PMZ

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PMZ Market Consultation

Delta Netwerk A4 ZUID

Concessions crossing borders…

Scope definition and tender strategy for the Antwerp-Rotterdam Highway Network concession.

October 2007

Final version

Concessions crossing borders…

Scope definition and tender strategy for
the Antwerp Rotterdam Highway Network concession

Input for the PMZ Market Consultation 2007

October 2007
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The Delta Netwerk A4 ZUID consortium is a cooperation between:

- *Brisa Auto-Estradas de Portugal S.A.*
- *Movenience, a joint venture of NV Westerscheldetunnel, Brisa S.A. and NedMobiel aimed at Electronic Toll Collection*
- *Vialis, on behalf of VolkerWessels*

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Brisa movenience Vialis VolkerWessels Tunnel Westerschelde Maakt meer mogelijk! NedMobiel

Preface

This report contains an elaboration on the business case for setting up a Public Private Partnership (PPP) for the development, maintenance and operations of the highway network between Rotterdam and Antwerp. It is our contribution to the market consultation as set out by the Project Mainport corridor Zuid (PMZ) direction of the Dutch Ministry of Transport. This market consultation asks for the definition of a scope for the PMZ PPP, that makes commercial operation of the network possible.

The research that is reported in this document was executed by the Delta Netwerk A4 ZUID consortium; a cooperation between Brisa Auto-Estradas de Portugal S.A., Movenience (a joint venture of NV Westerscheldetunnel, Brisa S.A. and NedMobiel), and Vialis, on behalf of VolkerWessels. The Delta Netwerk A4 ZUID consortium is an operators consortium, which means that our views on the development of road and highway networks are based on providing mobility services to our customers (road users). To do this we finance, design, build, operate and maintain roads on a commercial basis.

Besides the authors of the report, many other people from the Delta Netwerk A4 ZUID partners have contributed to the research and analysis that are the basis of our views. We thank them for their idea, statements and other inputs. Furthermore we discussed some of our ideas with Professor Erik Verhoef from the Vrije Universiteit in Amsterdam, and Professor Harry Geerlings from the Erasmus Universiteit in Rotterdam; we thank them for their time, cooperation and remarks!

We hope that, by writing the report, we have answered more questions than we have raised. Above all we hope that our report contributes to the actual development of the PMZ area and the procurement of the PMZ project.

The authors.

Executive summary

Delta Netwerk A4 ZUID : 3 cents per kilometre for a sustainable PMZ corridor

The Delta Network is a cooperation of the Portuguese concessionaire Brisa, the Dutch tolling company Movenience (joint venture between Brisa, Westerscheldetunnel and NedMobiel) and the Dutch constructor VolkerWessels, represented by Vialis. Within this cooperation we have analysed our possible roles within the PMZ corridor.

Toll and road pricing for optimal customer satisfaction

Corporate Social Responsibility (CSR) is one of the main starting points for PMZ. The main idea behind CSR is that private parties take their share in achieving social goals, even without directly profiting from it. Introducing tolls into the system of development, maintenance and operations of highways, is a strong driver for CSR in this sector. It puts people –customers- first in line when thinking about business optimizations and strategic corporate choices: customers are the main or only source of income, and thus the most important focus for a concessionaire. This results in the following advantages for the road user:

- Engagement of road users in the decision making processes, and great importance for customer care tasks, because 'happy customers come back'
- Operational focus on higher availability, because unavailability results in lower revenues
- Focus on safety aspects, because customers avoid unsafe roads, because accidents lead to unavailability and thus to a decrease of income and because not being safe results in a withdrawal of permits, causing the concessionaire to close the road (and thus lower his revenues)
- Lower macro-economic prices for using infrastructure, because the introduction of banks and financial institutes into the sector raises efficiency and cost-effectiveness

– Innovations in techniques, organisation and financing models, because companies are free to decide on the way in which they can achieve the goals that are set.

For the reasons mentioned above, the business case for private financing of (the development, maintenance and operations of) the PMZ infrastructure, is based on toll revenues.

Investments in tolling are limited, because tolling can be 'bought' from the national government, as soon as the national road pricing scheme is in place. The price for this will be 5% of the revenues. Toll roads should be excluded from the national scheme, because tolls levied on the road are sufficient for development and maintenance of the infrastructure.

3 cents per kilometre for mobility services

For 3 cents per kilometre we can maintain and operate the PMZ network, and finance the construction of the new A4 Klaaswaal link. This is 12 % cheaper than the flat fee that will be introduced in the national road pricing scheme (3,4 cents / km).

The PMZ concession should incorporate the whole highway network within the corridor, because it enables us to deliver high standard mobility services for the road user:

– very low toll prices due to substantial economies of scale in maintenance and toll operations
– guaranteed availability of the North-South connection between Rotterdam and Antwerp;
– active traffic management for predictable travel times;
– optimal customer relations, road assistance and service points.

The A4 corridor as a freight route, with toll prices stimulating freight traffic to avoid the A16 and to use the A4 route, can be made possible when a part of the maintenance will be paid for by the government. A further optimisation of the toll prices for this scenario

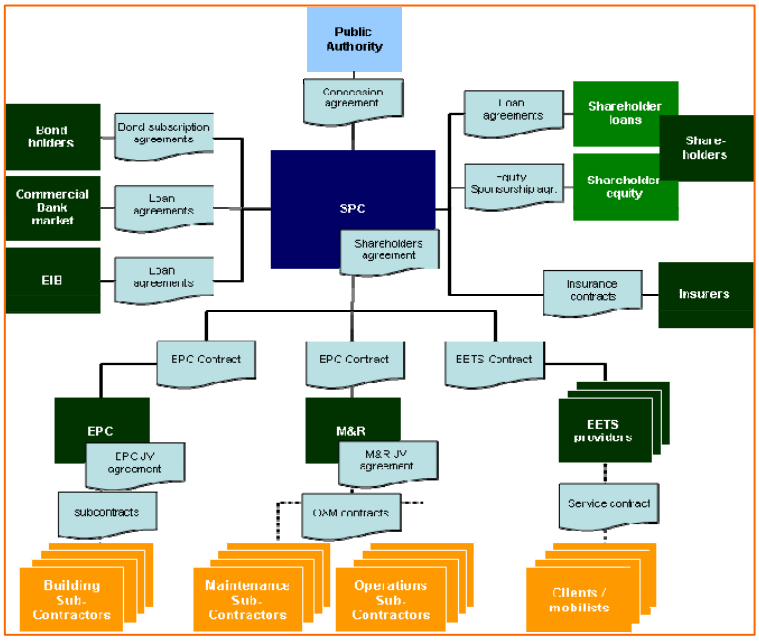
may lead to a commercially suitable business case without allocating maintenance budgets to the project.

It is the Delta Networks' opinion that present legislation on spatial procedures (e.g. MER) is sufficient to guarantee responsible handling of the environmental impact within the corridor. However, it is recommended by PMZ that impact on the Environmental Utilisation Space is to be paid for by the concessionaire. Calculations indicate that in that case, and with the introduction of an Environmental Investment Fund, this fund can invest around M€ 275 in environmental compensation and mitigation measures, provided that maintenance budgets that are already reserved for the network are to be allocated to the project as well.

Revenues from spatial development or other sources like gas stations or highway restaurants are left out of the concession. Revenues from spatial development are very hard to quantify, let alone to allocate them to the project. Furthermore, compared with the costs for the development of infrastructure, they are not significant.

Concession contract and Regional Public Authority

The Delta Network proposes to constitute a Regional Public Authority (RPA) that acts as a grantor for the PMZ highway concession and possibly other service concessions as well. This way, above benchmark revenues from tolls can be returned to the regional inhabitants, by means of lowering general local taxes. The RPA is run as a company, and in case more services are granted, financing can be attracted in this RPA, thus sharing risks between the various projects.



The PMZ highway network can be privatised using a concession agreement. Although a PPP Joint Venture structure has the advantage that it incentivises both the concessionair and the grantor in the same direction, a concession structure is less

complex, and is better equipped to transfer risks towards the parties best capable of managing them.

The concession agreement starts with the beginning of the construction of the A4 Klaaswaal link. It is not acceptable to levy tolls before opening of the new infrastructure, tolling starts only after completion of this link. It is however possible to have the concessionaire to maintain the existing infrastructure sooner, using a maintenance contract based on an availability fee.

The business case is not too sensitive for changes in the concession period. For acceptance reasons it is therefore recommended that the concession period will have a fixed end date, 30 years after starting date.

Tendering the PMZ project will take at least another 30 months. Assumed that construction of the Klaaswaal link requires another 3 years, first cars will not drive this new A4 link before 2014.

Public and political acceptance

Public and political acceptance is a key factor in the success of PMZ. Our approach leads to easy to explain advantages for the general public and for local, regional and national authorities:

- Delta Network's roads are cheaper than other roads;
- Road users don't need other equipment or administrative procedures, because tolling is bought from the national road pricing scheme;
- Quality of life is guaranteed by the environmental procedures combined with increased mobility;
- The cap on extra profits for the concessionaire lets regional inhabitants enjoy substantial financial advantages of successful exploitation of the Network.

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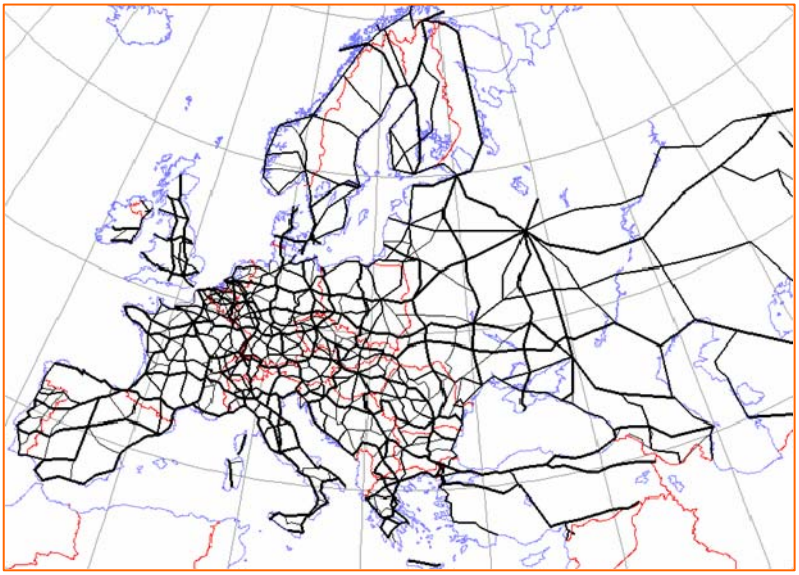
INTRODUCTION

Chapter 1: Concessions Crossing Borders …

Private ownership of infrastructure and PPP's have proven to deliver extra mobility to drivers in a cost-effective way. Road pricing and tolling are increasingly used as an instrument for helping governments to develop infrastructure and influence user behaviour for increasing mobility and improved service to the mobilists.

Private highway development and tolling in the EU

The European White Paper on Transport, that defines European policy until 2010, sets an overall agenda for road infrastructure development and the usage of it. It states that the various modalities within the European Union must have equal chances to compete among each other, which can only be obtained if users of a specific modality pay for the costs (including environmental and social nuisance costs) of this usage. For road transportation this means that new financial resources like tolling and road pricing are to be introduced.



Of course, and especially within the Trans European Network (TEN), services to customers and mobilists should be interoperable throughout Europe. Crossing the border cannot limit services!

Furthermore the White Paper states that congestion is a great threat for economic development and air pollution reduction. Tolling and road pricing might help to fight this, but a further development of TEN is necessary to obtain substantive results. Due to decreasing public funds, this development is for a great part to be financed with non-public funds. Concessions can help governments to cross the border towards private financing of infrastructure.

In Europe this has resulted in growing private participation in financing, building, operating and maintaining the road networks (see appendix III). Governments have an increased focus on their core businesses and turn to the market to profit from the creativity and

efficiency of private parties. Furthermore, PPP generates funding for infrastructure development, optimises risk allocation and is a stimulus for customer-orientated maintenance and management of the network. Investors find in these projects a stable, low risk and profitable long term investment.

Road management in the Netherlands: the operators view

In the Netherlands, first experiences with a private approach towards infrastructure have been successful. The Westerscheldetunnel and the A59-project have been examples of projects that could be realised sooner and with less public investment. Experiences with PPP-projects, not only in infrastructure, show that projects are completed within time, budgets and quality. The *Central Plan Bureau* states that with the recent developments in the financial and infrastructural sector, the government no longer is the only logical dominant party for infrastructure development (Lijesen and Shestalova, 2007, CPB Document No. 146).

Present PPP projects in the Netherlands are structured around the standard DBFM contract of Rijkswaterstaat. Although this is a good start, one can ask whether structural improvements can be obtained with the business model that lies underneath this contract. Within the PIM project and within 'Anders Organiseren van Wegbeheer', the Ministry of Transport explores new models for optimal and professional management and maintenance of roads, including possible private operations and management. The traditional borders of public and private tasks are explored and sometimes crossed!

With the planned introduction of road pricing in 2011, the new cabinet joins in with European policy on road pricing. The business model for the road pricing scheme has not been determined yet, but will be in line with European developments. This means that the following four roles are to be explored:

1. (private) road operators that are responsible for the development and management of the road network,
2. road users (car drivers) who use the network and pay for this service,
3. EETS providers who handle the administration and clearing of the payment between the road users and the road operators, and
4. an interoperability authority responsible for standardisation of toll collection systems, procedures and validating technologies, assuring interoperability.

The market is slowly adapting itself towards the future. Builders and contractors reorganise into project developers, national and international companies see an emerging market for developing, financing and exploiting infrastructure and prepare themselves for this new paradigm. The Dutch government strives to cooperate with the private sector to formulate a clear vision on the future of mobility in the Netherlands.

The PMZ network: ideal for an A4 mobility provider

The A4 highway is part of the Trans European Network, as described earlier in this report; which means that all European policies apply and the PMZ network is a crossborder connection by nature. Furthermore all national Dutch policies have to be incorporated into the project, setting a project environment that includes professional road management, private investments and the four discussed road pricing roles.

Acceptance of toll prices

Toll on existing roads is a delicate matter. Although the clamour for better mobility gets stronger every day, the public's antipathy against toll is a critical factor in achieving a successful business case. In searching solutions for the PMZ-corridor, private and public parties should use all their creativity and decisiveness to solve this dilemma. Low toll prices, reliable and congestion-free travel times and superb quality of the infrastructure can help to overcome this antipathy.

