larger extent based on quantitative information, thus generating three investment cases in consultation with affected authorities and the Ministry as a basis for choosing one of the alternatives.

The process is implemented by the initiating parties themselves, but the Ministry monitors the process and can ensure that all procedures are complied with. The MIRT process is transparent in the sense that the documents are in the public domain, uploaded to the Ministry's website where members of the public may post their comments. The Ministry reports annually to the Parliament on project progress and the Ministry's contribution thereto. Finally, the findings lead to an administrative decision identifying the preferred alternative, termed MIRT2.

In the next phase (planning/development), following the decision to commence planning, a more detailed study is made of the preferred alternative, which results in the documentation of the project alternative that is to be presented to the inter-ministerial committee, ICRE, where it will thereafter be subjected to political

deliberation on the basis of assessments from the external independent bodies mentioned above (CPB, PBL, etc.), before being submitted to the Government for final prioritisation in relation to other investment projects.

Experience with the scheme

The findings from an evaluation of the Dutch scheme, based on a review of 21 national road projects and canal projects, were presented in 2013 (DeVries et al., 2013). Its remit was restricted to examining whether the projects had been implemented in accordance with plans and stipulations, and whether the principles laid down by the Ministry had been adhered to. The report concluded that the projects had undergone a well-defined front-end phase that led more swiftly to the final decisions as to the final choice of concept (MIRT2). Previously this had been expected to take about 5 years on average, whilst it had now been reduced to 2-4 years. More time was needed for certain major projects. Moreover, it was suggested that the scheme was overshooting its target as far as certain smaller projects were concerned. One had also noted instances of the development phase being terminated prematurely because of pressure from politicians.

The Ministry has itself observed that the scheme has delivered positive results in terms of project progress, and that more weight will now be attached to the problem of cost overruns in moving forward.

Summary/assessment

The purpose of the scheme operated in the Netherlands is largely to generate good choices of concept, tailored to the needs and priorities of society, as well as realistic budgets. The process is more comprehensive than the Norwegian one and is to a larger extent an internal process, requiring both extensive involvement from all affected parties and follow-up on the part of ministries along the way.

The scheme is rigid in the same way as the Norwegian one, in the sense that it is a prerequisite for achieving central government funding that the MIRT rules are complied with. The process leads to the stage where the project proposal is submitted to an inter-ministerial body for political evaluation.

The MIRT process involves three phases, two of which address the choice of concept at an earlier point in time than does the Norwegian process, inasmuch as

it calls for fairly extensive discussion before the process can even be initiated (MIRT1). Consequently, it is clarified at an earlier point in time what is the preferred alternative. In Norway, it is a requirement that at least three conceptual solutions be assessed and analysed at the same level of detail. In the Netherlands, one avoids in-depth analysis of more than one alternative by having a more comprehensive and politically-founded process (here referred to as the idea phase), during which this is clarified before embarking on the formal and more in-depth technical appraisal.

In other words, the actual choice of concept is clarified at an early stage through a transparent process, which is political in nature, and which is followed by a technical analysis of the chosen concept, and finally a political process to prioritise this in relation to other investment initiatives. There is much to suggest that this is a sound approach. The Norwegian approach is more technocratic in nature, inasmuch as one delves straight into the technical analysis (QA1). Many have suggested that QA1 is launched too late. It should also be considered whether it is optimal to embark directly on, and devote considerable resources to, a thorough technical analysis of several alternatives, whilst in the Netherlands more weight is attached to the political aspects of the choice, and one takes a more democratic approach to clarifying the key issue, i.e. the choice of conceptual solution.

The scheme in the Netherlands is more decentralised than the Norwegian one in the sense that decisions are primarily taken at the Government level, whilst the Parliament assumes more of a formal role, which is limited to adopting the budget. Moreover, a much higher degree of involvement is expected in the MIRT process, both at the ministerial level and from the initiating party. There are numerous parties that may provide input on project proposals at the local level, the regional level, the agency level and the ministerial level.

There are no clear guidelines as to which projects are encompassed, other than that the scheme applies to the projects falling under the auspices of the Ministry for Infrastructure and Environment. There is no specific threshold value defining which projects are included, but it is evident that the scheme pertains to large investment initiatives.

However, the scheme operated in the Netherlands must probably be considered significantly more comprehensive than the Norwegian one, and requires greater involvement at the ministerial level than the Norwegian scheme, which gives

subordinate agencies considerable room for manoeuvre. The gatekeeper role is primarily assigned to the Ministry, which decides whether the MIRT process shall be initiated.

The situation in the Netherlands also differs from that in Norway by a much higher incidence of private sector co-funding (PPP), as well as a requirement for self-funding on the part of local authorities. According to the Ministry for Infrastructure and Environment, private sector co-funding is required for all projects with a budget in excess of EUR 60 billion. According to the Ministry, there were 32 ongoing PPP projects as at May 2012. A major portion of these are in the water sector, in the construction of locks, canals, ports and dykes.

The co-funding element may imply that more weight is attached to profitability (cost v. benefit) than in Norway. How long the system of FES funding of infrastructure projects will continue in its current form is unclear after the Government announced in 2010 that changes will be made. We have no information as yet on how this will be structured in future.

A project case

One of the projects described by the Ministry for Infrastructure (Jorissen, 2012) is Maasvlakte 2, which concerns expansion of the container port in Rotterdam by 1,000 hectares, through the development of a new 2,000-hectare land area by earth moving involving more than 300 million cubic metres of sand. The total cost of this was EUR 3 billion. The project was one of the largest infrastructure projects in the Netherlands in recent years. It was commenced in 2008. The implementation period was 4 years and the first ships called in 2014.

Public sector funding accounted for close to half of the total, of which central government contributed 30 percent and Rotterdam contributed 70 percent. Rotterdam initiated, and was responsible for, the project.



Figure 4.3 Maasvlakte 2 (source: Wikipedia)

The project was put out to tender, with the call for tenders being extended to the entire EU. There was concluded a DBM contract (design, build, maintain), which concerned the development, and a DBFM (design, build, finance, maintain) contract with a duration of 35 years, encompassing the remainder of the funding

and revenue side, which is based on port fees from the shipping and transport industry.

The Ministry states that the scheme delivered an efficiency gain for central government of about 6 percent of the investment cost, and that one managed to implement the project much more swiftly than would otherwise have been possible. The project is referred to by the Ministry as a good illustration that both the scheme and the principle of private sector co-funding are working in practice.



Figure 4.4 From the construction of Maasvlakte 2 (source: Wikipedia)

5. The United Kingdom

Background

The UK has, like most Western European countries, well-developed infrastructure (see the Global Competitiveness Report and corresponding international comparisons). The Government nonetheless has high ambitions for further investment, in both physical infrastructure and public sector ICT, as a basis for continued economic growth and welfare. Central government has a large portfolio of investment projects underway and in the pipeline, many of which are very large and complex.

The country has been and remains rich, as measured in GDP/capita (ranked number 24 in 2014, according to the World Bank), but large budget deficits have given cause for concern in recent years. The conservative Government elected in 2010, and re-elected in 2015, has made drastic cuts in government budgets and is committed to getting more value for taxpayers' money. This involves, inter alia, directing public investment towards the most profitable areas, and ensuring that projects are implemented by the scheduled time and within the budgeted cost. The UK was an early adopter of project methodology and independent quality assurance, and is considered a country leading the way by example in this field.

Furthermore, the Government is committed to obtaining co-funding from the private sector and from local authorities. The rationale is that this indicates commitment and a willingness to pay, which increases the likelihood that the project will be successful. It should be noted that Northern Ireland, Scotland and Wales all have considerable self-determination with regard to, inter alia, the prioritisation and follow-up of large investment projects. The same applies to Greater London. This chapter is primarily concerned with the scheme for national projects, which is the direct responsibility of the Government.

Parties and roles

The UK operates a scheme of mandatory quality assurance at important transitions between project phases (HM Treasury and Cabinet Office, 2011). This applies to

the largest and most risky central government investment projects – across sectors. Joint ownership of the scheme lies with HM Treasury (i.e. the UK Ministry of Finance) and the Cabinet Office (i.e. the UK Office of the Prime Minister). It is managed by the Infrastructure and Projects Authority (IPA). For administrative purposes IPA is placed within the Cabinet Office, but it reports jointly to HM Treasury and the Cabinet Office. See Figure 5.1. The scheme is additional to the requirements and processes applied by individual ministries and agencies.¹⁰

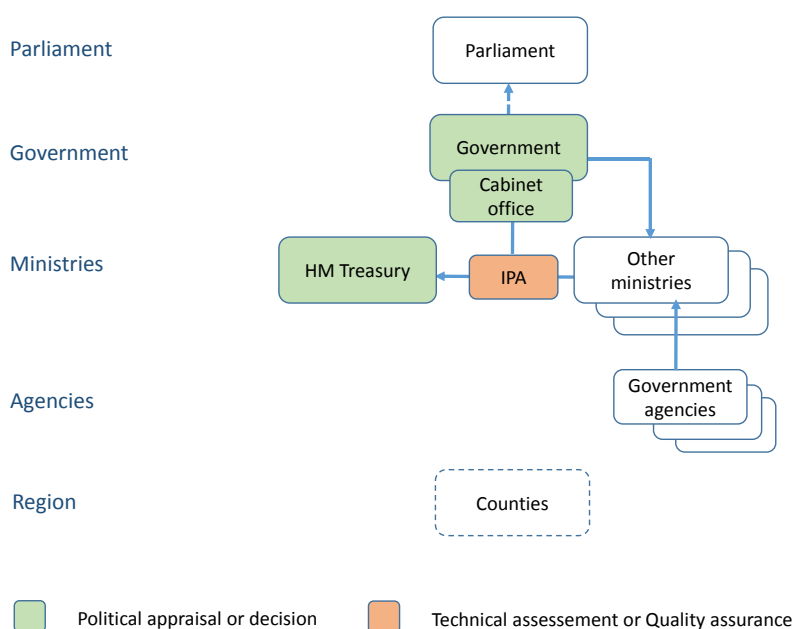


Figure 5.1 Public investment project parties and roles in the UK

¹⁰ IPA was formed 1 January 2016 from a merger between Major Projects Authority (MPA) and Infrastructure UK. Before this date, MPA was responsible for the governance scheme presented in this chapter. Infrastructure UK had expertise in financing, procurement and various forms of public-private partnership (this unit had been strengthened in recent years to improve procurement skills across government). With the merger, expertise in delivery, assurance *and* financing of major public projects, is brought together in a single body.

An administrative scheme

The Cabinet Office receives a copy of all quality assurance reports. The primary intention behind the scheme is nonetheless to provide HM Treasury and project owners in line ministries with a better basis for assessing whether projects should be continued through the various decision gates. The scheme forms part of a broader effort to strengthen the financial and efficiency perspective in central government activities. The Cabinet Office also uses the assurance reports to draw insight and highlight key emerging themes to target future work and share lessons across government.

Political choices will of course also be made in the choice of concept and later in the process, but this is not highlighted in the same manner as in the Norwegian scheme. It is nonetheless reasonable to expect that a better technical basis for decision making, not least in the front-end phase, will also pave the way for good political decisions.

It may in this context be mentioned that Parliament will only be involved in the prioritisation of individual projects as a matter of exception. The UK has an electoral system and culture in which decisions in economic matters are heavily centralised in the Government, which always has a majority in Parliament (Young, 2006). Consequently, the annual budget submitted by the Government is low on detail and is always adopted, although there may be considerable opposition against its contents. This is in contrast to the situation in Norway, where relatively small investment projects are discussed in the Parliament and lead to consensus-based decisions. Coelho et al. (2014) identifies this polarisation as a major political risk in UK infrastructure projects.

Internally within the Government, the Chancellor of the Exchequer (i.e. the UK Minister of Finance) has considerable control over the allocation of resources. The other ministers enjoy extensive independence in their various fields, but any project or initiative requiring funds on top of the allocation already made to the relevant ministry need to be approved by HM Treasury. The objective is economic growth, and profitability is a key focus. Economic profitability is required to be calculated and emphasised at both central and local levels of the public administration (HM Treasury, 2006). We may, inter alia, note how this is strongly reflected in the priorities in the national infrastructure plan (HM Treasury, 2014).

Moreover, the UK relies more heavily on private co-funding than many other countries, which is assumed to further strengthen the focus on economics.

Stricter requirements over time

Both the scheme and its organisation have developed over time. In 2000, the Office of Government Commerce (OGC) was established in HM Treasury, as an amalgamation of various agencies and resources, to assist central government in getting the most from its procurements. OGC became, over time, an important project and programme management resource, and introduced a number of elements based on best practice in the private sector. Not the least of these is OGC Gateway™ - the process of classification into phases and independent quality assurance for each transition between phases (Klakegg et al., 2015).

A major change took place in 2011. The background to this is outlined in a report from the National Audit Office, which reviewed the situation with regard to the quality assurance of large projects (National Audit Office, 2010). The report noted that there had been major improvements over the last decade, including that independent quality assurance turned out to have a good effect. However, weaknesses were also identified, especially in the strategic analyses, with major variations in application and compliance being observed between the ministries. The National Audit Office recommended a stricter regime, with the quality assurance requirement becoming mandatory for all large projects, and with a quality assurance plan for a project having to be prepared already upon the inception of such project. This will facilitate quality assurance in a timely manner, and make it easier to follow up on compliance with the plan. Measures to ensure better portfolio management were also recommended.

This resulted in the Government establishing the Major Projects Authority (MPA), now known as Infrastructure and Projects Authority (IPA), in 2011. The OGC was disbanded at the same time. The MPA (now IPA) was given a clear mandate to ensure independent quality assurance of the largest projects, as well as to report on, support and develop expertise in the management of large projects within the public administration. A key duty of the IPA is to manage the quality assurance scheme. This encompasses both scheduled quality assurance and extraordinary project reviews whenever needed. Besides, the IPA is involved in the selection of project managers for the largest projects, and provides support for individual

projects if problems arise. The IPA is also responsible for gathering and publishing data on the projects in its portfolio; the Government Major Projects Portfolio (GMPP). Each year, it publishes an overall assessment of the projects in the GMPP in colour-coded form (cf. traffic lights) and reports on challenges. The underlying rationale is that transparency will have a disciplining effect, and also that it will make it easier for the line ministries and HM Treasury to make choices based on what is good for the portfolio as a whole. Finally, the IPA shall also assist with the development of project and programme management capacity in the public administration.¹¹ More information on the IPA is available on www.gov.uk.

The encompassed projects

There are 188 projects in the MPA portfolio as at 2015, and these have a combined value of close to GBP 500 billion. These are projects that are so large as to require appropriations on top of the allocations given to the relevant line ministry, that will commit central government financially for a long time to come, that require their own legislation and/or that are especially innovative or controversial (HM Treasury and Cabinet Office, 2011). There is, in other words, no specific threshold value for inclusion in the GMPP, but the projects are typically larger than those encompassed by the Norwegian Quality Assurance scheme. The MPA is charged with identifying the projects, but HM Treasury and the relevant line ministry need to consent to their inclusion in the portfolio.

According to Cabinet Office (2015), the projects may be classified into four types; (i) transformation and service delivery projects («modernisation projects»), (ii) infrastructure, such as transport and buildings, (iii) defence procurement, and (iv)

¹¹ An important initiative has been the establishment of the Major Projects Leadership Academy (MPLA), in collaboration with Said Business School at the University of Oxford, which thus far has admitted 350 and graduated 120 senior project managers. Its vision is to have a large pool of particularly experienced project managers who can move across the public administration and take leadership of those large projects that are accorded the highest priority. Weight is also attached to evolving the skills and clarifying the roles of the Senior Responsible Officer (SRO), who is the person designated by the initiating ministry as the officer in charge of following up on a project and making overarching decisions. A new initiative in 2015 is the Project Leadership Programme, which is to encompass a broader group of project managers, not only those in charge of the very largest projects. This is to be implemented in collaboration with a consortium led by Cranfield Management Development.

ICT projects. The first type is the largest, when measured by the number of projects (more than 40%). The complexity of these projects is often high, although the investment cost is limited, because the focus is on changing the method of delivering a service. One example is the reform of the electoral system that enabled online voting. Many projects are a combination of (i) and (iv), i.e. their focus is on developing new technology for precisely the purpose of changing a service. The number of infrastructure and defence projects is somewhat smaller, although these are large in size.¹²

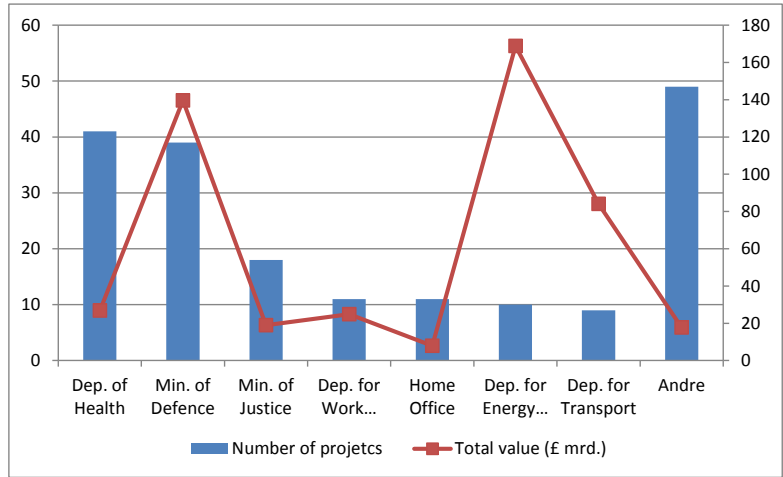


Figure 5.2 The projects encompassed by the scheme, as at September 2014 (based on Cabinet Office, 2015)

The projects fall under the auspices of different line ministries. When looking at the *number* of projects, the Department of Health ranks top of the list, with a large number of projects concerned with the modernisation of services by way of ICT.

¹² According to Cabinet Office (2015), the median project is valued at GBP 1,295 million within defence, GBP 902 million within infrastructure and buildings, GBP 207 million for transformation and service delivery projects and GBP 173 million for ICT projects.

However, highest-ranking ministries in terms of overall *investment cost* are the Department of Energy and Climate Change, the Ministry of Defence, as well as the Department for Transport (see Figure 5.2).

The transport projects include several very large rail projects. However, it is notable that the portfolio includes few, if any, road projects – unlike the Norwegian scheme, in which road projects represent a majority. In the UK, most road projects fall under the auspices of local authorities and fall outside the scope of the duties of the MPA (for the time being), although these often include a significant element of central government co-funding. It should be noted that the Department for Transport (DfT) has its own procedures for ensuring successful road projects. Formerly, it was the DfT itself that evaluated funding applications, based on recommendations from various investment committees. From 2013, there have instead been established Local Transport Bodies (LTBs) in each region. These are allocated a lump sum of central government funds earmarked for local transport infrastructure, and are subject to clear guidelines requiring them to emphasise profitability, obtaining local co-funding and establishing a quality assurance scheme (DfT, 2011). As far as transport infrastructure in the London region is concerned, Greater London has long enjoyed considerable independence in the spending of the funds made available by the DfT (DfT, 2015). Motorways and trunk roads in England fall under the auspices of the newly-established road enterprise Highways England, which has an appointed board charged with prioritising and following up on its projects.