Dealing with mobility issues is not only a case of solving congestion problems but also one of taking chances by connecting places and area's. The OESO report[1] on the Randstad developments states that the Netherlands are falling behind in this. It suggests road pricing as one of the solutions. Commercial exploitation of infrastructure automatically puts the wishes of the customer first: availability, reliability, price/quality, easy access and safety. The operators view on mobility embraces EU and national policies and believes in the power of the market to achieve public goals in a cost-effective, customer-orientated and environment-sustainable way. Suitable legislation and contracts must form a breeding ground for private parties to develop creative and effective future proof solutions. The discipline of the banks will be sufficient encouragement for businesses to operate in a cost-effective way.

[1] OECD Territorial Reviews: Randstad Holland, Netherlands, April 2007.

Private road operation and its social benefits

One step before defining the best concession agreement and organisation structure for a PPP project is the decision to develop the project in a PPP structure. In the Netherlands, this decision is usually based on a methodology called the 'Public Private Comparator' or the 'Public Sector Comparator'. These methodologies analyse financial aspects of the project to compare the PPP approach with a classical governmental development approach. PPP, however, provides benefits far beyond the innovative financial schemes and debt market possibilities, namely:

- Speed up the development of projects, and in doing so fulfilling government goals, social benefits and public needs;
- Stimulate technological developments and innovation;
- Take advantage of innovative financial market solutions and create higher efficiency on the allocation of resources;
- Deliver projects on time and within budgets; banks supervisory role as a capital provider, strengthened by their ultimate rights to "step-in" and take over an underperforming or defaulting project is a strong disciplinary force for project managers;
- Assess and allocate the project risks to the parties' best placed to manage and control them;
- Maximize the affordability for the State (affordability is about comparing the expected costs for the State with the capacity of the State to pay them), minimising its contribution, while stimulating the development of more and better public services;
- Leverage the growth of the countries GDP by an increase of the investment and consumption associated to the projects; There is the possibility to an off balance sheet treatment of the public funds according to Eurostat rules, relieving state budget and overcoming (eventual) public debt and budgetary constraints.

For the PMZ project it has already been decided that the project will be developed using a PPP approach. What has not been decided yet, however, is the scope of the concession agreement and organisation structure that allow for a successful project, from the perspective of both the concessionaire and the government.

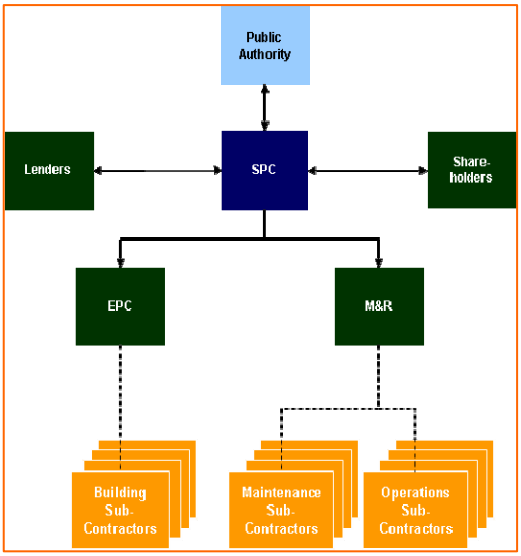
Chapter 2: Private Financing of Infrastructure

Private financing of infrastructure comes with a fundamental change in the way the road is being looked at. Road infrastructure becomes a means for generating cash flows. Predictable cash flows allow for relatively cheap debt financing. The organisation that develops and manages the road is a commercial company, that aims to increase revenues and decrease costs. Also the way in which the road user will be approached changes: mobilists become paying customers, who require service and quality for their money! Of course, the development and management of infrastructure remains a public responsibility (at least to a certain level), and that is why innovative forms of Public Private Partnerships are organised to divide public and private responsibilities.

This report takes the private financing, development and operations of infrastructure as a starting point. This chapter describes some main characteristics of private involvement in the road sector; it has not yet translated these characteristics towards the specific PMZ situation.

Risk allocation and contracts

Public Private Partnership (PPP) is all about organising the project in such a way that risks can safely be removed from the government and allocated to an operator. This is usually done by putting together an organisation structure that incorporates at least two Special Purpose Vehicles: a 'Concessionaire SPC' (SPC), and a 'Engineering, Procurement and Construction SPV' (EPC). In many cases also a 'Maintenance & Repair and Service SPV' (M&R) will be founded.



Clear and stable concession agreements and / or contracts limit the government's risks, while making sure that private parties are aligned with the public interest providing a service complying with the required level of quality along the terms of the PPP.

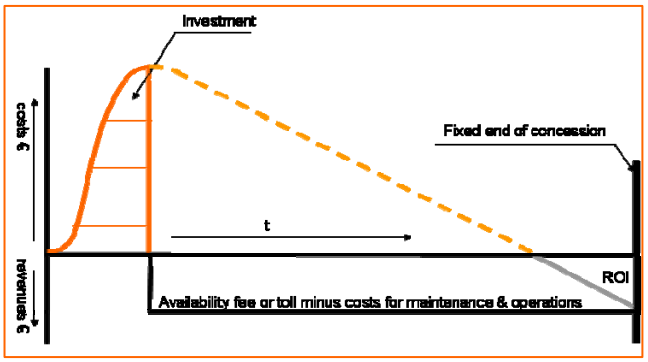
Typically, the concession agreement between the SPC and a government concerns the allocation of finance, construction, operation, interface and traffic volume risks. A contract between the SPC and the EPC typically concerns construction and investment risks.

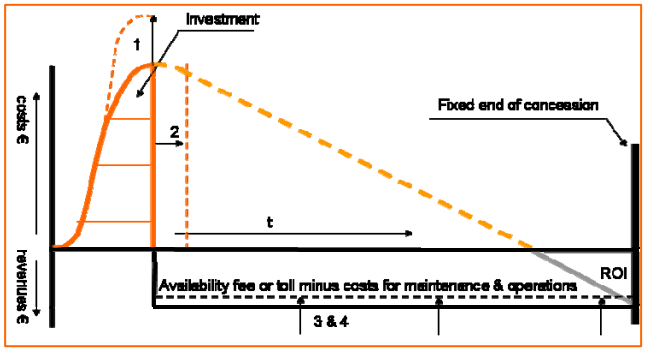
Concession and contracts are thus the core for a well managed and successful project, from the perspective of both the government and the concessionaire. This report deals with the concession of the Project Mainportcorridor Zuid (PMZ) in the Netherlands, which is to develop, maintain and operate the Dutch highway network between Rotterdam and Antwerp.

A concession of this magnitude and such a scope has never been agreed on before in the Netherlands. The concession for this project in this way helps the mobilists to cross the Dutch-Belgian border; but is in itself crossing borders as well!

Influencing Return on Investment

Private road operators are most of all aiming at maximising returns on their investments, calculated by their Return on Investment (ROI), the ratio of money gained or lost on an investment relative to the amount of money invested. This can be used for contract development, and as such contribute to achieving public goals as well. In general the mechanism behind ROI is as follows (see also figure). During construction phase, a large amount of money is invested in the project (debt and equity), while there is no source of income. From the start of the operations phase, income is generated and net revenues (total income minus operational and maintenance cost) are used to repay the debt and the interest on the debt. What is left, is used for depreciation of the equity. Towards the end of the concession period, the invested money is repaid and depreciated, and the rest of the income contributes to the ROI. Total profit, therefore, equals the triangle in the lower right corner of the figure. The ROI equals this profit divided by the total equity that was invested during the construction phase.





Financial results are thus highly dependant on an optimal scheme of income and expenditures *during the whole lifespan of the project*. This is a great advantage of private financing above the more traditional way of infrastructure development, that focuses on the cost optimisation during the construction phase only). Given a certain concession period and financing structure, ROI can be influenced by the concessionaire by managing 4 variables (see also figure on the previous page):

1. Total construction costs;
2. Construction period (time between expenditure and start revenues);
3. Maintenance and operation costs; and
4. Generated income (tolls or availability fee)

These four variables should be explored on the development of the concession contract, seeking for shared interests, aligning incentives and capturing gains for both public and private parties (see chapter 7).

Legislation on infrastructure financing

The Statistical Office of the European Communities or Eurostat is the Directorate-General of the European Commission. Eurostat is responsible for the development of the European System of Accounts (ESA), which defines the accounting rules and concepts which members states are required to use on their own national accounting. Eurostat is also responsible for providing the guidance on the accounting treatment of capital projects, therefore being the ultimate arbiter of whether or not a PPP type concession would be accounted for on or off state balance sheet treatment.

Eurostat has issued guidelines on the national accounting treatment of infrastructure funding under the latest version of ESA (ESA95) and its decision on the treatment of PPPs published on 11 February 2004. According to this guidance, for the public funds to achieve off balance sheet treatment:

- The government unit responsible for the provision of the infrastructure must have autonomy from government in its decision making processes, i.e. must have an independent board;
- Where a government owned or controlled entity is directly involved with the provision of the infrastructure, at least half of its revenues must be derived from market sources, i.e. end-users, rather than state subsidies;
- Where a private sector contractor is involved with the provision of the infrastructure, such a contractor must bear the construction risk and either the demand or the availability risk.

Eurostat has made it clear it considers that transfer of risk (construction, demand or availability) must involve passing down the majority of such risk to the private sector. A contract that involves only partial transfer of risk may dilute the argument for off balance sheet treatment. On balance sheet projects will tend to have a major impact during the construction period, with a limited pay back during the operational period. Off balance sheet projects change the timing of the state funding, spreading it over the operational life of the project.

Chapter 3: Introduction on PMZ[2]

The Project Mainportcorridor Zuid (PMZ) is an attempt to find new and innovative ways for private companies and public authorities to work together. This kind of partnership should result in greater accessibility and the related quality of life in the corridor between Rotterdam and Antwerp. Businesses and public bodies are engaged in joint explorations to find out how this can be achieved. PMZ is one of the twelve projects which have been designated by the cabinet (Taskforce PPP) as projects for public-private partnership (PPP).

The purpose of PMZ is to improve accessibility and the related quality of life in the corridor between the mainports of Rotterdam and Antwerp. The means for making this happen is an innovative form of public-private partnership. Businesses and public (regional) authorities have been working together actively on PMZ right from the very start. In the present phase of the project, private companies are involved in a PMZ market consultation on the optimum scope, business case and type of contract for the A4 corridor, while regional public bodies are considering how the surrounding areas can best benefit from the construction of the A4 South. The advantages that the government expects to be gained from a partnership with the private sector are private capital, innovation, and a speedier process.

The A4 has the potential to become the most important route to the Randstad. Completing the A4 South will strengthen the robustness of the transport network to the south of Rotterdam. The previous Minister for Transport, Public Works and Water Management, Ms. Karla Peijs, determined the scope for PMZ in September 2006. It is primarily aimed at the development of the A4 corridor between Rotterdam and Antwerp as a free-flow route, particularly for freight transport. The construction of the missing link of

[2] Partially based on the PMZ website www.pmz-rws.nl

the A4 through the Hoeksche Waard area (the A4 South) is one possibility, providing it is socially responsible and is financed and operated completely by private parties. The PMZ Project Board has translated the Minister's letter into a geographical, functional and institutional scope. The scope forms the basic variant of the market consultation exercise.

The PMZ–project started by inviting public and private parties to formulate their vision on mobility and quality of life in the corridor. The Minister of Public Works and Water Management narrowed down the scope of the project and emphasized on the A4-road as a free flow route for freight traffic with larger societal benefits for the area.

The market consultation

An initial analysis on private development of the corridor by the PMZ project team did not lead to a closing business case. Without a feasible commercial business case, private parties are not willing to participate in the project. A public and private market consultation must lead to a feasible business case and a procurement process that attracts private consortia to participate in the project.

The PMZ-project board plans two consultation rounds. In the public consultation public parties are invited to contribute to PMZ promising green, blue and red projects and to consider the contribution of road assets. In the private consultation round, market parties are asked to give their vision on a realistic scope for the PMZ-project, on the public preconditions and the tender- and procurement process.

Aims and scope of the market consultation

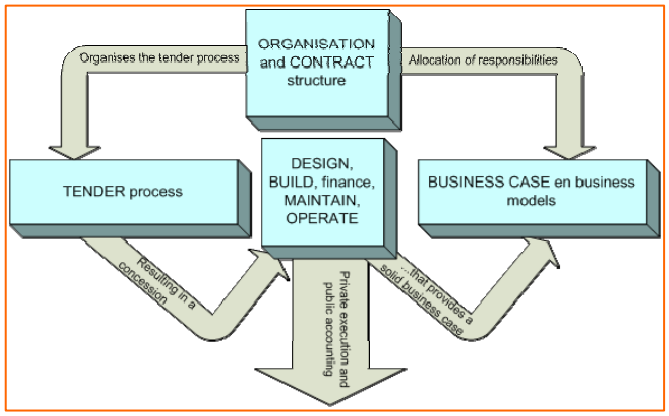
The main goal of the project will be to develop and describe a suitable geographical (what networks are to be included), functional (what resources are to be included – tolls, availability fee, value capturing of real estate development) and institutional (what contracts) scope of the PMZ PPP project, that allows for a feasible commercial business case, embedded in a well-thought procurement strategy and process. A business case analysis provides a realistic scope for the PMZ project, a vision on public preconditions, contractual anchoring of the proposed solutions and an advise how to formulate a tender process that will give private parties the opportunity to distinguish themselves and use their expertise and creativity to serve consumer wishes and public goals.

Chapter 4: Guidance for the Reader

This report is about the scope of the PMZ concession agreement and organisation structure, aimed at a successful project development, and about the process architecture that enables the concession grantor (the government) to attract the best bidders and potential concessionaires to the project.

The report sets out the roles, tasks and responsibilities of the public parties and compares these with the roles, tasks and responsibilities of the private parties, for the four fundamentals for implementing the project:

1. the contract and organisation structure, as the basis of the pubic private partnership and the way in which the public as well as private parties organise themselves in a public private partnership.
2. the tender process, that defines the rules of engagement to allow for a fair competition on the private side and guarantees the best result for the government.
3. the concession and its elements, that defines the division of risks and responsibilities of all parties during a Public Private Partnership, and that defines the way in which the project is developed and operated.
4. and finally, the business case, that is the result of all of the above, defining potential costs and revenues and analysis the commercial potential of the project.