The stage-gate model

The project governance scheme is based on a stage-gate model with four phases: policy formulation, project initiation, implementation, as well as commissioning and operation; see Figure 5.3. The figure illustrates the stage-gate model, with the IPA's quality assurance at the bottom, and HM Treasury's approval at the top.¹³

¹³ The HM Treasury approval process may take three different forms, depending on the cost and risk associated with the project. The very largest and most complex projects (typically in excess of GBP 1 billion) need to be approved by the Major Projects Review Group, which is a panel of experts charged with advising HM Treasury on precisely the most critical of all projects (NB: Not to be confused with the IPA). Other large projects are approved by a so-called Treasury Approval Point, with or without a prior panel meeting.

The main elements of the scheme are outlined below, based on HM Treasury and Cabinet Office (2011).

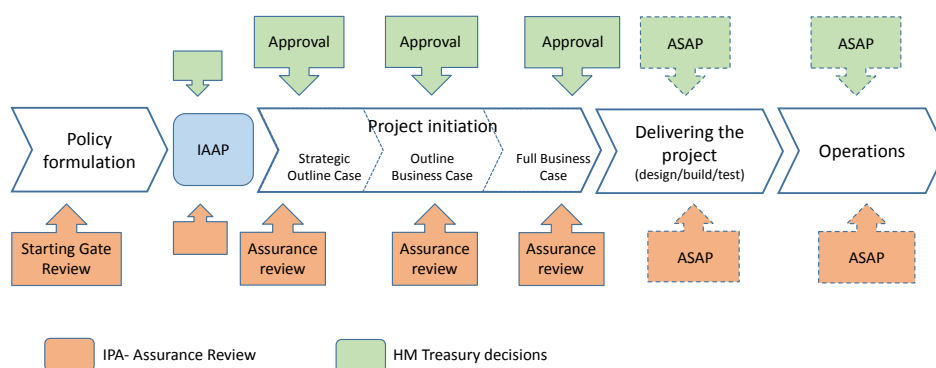


Figure 5.3 The stage-gate model, based on HM Treasury and Cabinet Office (2011)

Starting Gate¹⁴

This is a relatively new gate introduced in the front-end phase of projects, and is focused on checking whether an initiative is in line with the priorities of the Government, that it is viable and that it does not entail unnecessary risk. Quality assurance is based on a general risk assessment. The quality assurers will conduct interviews with ministers and high-ranking civil servants. They will thereafter author a recommendation addressed to the relevant line ministry. Unlike the other quality assurance gates, Starting Gate is not linked to any HM Treasury decision point. However, if the project proceeds, HM Treasury will verify that it has been undertaken.

This will not be described in detail here, but reference is made to HM Treasury and Cabinet Office (2011).

¹⁴ Separate guide to Starting Gate, Cabinet Office (2011a)

Integrated Assurance and Approval Plan (IAAP)¹⁵

Furthermore, a plan for quality assurance and decision points shall be prepared in advance. This was introduced in response to the National Audit Office report from 2010, and is intended to support the project owner in bringing the project to a successful conclusion. The plan shall be approved by the IPA and HM Treasury.

Business Case and the OGC process

Whilst Starting Gate and IAAP are new, the remainder of the quality assurance scheme is based on the so-called OGC GatewayTM process, which was introduced in 2001 and has retained its old brand name. The minimum requirement is three quality assurance points in the front-end phase, based on the three versions of the Business Case; Strategic Outline Case, Outline Business Case and Full Business Case (see below). The reports form the basis for HM Treasury's continuation decisions. Approval of the Full Business Case is the same as an investment decision – the project may then start to conclude contracts and spend money. In addition, there should be at least one quality assurance point in the implementation phase and one after commissioning, in line with the five phases of the OGC process. This is to ensure that one has conducted the necessary testing/piloting, absorbed lessons along the way, and assigned responsibility for the realisation of gains.

Development of the Business Case in three stages:¹⁶

A Business Case is a summary of the findings from the analyses and appraisals made of an investment at a specific point in time. Its contents largely correspond to those of an economic analysis, but additional contents are required. HM Treasury requires application of the so-called Five Case method, which comprises the following five key components: the strategic case, the economic case, the commercial case, the financial case and the management case.

The Business Case is developed over time in an iterative process, in which additional details are added along the way and the weight attached to the five

¹⁵ Separate guide to Integrated Assurance and Approval Plans, Cabinet Office (2011b).

¹⁶ Based on guide to Business Cases, HM Treasury (2013), and The Green Book, a guide to Economic Analysis, HM Treasury (2003).

dimensions will change, as shown in figure 5.4. The HM Treasury approval process involves three stages, requiring the following variants of the Business Case, respectively:

1. Strategic Outline Case. The focus is primarily on strategic (and economic) issues, as well as selection of the level of ambition. Success criteria need to be defined as a basis for filtering out alternatives. The purpose of Strategic Outline Case is to reduce the opportunity space from a long list to a short list (i.e. to bring it down to only 3-4 alternatives).
2. Outline Business Case. This involves a more detailed analysis of the 3-4 alternatives, with a view to recommending a concept. Economic considerations are key, but one will also address the structuring of the project and the implementation approach, including the robustness of the plans, the funding opportunities and the contract strategy.
3. Full Business Case. This is the most comprehensive version of the Business Case, and pertains to the chosen concept only. One needs to ensure that the project remains relevant and profitable, as well as present specific implementation plans. It needs to be documented that cost and risk are under control, that adequate knowhow is available, etc. The Full Business Case underpins the actual investment decision.

Strategic Outline Case needs to be approved prior to commencement of Outline Business Case, which again needs to be approved prior to the commencement of Full Business Case.

The investment cost is included in the Business Case, but the cost estimation method is not accorded as much weight as under the Norwegian scheme. The guidance notes refer to the risk of systematic underestimation (optimism bias), and recommend an adjustment of the base estimate by applying standardised adjustment factors based on historical data for each project type and development level.¹⁷

¹⁷ This was included in the HM Treasury guidance notes after Mott Mac Donald (2002) prepared the basis for such adjustment factors.

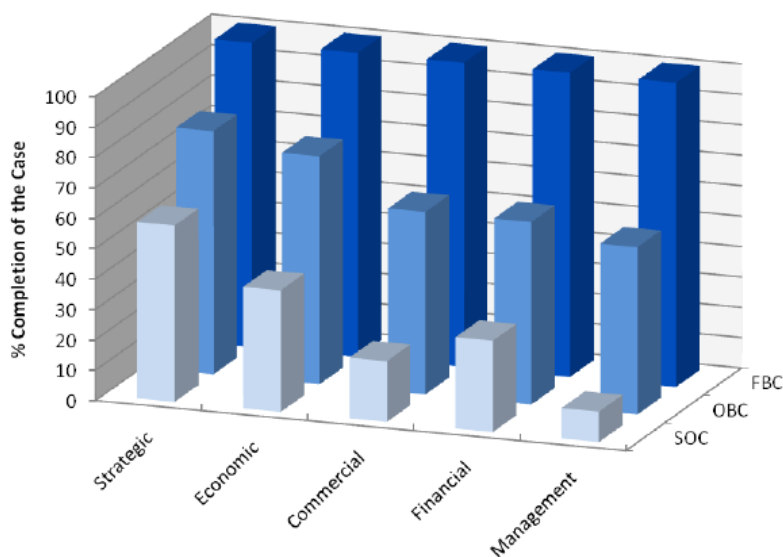


Figure 5.4. The development of the business case across the five dimensions of the Five Case Model (source: HM Treasury, 2013).

Other measures

In addition to, or instead of, the abovementioned «simple» Assurance Review, one might opt for conducting a Project Assessment Review (PAR)¹⁸. This is a somewhat more thorough review of the project, either in all of its aspects or with a focus on specifically defined challenges. The need for PAR should be considered early and included in the IAAP, but PAR may also be initiated along the way.

Besides, the IPA has an extensive toolkit of measures to address any projects that run into problems along the way («Consequential Assurance and Intervention»). This includes, in addition to PARs, *inter alia*, case conferences, action plans, direct assistance from the IPA for strengthening project leadership, as well as termination plans. In addition to the quality assurance of individual projects, it is also required to perform quality assurance at the programme and portfolio levels, so-called Gateway 0 Reviews (not shown in the figure). The line ministry and the IPA will

¹⁸ Separate guide to PAR, Cabinet Office (2011c).

jointly consider the need for this, and quality assurance is conducted in a manner corresponding to that applicable to individual projects.

External quality assurance

As far as actual quality assurance is concerned, it is carried out by a team of 2-3 project experts who are independent from the project. These may be civil servants and/or external consultants. The team is appointed by the IPA on a case-by-case basis, from a pool of about 500 accredited quality assurers. After the team has been put together and has received the underlying documentation in preparation for quality assurance, specific deadlines apply, typically in the range of 6-12 weeks, depending on the type of quality assurance. The actual review is thereafter conducted intensively over 3-5 days (up to 10 days in case of PAR), based on interviews. This results in a report setting out the recommendations of the team.

It is important to note that all ministries have independent responsibility for quality assurance, and that IPA's reviews will only be a supplement thereto, for the largest and most critical projects.

Summary/assessment

The UK has an integrated framework for large central government investment project governance, in which independent quality assurance is duly coordinated with the decision points. A designated IPA unit has also been established directly under the Cabinet Office, with a clear mandate to follow up implementation. Besides, an extensive collection of guidance notes and best practices has been accumulated under the OGC, and subsequently the MPA and IPA.

How does the scheme work?

Over the first couple of years after the introduction of the current scheme in 2011, when it was governed by MPA, several evaluations of the workings of the scheme have been conducted (National Audit Office, 2012, House of Commons Committee of Public Accounts, 2012, and Lord Browne of Madingley, 2013). These are by and large unanimous in their conclusion that it was appropriate to establish a separate body to support more effective management and delivery across government, and that the unit has achieved a lot within a short space of time. It is held to be of particular importance that the MPA was given a mandate directly by the Prime Minister. However, the evaluations are also suggesting that one might

have gone further. It is noted that the MPA has limited resources and that it lacks the power to impose sanctions. It is also observed that HM Treasury is only abandoning projects as the result of recommendation from the quality assurers as a matter of exception. The line ministries and HM Treasury need to become more involved, not least with regard to sharing and using the findings for management and learning purposes. It is also noted that the requirements applicable to the Starting Gate process are inadequate, and that this phase is in many cases omitted. Moreover, the MPA needs to publish more data at the project level, and needs to work on the quality of the published data.

The IPA observes, in its latest annual report (Cabinet Office, 2015), that there has been a clear improvement when comparing performance for the 89 projects that have been included in the portfolio throughout the three-year period. The predominant part of the projects that were of the most concern in 2012 achieved a better score in 2013 and an even better score in 2014. The IPA believes that central government has become better at project management, not least because it now acknowledges the importance of having qualified people to manage the projects.

The UK scheme versus the Norwegian scheme

The UK scheme is similar to the Norwegian one in that it is mandatory and relatively rigid. In both countries the scheme was introduced by the Government, spearheaded by the Cabinet Office in the UK and the Ministry of Finance in Norway, and is cross-sectoral and a supplement to project governance on the part of line ministries and agencies. Both schemes are broad in scope, strategically, tactically and operationally, and fairly similar in their technical contents – although an important difference is the estimation of construction cost uncertainty, which is more thorough under the Norwegian scheme. The project portfolio is also reasonably similar, although the UK scheme encompasses more «modernisation projects» and fewer road projects. Both countries have a focus on transparency – in Norway by way of project data being published by a trailing research programme and in the UK by way of the IPA doing so.

There are also certain key differences. Quality assurance in Norway serves as inputs for political decisions, which often deviate from what the quality assurers recommend. In the UK, projects are formally admitted through the decision gates by HM Treasury, and we know that HM Treasury has a tradition for attaching weight to the same financial and efficiency criteria as are presented in the Business

Case. «Politics» will of course come into play in the UK as well, but it is not specified how and when this happens.

Klakegg et al. (2015) generally holds that the UK scheme is somewhat more «business-like» than the Norwegian one. It is largely based on best practice in the private sector, and attaches major weight to financial and profitability issues. On the other hand, the UK scheme relies less on private sector input as far as the quality assurance reviews are concerned. Whilst the Norwegian Ministry of Finance concludes framework agreements with consultancy firms, the IPA selects *individual expert* for each team. The portion of civil servants was approximately 50% in 2010 (National Audit Office, 2010), but one has subsequently sought to increase this. The UK scheme also involves more explicit accumulation of expertise on the part of central government, inasmuch as the IPA has established a training programme for central government project managers (and quality assurers).

Moreover, the UK scheme includes a much larger number of quality assurance points, not only in the front-end phase, but also during implementation and operation. On the other hand, each instance of quality assurance is less comprehensive. The UK scheme is also more flexible in that it may be expanded to include additional reviews whenever needed, and also in that the IPA may intervene directly in projects that need assistance. The UK scheme is not only intended to pave the way for managing individual projects, but also for portfolio management, and aims to achieve learning across projects¹⁹.

¹⁹ It should be noted that the UK Government sees investment in different types of infrastructure together, unlike the case in Norway where strategic plans are developed for each sector. The first National Infrastructure Delivery Plan was published in 2010, and included a portfolio of critical projects and programmes in transport, energy, communications, flood defence, water and waste, and scientific infrastructure (i.e. “economic infrastructure”). The current plan, published by IPA in 2016, includes also large-scale housing and regeneration projects and key social infrastructure such as schools, hospitals and prisons.

A project case: Crossrail

Crossrail is Europe's largest rail programme, with an estimated cost of GBP 14.7 billion upon completion in 2019. It involves the construction of about 120 km of double-track railway line from west to southeast in England, through a new tunnel directly under Central London. The latter is by far the largest and most important element of the project. In addition, it includes links to the existing railway lines of Transport for London (TfL), the construction of nine new stations and the upgrading of 29 existing ones, signalling system, the procurement of 65 new trains, maintenance depot, as well as the appointment of a company to operate the aforementioned. Actual construction work commenced in 2009. Tunnel breakthrough was achieved in 2015.

The objective of the project is to provide a new high-frequency rail service for London and the surrounding region. Travel times are currently long between east and west, typically requiring several changes of train. Crossrail will deliver a 10% shift in rail-based transport capacity, and will alleviate pressure on several of the London Underground lines. The project is described as absolutely necessary for a city expected to have a population of 10 million in 2030. In addition, it is expected that another 1.5 million people living in the surrounding region will be brought within a travel time of 45 minutes to London, and this is in itself expected to create 30,000 new jobs in Central London.

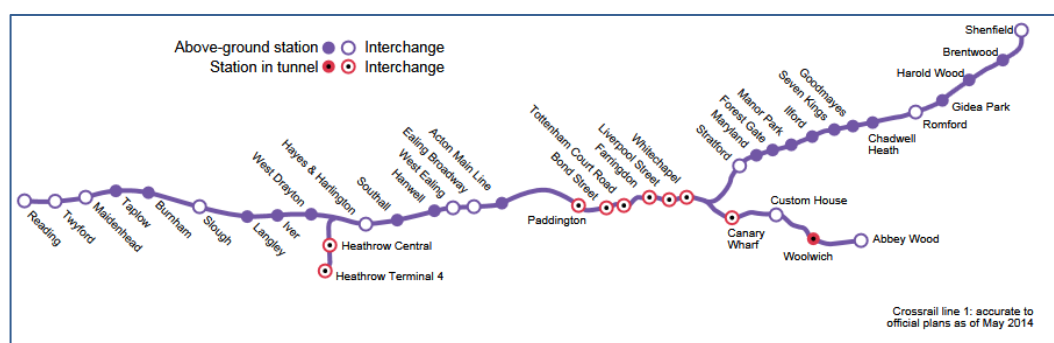


Figure 5.5 The new rail section with stations

Crossrail has been included in the IPA portfolio of large investment projects throughout the three-year period (2012-14). The project has also been reviewed by

the National Audit Office (National Audit Office, 2014), and hence there is extensive information available.

The project had a long front-end phase. The idea was first launched locally in the 1940s, and many concepts and potential routes have been discussed over the years. The project was submitted to Parliament in 2005, but it was another three years until it was adopted in the form of a designated statue in 2008. National Audit Office (2014) has retrospectively concluded that there was a consensus that the project was needed, but it is believed that the initial analyses were unrealistic and also that quality assurance was inadequate in that phase. The project was eventually adopted, after a funding plan was put in place that included appropriations via both DfT and TfL, loans from Network Rail and TfL, as well as contributions from the business sector. The central government contribution via DfT is about GBP 5 billion. The project, as eventually adopted, has a Benefit-Cost-Ratio of 1.97. According to the DfT scale, this is a project offering «medium Value-for-money».



Figure 5.5 Illustration of the Tottenham Court Road Crossrail ticket hall (obtained from www.crossrail.co.uk)

There has been a political consensus on the project. However, a Spending Review was conducted after the change of government in 2010, which identified savings in excess of GBP 1 billion and reduced the estimated cost from the original GBP 15.9 billion (2008) to GBP 14.7 billion. This would be realised by, inter alia, choosing a different and somewhat slower tunnel drilling strategy, and resulted in the completion date being postponed from 2017 to 2018.

Both the IPA and the National Audit Office are of the view that thorough planning work was done in the front-end phase, in the knowledge that changes and redesigns are expensive. There have, indeed, been no major changes since start-up. The establishment of a qualified implementation unit (a separate company; Crossrail Ltd.) and clear roles and responsibilities for all parties involved, are identified as important factors. Crossrail Ltd. was originally a joint venture between DfT and TfL, but this was amended with the result that Crossrail Ltd. is now a wholly-owned subsidiary of TfL. Both of the two main sponsors have senior personnel dedicated to following up the project. Private sector expertise has also been brought in to support the project along the way. Another key element was that both stakeholders were given the opportunity to withdraw until the final decision point in 2011. It was thus avoided that quality assurance would be a mere formality. The funding scheme, under which several parties are contributing funding to the project, is also highlighted as a positive feature.

The IPA awarded the project a Yellow/Green score in its traffic lights for 2012, 2013, as well as 2014. This is the second-highest level of five possible, which means that it is likely that the project will realise its objectives, although a watchful eye needs to be kept on the risk factors (Cabinet Office, 2015).

There has been some opposition from, inter alia, freight train operators that fear they will be the losers (Crossrail is intended for passenger trains). It has also been objected that the development imposes certain inconveniences on eastern parts of the city, that a number of historical concert venues have had to be demolished, and that expropriation has been effected in an inconsiderate manner (according to Wikipedia). It must nonetheless be concluded that the level of conflict surrounding the project has been moderate.

6. Sweden

Background

Sweden is the fifth largest country in Europe in terms of land area, but has a relatively low population density of 23 inhabitants/sq.km (Norway has 16 inhabitants/sq.km, and the European average is 116 inhabitants/sq.km). The northern part of the country is covered in forest. The central and southern parts of the country have fertile agricultural land. A large portion of the country's manufacturing industry is located in proximity to the coast. Sweden has a high GDP per capita (ranked number 6 in 2014, according to the World Bank). Although its economy is strong, the country is facing economic challenges, such as high unemployment, especially amongst youth. Its infrastructure is well developed, with almost 10 times as long a classified road network and 2.5 times as long a serviced rail network as Norway. The country has a relatively high degree of urbanisation. According to the World Bank, 86% of the population lives in towns or cities (as compared to 80% in Norway).

Different forms of funding are used for public investment initiatives. The main principle is that the investments of central government agencies shall be funded by appropriations. An exemption is made for investments in the agencies' own administrative activities, which shall be funded by borrowing from the Swedish National Debt Office. This is a central government body under the Ministry of Finance, which is responsible for central public sector financial management. Interest and instalments on these loans are to be covered by the agencies' appropriations. In addition, the Swedish Transport Administration has been authorised to use debt financing of high-priority projects. There are examples of co-funding between central government and regional government, as well as PPPs (Public-Private Partnerships), which are schemes in collaboration with the private sector, but it has been used only to a limited extent in the transport sector. Sweden has a high degree of local and regional influence over investment decisions. Considerable amounts are channelled via regional transport authorities and the

health sector is still organised along regional lines. Our description of the public sector project governance scheme in Sweden is focused on investments made by the Swedish Transport Administration. This is because these constitute by far the largest group of investments. In addition, there is a brief description of the situation for investments in the defence sector. Finally, there is an example of a major transport investment.

Parties and roles

In Sweden, there is a clear distinction between policies and the implementation of such policies (Bruzelius, 2012). The Government formulates policies and government agencies are charged with implementing these. Boge (2006) observes that Sweden has a tradition of strong government agencies, which ensured, inter alia, the development of a national highway and motorway system through an expert-led road policy. Most of the investments are funded over the agencies' own budgets, but major investments may also be directly resolved by the Parliament. Such is the case with, inter alia, infrastructure, but also for example with the Swedish Armed Forces. The Government has in recent years identified a number of major rail projects, including the case project discussed below, which are absorbing a large portion of the investment allocation for new large projects. The Swedish Transport Administration's freedom to prioritise has therefore been limited to minor initiatives.

The central government budget process is centralised, but there is no single joint system for large investment project governance across the various central government sectors. Each sector has its own processes for the planning and implementation of investments (Swedish National Financial Management Authority, 2015).

Amongst central government agencies, the Swedish Transport Administration and the Swedish Armed Forces have the largest investment portfolios (Murray et al., 2013). The Swedish Transport Administration alone accounts for more than 50% of the value of central government investments. The investments are in both cases characterised by a small number of very large projects, and a large number of smaller ones. The health sector also makes large investments, but these are managed via regional government (the county councils), and thus are subject to a different governance regime than that described here.

The Swedish Transport Administration has a more independent role than have the Norwegian Public Roads Administration and the Norwegian National Rail Administration, which are subordinated to the Ministry of Transport and Communications. The Swedish Transport Administration is subordinated to the Ministry of Enterprise and Innovation, although its director general reports to an executive board, which is appointed by the Government.

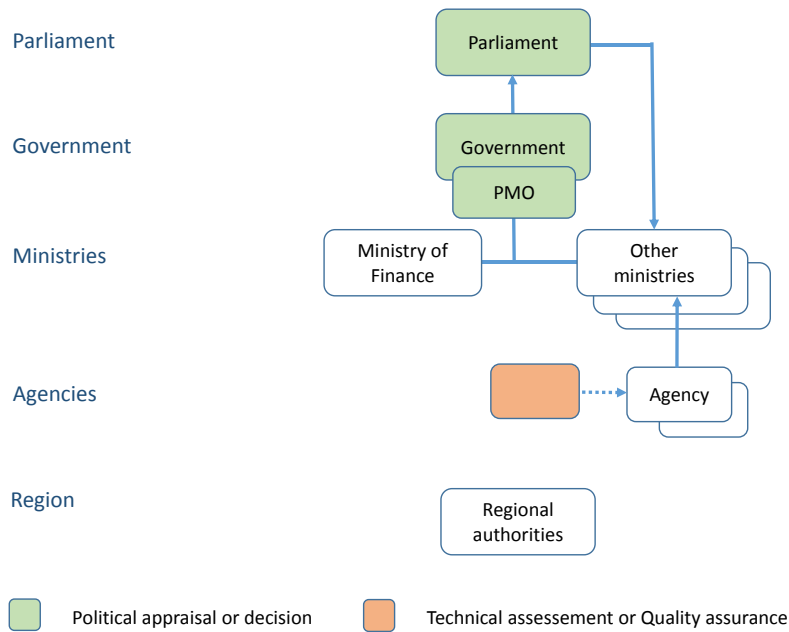


Figure 6.1. Simplified presentation of decision levels in Sweden.

The principle governing investment planning is that the Government lays down guidelines, whilst the relevant government agencies prepare and propose plans. There are differences in how this is done in practice. The planning of transport investments takes place in a close dialogue with affected local government administrations, regional government administrations, the Swedish Transport Administration and other government agencies (Swedish Transport Administration, 2014). This applies to both long term plans and individual

investments. The overarching planning effort results in a national plan, which also includes a financial plan. The planning of investments in the defence sector is carried out by the Swedish Armed Forces. The Government does not adopt any long-term investment plan for defence investments, but decides on individual projects (Murray et al., 2013)

The investments of the Swedish Armed Forces are channelled via the Swedish Defence Materiel Administration (FMV), which is an independent agency under the Ministry of Defence. Consequently, FMV has a more independent role than has thus far been played by the Norwegian Defence Logistics Organisation (FLO).

The stage-gate model

Long-term planning within the transport sector is carried out through a process similar to the Norwegian National Transport Plan. In 2013, a new economic planning process was introduced for major transport investments (>50 million SEK). The government’s 12-year national transport plan is indicative, and the government makes annual decisions regarding projects that could start within 1-3 years and that will be prepared for construction in the following 4-6 years. The Swedish Transport Administration prepare the basis for the decisions and the documents areis quality assured by a third party (another government agency). The total cost of the projects should be in accordance with prior decisions in parliament regarding the national transport plan.

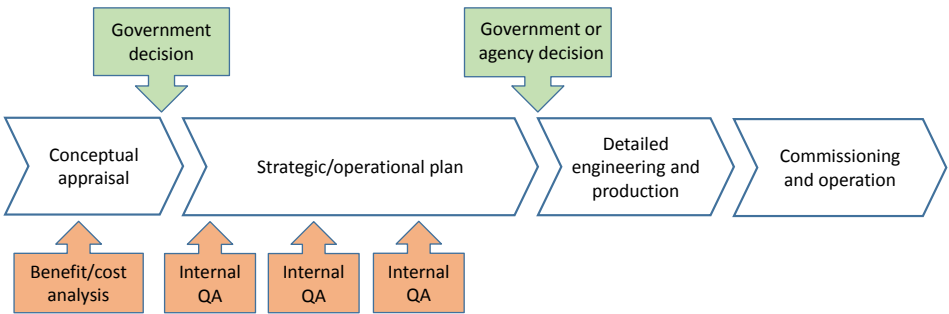


Figure 6.2. The planning process for transport infrastructure investments. Based on Transport Analysis (2015a)

The Swedish Transport Administration has established a new process for the planning of investment initiatives, labelled Strategic Choice of Measures, which

corresponds to the Norwegian Conceptual Appraisal. The planning of measures commences when inadequacies have been identified in the transport system. One starts out from a problem. The choice of concept is highlighted through, inter alia, application of a four-step model, which is used in the front-end phase of potential investments, before choosing measures. Strategic Choice of Measures involves the following steps:

1. Reappraisal
2. Optimisation
3. Conversion
4. New construction

The first step involves the reappraisal of various measures that may reduce transport needs, or whether other forms of transport may be utilised better, for example by shifting transport from road to rail. If measures are still needed, one moves on to step two, which involves the optimisation of existing infrastructure. One example is optimising the signal system at rail bottlenecks. The next potential step is conversion of existing infrastructure if needed, for example the expansion of existing roads. If the initial three steps do not solve the defined problem, there remains the fourth and final alternative, which entails the construction of new infrastructure and involves a larger investment. The investment planning outlined in Figure 6.2 is relevant if one moves on to Steps 3 or 4 of the four-step model. The Strategic Choice of Measures shall, according to the Swedish Transport Administration (2014), address, inter alia, the following:

- which problems and needs relating to the functioning of the road or rail network the measures are intended to address, and which stakeholders will be affected;
- the purpose of the project; and
- environmental considerations and other considerations of relevance to the measures.

The physical planning of road and rail projects is governed by designated statutes. The process results in a road or rail plan. The preparation of a road or rail plan involves five steps, the first three of which are subject to internal quality assurance of cost estimates and economic profitability. The steps are (Swedish Transport Administration 2014):

1. Consultation basis
2. Consultation document prior to choice of alternative
3. Consultation document
4. Appraisal document
5. Decision document

One aspect of the planning process is that the project will need environmental approval from the County Administrative Board. Final approval of a project is conditional upon such project being included in the annual budgets and incorporated into the appropriation letter to the Swedish Transport Administration and the regional and local authorities. Major projects may be subject to a specific resolution on the part of the Government or the Parliament.

The planning of a road or rail project previously involved four steps (Pre-study, Road and Rail Appraisal, Road and Rail Plan, Construction). The Stockholm City Line project, which is discussed below, was planned under this regime.

The Swedish system has a strong focus on choice of concept, collaboration, economics and environmental aspects. Collaboration involves central government agencies, regional government agencies and local government agencies. The analyses are required to include a zero option alternative, which is defined as in Norway, i.e. no investment other than necessary maintenance. The Swedish Transport Administration is required to perform a cost analysis in each phase of the planning process. More weight is attached to economic profitability than to cost estimation in documents and descriptions of the planning process in Sweden.

Several funding sources are available to the Swedish Transport Administration. In addition to appropriations, it may under certain circumstances obtain loans from the Swedish National Debt Office, it may raise co-funding from local government and regional government, and it may include user funding. The Ministry of Finance has indicated that it will be restrictive when it comes to permitting debt financing. PPP (Public-Private Partnership), which involves co-funding schemes with the private sector, has also been used. Examples are the Arlanda Line and the new Karolinska hospital. There is nonetheless some concern that the use of PPP results in impaired budget discipline and in infrastructure projects becoming more expensive than would otherwise have been the case. The Government stated in its Transport Plan 2013 that central government borrowing costs are lower than those of private companies, and that central government capital costs will increase if PPP

is chosen as funding method. The previous conservative government was therefore not endorsing PPP. There is similar concern that internal debt financing from the Swedish National Debt Office may also undermine budget discipline.

According to Silborn (2013), it is often argued in the Norwegian debate that the Swedish Transport Administration has considerable freedom in prioritising investments within its financial limits. However, the Government tends to identify projects that are to be accorded priority. When these and ongoing projects have been included in the plans, a major portion of available funds are tied up. This implies that the true freedom of the Swedish Transport Administration is not so considerable after all.

Quality assurance of transport projects

Sweden does not have formal schemes for the external quality assurance of investments, as are applied in Norway. Individual government agencies have considerable responsibility for the preparation and quality assurance of the basis for decision making. Within the transport sector, Transport Analysis follows up on economic calculations and methods, in particular. Transport Analysis, which was established in 2010, is a separate agency under the Ministry of Enterprise and Innovation. This implies that the agency is organised at the same level as the Swedish Transport Administration. Transport Analysis is charged with reviewing the basis for decision making, carrying out evaluations and compiling statistics within transport and communications (Transport Analysis, 2015b). According to both Bruzelius (2012) and the Swedish National Audit Office (2011), there is no activity on the part of the Swedish Transport Administration that could be described as external quality assurance. External reviews have nonetheless been conducted on a couple of occasions, which have typically focused on project portfolios, rather than on individual projects.

The economic calculations are subjected to quality assurance. SIKa (Swedish Institute for Communication Analysis) was charged with coordinating models and tools, as well as reviewing the underlying planning documentation. This was predominantly a general review, which did not address cost estimates in depth. This effort continued when SIKa was incorporated into Transport Analysis in 2010.

Quality assurance of cost estimates for investment projects is primarily performed in the form of internal analyses, although these may include or be carried out by external consultants. There has in recent years been a development towards expanded use of successive calculation for the quality assurance of cost estimates.

The Swedish National Audit Office (2011) notes that the Government had not performed any quality assurance of cost estimates in connection with the latest planning of rail investments. Successive calculation is used for all rail projects in excess of SEK 50 million, and extensive training in use of the method has been provided. Successive calculation is used for the quality assurance of previous project cost estimates (Swedish Transport Administration 2011a and b). Transport Analysis (2015) observes that cost calculations based on successive calculation are established practice in the Swedish Transport Administration. There are steering committees for all large investment projects, and one of their duties is the quality assurance of cost estimates.

Calculation blocks are used in both budgeting and follow-up. One thereby facilitates the follow-up of actual costs, not only at the project level, but also for individual parts of projects (Swedish Transport Administration 2011a and b).

One challenge in the the Swedish system was, according to the Swedish National Audit Office (2010), that projects evaluated in connection with a national and/or regional plan may have reached different stages of the physical planning process. This implies that the cost estimates for the various projects can be based on different degrees of uncertainty. There is typically more uncertainty in the early phases. This was one of the reasons for introducing the new planning process in 2013, whereby the government makes annual decisions regarding transport infrastructure projects.

Considerable weight is attached to the assessment of environmental aspects of potential investments, and other parts of the public administration are involved in such assessments. There shall in connection with road or rail appraisals be prepared an environmental impact assessment, which requires the approval of the County Administrative Board. After a road or rail plan, as well as an environmental impact assessment, are in place, the Government may grant environmental clearance of major projects. The Government checks that the project complies with environmental requirements in the environmental legislation, as well as in the planning and zoning legislation, including municipal planning requirements.

According to the Swedish National Audit Office (2010), a Government approval process will on average last 15 months. The plans are subjected to public consultation.

Planning of defence investments

Defence procurement and transport investments are both subject to the general budget process. However, the planning of defence projects is not structured in the same manner as for transport projects. The description below is based on Murray et al. (2013), which has outlined the investment process for central government investments, with a special focus on the Swedish Armed Forces and the Swedish Transport Administration. Development after 2013 will imply that a revised planning process should take effect as from 2017. As a consequence, the government and parliament will once per electoral period, make decisions on investments at strategic level, which should be included in a next 12-years long-term plan. A structured and systematic follow-up process, similar to that found in the area of transport infrastructure, will then be introduced between the involved parties in the defence sector.

Strategic planning in the Swedish Armed Forces starts out from perspective studies, which look 10-20 years into the future. These are performed every 4th year, but sometimes more often. A number of alternative scenarios are defined on the basis of such perspective studies, and one highlights, inter alia, any investment needs associated therewith. One of the alternatives is required to be the continuation of current decisions and budget levels for the Swedish Armed Forces. Preliminary cost calculations are prepared. In addition to perspective studies, appraisals are carried out by the Swedish Parliamentary Defence Commission. The Swedish Parliamentary Defence Commission is a parliamentary forum in which the Government and the political parties represented in the Parliament review defence policy. Reports from the Swedish Parliamentary Defence Commission form the basis for defence policy decisions such as the abolition of general conscription, the size of the operational strike force and major materiel procurement.

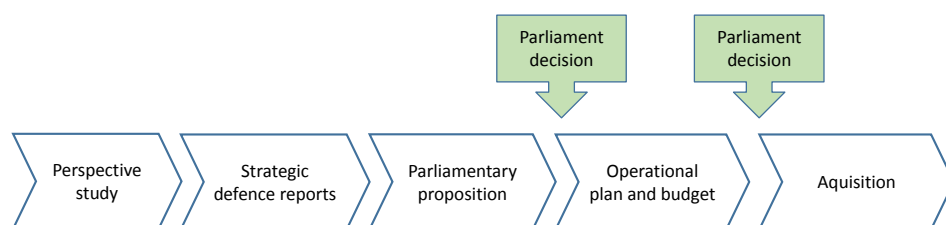


Figure 6.3. The planning process for defence investments. Based on Murray et al. (2014).

The Parliament determines the orientation of the Swedish Armed Forces in a separate proposition on defence-policy orientation, referred to as the Orientation Proposition. The proposition adopted in 2009 was based on one perspective study, two reports from the Swedish Parliamentary Defence Commission and certain supplementary analyses. Financial analyses of defence investments are typically focused on costs. Economic analyses, as commonly prepared within the transport sector, are rarely undertaken (Murray et al., 2013).

Summary/assessment:

There is no joint structure across different ministries and project types for the handling of major investments. It implies that there is no joint framework for investments in, for example, the Swedish Armed Forces, the Swedish Transport Administration, IT projects and government buildings, as is the case in Norway.

The system for the appraisal of transport investments is well established, with step-by-step planning and extensive involvement of affected parties.

Government agencies play a key role in the evaluation of measures, the analysis of alternatives and the estimation of costs. The Government makes the decisions, but largely based on the proposals of the agencies. The County Administrative Boards evaluate projects from an environmental perspective. The strong formal role of agencies in Sweden ought to result in less extensive political involvement in the details of investment projects, as compared to Norway. We nonetheless register that decisions pertaining to many large projects involve the Government and the Parliament.

There is no formal scheme for external quality assurance of the choice of concept or the cost estimate. As far as transport projects are concerned, the agency

Transport Analysis only performs such role partially, whilst there is no corresponding role for defence investments. A study also demonstrates that defence investments would benefit from a more transparent and structured decision-making process, of the type established for transport projects. Murray et al. (2013) have compared the planning and quality assurance of investments on the part of the Swedish Armed Forces and the Swedish Transport Administration, respectively. They describe the Swedish system for the planning of transport investments as exemplary, when compared to the system for defence investments.

In practice, the Swedish system for transport projects encompasses many of the elements from Conceptual Appraisal and QA1, although it is somewhat less formalised. There is no evident parallel to the Norwegian QA2 review, but suggestions have been made that something similar would be desirable. Economics and environmental consequences are major focal areas in the Swedish analyses of transport sector investments.