Exploring these fundamentals will provide our view on the procurement, contracting and management of road projects, and the way Public Private Partnerships can be built and structured.

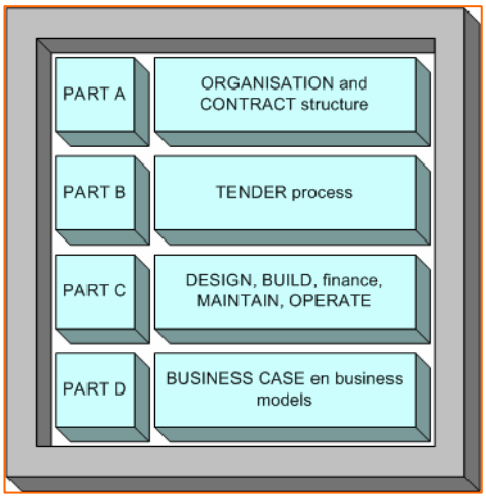
The report structure follows these 4 elements. A more detailed structure is described below.

The introduction part describes some macro-economic developments within the road sector (chapter 1), introduces the PMZ project (Chapter 3) and gives an introduction in private

financing of infrastructure (chapter 2). The introduction closes with a guidance for the reader (present chapter 4).

Part A defines a project structure based on typical PPP contracts and specific local circumstances. Chapter 5 comments on the public organisation within the PMZ area; the organisational lay-out for granting the concession. Chapter 6 describes the contract 'spider' for the project, including the latest EU legislation on toll interoperability. Chapter 7 deals with the concession agreement and gives some remarks on the standard DBFM contract that is used for Dutch PPP projects.

Part B of the report sets out guidelines and suggestions on the tender process. Chapter 8 describes general theory on franchising infrastructure, while chapter 9 analyses the scope for the PMZ project. Chapter 10 deals with the provision of information from the grantor to participating consortia. Chapter 11 defines the general process architecture for tendering the PMZ project.

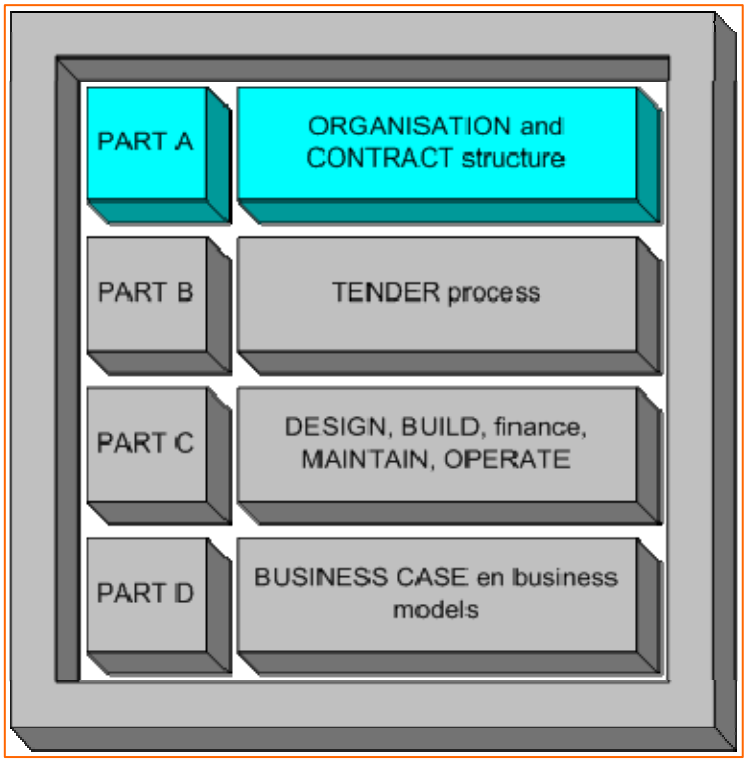


Part C follows the main elements of a standard PPP contract: Chapter 12 describes the Design & Build aspects for the PMZ project, resulting in investment costs. Chapter 13 defines the tolling strategy and chapter 14 describes the Maintenance and Operation elements, resulting in an estimation of operational costs.

The last part, part D, gives an overview on the business case for the PMZ concession. Chapter 15 describes a general approach for analysing a project from a business point of view. Income estimations that where drawn from traffic modelling are described in chapter 16. Chapter 17 describes the financial modelling and sensitivity / uncertainty analysis that come with that. Finally, chapter 18 describes the conclusions that can be drawn from the analysis, resulting in a functional, institutional and geographical scope definition of the PMZ project.

Part A:

ORGANISATION and CONTRACT structure



Chapter 5: Organisation Structure and Starting Points

The PMZ project direction expresses the ambition to be innovative; not only concerning the private operations of highway networks and financing aspects, but also concerning social and environmental responsibilities taken by corporations. This chapter discusses starting points and ways in which these responsibilities can be allocated to private parties, and an organization and contract structure that ensures these allocations.

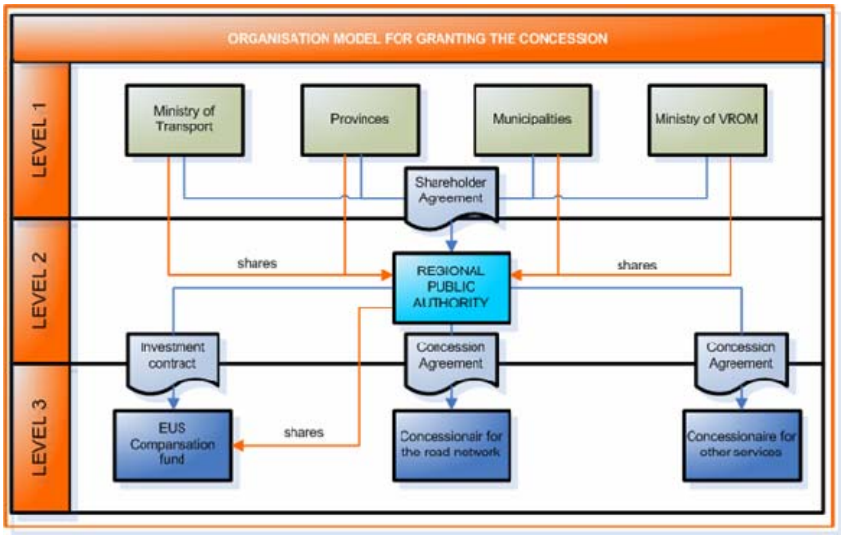
Organisation model for granting the concession

The organisational model for the PMZ project needs to fulfil the following goals:

- Clear definition of tasks and responsibilities for each participating organisation;
- Align public parties in such a way that interests are equal and granting a concession can be organised ('speaking with one mouth');
- Make sure the complexity of the structure is as low as possible and participating organisations can contribute their unique skills and expertise;
- Make Environmental Impact Assessment and compensation within the region possible.

These goals can be met by the organisation structure as set out in the figure on the next page.

The core of the organisation model is the 'Regional Public Authority' (RPA) a Public Public Partnership, by means of a Joint Venture (JV). A JV structure, where participating governments share ownership between themselves, in combination with a cap on private profits, makes sure that generated profits above a certain benchmark (at least partly) flow back to the local authorities and in this way, to the regional road users. Furthermore, in case not only the highway concession is granted by this RPA, but also other projects and services are tendered, the RPA can be a vehicle for attracting debt facilities and program development (conform to the BAM model in Antwerp); this is only possible when the RPA is structured as a private company. For PMZ, this Joint Venture aligns all public parties that have an interest in the region and the project, and defines the ultimate scope of the PMZ project. The RPA is the managing authority of the region, within the functional limits of the Shareholders agreement (i.e. mobility and possible environmental and landscape issues).



The RPA grants concessions for several services in the PMZ area. The concession for the development and operations of the highway network is one of them[3]. Besides this main concession, concessions for other services can be granted; e.g. for transport by means of other modalities or for the development of industrial estates. The RPA can also start up an investment fund to compensate for exceeding Environmental Impact limits, as will be discussed in the last paragraph of this chapter.

Corporate Social Responsibility

Corporate Social Responsibility (CSR) is one of the main starting points for PMZ. The main idea behind CSR is that private parties take their share in achieving social goals, even without directly profiting from it. Usually this general idea is made more concrete by translating it into a 3-P prioritising order: *People, Planet, Profit*. Practically, this means that the main aim for companies will continue to be 'gaining profits', but that this goal is restricted by boundary conditions concerning the health and well-being of the people and the planet.

Introducing tolls and private financing into the system of development, maintenance and operations of highways, is a strong driver for CSR in this sector. It puts people –customers- first in line when thinking about business optimizations and strategic corporate choices: people –customers- are the main or only source of income, and thus the most important focus for a concessionaire. This results in the following advantages for the road user:

[3] The RPA can also start up a joint venture with the private road operator, in a so called Joint Venture Public Private Partnership (JV PPP). The next chapter explains why for the PMZ project, the concession model has been chosen.

- Engagement of road users in the decision making processes, and great importance for customer care tasks, because 'happy customers come back'
- Operational focus on higher availability, because unavailability results in lower revenues
- Focus on safety aspects, because customers avoid unsafe roads, because accidents lead to unavailability and thus to a decrease of income and because not being safe results in a withdrawal of permits, causing the concessionaire to close the road (and thus lower his revenues)
- Lower macro-economic prices for using infrastructure, because the introduction of banks and financial institutes into the sector raises efficiency and cost-effectiveness
- Innovations in techniques, organisation and financing models, because companies are free to decide on the way in which they can achieve the goals that are set.

For the reasons mentioned above, in this report the business case for private financing of (the development, maintenance and operations of) infrastructure, is based on toll revenues. Availability fees are left out of the analysis, but can be introduced when political acceptance for tolling and road pricing is low.

Of course, some governmental goals will not be met or put in the same priority by introducing tolls. These aspects can be introduced in the contract, as boundary conditions or Critical Success Indicators (CPI's). This way, private financing together with a well thought out contract becomes a strong tool in reaching Social Corporate Responsibility.

CSR is also about improving the quality of life and living environment, The tool for that is the Environmental Utilization Space policy, which will utilize metrics and monitoring plans for assessing the impacts and implementing accordingly mitigation and compensations schemes to overcome those impacts.

Environmental Utilisation Space

The Environmental Utilisation Space (EUS) is the other main starting point for PMZ. EUS as it is used in the PMZ project will serve four main objectives:

1. mitigate impacts of highway developments,
2. design schemes for compensation and internalizing environmental costs,
3. play a regulatory role and

4. ensure that the process is continuously supervised, audited and updated.

Three environmental aspects – air quality, noise pollution and external safety – constitute the focus for the mitigation and compensation scheme. Each one of them is considered to have a certain degree of possible mitigation/compensation, based on the footprint of their impacts, according to the tables below.

Environmental aspect	Impact
Air quality (emissions)[4]	Local
NO_x	Local
SO_x	Local
CO_2	Global
PM	Local
Noise Pollution	Local
External Safety / Hazards	Local

Note that while mitigation measures usually refer to procedures to minimize impacts during the construction phase and use, compensation is usually an ongoing process dependent on the "amount" of impacts and its evolution with time, during use.

Generally, according to the EU Directive 85/337/EEC on the Environmental Impact Assessment, the approach for dealing with pollution covers two cases: the first one (corresponding to numbers 1 to 4 below) considering that an Environmental Impact Assessment for the corridor has not been carried out previously. The second one (corresponding to numbers 3 to 4) considering that the environmental impact assessment for the corridor was already performed according to the common legal frameworks.

Environmental Aspect	Mitigation	Compensation
Air quality	Difficult	Possible
Noise Pollution	Possible	Possible
External Safety / Hazards	Possible	Possible

1. Estimate impacts for the three aspects - air quality, noise pollution and external safety - applying models inputting the estimated average daily traffic (ADT), its distribution throughout reference periods, traffic mix, longitudinal and vertical alignment, terrain model, etc, and evaluate the expected environmental impacts[5];
2. The expected significant adverse effects/ impacts are assessed based on the comparison with legal limits for the three environmental aspects; Define and implement mitigating measures for the most significant adverse impacts. The

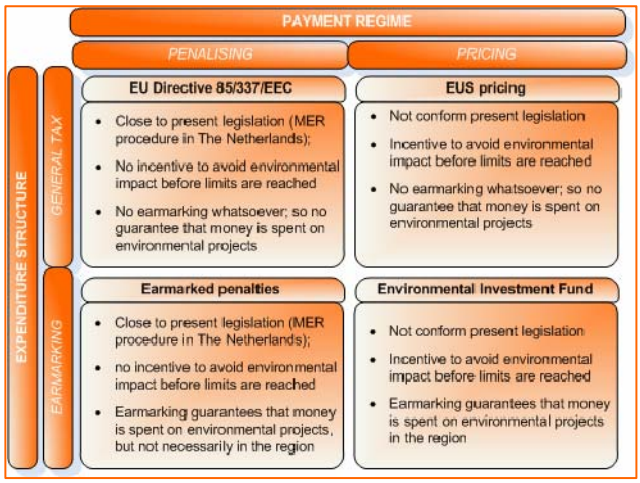
[4] NO_x – Nitrogen oxide; SO_x – Sulfur oxide; CO_2 – Carbon dioxide; PM – Particulate matter;

[5] Environmental impacts include the following factors: human beings, fauna and flora, soil, water, air, climate, landscape, material assets, cultural heritage and their interaction. However, PMZ indicates in 'Annex no. 3, only impacts on noise, air quality and external safety will be considered in the EUS-scheme.

values of the impacts after mitigating measures are called residual values (in opposition of gross values), and must comply with legal limits;

3. Define EUS "boundaries": the isoclines for which the values for the different impacts corresponding to each one of the environmental aspects equal the legal limits. At this stage, choosing separate EUS limits/ boundaries for the different environmental aspects or making one integrated EUS boundary will depend on the suitability of a possible weighting formula. However, it seems more straightforward choosing separate EUS limits or an outer boundary for individual EUS, which seems the most conservative approach;
4. Set a monitoring scheme for controlling and supervising the value of impacts during operation, which should be below the limits, and implement a reporting procedure alerting for values higher than those limits, meaning that too much environmental space is utilized and triggering compensation and mitigation mechanisms.