Several studies from, inter alia, the Swedish National Audit Office identify challenges relating to cost overruns, as well as the absence of a formal benchmark cost against which the final cost can be assessed. As the result, more systematic cost evaluations are introduced. The Swedish Transport Administration's use of calculation blocks in its uncertainty analyses has been initiated to ensure that it is possible to compare the expected and actual cost of projects. More structured use of external quality assurance of cost estimates for major Swedish projects has been proposed. The purpose is partly to highlight the uncertainty associated with the projects, and partly that an external review has a disciplining effect.

A project case - the Stockholm City Line

The Stockholm City Line is a 6 km long rail tunnel being constructed beneath the centre of Stockholm. The Stockholm City Line is the equivalent of a new Oslo tunnel for the railways. There are only two tracks approaching Stockholm Central from the south. These tracks are the most heavily trafficked section of the Swedish rail network. The project will result in two new tracks being provided in a new tunnel. This will enable the separation of local and long-distance traffic into and out from Stockholm. In addition, the project includes two new stations below ground.



Figure 6.4 Alternatives shown in the pre-study. Alternative UA3 was chosen. (Swedish Rail Administration 2002)

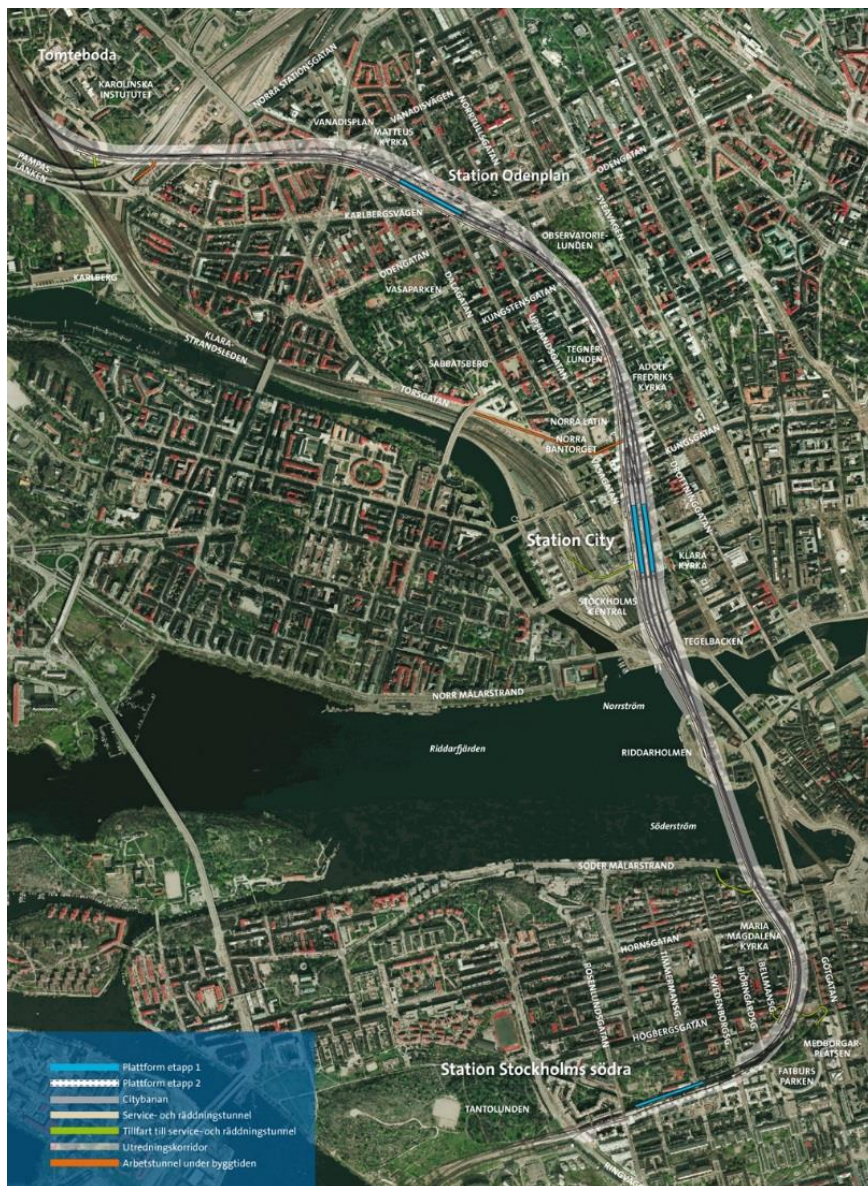


Figure 6.5 Aerial photo of key parts of the project. Source: Swedish Transport Administration. <http://www.trafikverket.se/citybanan>

The project had a very long gestation period, with a number of studies. From the 1970s to the 1990s, one discussed a third rail track, referred to as the «Third Track». The intention was to expand rail capacity. The plans for a third track were shelved in the 1990s, and one embarked on the planning of two new tracks in a tunnel. The project became very expensive, and several rounds were required in order to raise the funding for the development. In May 2006, the Stockholm County Council (the regional government), the Swedish Rail Administration and the City of Stockholm (the local government) reached agreement on funding.

An attempt at rescinding the agreement was made in the autumn of 2006, but other municipalities outside Stockholm became involved in the funding of the project in the spring of 2007. The Government approved the project in May 2007, and construction commenced in 2009.

The budget is SEK 16.8 billion. The project is funded by central government via the Swedish Transport Administration, the City of Stockholm, the Stockholm regional government, as well as regional funds (the regions of Mälardal and Östgöta). Stockholm contributes SEK four billion, and the five affected regions (regional governments) contribute a total of SEK two billion. The project has been characterised as the worst building and construction project in Sweden due to a number of mishaps, including fatal accidents.

The co-funding from affected municipalities and regional governments has been criticised. The Swedish National Audit Office (2012) has shown that the co-funding has resulted in higher costs and increased risk for central government. This is because central government committed itself to several rail investments that did not originally form part of the project, in order to obtain such co-funding. The project is unusually large, and hence is not representative of the average project. It nonetheless illustrates certain aspects of the Swedish system. It partly shows the focus on regional and municipal co-funding and planning involvement, and partly that this type of large project involves the Government.

The Swedish National Audit Office estimates that the overall cost to central government is SEK 24.5 billion, and notes that the aggregate amount was not presented to the Parliament, although the Government is required to submit this type of decision to the Parliament. The figure of SEK 24.5 billion is not a cost increase for the Stockholm City Line when taken in isolation, but a summary of all

costs committed to by central government via its decision, including other projects that are accorded priority as a result of such decision. The Swedish National Audit Office also observes that the borrowing costs of municipalities are higher than those of central government, which means that funding costs are increased through this type of co-funding.

7. Denmark

Background

Denmark consists of the large peninsula of Jutland and the island group to its east, comprising a total of about 500 islands, 79 of which are inhabited. Denmark has one of the most decentralised public sectors in the world. Following a structural reform in 2004, which entered into effect in 2007, the number of municipalities has been reduced from 271 to 98, whilst the 14 counties have been replaced by five regions. Denmark has a relatively small land area; about one tenth of that of Norway, has a very flat landscape and is one of the most densely populated countries in Europe. About 30% of the 5.5 million inhabitants live in the Copenhagen region. The flat landscape and high population density are favourable for infrastructure investments and public transport. Norway has almost twice as much railway as Denmark, whilst Denmark has three times as many passengers per year (www.jernbaneverket.no).

Denmark has in recent years focused on expanding public transport and infrastructure. The *Green Transport Policy Agreement* was concluded in 2009, and included the establishment of an infrastructure fund for purposes of funding transport investments. It was decided, as part of the agreement, to perform a number of strategic analyses and establish a Terrestrial Transport Model, which would provide an improved basis for economic analyses in the transport field (Ministry of Finance 2014).

As an EU member state, Denmark has a number of projects that have received contributions via EU support schemes, for example the Øresund Bridge and the future Fehmarn Belt Fixed Link, but also smaller projects (www.trm.dk).

In 2014, the Government concluded an agreement with the Red-Green Alliance and the Danish People's Party for the establishment of a Train Fund DK. This allocated DKK 28.5 billion for the railways, in a bid to reduce travel times and provide a more modern, stable and environmentally-friendly railway (www.bane.dk).

Parties and roles

Denmark has a scheme establishing a joint project model for large public investments in the road and rail sector, which involves external quality assurance. It also has a project model for IT projects that will not be explored in depth in the present report.²⁰ The focus in the present report is on the financial management model in the transport sector (also referred to as New Construction Budgeting), because it has distinct similarities with the Norwegian model. The model was introduced in 2003 to achieve a more integrated approach to this sector. The background was experience from Norway and England, as well as recent Danish research on major projects in Denmark and international research (Ministry of Transport and Building 2010a). The Ministry of Finance and the Ministry of Transport and Building performed, prior to the introduction of the model, an analysis of budget overruns, and found that the 12 projects examined had registered budget overruns of about 30 percent on average (Ministry of Transport and Building 2015).

The scheme is to be introduced gradually with the intent of gaining experience with its application, and drawing on such experience to adapt the system when needed. Initially, it applies to major road and rail projects, but neither to renewal or maintenance projects, nor to minor projects that are funded in increments (Ministry of Transport and Building 2010a). Road and rail projects are amongst the largest and most complex central government investments (Ministry of Transport and Energy 2006).

In 2007, the financial management model was expanded from being only one joint project model for the sector, to requiring projects in excess of DKK 250 million to

²⁰ Denmark has a separate project model for IT projects. All public sector IT projects are required to use the central government joint IT project model. If the project has a budget in excess of DKK 10 million, the project shall be subjected to risk assessment, a status report shall be submitted twice a year, a project completion report shall be submitted upon completion and a benefit realisation report shall be submitted one year after completion of the project. All of the said reports shall be submitted to the IT Project Council. Any IT project in excess of DKK 60 million shall be presented to the Finance Committee (www.digst.dk).

be subjected to external quality assurance and experience-based correction supplements, which are percentage increases added on the cost side.

This applies to the appraisal prepared at the two decision points in the model labelled as Decision Levels 1 and 2. At Decision Level 1, it is decided which concepts will be taken forward, and at Decision Level 2 it is decided whether the project shall be implemented (Ministry of Transport and Energy 2006). The intention behind the expansion was to improve the quality of the basis for decision making at both Decision Level 1 and 2. Thereby is created an improved basis for the prioritisation of large projects. The external quality assurance will enhance and consolidate the project basis before a decision is made, and the experience-based correction supplements are intended to ensure a higher degree of certainty in budgeting and an improved basis for prioritisation.

The model is intended to provide quality assurance for the Parliament's prioritisation of investments, in connection with, inter alia, the preparation of the Government's investment plans and transport policy solutions (Ministry of Transport and Building 2010a).

The project is appraised by the government agency responsible for the project, and the basis for decision making is subjected to quality assurance by an external consultancy firm, with relevant expertise, appointed by the Ministry of Transport and Building. The experience-based correction supplement is thereafter added. The Ministry of Finance is not involved in the process, but needs to be contacted if the agency's project appropriation is exceeded by more than 5% and if is necessary to draw on the contingency reserves. The agency thereafter prepares an overall recommendation based on its appraisal and the quality assurance. The agency decides itself which of the advice from the quality assurer should be adhered to or not adhered to. An overall recommendation is submitted to the Ministry of Transport and Building, which forwards it to the Prime Minister's Office (the Government) and thereafter to the Parliament.

The Government subjects the recommendations to political deliberation before the Parliament becomes involved. This is referred to as the right of initiative on the part of the Government, and implies that the Government may choose to disregard the recommendations of the agency if it disagrees politically. The Government also has some scope for influencing proposals/policy independently of the Parliament, for example by choosing the timing of the proposals. However,

the ultimate decision is made by the Parliament. In practice, the Government will act in such a manner as to have the backing of the Parliament majority for its policy.

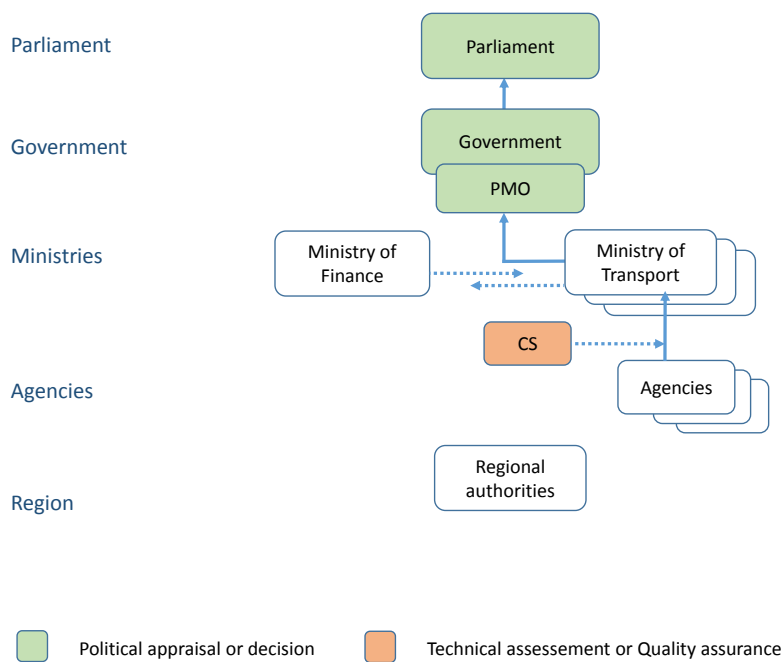


Figure 7.1 Simplified presentation of decision levels in Denmark. CS refers to experience-based correction supplements.

Central government project ideas may materialise in different ways. Project ideas often originate from agencies, as these are familiar with investment needs, and agencies may receive suggestions from municipal and regional administrations. However, these may also originate from national or local politicians. There is an ongoing dialogue between civil servants in agencies and in municipal/regional administrations, as well as an ongoing dialogue between national and local politicians, and project proposals may originate from both. However, formal proposals for central government projects cannot be submitted by municipal or regional administrations.

In Denmark, all investment projects require two resolutions from the Parliament in order to come to fruition. One resolution adopting a «construction statute» and one adopting a «funding statute». The resolution adopting a construction statute grants permission for implementation of the project. The funding statute specifies the funds appropriated for one year, as well as the expenditure anticipated for the following three years, but does in reality imply an approval of the aggregate cost of the project (Transport Analysis (2012)).

No profitability requirement needs to be met in order for a project to be implemented, although an economic analysis, which is subjected to quality assurance, is required. However, according to the Ministry of Finance's document «A Joint Strategy for Public Investments (2014)», more weight shall in future be attached to economic analyses in the prioritisation of public investments, based on a recommendation from the Danish Productivity Commission (Ministry of Finance 2014).

The stage-gate model

The Danish project model comprises five phases with two decision points. The two decision points are labelled Level 1 and Level 2. The basis for decision making at each decision level shall be subjected to external quality assurance and the investment cost shall be increased by an experience-based correction supplement following such quality assurance.

The financial management model was introduced because one wanted a more unified approach to the sector. This resulted in the general classification into phases corresponding closely with the project models used by institutions, thus enabling the phases used by institutions to be classified correctly in relation to the models. A more unified approach means that external and internal project management are premised on joint budget data and calculation rates (Ministry of Transport and Building 2010a). Sector-specific guidance is provided for the rail and road sectors (Banedanmark (2010), Danish Road Directorate (2010)).

Phase 1 leads to Decision Level 1, and provides a basis for a decision to further examine certain specific alternatives. This phase involves the preparation of investment plans to support the political decision-making process in relation to the prioritisation of future infrastructure investments. The analysis is intended to clarify transport alternatives, including a financial estimate, to enable the appraisal

to serve as a basis for deciding whether a project is a relevant and profitable option that merits further examination.

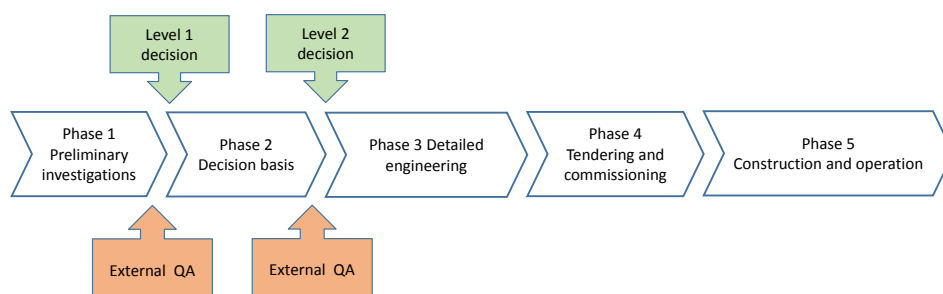


Figure 6.2 The process under the financial management model for large investment projects, showing the two levels of decision making (Main Memorandum 2010)

This involves a cost estimate, including its key underlying assumptions, and a description of the preliminary assessment of risk and uncertainty, as well as a description of the organisation of the project and the alternative concepts. A societal rationale (transport efficiency, regional development, environmental considerations, etc.) shall also be provided, and an economic analysis shall be performed.

The need for a Phase 1 review is examined on the basis of the cost and complexity of the project, what experience one has from similar projects and the need for making real decisions, such as for example the choice of route for a railway.

There will, as a matter of exception, be cases in which a Phase 1 cost estimate is never prepared, if the project is brought directly into Phase 2 against the background of a political decision-making process. A political decision may also in special cases be taken to implement a project on the basis of the Phase 1 review only. No threshold value has been specified in this regard, but it will usually apply to smaller projects. Such clarification takes place through a dialogue between the ministry and the agency.

The basis for decision making at both decision levels is subjected to quality assurance, and the main contents of such quality assurance is the same at both levels, although with a slight difference in focus. The scope and scale of quality assurance reflects the level of detail in the basis for decision making. The basis for decision making at Level 1 will be significantly less comprehensive than that available for quality assurance at Level 2 (Ministry of Transport and Building 2010a).

The external quality assurance report at Level 1 shall include:

1. Summary
2. Review of the assumptions and calculations in the transport analysis.
3. Review of the financial calculations and assumptions.
4. General review of the economic analysis of the project proposal, as well as alternatives to the project, and a review of the planning authorities' analysis of needs, goals and risks for the project, as well as an assessment and audit of the alternatives, the zero option and potential postponement (Ministry of Transport and Building 2010b).

The external quality assurance report at Level 2 shall include:

1. Summary
2. Review and assessment of the assumptions, calculations and capacity in the transport analysis.
3. Review and assessment of the possibilities examined in the environmental impact assessment
4. Assessment of the costs and associated assumptions, including safety assessments, risk management plans and the project time schedule.
5. Assessment of the economic analysis.
6. Assessment of plans for the organisation of the project.
7. Assessment of potential reductions, simplifications and savings, which may be used if the assumptions underpinning the project change (Ministry of Transport and Building 2010c).