Generally, the four steps above are sufficient to assess and manage environmental impact from the development and operation of infrastructure. In the Netherlands, Environmental Impact Assessment studies (MER) analyse effects for 10 years after the construction of the roads. Based on the assumptions that cars will become cleaner and quieter in that period of time, such an assessment is sufficient to conclude that environmental limits will be met, now and in the future. Even more so, considering that road pricing can be used as an instrument for decreasing environmental impact due to less congestion, less mobility and more cost- and environmental awareness of the road user.



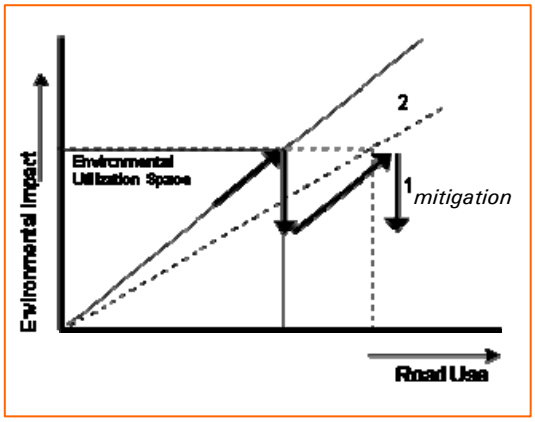
These arguments hold for private operators as well as public ones, but for political acceptance purposes it might be useful to design an extra system, to stimulate a concessionaire to work without exceeding the EUS. Such a system can be based on the figure above. The figure is structured along two axis: 1) the way EUS is being paid for and 2) the way the gained revenues are spent. These axis are elaborated below.

1) the way EUS is being paid for

Payment can be done in two ways: penalising the concessionaire when limits are crossed, or payment of a price for each unit within the scope of the EUS. A penalty gives an incentive not to cross a certain limit, a price gives an incentive to decrease the environmental impact as much as possible.

Penalty payment model

This mechanism is based on the potion that there is a direct connection between the intensity of road usages and the environmental footprint of this road. For the emissions, penalties can be based on an average pollution unit per vehicle, and a maximum number of vehicles for the road. This estimation is the maximum intensity of the road without any added mitigation projects and may not exceed the starting intensity of the business case models. Measurements of the several EUS boundaries trigger a *bonus / malus* payment mechanism in the contract.



The trigger for the *bonus / malus* system is the measurement of the actual environmental impact, rather then a calculated one, based on traffic intensity. This provides the concessionaire with the opportunity to invest in mitigation projects such as noise reduction screens or a more silent pavement, and in doing so creating more room for traffic – and thus revenues- within the same EUS. The bold arrows in the figure above demonstrate this mechanism. A second mechanism for increasing traffic intensities, without increasing the environmental impact, is to change the interdependency of those variables. When for example the average pollution per car decreases, more traffic can be handled, within the same EUS (see dotted line in the figure).

The concessionaire, however, has only an incentive on mitigating measures to compensate for extra traffic intensities. There is no trigger for compensation.

Pricing model

Introducing a direct payment for environmental impact results in internalising environmental costs directly into the business case for a new road. The concessionaire is incentivised to

use all his creativity to reduce the environmental impact of his operations, because this opens new space for increased revenues.

Payment can be introduced by two mechanisms: governmental set prices and by introducing a the price in the tender procedure (auctioning the EUS prices).

- Set prices are determined in the contract and are a direct way of internalizing pollution costs in the tolls paid by end-users, based on the polluter-payer principle. The price level and the resulting increase in toll prices can be calculated using the pollution per vehicle (emission factor) and multiplying this with the external pollution costs, but might be set otherwise for various reasons. The text box on the next page demonstrates this calculation.
- Another mechanism is to auction EUS prices in the tender for the concession. Instead of aiming for the cheapest toll price or the lowest availability fee, the tender can be won by paying the highest EUS price, when the road is in operation. The concessionaire has an incentive on decreasing the environmental impact, because he has to pay a high price for each pollution unit that occurs from his operations, and will internalise pollution costs in the tolls paid by end-users, based on the polluter-payer principle. This creates prices that (indirectly) reflect the maximum willingness to pay by the end-users for the environmental impact they cause (the maximum price they want to pay for road usage including its environmental impact). Furthermore, because the concessionaire has to facilitate as much traffic as possible to earn this extra investment back, there is also an incentive on other social aims such as availability, optimal toll price and mobility.

The first mechanism (pricing) imposes several practical problems concerning the context of the concession. What price can be set on environmental impacts when other roads in the region are not burdened by these costs? How to determine the price on existing links in the network? etc. Auctioning solves the problem of setting a price level, but will undoubtedly influence the result of the tender, and maximises the toll prices to the maximum willingness to pay for environmental protection by the end-users. It has to be elaborated what the impacts of such an auction will be for social welfare (compared to the arguments brought up in chapter 8).

To reduce the difference in net costs for the concessionaire between these two pricing alternatives, it may be agreed in the contract that the concessionaire is compensated for

the price he pays for the first x 'pollution-units', x being the amount anticipated by multiplying the estimated Average Daily Traffic (ADT) and a certain 'pollution constant'. In this way, the incentive for reducing impacts starts from the very first traffic movement on the infrastructure, but the business case is not hindered until traffic exceeds expectations. Both mechanisms may result in a cash flow towards the concession granting authority (RPA), which then has to decide what to do with it.

Computing pollution costs and prices (for emissions NO_x, SO_x, CO_2 and PM)

*The European "*Project MEET – Methodology for Calculating Transport Emissions and Energy Consumption (EC, 1999*)", provides the following emission factors for gasoline and diesel vehicles for an average speed of 80km/h for individual transport (IT). In the same table, external costs[1] of the emissions are considered. Combining this information in the table makes it is possible to compute the costs of emission per type of emission, type of vehicle and km; the last column in the table.*

Mean of transportation	Emission variable	Emission factor (g / vkm)	Emission costs (€ / ton)	Costs (€ / vkm)
IT (diesel)	NO_x	0,393	58,6	0,000023
	SO_x	0,083	58,6	0,000005
	CO_2	141,295	162,8	0,023003
	PM	0,008	678,3	0,000005
IT (gasoline)	NO_x	1,014	58,6	0,000059
	SO_x	0,067	58,6	0,000004
	CO_2	198,574	162,8	0,032328
	PM	0,090	678,3	0,000061
BUS (for an estimated 25 Pax/ vehicle)	NO_x	36,500	58,6	0,002139
	SO_x	0,725	58,6	0,000042
	CO_2	15550,000	162,8	0,252340
	PM	4,075	678,3	0,002764

For PMZ, when the present MER procedure needs to be back-upped, the pricing method as described above is considered to be most appropriate.

2) the way the gained revenues are spent.

Revenues coming from penalising or pricing environmental impact can be used for environmental compensation projects. Generally, revenues are added to the general taxes and the government (parliament) decides where to spend this money. For the income from EUS payments, this results in a very indirect reinvestment of the money. PMZ region

inhabitants suffer the environmental impacts, and have to trust the government to wisely decide on the spending on the money. Spending it on nature and environmental projects is not guaranteed, let alone that it is guaranteed that the money is spent on such project within the region.

To counteract these objections, the revenues can be earmarked within the national budgets to allocate it to the ministry of VROM. To guarantee that the money will be spent on compensation projects within the PMZ region, an Environmental Investment Fund (EIF) can be set up. The aim of an Environmental investment fund will be to reinvest revenues in environmental, mitigating or compensating projects.

An Environmental Investment Fund (EIF) is created as a Special Purpose Company to invest extra income from penalties or revenues from EUS pricing in compensating environmental projects within the region of the pollution. The EIF can be structured as previously shown in this chapter. The founding of an EIF makes sure income from exceeding the EUS boundaries or the environmental impact of the roads is spent on compensation or mitigation within the region and thus results in a sustainable level of environmental impact on this region and complies to the goal mentioned by PMZ to increase the public acceptance for infrastructure development in the region. An EIF is easy to communicate and explain, which is good for acceptance of new roads and explicitly mentioned by PMZ as a precondition for the proposed schemes. Possibly the concessionaire can also take part in this EIF as a shareholder, creating a choice for the most economical investment in environmental compensation or mitigation.

On the other hand, the investments made by the EIF result in compensation, rather then mitigation. The total environmental impact decreases, but locally the situation may still show increased environmental impact (especially local impacts as shown in the tables on the previous pages). The recent decree of the 'Raad van State' concerning the widening of the A4 highway between Leiden and Burgerveen demonstrates that this may cause considerable delay for the project.

Despite this last remark, the EIF as described above is considered to be most suitable for the PMZ project (when present MER procedures are decided to be insufficient to counteract environmental impacts).

Chapter 6: The Contract 'Spider' for Risk Allocation

As described in the PMZ documentation, the starting point for the PMZ PPP is the Concession model, with an alternative being a Joint Venture/Institutional Partnership involving both the Public and the Private Sectors. Having said this, there still is a range of possibilities for cooperation between the Public and Market Parties, in the middle of the 100% Public and 100% Private; e.g. the DBFMO(&T), the Concession and the Joint Venture.

CONCESSION MODEL	Risk Allocation			
Risk	Public	Private	Responsible	Backed by
Environmental approvals	x		Government / Ministry	
D&C		x	EPC	Concessionaire
Land acquisition	x		EPC	Concessionaire
Demand or availability risk		x	Concessionaire	
Archaeological findings	x		Government / Ministry	
Explosives	x		Government / Ministry	
Soil pollution	x		Government / Ministry	
Financial (e.g. increase of interests rates, difficulty to serve debt, etc)		x	Concessionaire	Monoline Insurers
O&M		x	M&R	Concessionaire
External safety (risks involving the transport and use of hazardous goods)[6]		x	Concessionaire	Insurers / Government
Acts of God	x	x	To be apportioned between the Market and the Public Party	Insurers / Government
Terrorism		x	To be apportioned between the Market and the Public Party	Insurers / Government
Political, social and economical environment (inflation, depression, etc)		x	Concessionaire	
Legislation relating road infrastructures	x		Public Party	

Defining the most suitable structure for cooperation, laid out in contracts, starts with a well thought out allocation of the many risks that face the project, always keeping in mind the following principle: risks have to be allocated to the parties which are best placed to

[6] In the case of a DBFM contract, not including operation, the risk is allocated to the Operator (and not the Concessionaire) and backed by an Insurer

manage and control them. The tables on the previous page and below draw the typical risk allocation for both the concession and the PPP Joint Venture model.

JOINT VENTURE PPP risk	Risk Allocation		Responsible	Backed by
	Public	Private		
Environmental approvals	x		Government / Ministry	
D&C		x	EPC	JV
Land acquisition		x	EPC	JV
Demand or availability risk	x	x	Joint Venture	
Archaeological findings	x		Government / Ministry	
Explosives	x		Government / Ministry	
Soil pollution	x		Government / Ministry	
Financial (e.g. increase of interests rates, diffilculty to serve debt, etc)	x	x	Joint Venture	Monoline Insurers
O&M		x	M&R	JV
External safety (risks involving the transport and use of hazardous goods)[5]	x	x	Joint Venture	Insurers / Government
Acts of God	x	x	Joint Venture	Insurers / Government
Terrorism	x	x	Joint Venture	Insurers / Government
Political, social and economical environment (inflation, depression, etc)	x	x	Joint Venture	
Legislation relating road infrastructures	x		Public Party	

Note that in the table above, in case the EPC or M&R has first responsibility for a certain risk, backed up by the Joint Venture, there still remains some of the responsibility for the public participant. As can be seen from the tables above, in the Joint Venture PPP model, compared to the concession model, more risks are shared between the public and private parties within the Joint Venture. This way one of the major possible drives for PPP, allocating the risks with the private parties, might not be met. Furthermore, decision making and entrepreneurialism might be more difficult when a public party has shares in the company. On the other hand, the Joint Venture model comes with some advantages:

- Financing might be cheaper, because of government involvement in the Joint Venture;
- The PPP joint venture forces all interest of all parties in the same direction. Especially when the project is complex and the timeline is long, this gives an 'insurance' on long term cooperation;

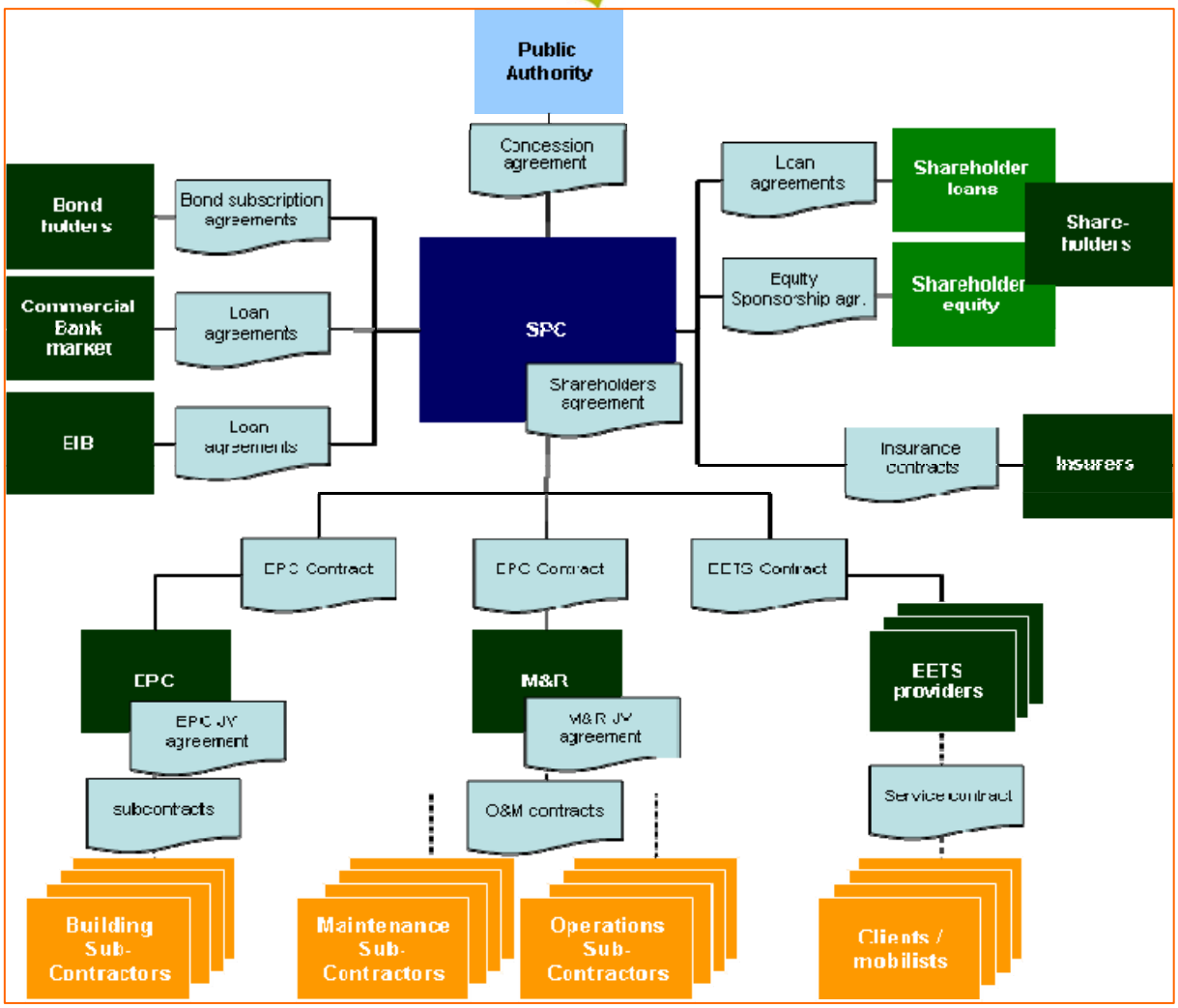
– When political acceptance for private involvement in infrastructure is low, due to the risk of 'exorbitant profits' made of the mobilists, setting up a Joint Venture PPP can increase this acceptance: when a public party is shareholder in the Joint Venture, profits will flow back to the general budgets of this party, and in this way, back to the mobilists.