Quality assurance is intended to be an independent assessment of the project documentation and the cost estimate. It is required to examine the financial estimate, the transport and technical solution model, the organisation of the project, as well as whether the economic analysis is of adequate quality. Quality

assurance shall be conducted on the basis of the materials and examinations completed in preparing the basis for decision making. The quality assurer shall not conduct additional investigation or prepare independent solution proposals. He/she shall be an independent advisor with expertise and experience within the relevant fields, and cannot be the same person as is performing the main appraisal.

The quality assurance effort is intended to be a parallel process, thus enabling the conclusion to be available simultaneously with the publication of the basis for decision making, which allows the findings from the quality assurance to be taken into account in the final basis for decision making that the Ministry of Transport and Building submits for political deliberation. Quality assurance shall last for a maximum of two months and shall not serve to prolong the project process (Transport Analysis 2012).

It will be possible to deviate from this procedure if specific circumstances pertaining to an individual project mean that a parallel process is inappropriate. Any such deviation shall be agreed with the Ministry.

Experience-based correction supplement

An experience-based correction supplement shall be added at both decision levels after the external quality assurance has been completed, in order to prevent the cost estimate from being unrealistically low. This is described as a form of double quality assurance of the basis for decision making and the budget (Ministry of Transport and Building 2010a).

There is in the first decision phase added a correction supplement (C1), which is usually 50% of the quality-assured cost estimate. A decision is made, against this background, as to whether more detailed checks should be carried out, for example in the form of an environmental impact assessment. C1 is thus used to improve the basis for determining which projects should be accorded priority when it comes to preparing an improved basis for decision making (Ministry of Transport and Building 2010a).

There is in the second decision phase added a correction supplement C2, which forms the basis for the decision as to whether the project shall be implemented, with its budget comprising a base estimate plus the correction supplement C2. Consequently, C2 is an appropriated reserve set aside to realise the project. The

correction supplement in the second decision phase is, until further notice, put at 30% of the cost estimate (Ministry of Transport and Building 2010a).

C2 can be split into two components; C2-A and C2-B. C2-A: One third of the correction supplement is set aside as part of the project appropriation of the transport agency. This reserve may be used to realise the project, but use of such reserve is subject to strict documentation requirements. C2-B: The remaining two thirds form part of an overall reserve for the portfolio of projects under the Ministry of Transport and Building (formerly the Ministry of Transport and Energy). Hence, this reserve represents 20% of aggregate expenditure for the year on the projects encompassed thereby, with scope for making transfers between financial years.

Once the choice of concept has been made, the project moves into Phase 2. This is when the basis for a final political decision for the implementation of a project is to be prepared. This means focusing on the clarification of technical, financial, service and organisational risks. One needs to prepare a realistic budget in which the basic estimate is premised on fixed assumptions, such as for example its relationship to other projects, the price level, etc. Furthermore, one needs to outline the assumptions underpinning the forecast, identify and assess risks, and perform an economic analysis. The budget and identified risk areas shall form the basis for the political decision-making process with regard to whether the project shall be implemented or not, as well as how the project shall be prioritised in relation to other potential investments (Ministry of Transport and Building 2010a).

At Decision Level 2, a proposal is submitted to the Parliament, which shall on the basis thereof reach a decision as to whether the project shall be implemented, as well as the appropriation, if any, to be made for such project (Ministry of Transport and Building 2010a).

As far as financial management after the project has been adopted is concerned, there will be no clear distinction between Phases 3, 4 and 5. The status shall be reported to the Ministry every six months, with an update of the budget and the risk register. However, any changes in assumptions and identified risks shall be updated on an ongoing basis as and when these are identified. In Phases 3 and 4, financial management consists of updating the forecasted project cost estimate accordingly as and when planning is clarified, detailed and specified, as well as on focusing on not exceeding the basic estimate and the appropriation. In Phase 5,

the focus is on monitoring and identifying deviations, as well as on ensuring that the financial implications of any deviations are incorporated into the forecast (Ministry of Transport and Building 2010a).

The project concludes with a review of the budget from the perspective of the actual final cost, such as to establish any deviations and draw lessons for the future from these (Ministry of Transport and Building 2010a).

Experience with the model

The Danish scheme is under continual evaluation. The projects to which the scheme applies are large. With an average time schedule of 10 years from planning until completion, only a limited number of projects have been through the scheme since its inception in 2007.

A total of 27 road projects and 11 rail projects have been subjected to external quality assurance (as at the spring of 2013). However, only a small number of these had their inception under the scheme, whilst the others have been re-estimated under the scheme. Hence, the information available from evaluation of these is thus far limited (Ministry of Transport and Building 2015).

The Ministry of Transport and Building's (2015) evaluation of New Construction Budgeting (NAB) concluded that budget accuracy has improved significantly, and that only two projects have registered cost overruns. Cost reductions have been registered for a number of projects over the period of application of the scheme, which reductions amount to a total of DKK 2.1 billion.

External quality assurance has been criticised for variable quality, and for not always being based on a complete understanding of the processes, prerequisites or procedures on the part of government agencies. Numerous errors and deficiencies have at times been found in the financial estimates. These errors are often modest in magnitude, being in the range of DKK 5-20 million. Criticism has also been voiced against agencies, which have not always accounted for those instances in which they fail to heed the advice of the quality assurers.

However, the general conclusion from the evaluation is that agencies are satisfied with the quality assurance scheme and the specific quality assurances conducted, and that this enhances confidence in the basis for decision making (Ministry of Transport and Building 2015).

Summary/assessment

The purpose of the scheme in Denmark is to have a more uniform process for these various agencies, to ensure realistic budgets and good concept choices. This is intended to provide quality assurance for the Parliament's prioritisation of the projects included in the Government's investment proposals.

The scheme is rigid in the sense that the projects have to undergo the process in order to obtain central government funding, and that the process leads up to a final decision by the Parliament as to whether or not the project shall be implemented.

The process applies a significantly lower threshold value to determine which projects to include than does the Norwegian one (DKK 260 million and NOK 750 million, respectively), and thus far applies only to road and rail projects, whilst the Norwegian model encompasses all central government investments.

The financial management model features five phases with only two decision points, placed in much the same way as under the Norwegian scheme. However, the Danish process attaches less weight to initial examination than is the case in Norway, and more weight to the process once the project/concepts have been chosen. The concepts to be taken forward are determined after the first decision point.

The external quality assurance has major similarities with Norwegian one, especially in terms of when it takes place and what is subjected to quality assurance. However, under the Danish scheme the external quality assurance process is expected to run in parallel, such as to be completed or performed in the final phase of project appraisal. Quality assurance in Norway takes place after the appraisal on the part of the agency has been completed. In Denmark, the conclusion will be available simultaneously with the publication of the basis for decision making. The agency makes an overall recommendation to the Ministry, in which it may elect to disregard elements from the quality assurance. This distinguishes it from the Norwegian model, in which quality assurance is presented in a separate report submitted to the Ministry alongside the agency's appraisal.

The external advisor shall not itself conduct any additional investigation or prepare any independent analysis, as is often done in Norway. Quality assurance shall be performed on the basis of the materials and appraisals developed in preparing the

basis for decision making. The external quality assurance shall last for a maximum of two months in Denmark, and shall not serve to prolong the process. No fixed deadline applies under the Norwegian model. Experience-based correction supplements are not used under the Norwegian model, which has to do with the difference between the methods used by these countries in calculating costs.

The Danish process may be characterised as relatively informal and political, with the Parliament making the decisions at both levels. The scheme is reasonably centralised, in line with the Norwegian one. The agencies advise the ministries on specific solutions, whilst strategic decisions are made by the ministries. The ultimate decision is made by the Parliament. Numerous parties may provide input on project proposals. Both formal and informal project input may originate from the agencies, national politicians, local politicians, municipal administrations and regional administrations.

The Danish scheme is under continual evaluation, and the Ministry of Transport and Building performed an evaluation in 2015 on the basis of the relatively small number of projects that have been through the scheme. The general conclusion from the evaluation is that agencies are satisfied with the scheme and that it enhances confidence in the basis for decision making. Minor changes have been proposed, but the scheme will be retaining its main features.

A Project case

Limfjord Link

A third Limfjord Link is assumed to be of major strategic importance to Aalborg and the entire region. The establishment of a new transport link across the fjord will expand capacity in a traffic bottleneck and create a more reliable transport system. It will result in considerable development of the Aalborg area (Danish Road Directorate 2014).



Figure 7.3 Limfjord Link, chosen alternative: Egholm Line, 20 km of new motorway west of Aalborg via the island of Egholm

In 2010 and 2011, the Danish Road Directorate conducted an environmental impact assessment of three proposals for a third Limfjord Link (Danish Road Directorate 2014).

The project was subjected to external quality assurance and the quality assessors were generally satisfied with the cost estimate and the assumptions, and the proposals were perceived to be realistic. The review did not identify any circumstances suggesting that such proposals should not be submitted for political deliberation. However, the quality assessors also identified issues of minor importance, as well as deficiencies in the budget. They identified, inter alia, errors in the lime stabilisation in the prepared estimates. In total, the estimates made for the three potential solutions put forward were adjusted by DKK 8.9, 29.3, and 12.4 million, respectively. DKK 29.3 million corresponded to about 0.4 % of the cost (Ministry of Transport and Building 2015).

In connection with the «Agreement for the Electrification of the Railways in 2012», the alternative known as the Lindholm Line was abandoned on the basis of the conducted environmental impact assessment, and in order to create local clarity with regard to planning and land development (Government 2012).

The two remaining alternatives were: the Egholm Line; 20 km of new motorway to the west of Aalborg via the island of Egholm, and the East Link; 11 km expansion of the E45 road, as well as the construction of a parallel tunnel (Danish Road Directorate 2014).

The Egholm Line was chosen on the basis of the conducted appraisal and a trade-off between the transport, environmental and financial implications, as well as economic profitability (Danish Road Directorate 2014).

8. Canada (Quebec)

Background

Canada is the second largest country in the world in terms of land area, but has only 34 million inhabitants. The country is a federation of ten provinces, with an additional three territories. Quebec is the largest province and includes large areas in its far north that are virtually uninhabited. The province has significant natural resources, and supplies much of the country with hydropower. A severe Nordic climate means that only 12% of the country is suitable for agriculture. Quebec is francophone, and differs considerably from the other provinces, linguistically, culturally, religiously and socially. The northern part comprises the tundra and permafrost landscape of Nunavik, the territory of Canada's Inuit. The population is largely concentrated in the southern part, around or along the Saint Lawrence River, which is the outflow of the Great Lakes in the deeper interior of the continent. Its land area is five times the size of Norway, but it has a much more severe winter climate. The natural and demographic conditions mean that the infrastructure is restricted to a relatively small part of its land area, with the highest population density, which makes infrastructure investments profitable. However, major developments are also taking place in the form of hydropower, whilst there are expansive plans for exploiting fossil energy resources in parts of the province.

In the 1960s and 70s, considerable investments were made in infrastructure in Quebec, not least in connection with the Olympics in Montreal in 1976. At present, there is a major need for new investments to maintain, improve and renew such infrastructure.

Parties and roles

In 2004, the Auditor General took the initiative for a review of projects to consider methods for avoiding cost overruns and delays in public sector projects. The triggering factor was the poor performance of the project to extend Montreal subway to Laval. The Treasury Board Secretariat (SCT) followed up by ordering a comprehensive review from Centre interuniversitaire de recherche en analyse des

organisations (CIRANO), including a comparative study of overarching governance systems used in certain other countries. The study recommended a harmonisation of public sector practice. Based on these recommendations, SCT started to develop a governance framework for public projects.

In November 2008, the Government of Quebec adopted a so-called political framework for public sector infrastructure project governance. This exercise was to some extent inspired by the Norwegian quality assurance scheme, and experience was shared between representatives of the Norwegian scheme and the Government of Quebec.

The Council of Ministers (i.e. the Government) now had to approve major projects at three decision gates in the front-end. Private consultants were engaged to review the documentation before these political decisions, in much the same way as in the Norwegian scheme. A central unit at SCT was established to converge information and facilitate learning. It should also be noted that due to the Government's high ambitions regarding PPP projects at the time (public-private partnership), another public body, *Quebec Agency for PPP* (established 2005), came to play an important role in ensuring PPP projects' compliance with the scheme.

In 2010, due to major critique against PPP as a way of implementing projects, the Government announced the end of Quebec Agency for PPP. The agency was converted to Infrastructure Quebec, with a broader mandate to provide expertise in planning and implementing major infrastructure projects regardless of delivering approach. The governance framework was revised at the same time, and gave Infrastructure Quebec a central role to coordinate it. Private consultants were still involved to review the documentation before decision gates.

However, shortly after the 2010 revision, a new report from the Auditor General suggested to strengthen the governance framework further, and a subsequent KPMG report ordered by the Government went even further in its recommendations.

The third version of the framework was therefore introduced in 2014, and is the version presented in this chapter. The main changes were the following:

-
- A new law was adopted on public infrastructure, allowing the SCT to produce directives in order to legally frame the governance of major infrastructure projects. Thus the revised framework is in the form a *directive* (as opposed to a *political framework* as it was before), implying that there is a legal obligation for all ministries to comply with it, and the SCT now has means to enforce this compliance.
 - A new organization, Société Québécoise des Infrastructures (SQI) was established, by the fusion of Infrastructure Quebec and Société immobilière du Québec. SQI was given a mandate to be project manager for all major infrastructure projects, in association with the sponsoring line ministry. One exception is transport projects, which are managed by the Ministry of Transport, but have to comply with the same governance framework. This was a major change from earlier, when all government agencies and ministries were themselves responsible for planning and implementing infrastructure projects. SQI reports to the Treasury Board.
 - The private consultants have seen their role vanish and replaced by expertise in the public sector. Quality assurance is now performed internally in the SQI, and then again by SCT before the project is presented to political decision-makers.

The parties involved in the current version of the scheme are shown in the figure below. On the political level the Council of Ministers must approve all the deliverables, which will always be approved by the sponsoring ministry first. At the administrative level, SCT is responsible for the governance framework, and reviews all documentation before presenting it to the Council of Ministers – with a recommendation. SQI is the project manager, viewing the sponsoring ministry as its client. It is responsible for producing the documentation, and yet there is a separate internal unit in charge of validating it. In addition to the parties shown in the figure, the Auditor general of Québec plays an important role at a broader level. By reporting periodically about the state of the public projects, it forces political authorities to assess the situation and take measures to correct weaknesses in the framework.

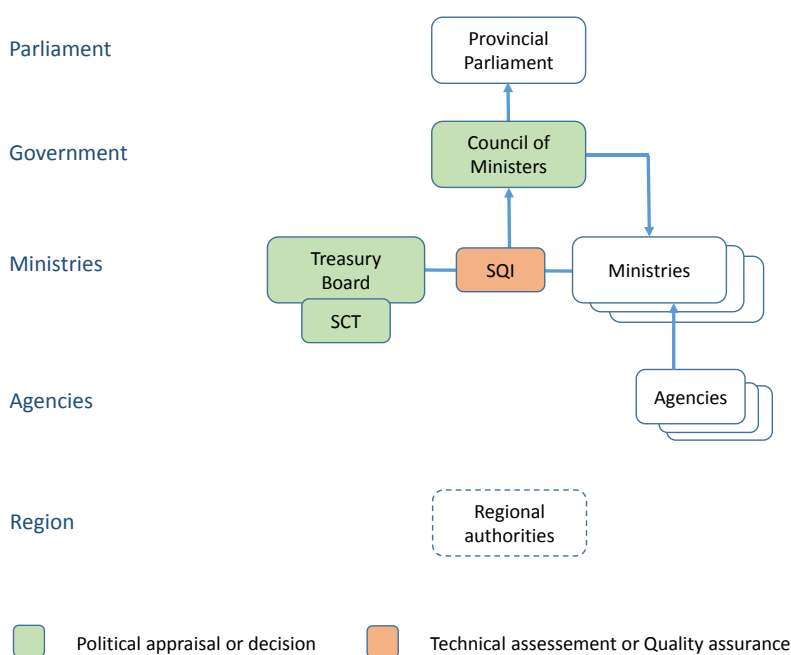


Figure 8.1 Large infrastructure project governance system in Canada (Quebec)

The objective is to reap more benefits from the investments and to improve cost control. In principle, the scheme ensures that:

- The scope and time schedule are well defined
- Risks are identified, assessed and monitored
- Realistic cost estimates are prepared, which take account of the entire life cycle of the project

The stage-gate model

The scheme has established two threshold values. All projects with an aggregate cost in excess of CAD 50 million shall be included in the scheme. In addition, it encompasses any projects pertaining to the maintenance or improvement of transport infrastructure with a value greater than or equal to CAD 100 million.

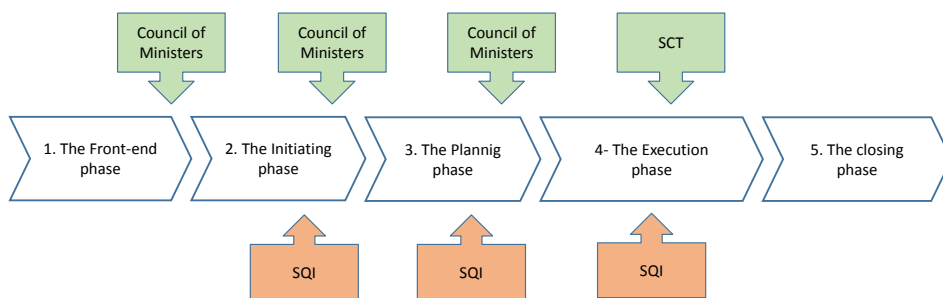


Figure 8.3 The project process in Canada (Quebec)

The Canadian scheme applies a gateway process that in principle splits the front-end phase into three stages, with SQI and SCT responsible for quality assurance, whilst the Council of Ministers is involved at key decision points. In addition, specified documents must be presented and approved by the SCT in the execution phase and at the closing of the project. This is illustrated in Figure 8.3.

The content of the five project phases and their main deliverables are summarized below (SCT, 2014).

Stage 1: Strategic clarification

At this level, the effort is intended to result in a so-called Strategic Presentation Document, which is prepared by the relevant line ministry. It shall provide a fundamental clarification as to which choices or conceptual solutions are available for selection. The decision to bring the project forward to the next phase, as well as the choice of alternative, if any, is made by the Council of Ministers.

The document shall be based on the following studies:

1. A brief description of needs
2. Preliminary estimation of project costs
3. Preliminary estimation of costs for the production of Opportunity Case and Business Case

The key issue to be clarified at this initial stage is the extent to which the project is relevant, i.e. whether it is well-suited for solving the problem one is faced with. A cost estimate shall be prepared, and a 20-100 percent margin of error is permitted.