Nevertheless, for the PMZ network, the concession model seems to be advantageous, given that:

– the technical complexity of the project is low: the scope of the works is well defined and there is no need for special innovative technical solutions;
– traffic, technical and political risks are low, and so can be the costs of financing;
– the risk of exorbitant profits can be countered by introducing a clause in the contract, limiting the profits or on the ROI (cap or band mechanisms);
– the network is big enough for optimising operations and maintenance;
– a concession keeps the level of complexity low; companies can stick with their core businesses;
– a larger possibility for off balance sheet financing.

Therefore, the rest of this document is based on a concession agreement structure. The typical contract spider for the Concession model is drawn in the figure on the next page.

The SPC is the central body in the typical concession structure for PPP projects. This SPC is generally formed by a consortium of contractors and equity providers that participates in a tender process to obtain a concession for an infrastructure project. The main contractual relationship is the concession agreement between the public authority and the SPC, which generally takes place over a term of 30 to 50 years. From this concession agreement, the SPC has the responsibility to construct and maintain the network, according to pre-defined quality standards and service level agreements (SLA's), and is entitled to commercially operate the network, levying tolls conform to a pre-defined toll regime and price. Generally the public authority transfers most of the project risks to the SPC.



The financing of the project is structured through the SPC. Financing is provided for by both debt and equity providers. Typically a PPP project will be funded with between 80 and 90% debt and 10 to 20% equity in various forms. Shareholder return consists of any excess funds available after repayment of debt and operational expenses.

SPC's use specialised sub-contractors for both construction works and maintenance. A great part of the construction and maintenance (availability) risks are transferred to these subcontractors, by M&R and EPC contracts. Another part of the risk is insured, if possible. This way, the SPC has limited project risks, and can thus attract relatively cheap financing.

Of course, each project structure is tailored to the specific circumstances, and the abilities of participating organisations for managing risks and creating value. The contract spider as drawn on the previous page might change due to this tailoring.

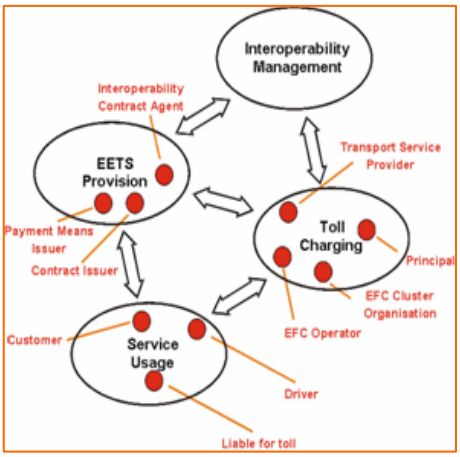
Starting date of the concession

The concession period is mainly determined by the time it takes to recover all the construction, operating and financing costs. The starting date is generally set as day 1 of the construction period; this way the risk of late delivery is transferred to the SPC, while at the same time the mobilists pay for the services that they receive, not for those they are to receive in the future (as will be when the starting date is set to be 2010 as proposed by PMZ). From this point of view, it is not recommended to start the concession period in 2010, 5 years before the construction of the Klaaswaal link. It is, however a good idea to assign a performance based maintenance contract for the whole network, starting in 2010 and transferring that contract into the concession as soon as construction starts for the Klaaswaal link in 2015. This way the future concessionaire can get acquainted with the infrastructure and the mobilists can get used to this new private operator.

As can be seen from the contract spider, the concessionaire (SPC) has contracts with European Electronic Toll Services providers (EETS providers). This is conform EU regulation on interoperability of toll roads, as developed in the EU CESARE projects. Within CESARE a business model for interoperable toll roads within the EU has been developed and agreed upon. The main conclusions of the CESARE project are:

1. The tasks for operating a road network and the electronic levying of tolls are separated and allocated to different organisations: the road operator (toll charger) and the EETS provider. The EETS provider has a contract with the mobilists on the one side, and with road operators on the other.

2. There will be an interoperability organisation for setting standards (techniques and contracts), permitting EETS providers and arbitrating disputes.



3. Reselling of services instead of cross-border invoicing, to overcome national differences in VAT and other taxes (conform the telecom sector).

4. Road operators have to allow all European mobilists that have an On Board Unit (OBU) that is conform EU standards, to pay with that OBU. They are furthermore obliged to sign contracts with permitted EETS providers to allow their customers on their roads, using standard contracts.

Chapter 7: The Concession Agreement

The concession agreement is the most important contract for the PMZ project. It defines the allocation of risks between public and private parties and with this the basic structure of the entire project. This chapter describes some guidelines on the development of the concession agreement, and comments on the standard DBFMO contract that is used in the Netherlands today. NB In literature, some authors distinguish a concession contract and a DBFM contract as different types. In this report, the terms are used for the same type of contracts: the DBFM is the contract that defines the concession.

Contract design: combining ROI and public goals

The four defined ways for influencing ROI (chapter 2) can be a guideline for contract development (especially the payment regime) by the grantor. The principle behind this is simple: achieving policy goals or public boundary conditions are rewarded by contributing to one of the four possibilities for influencing ROI.

The most direct way for rewarding achievement of public goals, is the introduction of tolling into the concession (opposite to an availability fee). The people that use the infrastructure, pay for it and generate income for the concessionaire. The more customers on the road, the higher the revenues, and therefore the better the ROI. This creates an incentive on a short construction period, good customer relations and high availability of the infrastructure. These items are no longer a public goal, but become commercial operational aims. Public goals that have no immediate relation to toll revenues, are incorporated into the contract as boundary conditions, or required services. Compliance with these conditions or services is subdued to a *bonus / malus* mechanism. Combined with well organised traffic management this is the best guarantee for an optimal and sustainable mobility and minimum congestion in the PMZ area.

If there is no juridical ground or acceptance for levying tolls, public goals meet commercial ones by making the payment regime depending on the achievement of the public goals overall. The best example of this is the availability fee; the concessionaire gets paid for every hour the road is available for customers. In case of PMZ, there is an acceptance for and juridical base for tolling, enabling the most direct way for directing both public and private goals in the same direction. This is why, for this business case, tolls have been chosen as the main (and if possible only) source of income for the concessionaire.

Without discussing the political question about core business of the government and whether investing in infrastructure is included in this or not, private financing of infrastructure comes with some great advantages. Good contracts ensure that commercial goals are equal to the public goals, and there is an incentive on optimising costs during the whole lifespan of a project. Besides hat, private (project) financing ensures a strong involvement of banks and other financial institutes, resulting in a strong emphasis on efficiency and effective allocation of money. Finally, creating enough freedom in the contract for the concessionaire (requiring *what* to achieve, not prescribing *how* to achieve this) creates room for technical and organisational innovation.

The Dutch standard DBFM contract

The Dutch Ministry of Transport, Public Works and Watermanagement has set a standard for PPP project contracts; the 'Basic DBFM Agreement Rijkswaterstaat'. This standard is relatively new in the market, and aims at standardising PPP agreements so expectations are managed and tender costs can be lowered. This paragraph describes some remarks about this standard contract and gives suggestions for improvements.

Starting points

The name of the standard agreement, DBFM (Design, Build, Finance and Maintain), immediately gives a first insight in the applicability of the agreement for toll concessions; it doesn't include the 'O' for Operations.

The standard was developed for an availability fee payment mechanism and this starting point can be recognised all over the contract, not only in the name. As a consequence, the relation between the Grantor (the State) en the Concessionaire (in the contract consequently called the 'contractor') is unbalanced for tolling projects. The concessionaire

has too little freedom for running its' business and the involvement of the State is too high: in a PPP for infrastructure the State is supposed to define *what* it wants, and not so much *how* it wants the concessionaire to deliver this (see also figure in chapter 11).

While maintaining and construction is about assets, operating is about providing customer services which means that activities such as operation of the measurement equipment (that has to do with traffic management) doesn't seem to fit within the scope of a DBFM contract. Not being the Operator also implies that there are risks such as environmental risks involving the transport of hazardous goods that are not hold by the DBFM Contractor, but transferred to the Operator. By disaggregating the value chain, technical and contractual interfaces arise, requiring from all parties additional management resources.

Anglo-Saxon Law

Furthermore, the standard agreement seems to be based on agreements as used in the United Kingdom. Because the UK has a much longer history in PPP (due to the Private Finance Initiative –PFI- program under Thatcher), this provides a solid base. However, these contracts were based on Anglo-Saxon Law, which differs quite a lot from the Dutch Law. Because Anglo-Saxon Law doesn't use terms like 'reasonableness' (*redelijkheid*) and 'fairness' (*billijkheid*), contracts have to address all possible events and issues, resulting in a very detailed contract. When applied in a Dutch Law environment, this may result in 'over-arranging' and duplicates. Because however this international Anglo-Saxon based agreement might give foreign consortia some comfort, without obliging them to study Dutch Law, it is not advised to adapt the standard agreement to better fit the Dutch legislative environment.

Applicability as a standard agreement

However Anglo-Saxon, the specific details for various payment regimes are not included in the standard agreement. This way, the standard agreement is applicable to all kinds of situations, but does not optimally succeed in bringing down the deal costs; there is still a lot of tailoring to be done for each project. This could be improved by adding a appendix standard for each payment mechanism such as tolling, availability fee or value capturing.

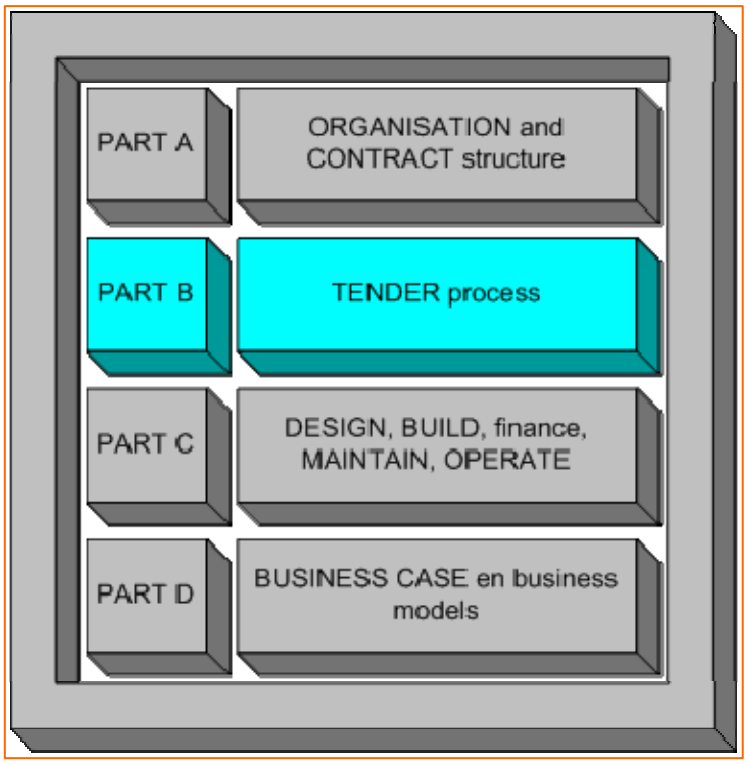
Other comments…

Some other and more detailed comments on the 'Basic DBFM Agreement Rijkswaterstaat' are listed below:

- Scope of the concession: Project physical boundaries as well as contractual scope have to be reflected on the contract.
- Reversible assets: Concession assets returning to the Public Party on the expiry date should be comprehensively listed.
- Grantor rights: The obligation, from the Contractor, to inform and request the Authority permission for changes in the shareholder structure, and to disclose financial information related to the concession have to be addressed.
- Service level agreements (SLAs): Measuring the quality of the Contractor "deliverables" is (only) possible by defining on the contract the SLAs.
- Risks to be allocated (Schedule 2 of the DBFM Contract): Risks that have to do with the presence on the Construction Site of any kind of obstruction not evident from the Disclosed Data, relating to soil (pollution, archaeological or explosives) and cable and ducts, should be allocated to the Public Party. Design and Construction permits, excluding environmental approvals, remain with the Contractor.
- Insurance and guaranties: Guaranties on behalf of the Grantor for the fulfillment of contractual obligation and insurance against third parties' claims, suits, demands, liabilities, damages and expenses arising or resulting from Contractor activities have to be included in the contract.
- Gas stations: It is common to have gas stations every 40 km and including them on the Concession Contract. However, there are other possibilities like concession the Gas Stations jointly or separately through an autonomous tender process. Important is to define the model and reflecting it on the DBFM contract. Once again, this has to do with the level of disaggregation the Public Party is seeking for.
- Project Planning: Planning for the design and construction phases as well for the maintenance activities should be included.