Stage 2: Opportunity Case

Thereafter shall be prepared a so-called Opportunity Case, in which it is clarified what alternative and funding scheme should be accorded priority.

The Opportunity Case shall be based on the following studies:

1. Needs analysis
2. Project specifications
3. possible options and evaluation
4. Choice of the best long-term option, and justification.
5. Annual investment allocation
6. Main economic and financial variables
7. Estimations of costs for the production of a full Business Case.

The cost estimate is now subject to a requirement that its margin of error shall not exceed 15-30 percent. The document is prepared by SQI in consultations with the sponsoring ministry, and there is an internal process of quality assurance.

Thereafter is required a recommendation from the Treasury Board, which examines the document before submitting it to the Council of Ministers for a potential decision to take the investment proposal forward to the next stage.

Stage 3: Business Case

This involves the SQI preparing a full Business Case, which is a comprehensive project plan that emphasises the assessment of risks, costs and timeframes.

The Business Case shall be based on the following studies:

1. Project scope
2. Project schedule
3. Project management plan

The capital cost estimate is now subject to a requirement that its margin of error shall not exceed 0 percent (in previous versions of the framework it was 5 %).

The plan is prepared by SQI, with an internal process of quality assurance. As at

the previous stage, it is the SCT that submits the document to the Council of Ministers for its final approval.

Stage 4: The execution phase

Responsibility for the project now lies with SQI, although the actual implementation can be done in different ways: (1) traditionally through a call for tenders, with one single contractor being chosen to implement the project, (2) managed by the agency by using several contractors that are responsible for different parts of the work, (3) Turnkey project, with a single party being given responsibility for planning, management and implementation of the project, (4) Public-Private Partnership (PPP), with the agency operating in partnership with private parties, with or without a funding contribution from these, for the design, construction and operation of the infrastructure. As noted there is less emphasis on partnership with private parties than a few years ago.

Project reports are to be produced for SCT about twice a year. If there is a modification to the project scope and costs above the planned estimates approved initially, the project manager has to formally ask for approbation of this modification to the Council of Ministers.

Stage 5: The closing phase

At closing, a final project report is to be produced, and approved by SCT.

For the maintenance and operating phase, SQI prepares a maintenance plan for the infrastructure that shall apply throughout its lifespan. The said plan shall be forwarded to the Treasury, which reports annually on the implementation and follow-up of maintenance plans. It is also included in the decennial infrastructure plan prepared at Treasury.

Summary/assessment

The Canadian scheme as originally envisaged was relatively simple, with two gateways and use of the private sector for quality assurance of the basis for decision making. It has gradually become much more extensive, having its own designated government agency charged with monitoring large projects from the idea is conceived and into their operational phase, a number of decision points at which the matter is elevated to the Government level, and comprehensive documentation requirements. One has moved from the Norwegian model towards

the UK model. From a legal perspective it has been strengthened, and there are now means to enforce compliance. The scheme has been changed three times, and the current version of the scheme went into operation in 2014. Not only has the framework evolved, but the organizational structures around it have been constantly reorganized since 2008. The positive thing about this is that learning and flexibility is obviously internalized into the system. The negative side may be that the scheme grows increasingly extensive and complex. Hence, it is obviously too early to anticipate any experience indicating how well the current scheme works, and whether or not it is too ambitious and rigid.

A case project - Centre Vidéotron

Centre Vidéotron is an 18,100 capacity multi-functional indoor arena in Quebec City. It replaced the former, and much smaller primary venue for indoor events, and is now the 6th largest indoor arena in Canada by capacity. Centre Vidéotron is primarily used for ice hockey, but also designed for other sports events and concerts. The initiation was somewhat controversial, it was the Quebec City Mayor who wanted to bring back a hockey team from the NHL.



The project idea went through all the steps in the Quebec project governance framework, and came out as a success. 50 % of the cost was to be covered by the City and 50 % by the province. Construction began in September 2012, and the arena opened in September 2015, 7,5 % under budget. It has been recognized by BC magazine Stadia as the 5th best sport infrastructure for 2015, and recently it is reported that the building generates high revenue flows.



9. Summary and assessments

As mentioned in Chapter 1, the term “governance” is commonly used to denote top-level management in the broader sense, i.e. *what is done at the top level (here: central government) to facilitate a certain outcome*.

The perspective of the present study is limited to “project governance” for specific investment projects. Consequently, our definition of the term is also more limited, as follows: *what is required for a project to succeed from an overarching societal perspective*. We are only examining central government investment projects.

In 2000, the Norwegian Ministry of Finance introduced a requirement for external quality assurance of the basis for decision making for the main central government investment projects in the country. The scheme was expanded in 2005 to include the basis for decision making with regard to the choice of concept. Certain other countries have also established similar schemes since the turn of the millennium. This study compares the Norwegian scheme with corresponding schemes in five other countries. The present chapter summarises key aspects of the schemes in these six countries and discusses which lessons can be drawn from this.

Establishment and scope

The background to, and development of, the schemes is illustrated in Figure 9.1. One will note that Norway and the UK were the first to establish limited schemes, but these were primarily focused on budgets and project management documentation in projects where the choice of concept had already been made. The UK created an Office of Government Commerce at the Treasury, which established a scheme drawing on external advisors from the private sector, and a number of follow-up points throughout the project cycle. This was ambitious, but turned out not to deliver adequate results. Gradually, the key focus in both countries was placed on ensuring public benefits from the investments.

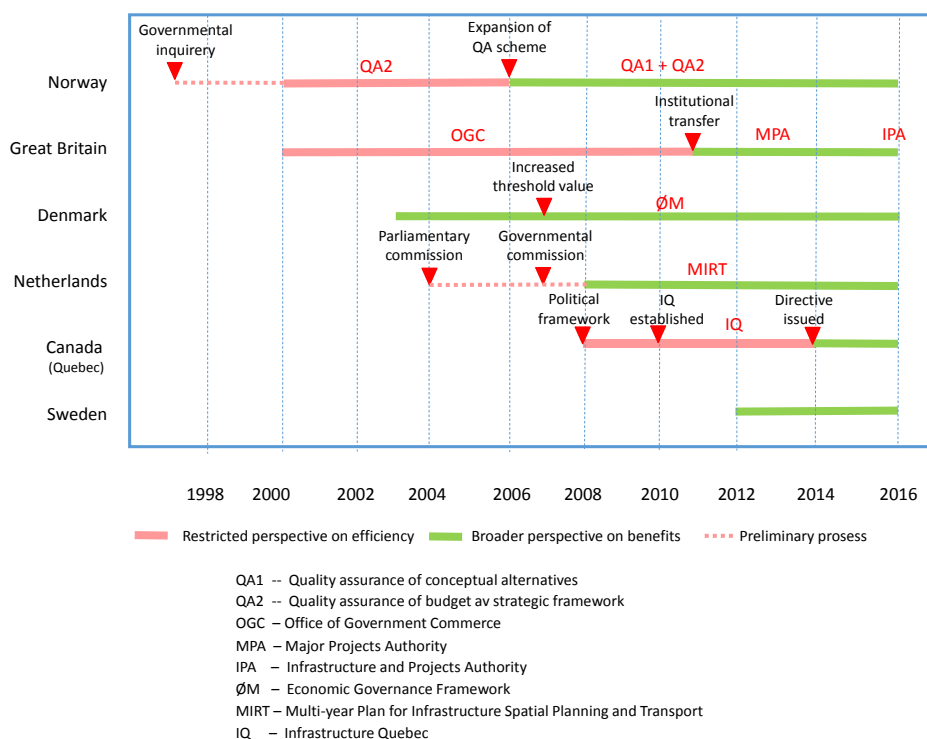


Figure 9.1 Introduction of investment project governance schemes in six countries

The background to these schemes was negative experiences from past projects, especially with regard to cost overruns and delays.

- In 2011, the UK closed down the OGC and instead created a *Major Projects Authority*, later transformed to *Infrastructure and Projects Authority*, which reports to the Cabinet Office, and introduced a more comprehensive and presumably more effective scheme.
- The scheme in Norway was introduced against the background of an inter-ministerial study of 11 projects (Berg et al., 1999). Norway expanded its scheme in 2005 to also encompass the choice of concept, and thus broadened the perspective to increasingly evaluate the actual investment initiative, in addition to the project.

- Denmark launched a scheme in the wake of a study of cost overruns in twelve transport projects. A financial management model was established in 2003 to streamline decision-making processes for the various sectors. In 2007, the financial management model was expanded, by requiring projects in excess of DKK 250 million to be subjected to external quality assurance, and also by introducing an experience-based correction supplement.
- In the Netherlands, one drew on advice from two central government commissions; one parliamentary commission in 2004 and one Government-appointed commission in 2007, although the establishment of a scheme did not, as we have noted, get underway until 2008. The predominant issue to be addressed was how to achieve swifter deliberation and implementation of major infrastructure projects.
- In Quebec, a comparative analysis of schemes in certain other countries was carried out, which analysis resulted in the establishment of a so-called political framework for large public sector investment project governance in 2008. This was largely inspired by the Norwegian scheme, but with particular focus on efficiency and project management issues. The scheme has been revised (expanded and strengthened) twice, and is now in the form of a directive, and with a public agency responsible for planning, reviewing and managing major projects.
- Sweden has no common governance scheme that applies to all types of projects. The economic profitability of investments has long been accorded weight in the transport sector, and more formalised uncertainty analyses of cost estimates have also been entered into use in recent years.

The Danish, Quebecian and Swedish models are to some extent inspired by both the Norwegian and the UK model, and discussions and information exchanges have taken place between the countries in advance.

The purpose of the schemes has, as mentioned, been focused on the efficiency aspect in the implementation of the projects. In Norway, one has now adopted a broader perspective of also ensuring public benefits from the investments, but it was the intention from the very beginning that the scheme would be expanded. This was done in 2005. In the UK, economic benefits have been a key focus for

the appraisals, along with the choice of concept, but the initial scheme placed the most emphasis on project implementation follow-up, before a major reorganisation took place in 2011. In Sweden, the requirement for environmental and economic analysis has long been a key focus, and Denmark has also emphasised economic analysis. Quebec stood out by primarily focusing its perspective on efficiency issues and less on the effects of the projects, but with the revision in 2014 it took a broader perspective too, and in the current scheme there is much emphasis on the front-end, justification of needs and project selection.

Overview of the schemes in six countries

It follows from Chapters 3 - 8 that these have many characteristics in common, for example that all have been put in place after the turn of the millennium, and place governance responsibility at a high level in the political system. Moreover, the schemes apply a stage-gate model at the project level. There are also a number of significant differences, for example in the use of internal or external experts, in the demarcation between the political and technical sphere, and in the comprehensiveness of the schemes. A comparison between the various schemes is presented in Table 9.1, as a basis for the discussion in the remainder of this chapter.

Both the UK and Norway have schemes that in principle apply to all sectors. The other countries have schemes that only apply to one or some sectors, and certain sectors that are exempted, as in Norway. This study has not aimed to address the schemes applicable in all sectors in the six countries, and primarily examines the sectors of relevance when it comes to major public sector infrastructure projects, which correspond to the sectors encompassed by the Norwegian quality assurance scheme.

Only three countries have introduced a threshold value defining which projects shall be encompassed. These are Norway, Denmark and Quebec. The schemes are in all countries focused on projects with central government funding that are large, complex or otherwise involve risk on the part of central government. In the UK, for example, the Infrastructure and Projects Authority makes an overall assessment as to whether a project shall be encompassed by the scheme, and it has, inter alia, chosen to include a considerable number of modernisation projects that are «small» in terms of investment cost, but highly complex and thus risky.

Table 9.1 A comparison of the schemes in six countries

Criteria/Country	Norway	Denmark	Sweden	Netherlands	UK	Canada
Who initiates the QA process?	Ministry of Finance	Ministry of Transport	Agency	A designated government agency	A designated agency under the Cabinet Office	A designated government agency (SQI)
Who decides the choice of concept?	Government	Parliament	Agency or Government	A designated government agency	Treasury	Council of Ministers
Who determines the budget?	Parliament	Parliament	Agency or Government	Government	Treasury ⁸⁾	Government
Sectors included ⁹⁾	All, with some exceptions ¹¹⁾	Transport sector	All sectors ¹⁰⁾	Infrastructure projects	All sectors ³⁾	Infrastructure projects
Threshold value (million)	NOK 750	DKK 250	No	No	Large projects ⁴⁾	CAD 50
Who appraises the project?	Agency or ministry ⁶⁾	Agency	Agency and regional authority	Responsible government agency	Agency or ministry	A designated government agency (SQI)
Who performs quality assurance?	External consultants	External consultants	A designated government agency, and internally	A designated government agency	Independent quality assurers ⁵⁾	A designated gov. agency (SQI and SCT)
Private co-funding	No	No	No, but may happen	For all in excess of EUR 60 billion	Desired, but no requirement ⁷⁾	To be considered, not required
Budgeted cost	P85 (normally)	Basic calculation + 20% ²⁾	In the portfolio		Estimate plus supplement	Estimate plus supplements ¹⁾
Target cost	P50 (normally)	Basic calculation + 10%	Budget		Estimate plus supplement	Budget
Decision points	2	2	2	3	5	5
Advisory interventions	2	2	Ongoing	1	6	Ongoing

Notes:

- 1) The Government shall be informed if it is anticipated that the budget will be overrun
- 2) The 20% supplement is managed at the portfolio level and is transferable from one year to the next
- 3) Central government infrastructure investments and ICT/restructuring projects
- 4) None. Relevant factors are size, complexity, requirement for a separate statute, as well as the degree of innovation
- 5) Both private and public sector technical experts
- 6) External resources are drawn on in some cases, from the private or public sector, including QA resources
- 7) This varies between sectors
- 8) Concerns approval of business case. The line ministry may have determined the choice of concept much earlier
- 9) Some countries may have different schemes in some sectors
- 10) This report discusses the transport sector and the defence sector
- 11) All, except for health, oil/gas and state enterprises

A threshold value is a simple criterion for deciding whether a project is subjected to the regime, but its application may seem rigid and not always optimal. In Norway, there has been concern in the transport sector, in particular, that the threshold value is inflexible. In the road sector, where the cost level is high, it means that some minor road works will be encompassed by the scheme and subjected to inordinately detailed and extensive analysis with regard to the choice of concept. This may make it necessary to devote considerable resources to the appraisal of minor changes in the choice of route, instead of real conceptual alternatives. However, this has resulted in a realisation that road investments should to a greater extent be combined in transport packages, rather than be examined individually in minor sections. Besides, this offers more scope for planning and considering alternatives.

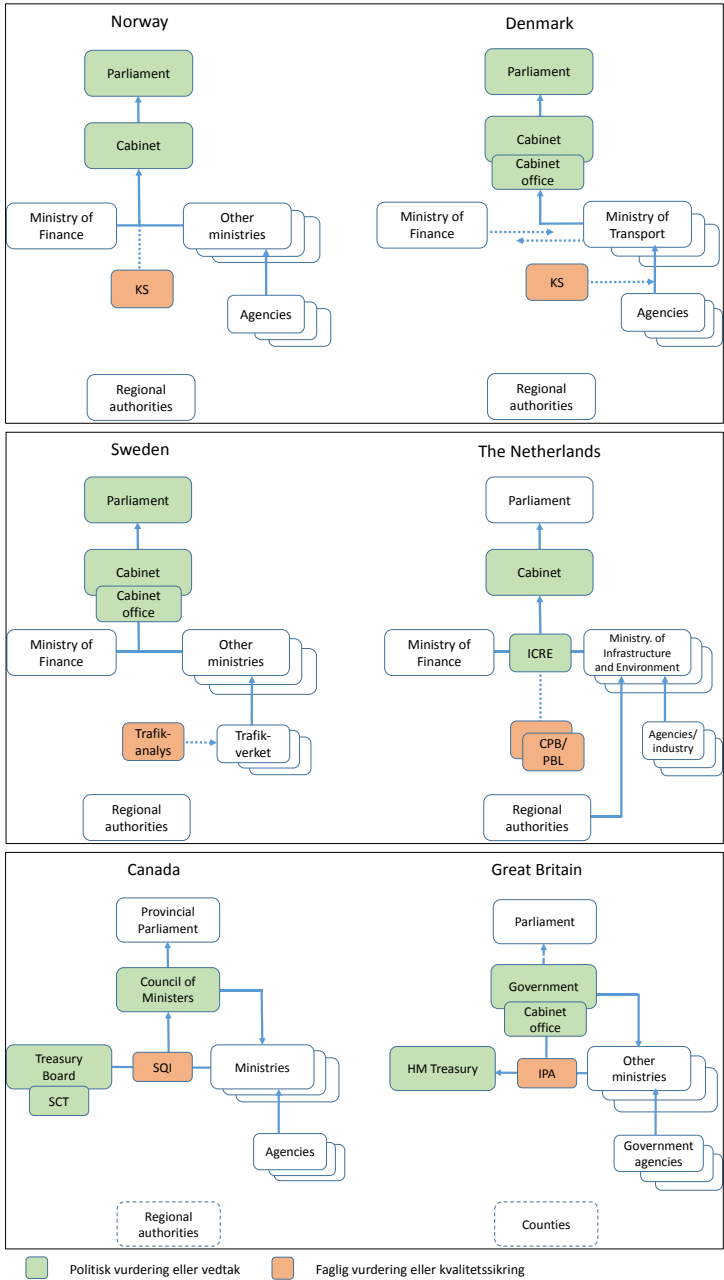


Figure 9.2 Responsibility for technical assessment and decisions under the various schemes

Parties and roles

The organisation of the schemes within the central government structures is illustrated in Figure 9.2. This shows that there are distinct similarities, for example that the Government plays a key role in all countries, primarily with regard to the final choice of project alternative. However, in the Scandinavian countries this decision is elevated to the parliamentary level, which presumably has to do with these being relatively small countries and economies, whilst such issues are decided at the Government level in the larger countries.²¹

Most appraisals are conducted at the agency level in all countries (except Quebec), but line ministries are involved to different extents. The Treasury Board/ HM Treasury have a role to play in making political assessments and decisions in Quebec and the UK, respectively, whilst the Ministry of Finance plays a more restricted advisory role in the other countries. A special case in Norway is that the Ministry of Finance manages the quality assurance scheme and imposes external quality assurance requirements. This implies that the line ministry will only be able to indirectly influence the outcome of the case to be resolved at the political level.

In the Netherlands, this role is performed by an inter-ministerial commission with representatives from the various ministries, which advises the Government on the appraisal, prioritisation and progress of the projects, as well as the spending of allocated funds originating from a reserve. However, the Ministry of Finance has a very strong position on this commission.

Another shared feature is the introduction of a third party in the information flow between the technical/executing level and the political/decision-making level, in the form of advice or quality assurance. In Norway and Denmark, this takes place with the assistance of external private consultants. In Norway, the use of external experts has been controversial. The criticism is partly that it prevents the development of adequate expertise in this field internally within the public

²¹ One explanation may be that these countries often have minority governments, and thus need support at the parliamentary level. It may also be noted that many central-government funded investment projects, especially within transport, are highly politicised in these countries, and that these are considered to be benefits that need to be allocated fairly along geographical lines, and not always to be investments that are primarily intended to pave the way for national economic growth.

administration, and partly that only a relatively small group of consultants are pre-qualified for such work, with these potentially achieving something akin to a monopoly position.

In the Netherlands, Quebec and the UK, on the other hand, designated bodies have been established within the public sector to perform such function. Sweden is distinguished by using existing agencies as technical advisory bodies at the agency level and by technical environmental aspects being dealt with at the regional level. Much of the quality assurance takes place internally within government agencies in Sweden. An objection that may be invoked against such arrangements is that it becomes difficult to ensure that the quality assurance is sufficiently independent and professional. In the UK, the ambition was that the quality assurers would predominantly be civil servants, but one was unable to access adequate capacity and skills in that way, and had to expand the portion of private consultants.

Another aspect of quality assurance is scope and time use. The Norwegian scheme is time consuming, inasmuch as it introduces two rounds of external quality assurance, which also include separate independent analyses. Some have argued that this may, in aggregate, delay the progress of a project by many months. Line ministries have also expressed a desire to reduce time use. It is noted, at the same time, that quality assurance serves to eliminate certain errors and defects at an early stage, which might have constituted impediments at a later date and potentially caused even greater delays. The other schemes vary somewhat in scope – several of these are more comprehensive inasmuch as the number of checkpoints is large, but each quality assurance exercise is slightly simpler.

An important principle is that the external quality assurance arrangement only has an indirect impact on the decision-making process. The decisions are to be made at the political level, and the recommendations of the quality assurer have advisory status only. This applies to all of the schemes.

The contents of the stage-gate model

The schemes are partly based on different project models, as shown in Figure 9.3. The number of project phases and decision points varies. The Scandinavian countries are distinguished by not following the projects as far as into the detailed engineering phase. In the other three countries, there are follow-up points all the way into the operational phase.

As far as the number of decision points is concerned, Denmark and Norway have the simplest schemes, with only two decision points. These are limited to the front-end phase, where the main decisions are made, and concerns the actual choice of concept and the strategic orientation of the project, respectively. The other countries have introduced a formal decision gate at an even earlier stage. This is an interesting observation, because the question has repeatedly been raised in the Norwegian context of whether one ought to have a «QA0» in addition to the other two, with the intent of clarifying the strategic premises underpinning the choice of alternative concepts at the earliest possible stage.

It is generally appreciated that premises laid down at this stage may have a decisive impact on the actual choice of concept. In many cases, the choice of concept has in actual fact already been made without considering any alternatives, which may turn out to be highly unfortunate. Both Sweden and the UK make allowances for a formal technical process at this early stage.

Quebec and the UK have the largest number of decision gates, which are encountered in five stages, in addition to any subsequent follow-up of individual projects in the operational phase (UK). The UK scheme is the most extensive, in which technical advice orientated towards policy formulation is, as noted, provided at a very early stage, in addition to the preparation of a separate plan for the subsequent follow-up and quality assurance of the project. However, at the same time the UK model is flexible, in the sense that the number of interventions and the scope of these are decided on a project-by-project basis, and may be changed throughout the project.

As far as advice/quality assurance is concerned, the Netherlands have the simplest arrangement, with only one intervention point, at the very end of the front-end phase, before the decision on continuation and choice of concept. The set-up in Denmark is similar to that in Norway, although with two intervention points, whilst Quebec, Sweden and the UK have several intervention points for technical advice or quality assurance.

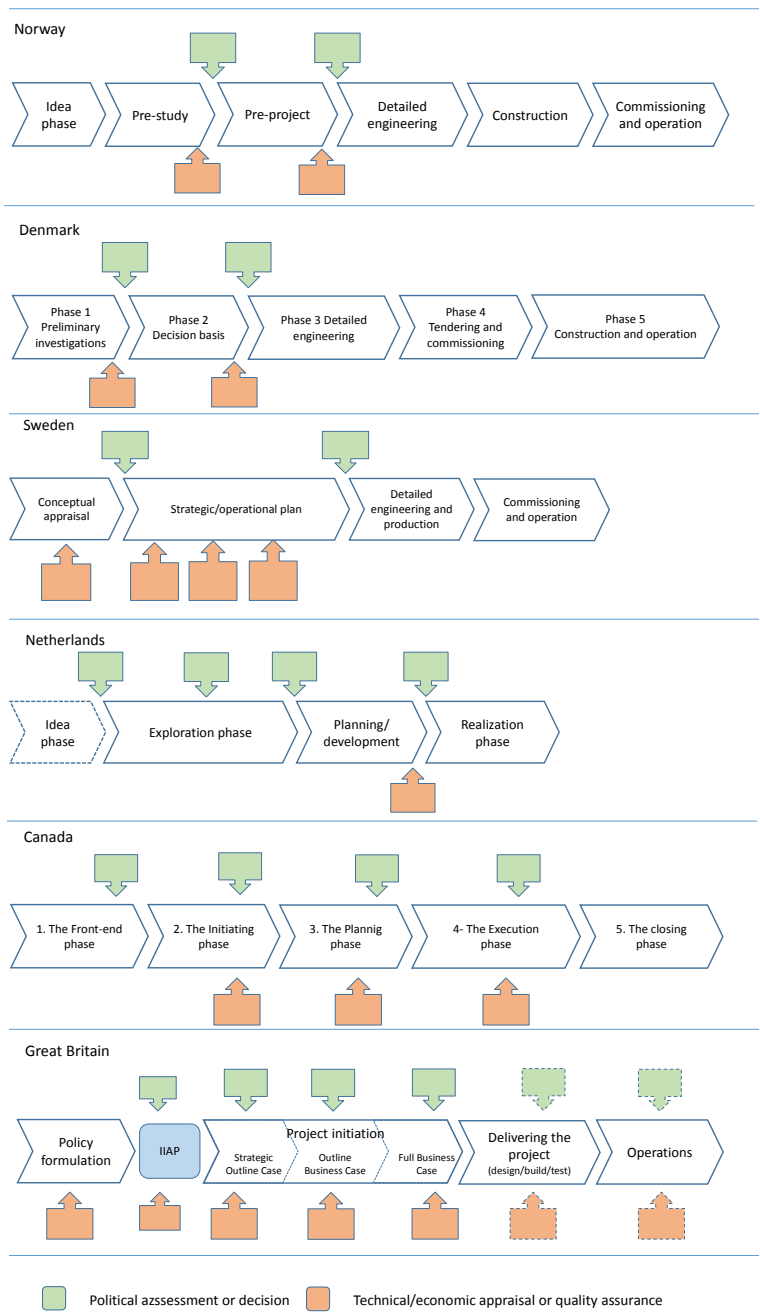


Figure 9.3 Summarised versions of the stage-gate models

The scope of quality assurance also differs. In Norway, the quality assurer is required to perform its own independent analyses, whilst in the other countries the quality assurer shall primarily review the work that has been done. In Quebec, quality assurance is an integrated part of the planning process taking place in a separate public agency (SQI).

Co-funding requirement

In the Scandinavian countries, and especially in Norway, there is a tradition for many central-government funded investment projects to be initiated from below, from the county/regional, or municipal, level. In the Netherlands, regional administrations play a key role in initiating measures, whilst in Quebec and the UK this level is less involved as far as the formal processes are concerned.

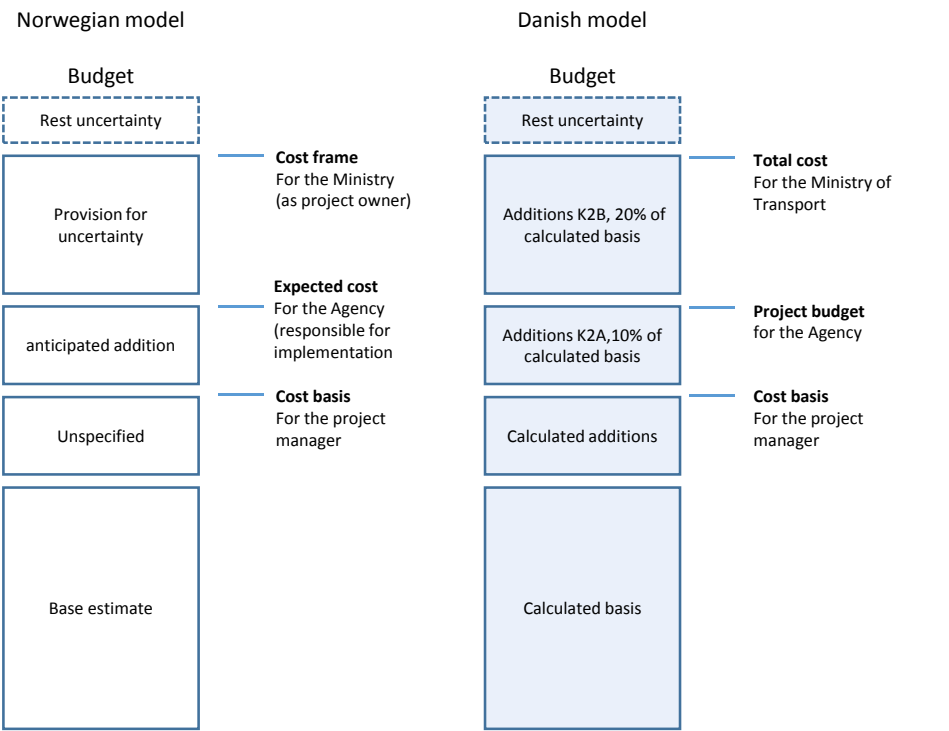
In all of the countries, the schemes are applicable to projects with central government funding. However, the conditions attaching to such funding differ between the various countries. The Nordic countries are not requiring co-funding from those that will benefit from the projects. The exception is the road sector in Norway, where a significant element of user charges has been introduced in recent years.

The situation is different in the UK and Quebec, where central government is signalling a desire for private co-funding in certain sectors, although there is no requirement. Only in the Netherlands is there a requirement that all investment initiatives in excess of EUR 60 billion *shall* have private co-funding. The rationale is that this will result in more weight being attached to profitability. The Netherlands is also distinguished by requiring co-funding from local authorities. The rationale is that this is evidence of commitment and a willingness to pay, which increase the likelihood that the project will be successful. The argument used on the part of central government is that co-funding will provide the local level with swifter access to central government funding.

Cost estimation

As far as cost control is concerned, a key element of the Norwegian scheme has been the introduction of probability-based cost budgets. Only Norway and Denmark are operating with a budgeted cost that applies to project governance at the ministerial level and a lower target cost at the agency level. The figures are estimated by agencies and quality assured by external consultants, and form the

basis for the final budget decision of the Parliament. The budgeted cost will normally be at, or close to, P85, whilst the target cost will be somewhat lower, at P50, in the Norwegian projects.



Note: Additions in individual projects may vary in the two models

Figure 9.4 Comparison between the Norwegian and the Danish budget model. Source: (Ministry of Transport and Building, 2015)

It would appear that Norway is alone in having such a practice. In Denmark, one will normally apply a basic cost estimate, to which is added a so-called experience-based supplement of 10 percent for the agency and 20 percent for the ministry. The 20-percent supplement is available at the portfolio level, and is transferable

from one year to the next. Hence, the latter provides the ministry with somewhat more freedom of action than under the Norwegian scheme.

The Danish Ministry of Transport and Building (2015) has compared the cost calculation methods in Norway and Denmark. It found, despite major differences, that there were also definite similarities; see Figure 9.4 ²²

The other countries apply a budget that is to be adhered to, but add a notional supplement that is not to be exceeded. If this nonetheless happens, the Government shall be informed. In the UK, it would not appear that a distinction is made between target cost and budgeted cost, but an uncertainty level is chosen for each case (e.g. P50 if central government is willing to assume a high risk of cost overruns or the project forms part of a large portfolio, and otherwise higher) and one uses «optimism bias» correction factors, based on rules of thumb tailored to the chosen uncertainty level.

We have not been able to specifically address the experiences of individual countries with the various budget estimation principles in this study, but this would be an interesting issue for potential follow-up.

The portfolio perspective

The Norwegian scheme is focused on requirements applicable to individual projects, and does not impose explicit portfolio evaluation requirements. It must nonetheless be expected that whether or not the project forms part of a larger

²² The sum total of «Base estimate» and «Unspecified» may be compared to the Danish cost basis, which comprises a «Calculated basis» and «Calculated additions», i.e. what is controlled by the project manager itself. The «unspecified» provision may thereby to some extent be compared to the Danish «Calculated additions». Moreover, the sum total of «base estimate», «unspecified» and «anticipated additions» may be compared to the project appropriation, i.e. what is at the disposal of the agency.

Finally, there will for both countries be a further element added to arrive at the overall budget appropriated for the project. In Denmark, this is the contribution to the central provision (20 %), whilst in Norway it is the additional amount up to the 85 percentile, less the so-called reduction list. For both countries it is the case that this level is at the disposal of the ministry, and not the agency.

portfolio will indirectly influence overall project risk and the need for a contingency reserve.

The UK scheme is intended to include a portfolio perspective, inasmuch as the Infrastructure and Projects Authority compiles and publishes data on all projects in the portfolio. In addition, quality assurance is required to be performed at the program and portfolio level at regular intervals. However, there is much to suggest that the potential has not yet been realised in this regard. The Quebecian scheme too has an ambition to facilitate project portfolio management.

Conclusions and assessments

A number of international studies have focused on the problems of managing public investment projects, at both the operational and the tactical/strategic level, and a number of countries have introduced measures to address the issue.

Norway was an early mover when introducing the scheme for quality assurance of the basis for decision making on such projects, also referred to as the State Project Model. The Norwegian scheme had inspired the introduction of several of the other schemes discussed in this report. The scheme currently aims to achieve good control over costs and progress, but also to ensure that investments deliver economic benefits. The Concept research program is monitoring the projects under the scheme and has through several studies documented, inter alia, that the results from the scheme, in particular with regard to tackling large cost overruns are encouraging, and partly very satisfactory (Samset and Volden, 2013)(Kvalheim et al., 2015).

There are also several indications that the Norwegian scheme has had a significant impact on important issues like budget discipline and on bringing about an improved basis for political decisions, as well as on enhancing awareness of issues relating to cost and quality in the public administration. However, there are also objections, relating to, inter alia, time and resource use, that the use of private consultants prevents the development of central government expertise, and that the scheme is rigid and inflexible. It has also been argued that QA1 is taking place too late and that the analysis of alternatives turns into more of a ritual exercise than anything of real relevance to the choice of concept.

The schemes in the other countries have definite similarities with the Norwegian one, but are also different therefrom in several respects. A multitude of approaches is positive and may potentially inspire alternative ways of organising and implementing such schemes in future. However, most of the schemes have not been in operation sufficiently long to enable much of a conclusion to be drawn with regard to their effects.

All in all, we are faced with two main types of schemes; i.e. the schemes in the Scandinavian countries, and the others. The former are relatively simple in terms of the number of intervention points, although these may be comprehensive in terms of which analyses are to be performed. The schemes do not intervene significantly in existing processes and practices, but impose new qualitative requirements with regard to appraisal and documentation. The schemes in the three other countries are more ambitious and extensive, with more follow-up points, also in the implementation phase, and more centralised control. It will be an open and interesting question for several years to come whether these more ambitious schemes will lead to more successful projects.

All of the six countries addressed in this study are now requiring the evaluation of several alternative conceptual solutions, which demonstrates that the importance of doing so is duly acknowledged. We know, at the same time, that the choice of concept is in Norway often made much earlier than upon the formal decision being made by the Government. Consequently, there is much to suggest that it takes a long time to change the processes and the culture of path dependency that results in one ending up with the same concept every time.

We also know that the final project choice is not only the result of systematic exploration of alternatives on the part of the technical professionals in order to identify the best alternative. In some cases, the choices of politicians carry the most weight, even if these are obviously in conflict with the recommendations of technical professionals. There is extensive agreement that this needs to be tolerated within a democratic political system. Consequently, the most important task for the schemes discussed in this study is therefore to bring in technical expertise at the earliest possible stage and to identify obvious flaws in the «worst» alternatives or conceptual solutions. We cannot expect that the best will be chosen, but we can ensure that we avoid the worst. Or in the terminology of the US researcher Simon Herbert (1961): not aim for «maximising», but put the bar at «satisficing».

The other thing we can expect, and which we are seeing numerous indications of in Norway, is that the introduction of such schemes will have secondary effects in the form of enhanced awareness and new practices, not only in the public sector, but also amongst the external experts used, and also further into the private business sector, which supplies the goods and services contracted by the public sector.

References

Arts, J, 2010, Streamlining Infrastructure Planning and Impact Assessment in the Netherlands, International Association for Impact Assessment Conference, 23-25 August 2010, Pretoria, South Africa

Banedanmark (2010), *Railway Memorandum – New Construction Budgeting for the Railways* (In Danish only. Danish title: *Banenotat – ny anlægsbudgettering på baneområdet*).

Bemelmans-Videc, M L, Rist, R C, Vedung, E (eds.), *Carrots, Sticks, and Sermons: Policy Instruments and Their Evaluation*, Transaction Publishers, New Brunswick, New Jersey. 1998

Berechman, J. and Wu, Q. (2006). *Cost overruns Risk Analysis in Transportation Infrastructure Investments*. Working Paper 2006-05. Phelps Centre for the Study of Government and Business. University of British Columbia.

Berg, P. et al. (1999): *Central Government Investment Governance. Final Report of the Steering Committee* (In Norwegian only. Norwegian title: *Styring av statlige investeringer. Sluttrapport fra styringsgruppen*), Ministry of Finance, 10 February 1999.

Bjertnæs, A. M. (2012): *Choice of Concept Evaluations – Intention and Improvements* (In Norwegian only. Norwegian title: *Konseptvalgutredninger – intensjon og forbedringer*), Master's thesis in organisation and management, NTNU

Boge, K. (2006) *Votes Count but the Number of Seats Decides. A comparative historical case study of 20th century Danish, Swedish and Norwegian road policy*. Thesis for the Dr Oecon degree, BI Norwegian Business School, Oslo

Böhren, Ø. (2011). *Owners, Directors and Managers. Corporate Governance in Norway* (In Norwegian only. Norwegian title: *Eierne, styret og ledelsen. Corporate governance i Norge*). Bergen: Fagbokforlaget.