Part B:

TENDER process



Chapter 8: Criteria for Tendering Infrastructure

PMZ is looking for a scheme in which private ventures can be involved in road operation activities. Especially the tendering process, and within that the criteria on which the choice for the most suitable private participant will be based, has great influence on securing the fulfilment of public goals. In short, to come to a suitable tender, goals of the government are the deciding criteria.

Tender regimes and criteria

This paragraph deals with the theory behind various regimes under which private involvement can take place and analysis the way they contribute to achieving governmental goals. It is largely based on a discussion of various franchising regimes by Verhoef[7]. Four possible tender schemes are discussed below: auction for the highest Bid, auction for the Least Present Value of revenues, auction for the highest patronage and the auction for the lowest toll-price.

1. The 'highest bid' tender scheme

In this tender the competitor that bids the highest price for a certain concession wins. This is the desirable tender scheme when the government wants to maximize income. It does not however correspond with the interests of users as they pay high tolls. The bid of course will depend largely on the constraints the government applies to the capacity, environmental impact and so on.

2. 'The Least Present Value Bid' tender scheme

Engel[8] proposes a Least Present Value bid. Under this regime, competitors bid for the net-present-value of toll revenues and the consortium that bids the Least Present Value wins the bid. The concession ends when total income reaches this NPV. The term of the concession is uncertain, but the NPV of the income stream is sufficient to cover the building costs in all scenario's.

[7] Verhoef (2006): 'Second-best road pricing through highway franchising'

8 Engel et al (1997): 'Highway franchising: Pitfalls an opportunities'

It can be argued that demand risk allocated at the concessionaire creates uncertainty and thus higher costs for users. In his argument, Engel makes some underlying assumptions that might not apply in the PMZ practise. Firstly capacity is treated as exogenous (this may well be the case in the PMZ situation) and secondly it is assumed that governments often account for losses due to renegotiations with concessionaires. Furthermore, two arguable assumptions are that the planner's objective is to minimize the expected tolls paid by users and that demand is inelastic. The first assumption is arguable for it supposes that users have no choice as to pay the toll and do not benefit from the road usage. The second is arguable because recent research shows/confirms that users *are* sensitive for pricing schemes.

3. The 'highest patronage' tender scheme

In this scheme the level of road-usage is the deciding criterion. The reasoning is as follows: social surplus is given by the sum of users surplus and profits. From the assumption that the auction is competitive, net profit will be zero. Therefore social surplus is maximised when consumer surplus is. Users will only use a toll-road when their surplus is higher than the toll. In other words, when usage is maximized, consumer surplus is as well. In this scheme both capacity and toll-price are endogenous.

Tender scheme	Highest bid	Least PV bid	Highest patronage	Lowest toll price
Drivers' advantage	Up-front payment	Least PV bid	Level of road usage	Minimal toll price
Capacity	Exogeneous	Exogeneous	Endogeneous	Exogeneous (fixed capacity)
Expected traffic	NRM model	NRM model	NRM model	NRM model
Revenue source(s)	Tolls	Tolls	Tolls	Tolls
Toll price	Contracted values	Contracted values	Endogeneous	Contracted values
Concession term	Fixed	Not fixed	Fixed	Fixed
Traffic risk	Private	Private	Private	Private
Goal	Maximize Government income	Minimize overall makro-economic price	Optimise volume - capacity ratio	Minimize toll price

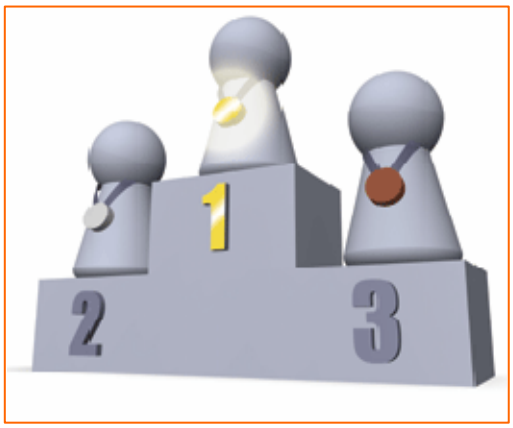
4. The 'lowest toll-price' auction

In this auction the concession is rewarded to the consortium that offers the minimal toll-price to end users, given a fixed capacity. Concessionaires will have to base their toll-price on the expected traffic volume and the costs of constructing, maintaining and operating infrastructure of which the main characteristics are prescribed by the grantor.

Of course, other tender schemes can be also analysed. A good example may be the auctioning of EUS, as discussed in the previous chapter.

Feasibility for PMZ

The tender schemes discussed above are examined by Verhoef in a theoretical environment. Research typically reduces road infrastructure to 'just roads', disregarding aspects as the relation between infrastructure development and spatial planning and economical aspects as network characteristics[9] of infrastructure to name two of them. These premises enable us to predict the outcome of various franchising regimes, but at the same time guarantee that the outcome in the real world will be a different one. The ideas behind the tender scheme models can, however, be interpreted into real world outcomes; in this case the PMZ network.



For compliance with the PMZ goals, the regimes above are analysed in this context.
The tender for the highest bid does not comply with the goals of PMZ. The users are confronted with a monopolist operator that maximizes income rather than the use of the infrastructure.

The tender for the lowest present value assumes that it is not the intention of PMZ to allocate traffic risk with the concessionaire (if not, the concessionaire gets an incentive to have as little traffic as possible on his road). This is specifically not the case for PMZ. There is always the risk of a government renegotiating with the concessionaire when a public task is put under private responsibility. This can be controlled by a robust contract and the selection of solid suppliers. Furthermore, in contrast to Engel's arguments, it is the intention of PMZ to allocate demand risk at the concessionaire.

From his assessment, Verhoef concludes that the 'highest patronage' regime offers the highest social surplus. However, it is not expected that capacity will be an endogenous parameter in the franchise. Given the fact that PMZ is the first Highway franchise in the Netherlands to be initiated and given the current legal arrangements for the development of infrastructure, government will surely ask for a certain capacity in the tender.

[9] Example: Network externalities: The concessionaire should have some degree of certainty on the pricing scheme in neighbouring links and potential expansions of serial or parallel links; these kind of interventions might greatly affect the amount of traffic on the examined link, thus affecting the income of the concessionaire.

A tender regime based on the highest price for environmental impact maximises toll prices to the willingness to pay for environmental impact of the users. This might by one step too far for PMZ.

As mentioned before choosing the best tender regime is highly dependant on the grantor's goals (in this case the PMZ management board) : maximising revenues, maximum network growth, maximum social surplus, or other… Based on our expectations of the PMZ situation, the 'lowest toll-price' will comply best to the goals of PMZ. In this scheme, the concessionaire is incentivised to manage construction, financing and operational risk as well as possible, while at the same time external costs for usage of the roads are at a minimum. Of course, operations take place within the boundaries of the EUS.

Chapter 9: Selecting the Most Suitable Scope

Goals behind franchising road operations and highway development to private investors and operators, are best met when these private parties can create enough liberties to organise the way they are to fulfil the requirements in the contracts, not depending on the choice for a tender scheme as discussed above. This freedom is dependant on the scope of the project and the requirements in the contract. PMZ asks for a scope definition along three axis:

- Geographical scope: what part of the highway network has to be included;
- Institutional scope: what kind of contract is best suitable;
- Functional scope: what elements should be included in the business model.

Geographical scope definition

For defining the geographical scope, PMZ must find an equilibrium between public acceptance and optimal road management. Optimal road management requires a large geographical scope, for this enables the road operator to fully optimise maintenance works (a concessionaire that has an entire network in operation can always guarantee the connection between Antwerp and Rotterdam) and set up a Traffic Management System that gives the customer – the road user - options for his behaviour. Furthermore a large geographical scope stimulates large scale standardisation, resulting in the following advantages:

- Technical and Maintenance standardisation means that identical components and parts are used on the entire network. This limits the number of different interfaces, makes sure that integration and testing activities are always the same along the motorway, the same problems with the same solutions occur, compared to having new problems all the time, and it enables the operator to gain expertise of the specific highway components and parts.

- Economical standardisation, reduces the costs due to the effects of serial production and economies of scale. In general, standardization of components or subsystems will lead to lower prices as production in large series is cheaper than production in small series or production of individual items.

– Visual standardisation: Creating a unique image all over the territory will make people instinctively associate with "The Motorway". Applying a uniform architectural image for the entire project will make the corridor easily recognized. This architectural image should be applied to viaducts and bridges, lighting poles, technical and operational buildings, tolling infrastructures, signalling and security equipments, noise barriers, assistance vehicles etc.

Also, from the perspective of social and governmental goals, a large scope can be advantageous; road users may find the visual standardisation comfortable and higher efficiency in maintenance and operations in the end causes lower toll prices for the customers. On the other hand, for PMZ, franchising a larger geographical network implies that existing highways should be added to the scope. This may result in low acceptance (*'we already paid for the roads by means of general and car related taxes, and now we have to pay for using them as well!'*).

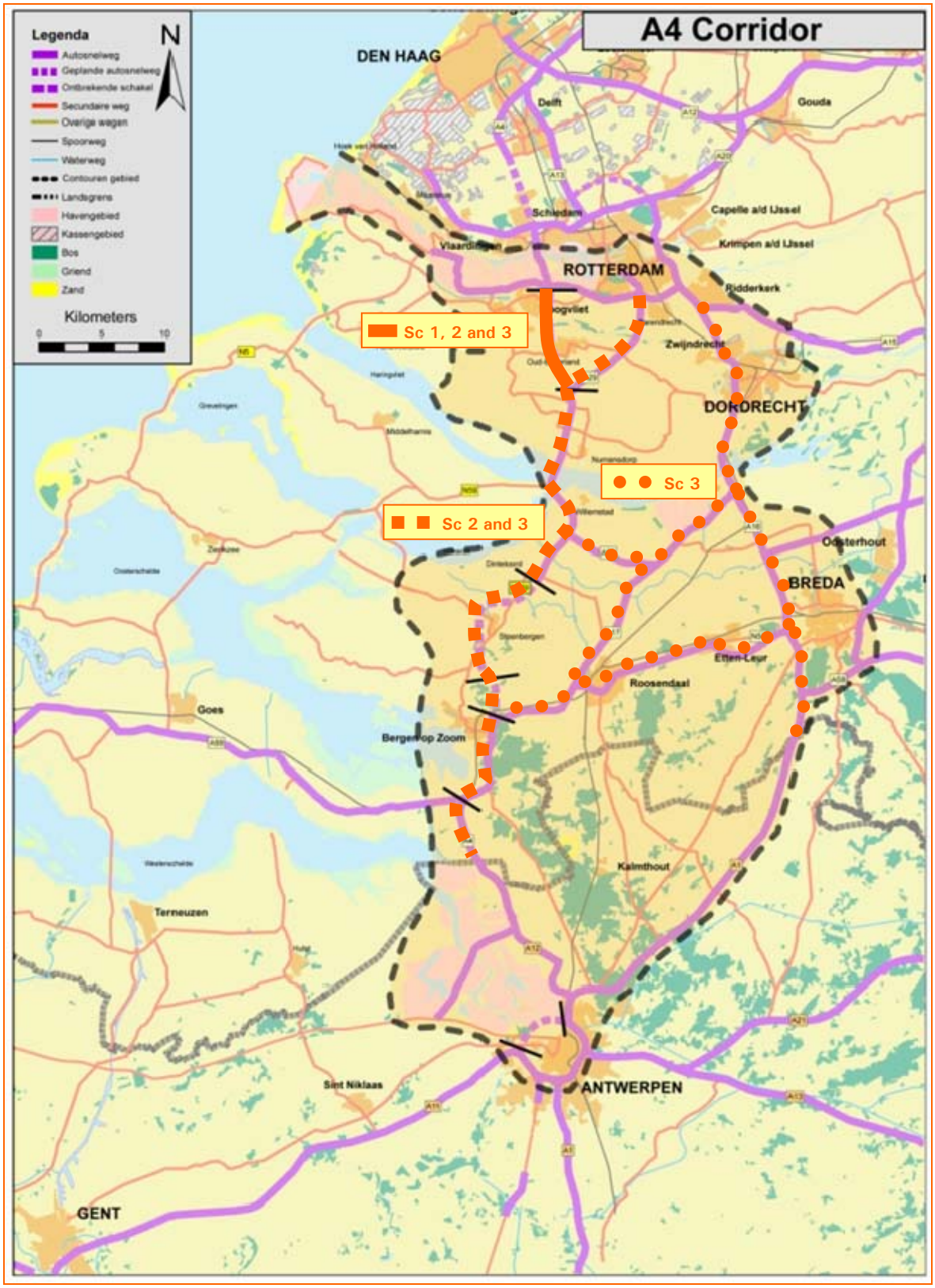
Finally a larger scope causes a better commercially suitable business case, resulting in lower prices, or even transferring the business case from 'not suitable' to 'suitable'.

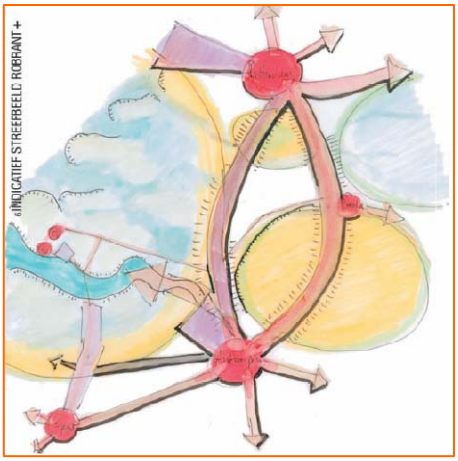
Finding the best suitable scope for PMZ should take into account all these elements. The Delta Network has defined three possible scenario's for the geographical scope (see figure on the next page; NB all scenario's exclude the stretch of the A15 between Hoogvliet and the beginning of the A29):

1. A4 South Klaaswaal
2. A4 Corridor between Rotterdam and Antwerp (including the A29 to the A15)
3. North South connection (A4 corridor and A16)

With a business case study, the commercially impossible scenario's (simply not enough revenues to finance the development of new and maintenance of new and existing infrastructure) were eliminated; i.e. scenario 1 (see business case). This means that scenario's 2 and 3 might be suitable. From a perspective of optimal customer orientation, maintenance efficiency, managing traffic on the north-south connection, guaranteeing the connection and standardisation, scenario 3 will be best. From the perspective of public acceptance scenario 2 might be preferable. For this study, scenario 3 was chosen, because it enabled for a self containing concession agreement, with revenues from the

infrastructure compensating for all costs and with many opportunities for optimisation, standardisation and service to the customers.





The Rine-Scheldt Delta (RSD) is an international partnership between public parties in the Scheldt Delta. The Rhine-Scheldt Delta organisation is concerned with opportunities and interests in the areas of economy, mobility, ecology, culture, tourism and recreation. The RSD initiated the RoBrAnt+ project that aims to harmonise policy regarding traffic and infrastructure (among others) for the area of Rotterdam – Brabant – Antwerp. One of the results of this project was a vision on the area where the A4 corridor was reserved for long distance (freight) traffic between Antwerp and Rotterdam (and beyond). For this reason, this scenario is included in this PMZ report.

Institutional scope definition

The institutional scope defines the best contract mechanisms and juridical environment for the project. Concerning these, and in relation to PMZ, the following remarks can be made:

Right to initiate projects

When the concessionaire has been given the responsibility to secure reliable connections between certain places, it might become opportune to develop new stretches in this network. The concessionaire can be given the right to initiate and even execute the spatial procedures for these stretches, while the State remains responsible for the judgment of the results. This way, a concessionaire is incentivised to incorporate mitigating or compensating measures –under the precondition that there remains a suitable business case-, so that his project –the new stretch- can be developed. This way external environmental costs will be incorporated into the projects' CAPEX and discussions on the necessity of the project become quantitative and measurable.

- Based on the analysis in chapter 6, a concession agreement is the best contract form for PMZ. This concession agreement must enable the operator to levy tolls (no availability based payment) on the network, and must oblige him to develop and maintain the network conform to the requirements;
- The contract must define a clear scope for the project, for an optimal risk allocation;
- From a cost point of view it doesn't really matter how long the concession is granted. Operational expenditure is not too sensitive for the concession period

(in relation to the geographical scope; see chapter 14 and 17);

- Of course, financing will be cheaper when there is no fixed end to the concession period, but the concession period is defined as a function of the NPV of the income or otherwise related to the financial elements. On the other hand, a variable concession period is not always politically acceptable. Because the commercial business case is not too sensitive to the concession period, and for reasons of acceptance, a concession period of 30 years has been chosen in this report.
- From a technical risk point of view, the concession period should be adapted to the replacement and reconstruction intervals of the main subsystems of the project, to include life cycles of all components and sub systems in the scope. All components that have a longer lifespan than the concession period form a risk for the grantor, for a concessionaire will be triggered to develop these parts to last as long as the concession period, and not longer.
- For reasons of public acceptance exorbitant profits should be capped, eventually using the EUS as a mechanism for this.

Functional scope definition

Concerning the functional scope, the basic rules are: decrease the complexity as much as possible and include only aspects that create value for the customer (mobilists).

Decreasing complexity within the functional scope, decreases risks for the operator and the grantor. When there is a business case based on only tolls, do not include other revenue sources in the contract. Concessionaires can then stick with their core businesses, and do not need to partner with parties from other sectors (resulting in inefficiencies).

A good example of the second rule is the inclusion of Dynamic Traffic Management into the scope of the project. This creates only value for the customer when traffic can be guided along the best route towards his destination, and this means there should be alternative routes within the scope of the concession. This way, the geographical scope defines possibilities for the functional scope. Only geographical scope scenario 3 should include the

execution of Traffic management in the functional scope (costs for operations like traffic or incident management are always to be included).

Value capturing by means of using extra value in real and industrial estate development as a source of income in the PMZ concession doesn't seem attractive, because of three reasons:

1. It is very hard and arbitrary to define the added value of land and real estate created by the infrastructure developments;
2. It is very hard to allocate the money gained from this added value to the project;
3. The amounts of money that are involved in real estate developments are usually not significant when compared to the budgets in infrastructural developments.

Furthermore, an extra difficulty comes from the strategic behaviour of interested parties in this sector. Parties have the tendency to buy land beforehand, waiting for a project to be developed in that region and so taking advantage of the value capturing of that project. Writing down the possibilities for value capturing within the PMZ area (about 25 to 35 M€, based on the possibility to develop 1500 extra houses) would trigger parties to invest in land positions in the region, and thus decreasing the possibility of resource allocation to the PMZ project. This last difficulty could be tackled when it will be decided (by law) that money that is earned due to a change in the purpose of the land within the PMZ area, will be allocated to the project.

Opportunity cards and the public contribution to the PMZ-project

In reaching the double goal of accessibility and quality of life in the corridor, PMZ asks the private market to take a look at the opportunities for spatial and nature development. PMZ presents a set of opportunity cards with projects that can help reach PMZ's goals and add to a suitable business case. From the road operator view, this report aims at keeping the concession simple and letting parties do what they are good at: financing, constructing and operating road infrastructure within a well defined scope. With faster realisation of infrastructure by private operators, accessibility rises. The improvement of the mobility in the region will improve quality of life, MER-procedures and EUS-mechanisms will add to that. Opportunity cards regarding the environment can be used in MER- and EUS-procedures; PMZ can coordinate this and be the mediator between private and public parties. Furthermore, the RPA or EIF as described previously can invest in these opportunities.

In obtaining support and cooperation from the public parties, PMZ can play an important role in accelerating planning and licensing procedures. If PMZ would be able to translate the positive intentions of public parties into an agreement about cooperation in the coordination of projects before tendering the concession, this would decrease the risks and as a consequence the costs for the project.

Chapter 10: Information and Competitive Advantage

The EU public sector procurement directive (2004/18/EC) describes contracting specificities of "complex contracts" such as PPP (e.g. competitive dialogue). One of the most important issues to deal with is providing each bidder or consortium with the same level of information, while at the same time allowing the bidders to distinguish themselves based on innovations, competitive knowledge and processing this information.

Needed information during tender phase (non exhaustive)	
Infrastructure	Lanes, length, number and type of engineering and DVM structures, surface area pavement & shoulders, Age of components, details on engineering structures, pavement types, inspection results, maintenance plans, conceptual design new infra, soil conditions, etc.
Traffic forecasts	Base year model information, forecast year model information, forecast results for different alternatives and scenario's, allowed toll levels and growth rates, model sensitivity analysis, etc.
Cost prediction	Maintenance costs existing infra divided into costs for daily repairs, periodical maintenance and large maintenance projects, management & overhead, etc. costs for winter and incident management, etc.
Legislation and contract	Juridical background, applicable law and legislation, tax issues, contract outline including payment and bonus / malus regime, reporting scheme, etc.
Procedures	Tender procedure, project scope, liberties for deviation from the scope, tender assessment criteria, etc.

The provision of traffic forecasts is an example of the equilibrium between honest treatment of all bidders and allowing for competitive advantages. That is why in this chapter, the provision of traffic information is analysed, as an example for the treatment of information in general. Some suggestion about the information that should be provided in a bidding stage, how potential bidders are given opportunities to produce additional model runs and about project planning and communication are provided.

Traffic information and model availability in the tender phase

In a bidding procedure, the importance of traffic forecasts is high as they are an important input for the financial models underlying the bid. Detailed knowledge about the model structure, chosen input and their validity, and the sensitivity of toll road forecast towards different model input variables is necessary.

All bidders need information about the traffic forecasts and associated toll revenues. This information should at least contain base year model information, forecast year model information, forecast results for different alternatives and scenario's. These items are

elaborated in appendix V. Even if all this information is provided, all bidders will want to produce additional model runs to answer specific question they have, or to analyse possible upside and downside cases not yet included. Any bidder will try to produce a maximum competing bid, with the least amount of financial risk. There are two approaches to support bidders:

1. they receive the model and may produce their own forecasts,
2. each bidder is allowed to request any model run which is then produced by the model builder.

The first option provides more freedom for bidders and is easier to plan. The second option is safer and provides less liability. If the bidding process includes more phases where the number of bidders reduces and bids become more detailed, it is not uncommon to increase the amount of data access step by step.

Planning and communication

In the current phase of the PMZ project, a level playing field and open channels of communication between PMZ and private consortia is highly valued to learn as much as possible about how to set up a bidding procedure.

In a bidding procedure however, the communication between bidders will be non-existent and knowledge about what a specific bidder is doing cannot be shared between PMZ and other bidders. There needs to be confidentiality in both directions, especially if bidders are not provided with the traffic model and additional runs are conducted centrally.

In the latter case, it is essential that the model builder (consultant) has enough capacity available to respond promptly to additional questions and model run requests throughout the bidding process. Obviously the model consultant has to keep all information confidential and cannot itself be a traffic advisor for one of the bidders.

Finally the project team and model consultant need to be available for meetings (data room) where bidders (in separate meeting) can address any issue and/or question they have regarding the traffic forecasts.

Chapter 11: The Tender Process

Tendering a PPP aims at creating value for both the grantor and the concessionaire, while at the same time allowing for competition so that the road users get most value for money. This chapter deals with the tender process for PMZ; the first paragraph describes present legislation on the tendering of PPP's, which is also applicable for PMZ. The second paragraph sets out other recommendations for the PMZ tender process, including a planning.

Legislation on tendering PPP's

Although there is no EU-wide PPP policy, specific European legislation or directives relating to PPPs, there are general principles that come from the European Treaty:

- adequate publicity of the procurement process and requirements,
- assure conditions for effective competition as well as for transparency and impartiality,
- define objective non-discriminatory criteria.

There is also a procedure introduced in the public sector procurement directive (2004/18/EC): the competitive dialogue, which more or less responds to the contracting specificities of "complex contracts" such as PPP.

Some EU members have their own legislation for PPPs. E.g. Portugal has the Decree-Law 86/2003 from February 26, according to which a Public-Private Partnership model should be considered in the case its more favourable when compared to the hypothetical risk-adjusted costing, by the public sector as a supplier: the Public Sector Comparator (PSC). Decree-Law 86/2003 is a top-level directive, intended to define the general rules for the State intervention on the procurement, contracting, supervision and follow-up phases of PPP projects.

In the Netherlands, there is the 'Modulair Model Aanbestedingsleidraad DBFM-Basisovereenkomst' (MMA); a guide for tendering the 'Basic DBFM Agreement Rijkswaterstaat' as discussed previously in chapter 7. This procedure is based on the tender guidelines for works (*aanbestedingsregelement ARW 2005*), which itself is based on the competitive dialogue as described in the public sector procurement directive

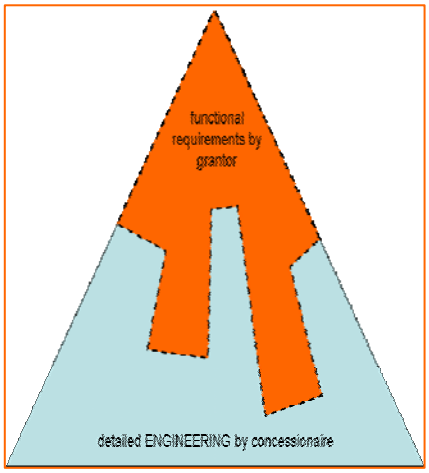
(2004/18/EC). It would be recommendable to align the MMA with the ARW 2005, and if necessary update it with insights derived from the present PPP procurement evaluations in the Netherlands.

In 2007, a new Procurement Law (*Aanbestedingswet* 2006) will be introduced in the Netherlands. This law prescribes (among others) integrity testing of private organisations that deliver services to the government by the COVOG[10] institute and deals with procurement criteria for public services. It would be logical to adjust and update the MMA towards this new Procurement Law.

Characteristics for the tender procedure

In general a well defined tender process includes the following:

- Definition of a clear scope for the project;
- Definition of clear criteria, weighting factors and other evaluation methods, freezing them along the procurement and contracting process;
- Optimal allocation of risks during the tender process negotiations (allocation to the parties which are best placed to manage and control them).



- Broad guidance on style and content of the bids should be provided by the principal. This can avoid unnecessarily difficulties in building the bid (broad guidance on style and content is different from detailed specification of the requirements relating resources or processes to implement, which is suitable for traditional procurement but might inhibit an effective transfer of the risks on PPP contracts – see figure; do not perform detailed engineering and abstract functional requirements from that, stop engineering at the level of these requirements -).
- In case of a payment regime by the grantor: focus on service specifications: define outcome specifications (what; not how) and quality level required for each service;

[10] *Centraal Orgaan Verklaringen omtrent Gedrag*

- In case of an availability fee: definition of a 3 P payment mechanism: *P*ay for the service provided; *P*ay for the quality of service provided; Do not *P*ay for higher quality service than required. And "No service, no payment; Poor service, poor payment';
- Avoid prescriptive funding/financing options allowing the private party to search for innovative and evolving models even after the PPP contract is awarded and signed.

A lesson learned from the second Coen tender

During the tender for the second Coen, risks were financially valued by the grantor as well as the bidders. The party that valued risks the lowest, was thought to be best capable of managing these. In case this party was one of the bidders, the other bidders were given penalty points in the evaluation of their bids.

The risks both grantor and bidders were not willing to take were pushed towards the bidders by the grantor: not incorporating these risks into their bid resulted in penalty point as well. Within the competitive dialogue phase, this mechanism was used to determine the final bid (total price).The result of this pricing mechanism is that the bidder that incorporates the most risks, can offer the best bid. This way the concession is granted to the party that is willing to take the most risks, at the lowest price. This creates an enormous risk for the grantor: when non-manageable risks occur, the concessionaire will sooner go bankrupt and the grantor will not succeed in developing the project budget. It is an example of 'penny wise – pound foolish'.