Bruzellius, N (2012) *Quality Assurance and Cost Control in the Nordic Countries* (In Swedish only. Swedish title: *Kvalitetssäkring och kostnadskontroll i de nordiska länderna*). Report 2012:6 Transport Analysis, Stockholm

Cabinet Office (2011a): *Starting Gate: MPA Guidance for Departments*. Version 1.0 – September 2011

Cabinet Office (2011b): *Integrated Assurance & Approval Strategy and Integrated Assurance and Approval Plans. A guide to implementing LAA*. Version 1.0 – May 2011

Cabinet Office (2011c): *Project Assessment Review. MPA Guidance for Departments*. Version 1.0 – March 2012

Cabinet Office (2015): *Major Projects Authority Annual Report 2014-2015*, published in June 2015

Centre interuniversitaire de recherche en analyse des organisations, 2006, “La gouvernance des grands projets d’infrastructure publique”, Review of the literature presented to the Secretariat du Conseil du trésor, pp. 17-18.

City of Oslo (2011): *Conceptual Appraisal (CA) in the City of Oslo. Requirements and Guidelines* (In Norwegian only. Norwegian title: *Konseptvalgutredning (KVU) i Oslo kommune. Krav og veiledning*)

Christensen, T. (2009): *The Norwegian Front-End Governance Regime of Major Public Projects – a Theoretically Based Analysis*, Concept report no. 23

Coelho, M., and Ratnoo, V., with Dellapiane, S. (2014): *The Political Economy of infrastructure in the UK*

Department for Transport (2011): *Local frameworks for funding major transport schemes: guidance for local transport bodies*

Department for Transport (2015): *A Short Guide to the Department for Transport*

Danish Ministry of Finance (2014), *A Joint Strategy for Public Investments* (In Danish only. Danish title: *En samlet strategi for offentlige investeringer*).

Danish Ministry of Transport and Energy (2006), Act 16 of 24 October 2006

Danish Ministry of Transport and Building (2010)a, *New Construction Budgeting – Main Memorandum* (In Danish only. Danish title: *Ny anlægsbudgettering – Hovednotat*)

Danish Ministry of Transport and Building (2010)b, *Terms of Reference for External Quality Assurance of the Basis for Decision Making at Level 1* (In Danish only. Danish title: *Terms of reference for ekstern kvalitetssikring af beslutningsgrundlag på niveau 1*)

Danish Ministry of Transport and Building (2010)c, *Terms of Reference for External Quality Assurance of the Basis for Decision Making at Level 2* (In Danish only. Danish title: *Terms of reference for ekstern kvalitetssikring af beslutningsgrundlag på niveau 2*)

Danish Ministry of Transport and Building (2015), *Evaluation of New Construction Budgeting* (In Danish only. Danish title: *Evaluering af ny anlægsbudgettering*)

Danish Road Directorate (2010), *Road Memorandum – New Construction Budgeting under the Remit of the Ministry of Transport, including Financial Management Model and Risk Management for Construction Projects* (In Danish only. Danish title: *Vejnotat – Ny anlægsbudgettering på transportministeriets område, herunder om økonomistyringsmodel og risikohåndtering for anlægsprojekter*)

Danish Road Directorate (2014), *Consolidation of the Traffic Forecasts for a 3rd Limfjord Link* (In Danish only. Danish title: *Konsolidering af trafikberegningerne for en 3. Limfjordsforbindelse*)

Flyvbjerg, B., Bruzelius, N., & Rothengatter, W. (2003), *Megaprojects and risk: An anatomy of ambition*, Cambridge, Cambridge University Press, UK

Flyvbjerg, B., 2014, "What You Should Know about Megaprojects and Why: An Overview," *Project Management Journal*, vol. 45, no. 2, April-May, pp. 6-19, DOI: 10.1002/pmj.21409

Flyvbjerg, B., M. K. Skamris Holm and S. L. Buhl (2003): "How common and how large are cost overruns in transport infrastructure projects?" *Transport Review*, 2003, Vol. 23, No. 1, 71-88

Government of Quebec, 2013, The 2013-2023 Québec Infrastructure Plan, Secrétariat du Conseil du trésor, Montreal

Government of Sweden (2011), Government proposition 2011/12:118. *The Transport Infrastructure Planning System* (In Swedish only. Swedish title: *Planeringssystemet för transportinfrastruktur*)

Government of Denmark (2012), Agreement on Electrification of the Railways, etc. (In Danish only. Danish title: *Aftale om Elektrificering af jernbanen mv.*), 7 February 2012

Government of Sweden (2015), <http://www.regeringen.se/sa-styrs-sverige/budgetprocessen/www.regjeringen.no> (2014). *Project Governance* (In Norwegian only. Norwegian title: *Eierstyring og selskapsledelse*) <https://www.regjeringen.no/no/tema/naringsliv/statlig-eierskap/eierstyring-og-ledelse/id613433/> Most recently updated: 7 January 2014

Haanæs, S., E. Holte and S. Larsen (2005): *The Basis for Decision Making and the Decisions Made in Major Central Government Investment Projects* (In Norwegian only. Norwegian title: *Beslutningsunderlag og beslutninger i store statlige investeringsprosjekter*), Concept report no. 3

HM Treasury (2003): *The Green Book. Appraisal and Evaluation in Central Government*, updated in 2011

HM Treasury (2006): *Value for Money Assessment Guidance*

HM Treasury (2013): *Public Sector Business Cases. Using the Five Case Model. Green Book Supplementary Guidance on Developing Public Value from Spending Proposals*, available on the HM Treasury website and dated 2013

HM Treasury (2014): *National Infrastructure Plan 2014*

HM Treasury and Cabinet Office (2011): *Major Project approval and assurance guidance*

House of Commons Committee of Public Accounts (2012): *Assurance for major projects*, Fourteenth Report of Session 2012-3.

Infrastructure Quebec, 2013, Planning and delivery of Major Infrastructure Projects in Quebec, Conference presentation by Vice-president – Projects, Mario Deschamps

Jorissen, R, Financing and organizing large infrastructure projects in the Netherlands, Ministry of Infrastructure and the Environment, 29 May 2012

Klakegg, O. J., Williams, T. and Shiferaw, A.T. (2015): *Taming the “trolls”: Major public projects in the making*. International Journal of Project Management

Kvalheim, E, Christensen, T, Samset K, Volden G, 2015, *Has the Government been provided with a better basis for decision making?* (In Norwegian only. Norwegian title: *Har regjeringen fått et bedre beslutningsgrunnlag?*), Working paper, Concept programme, NTNU

Lord Browne of Madingley (2013): *Getting a grip. How to improve major project execution and control in government*

- Miller Roger and Lessard, Donald R. 2000. The strategic Management of Large Engineering Projects: Shaping institutions, Risk and Governance. Cambridge Mass.: MIT Press.
- Miller, R, Hobbs, B, 2005, Governance Regimes for Large Complex Projects, *Project Management Journal* Vol. 36, No. 3, pp 42-50, September 2005, ISSN 8756-9728/03
- Morris, P.W.G. and Hough, G.H. (1991): *The Anatomy of Major Projects. A Study of the Reality of Project Management*, John Wiley & Sons, Chichester, UK, ISBN 0-471-91551-3
- Mott Mac Donald (2002): *Review of Large Public Procurement in the UK*
- Müller, R. (2009): Project Governance. Fundamentals of project management.
- Murray, R., Nordlund, P., Salomonsson, G., Lundberg, A. (2013), *Defence Materiel Procurement and other Central Government Investments – A Comparison of Planning, Funding and Implementation* (In Swedish only. Swedish title: *Försvarets materielinköp och andra statliga myndigheters investeringar – en jämförelse av planering, finansiering och genomförande*). Swedish Defence Research Agency (FOI), Stockholm. Report No. FOI-R--3644--S
- Myrbostad, A., T. Rohde, P. Martinussen and M. Lauvsnes (2010): *Regime for the Planning and Approval of Hospital Projects* (In Norwegian only. Norwegian title: *Regime for planlegging og beslutning i sykehusprosjekter*), Concept report no. 25
- National Audit Office (2010): *Assurance for high risk projects*
- National Audit Office (2012): *HM Treasury and Cabinet Office. Assurance for major projects*
- National Audit Office (2014): *Crossrail*
- Norwegian Ministry of Defence; *Conceptual solution (CS) for project XXX* (In Norwegian only. Norwegian title: *Konseptuell løsning (KL) for prosjekt XXX*), (undated report template)
- Norwegian Ministry of Finance (2003): *Regulations on Financial Management in Central Government. Central Government Financial Management Rules* (In Norwegian only. Norwegian title: *Reglement for økonomistyring i staten. Bestemmelser om økonomistyring i staten*). Adopted 12 December 2003, as amended, most recently on 8 June 2010
- Norwegian Ministry of Finance (2005): *Economic Analysis Guidance Notes* (In Norwegian only. Norwegian title: *Veileder i samfunnsøkonomiske analyser*)
- Concept report no. 47

Norwegian Ministry of Finance (2010a): *Tender Documentation with incorporated Requirement Specification and Contract Specification for Framework Agreement on Consultancy Services for Quality Assurance of Choice of Concept, as well as Management Documentation and Cost Estimate for Chosen Project Alternative* (In Norwegian only. Norwegian title: *Konkurransegrunnlag med innarbeidet kravspesifikasjon og kontraktspesifikasjoner til rammeavtale om konsulenttjenester vedrørende kvalitetssikring av konseptvalg, samt styringsunderlag og kostnadsoverslag for valgt prosjekteralternativ*), November 2010

Norwegian Official Report NOU 1999: 11, *Analysis of Investment Developments on the Continental Shelf* (In Norwegian only. Norwegian title: *Analyse av investeringsutviklingen på kontinentalsokkelen*)

OECD, 2014, Recommendation of the Council on Effective Public Investment Across Levels of Government, Adopted on 12 March 2014, OECD, Paris

OECD, 2015 *Principles of Corporate Governance*, OECD, Paris

Priemus, H, 2007, Decision-making on large infrastructure projects: the role of the Dutch Parliament, Transport Planning and Technology, February 2007, volume 30, number 1, PP71-93, Rootledge

Rasmussen, I., N. Heldal, T. Homleid, K. Ibenholt, J. M. Skjelvik and H. Vennemo (2010): *Heading for Quality? Evaluation of QA1 in the Transport Sector* (In Norwegian only. Norwegian title: *På vei til kvalitet? Evaluering av KS1 i transportsektoren*), Vista Analysis report 2010/10

Riksdagen (2015) <http://www.riksdagen.se/sv/Sa-funkar-riksdagen/Riksdagens-uppgifter/Beslutar-om-statsbudgeten/Inkomster-utgifter-och-skulder1/>

Samset, K., P. Berg and O. J. Klakegg (2006): *Front-end Governance of Major Public Projects*, paper presented at the EURAM conference 2006

Samset, K. (2008): *Projects in the Front-end Phase: Choice of Concept* (In Norwegian only. Norwegian title: *Prosjekt i tidligfasen: Valg av konsept*), Tapir Academic Press

Samset K and Volden, G (2013): *Better Cost Control. Experience from the First Investment Initiatives subjected to External Quality Assurance* (In Norwegian only. Norwegian title: *Bedre kostnadsstyring. Erfaringer med de første investeringstiltakene som har vært gjennom ekstern kvalitetssikring*), Concept report no. 35, Ex Ante Academic Publisher

Samset, K., B. Andersen and K. Austeng (2013): *The Opportunity Space. A Study of Concept Evaluations and Choice of Concept* (In Norwegian only. Norwegian title: *Mulighetsrommet. En studie om konsept-utredninger og konseptvalg*), Concept report no. 34, Ex Ante Academic Publisher

Samset K, Volden G, Welde M, Bull-Berg H, *Unintended Consequences. Perverse Incentives – On Public Investment Projects without Commitment* (In Norwegian only. Norwegian title: *Mot sin hensikt. Perverse insentiver – om offentlige investeringsprosjekter som ikke forplikter*), Concept report no. 40, Ex Ante Academic Publisher

Secretariat du trésor, 2008, Framework Policy for the Governance of Major Public Infrastructure Projects, Quebec

Secretariat du trésor, 2010, Framework Policy for the Governance of Major Public Infrastructure Projects, Quebec

Secretariat du Conseil du trésor (SCT), 2014, Directive sur la gestion des projets majeurs d'infrastructure publique (directive on the governance of major infrastructure projects), Quebec

Shiferaw, A., 2013, Choice of Project Concept and Decision-Making – An International Perspective, Thesis for the degree of Philosophiae Doctor, Trondheim, September 2013, Norwegian University of Science and Technology

Silborn, H. (2013). *Myths and Facts on the Differences between Swedish and Norwegian National Transport Planning* (In Norwegian only. Norwegian title: *Myter og fakta om forskjellen på svensk og norsk nasjonal transportplanlegging*). Samferdsel, 2013. No. 8. <https://samferdsel.toi.no/nr-8/myter-og-fakta-om-forskjellen-pa-svensk-og-norsk-nasjonal-transportplanlegging-article32076-1355.html>

Swedish National Audit Office (2010), *Cost Control for Major Road Investments?* (In Swedish only. Swedish title: *Kostnadskontroll i stora väginvesteringar?*). RiR 2010:25. Swedish National Audit Office, Stockholm

Swedish National Audit Office (2011), *Cost Control for Major Rail Investments?* (In Swedish only. Swedish title: *Kostnadskontroll i stora järnväginvesteringar?*). RiR 2011:6. Swedish National Audit Office, Stockholm

Swedish National Audit Office (2012), *Risks in the Funding of the Stockholm City Line* (In Swedish only. Swedish title: *Risker med Citybanans finansiering*). 19 April 2012. <http://www.riksrevisionen.se/sv/OM-Riksrevisionen/Pressrum1/Nyheter1/2012/Risker-med-Citybanans-finansiering/>

Swedish National Financial Management Authority (2015) <http://www.esv.se/amnesomraden/Styrning/Intern-styrning-och-kontroll/>

- Swedish Rail Administration (2002), Pre-study for the Stockholm City Line (In Swedish only. Swedish title: *Förstudie för Citybanan i Stockholm*). Report 2002:08. Swedish Transport Administration, Sundbyberg.
http://www.trafikverket.se/contentassets/1d6d97b856b04ab7bfdbd934663fbf05/citybanans_forstudie_feb_2002.pdf
- Swedish Transport Administration (2011a), *Construction Cost Calculations* (In Swedish only. Swedish title: *Anläggningskostnads kalkyler*), TDOK 2011:184
- Swedish Transport Administration (2011b), *Complete Uncertainty Analysis in accordance with the Successive Principle* (In Swedish only. Swedish title: *Fullständig osäkerhetsanalys enligt Successinprincipen*), TDOK 2011:185
- Swedish Transport Administration (2012), *New Methods for the Choice of Initiatives in the Transport System TV17078* (In Swedish only. Swedish title: *Nya former för val av åtgärder i transportsystemet TV17078*). Document reference: 100513.
<https://online4.ineko.se/trafikverket/Product/Detail/44426>
- Swedish Transport Administration (2014), *Planning of Roads and Railways* (In Swedish only. Swedish title: *Planläggning av vägar och järnvägar*). Swedish Transport Administration, Borlänge
- Swedish Transport Administration (2015)
<http://www.trafikverket.se/Foretag/Planera-och-utreda/Planerings--och-analysmetoder/Atgardsval/>
- TCI, 2004, Dutch Commission on Infrastructure Projects, Tijdelijke Commissie Infrastructuurprojecten, 2004, *Grote Projecten Uitvergroot: Een Infrastructuur voor Besluitvorming* (The Hague: Tweede Kamer der Staten-Generaal).
- Terramar AS and Asplan Viak AS, 2006, *Quality Assurance of Choice of Concept. The Development Project for the National Museum of Art, Architecture and Design* (In Norwegian only. Norwegian title: *Kvalitetssikring av konseptvalg. Utbyggingsprosjektet til Nasjonalmuseet for kunst, arkitektur og design*)
- Terramar AS and Asplan Viak AS, 2009, *National Museum of Art, Architecture and Design. Quality Assurance (QA1) of the Development Project. Assessment of Alternatives Analysis* (In Norwegian only. Norwegian title: *Nasjonalmuseet for kunst, arkitektur og design. Kvalitetssikring (KS1) av utbyggingsprosjektet. Vurdering av alternativanalyse*), dated 10 November 2008

Tirole, J, (2001), Corporate Governance. *Econometrica* 69 (1): 1-35.

Transport Analysis (2012). *Quality Assurance and Cost Control in the Nordic Countries* (In Swedish only. Swedish title: *Kvalitetssäkring och kostnadskontroll i de nordiske länderna*). Report 2012:6

Transport Analysis (2013). *Quality Assessment of the Swedish Transport Administration's Proposal for a National Transport System Plan 2014-2025* (In Swedish only. Swedish title: *Kvalitetsgranskning av Trafikverkets förslag till nationell plan för transportsystemet 2014-2025*). Report 2013:11. Transport Analysis, Stockholm

Transport Analysis (2015). *On Transport Analysis* (In Swedish only. Swedish title: *Om Trafikanalys*). <http://www.trafa.se/sv/Om-Trafikanalys/>

Tyholt Grindvoll I L. 2015, *What has happened to the QA1 Projects?* (In Norwegian only. Norwegian title: *Hva har skjedd med KS1-prosjektene?*) Working paper, Concept programme, NTNU

Volden, G. and Samset K, (2013): *Ex-post Evaluation of Central Government Investment Projects. Conclusions, Experience and Advice based on Pilot Evaluation of Four Projects* (In Norwegian only. Norwegian title: *Etterevaluering av statlige investeringsprosjekter. Konklusjoner, erfaringer og råd basert på pilotevaluering av fire prosjekter*), Concept report no. 30

World Bank, 2000, *Reforming Public Institutions and Strengthening Governance*, A World Bank Strategy, Washington DC, November 2000

www.bane.dk.

www.finansministeriet.dk

www.globalis.no

www.jernbaneverket.no

www.trm.dk

Young, S. (2006): *The British Budget Process: A Case Study*, Harvard Law School, Federal Budget Policy Seminar, Briefing Paper 32

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Forskningsprogrammet Concept skal utvikle kunnskap som sikrer bedre ressursutnytting og effekt av store, statlige investeringer. Programmet driver følgeforskning knyttet til de største statlige investeringsprosjektene over en rekke år. En skal trekke erfaringer fra disse som kan bedre utformingen og kvalitetssikringen av nye investeringsprosjekter før de settes i gang.

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The Concept research program aims to develop know-how to help make more efficient use of resources and improve the effect of major public investments. The Program is designed to follow up on the largest public projects over a period of several years, and help improve design and quality assurance of future public projects before they are formally approved.

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