And concerning the assessment of proposals from bidders:

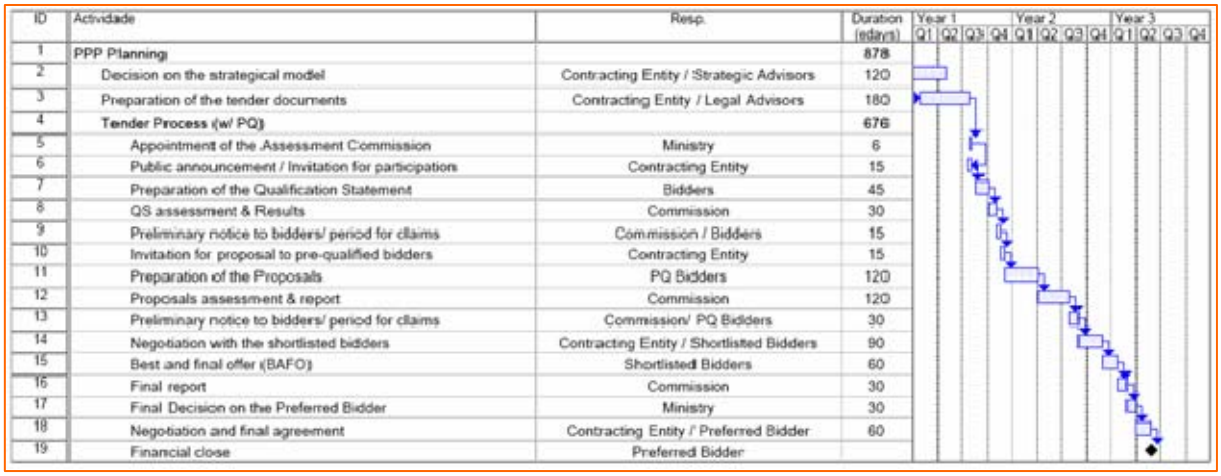
- Evaluation of the credibility of the competitor
- Evaluation of the credibility of the proposal (E.g. unrealistic financial models, with over-optimistic revenues and under estimated costs might lead to early termination of the contract);
- Make sure that the bids are not requested in terms of a different (higher) quality of services than what is the output specification, reference project and PSC;
- Determination of the risk-adjusted costing, by the public sector as a supplier – the PSC[11] – as a valid benchmark against which private sector bids[12];

[11] Public Sector Comparator may be defined as a hypothetical risk-adjusted costing, by the public sector as a supplier, to an output specification produced as part of a PPP/PFI procurement exercise. It is expressed in NPV terms. It is based on the recent actual public sector method of providing that output (including any reasonably foreseeable efficiencies the public sector could make) and takes full account of the risks, expressed in monetary terms, which would be encountered by the style of procurement. For additional informational please refer to "How to construct a Public Sector Comparator" – Technical Note nº5, Treasury Task Force Private Finance, UK

The PMZ tender procedure

The procedure for a successful tender of the PMZ project will have to be based on the general remarks in the previous paragraphs. This paragraph describes some other specific recommendations for the PMZ project tender procedure.

One of the main frustrations about tendering PPP projects in the Netherlands at present is the costs that are involved for the consortia that are involved. Especially for the losing consortia this is hard and may even result in a withdrawal from the market –in the end resulting in too few competing consortia-. High costs are mainly due to high expenditures on personnel, and financial and legal advice. Decreasing deal costs can be obtained by selecting consortia earlier in the process, based on a general vision on the project approach or a first bid.



ID	Actividade	Resp.	Duration (ndays)
1	PPP Planning		878
2	Decision on the strategical model	Contracting Entity / Strategic Advisors	120
3	Preparation of the tender documents	Contracting Entity / Legal Advisors	180
4	Tender Process (w/ PQ)		676
5	Appointment of the Assessment Commission	Ministry	6
6	Public announcement / Invitation for participation	Contracting Entity	15
7	Preparation of the Qualification Statement	Bidders	45
8	QS assessment & Results	Commission	30
9	Preliminary notice to bidders/ period for claims	Commission / Bidders	15
10	Invitation for proposal to pre-qualified bidders	Contracting Entity	15
11	Preparation of the Proposals	PQ Bidders	120
12	Proposals assessment & report	Commission	120
13	Preliminary notice to bidders/ period for claims	Commission/ PQ Bidders	30
14	Negotiation with the shortlisted bidders	Contracting Entity / Shortlisted Bidders	90
15	Best and final offer (BAFO)	Shortlisted Bidders	60
16	Final report	Commission	30
17	Final Decision on the Preferred Bidder	Ministry	30
18	Negotiation and final agreement	Contracting Entity / Preferred Bidder	60
19	Financial close	Preferred Bidder	

Another important issue is the tender requirements. At present one of the pre-qualifying criteria is the amount of construction works that were carried out in the past. This is a remainder of the classical approach towards infrastructure development. A changing perspective on infrastructure that comes with PPP – infrastructure is more and more to be seen as a means of production – however asks for other granting criteria such as financial engineering skills, operations management and maintenance (Life Cycle Cost) expertise. In the end, a concessionaire will have to be a management company, that incorporates

[12] Much of the public sector does not use commercial insurers. This is because the size and range of state business is so large that it does not need to spread its risk, while the value of claims is unlikely to exceed its premium payments. However the government still bears the cost arising from unsecured risks. Therefore, the PSC should include an estimate of the value of such uninsured risks, taking into account the likelihood of such costs arising.

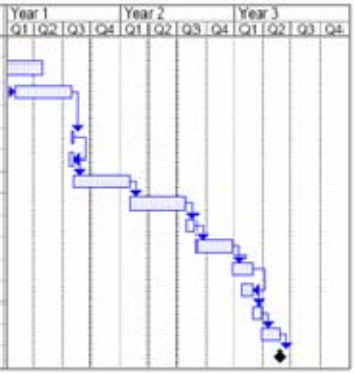
juridical, financial and managerial expertise, and that will be responsible for tendering the development and maintenance of their production means: the infrastructure.

The PMZ project still is in an early phase of development. The present market consultation aims at defining a suitable scope (decision on the strategic business model) for the project. When this goal is reached, there will still be a lot of steps to be taken. These steps are presented in the figure on the previous page (including a minimum planning for the separate steps).

As can be seen in the figure above, it will take at least another 30 months before financial close. Assuming that the scope definition (the decision on the strategic business model) of PMZ can be realised before the second quarter of 2008, financial close will be around the 3rd quarter of 2010. Assuming a construction period of 3 years and assuming spatial and environmental procedures can be finished before financial close, the new infrastructure will not be in place before 2014.

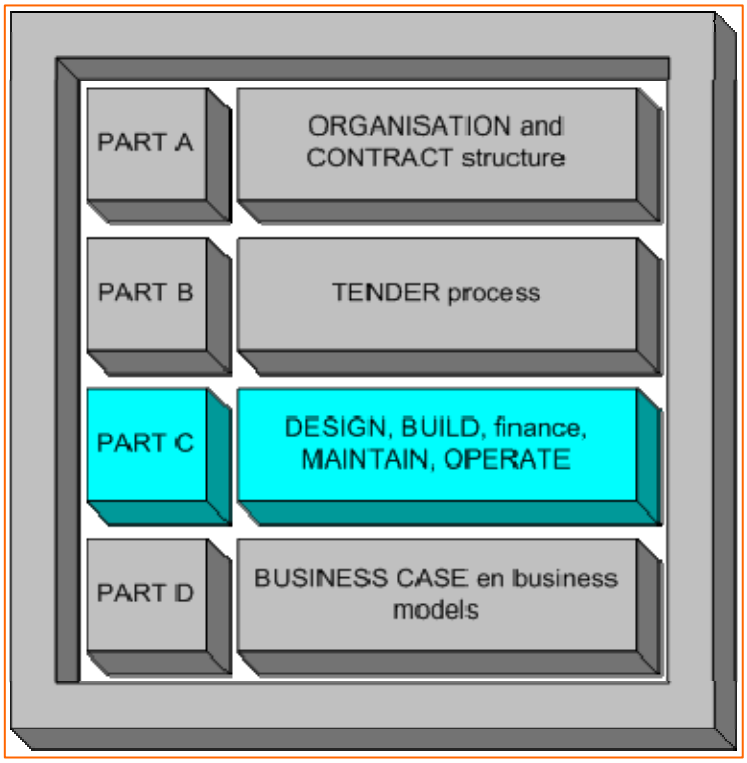
Leaving the prequalification out of the tender process planning will not significantly shorten the planning, as can be seen from the figure below.

ID	Actividade	Resp.	Duration (edays)
1	PPP Planning		877
2	Decision on the strategical model	Contracting Entity / Strategic Advisors	120
3	Preparation of the tender documents	Contracting Entity / Legal Advisors	180
4	Tender Process (w/o PQ)		675
5	Appointment of the Assessment Commission	Ministry	6
6	Public announcement	Contracting Entity	15
7	Preparation of bids	Bidders	180
8	Bid assessment & Report	Commission	180
9	Preliminary notice to bidders/ period for claims	Commission / Bidders	30
10	Negotiation with the shortlisted bidders	Commission / Sortlisted bidders	120
11	Best and final offer (BAFO)	Shortlisted Bidders	60
12	Final report	Commission	30
13	Final Decision on the Preferred Bidder	Ministry	30
14	Negotiation and final agreement	Contracting Entity / Preferred Bidder	60
15	Financial close	Preferred Bidder	



Part C:

DESIGN, BUILD, Finance, MAINTAIN, OPERATE



Chapter 12: Design and Build: CAPEX

This chapter describes the Design and Build phase of the PMZ project; especially the A4 Klaaswaal link. The first paragraph arguments that private development of infrastructure comes with certain advantages. The second paragraph gives a second opinion on the Capital Expenditures (investments/CAPEX) of the Klaaswaal link.

Private infrastructure development

Projects like the Westerscheldetunnel have taught that an autonomously operating principal organisation, that has freedom to make its own decisions is of overriding importance for the success of large infra-projects. Private companies (SPC / concessionaire) are relatively small organisations with a clear and simple structure, which have short (procedural) lines and manage their own finances. This turns private companies into very decisive principals, who are able to act immediately when the situation asks for action. To be able to operate quickly without the lumber of a big bureaucratic apparatus, is an important precondition for the success of big, complex and dynamic projects where tremendous interests are at stake. The fear of establishing precedents often plays an important role in decision-making within the public sector. More flexibility in e.g. land acquisition or bonus-/malus arrangements with contractors can make the difference for the planning of the project.

Private parties' focus on ROI reinforces this effect. Since their income is provided by tolling, and the tolling can only start when the construction is completed, the risk of delay of the completion of the infrastructure is theirs, and thus an extra incentive on scheduled completion is introduced. Deciding on expenditures based on ROI-considerations, is a strong contribution to good financial management. Management of the project environment regarding town and country planning, licences and purchasing of land in combination with extensive communication with the surroundings and future customers, are considered of major importance for the success of the project. Private parties will use all their creativity and energy to achieve their goals and optimise the support for their project.

Cost estimation for PMZ developments

The PMZ concession contains a specific question for the design and construction of the Klaaswaal link in the A4 network (the dotted black line in the map below). This chapter gives a second opinion on the cost estimations for the construction of this link.

The cost estimation is based on the horizontal alignment of the Klaaswaal link, and estimations for the vertical alignment and infrastructural engineering. For the calculations the following starting points and assumptions apply:

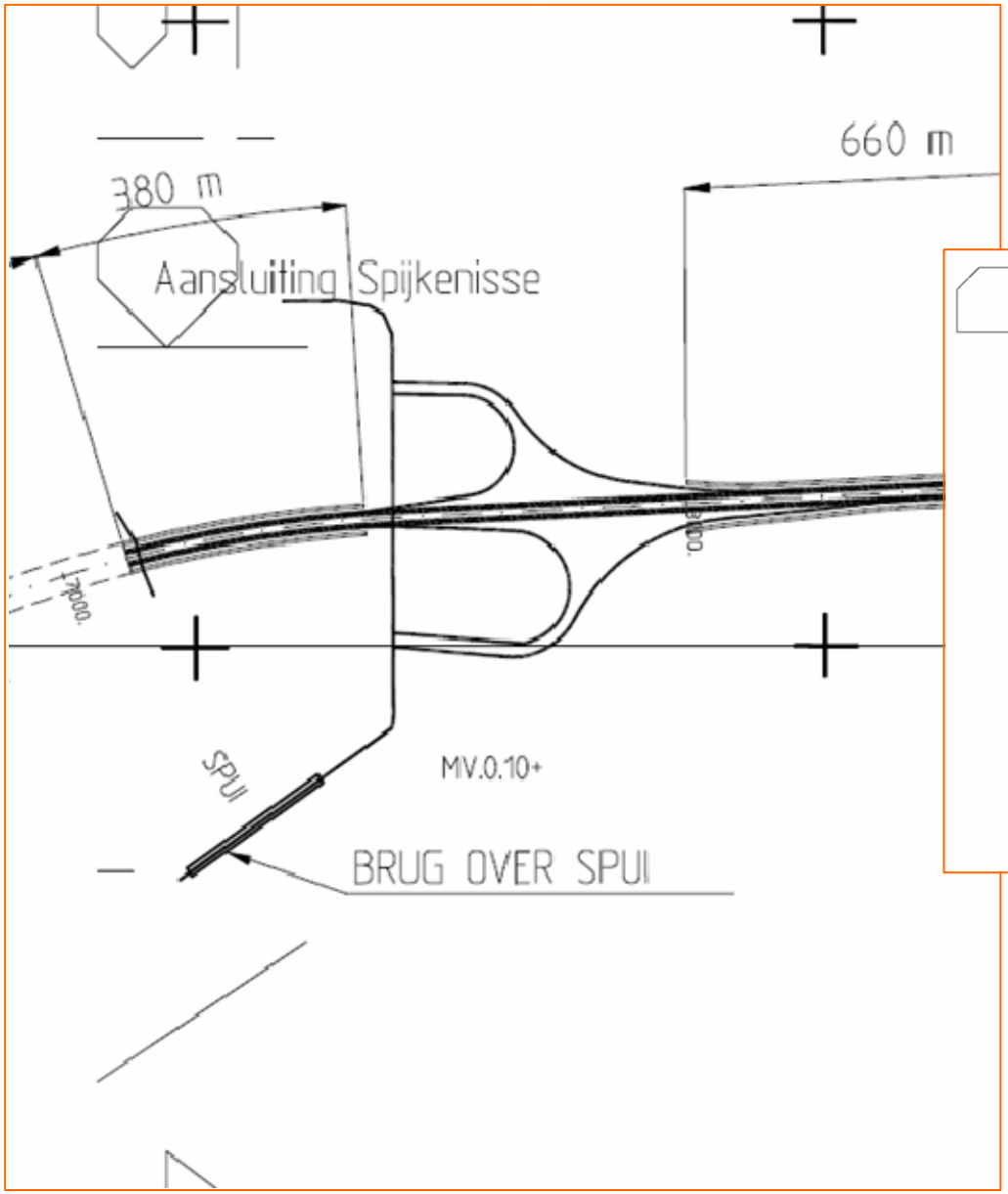
- Design and construct of a 2x2 highway between the A4 (Hoogvliet connection), and A29 (Klaaswaal connection). The total length of this route is 11 km.
- There are 4 connections and four crossings with the secondary road network incorporated in the estimation.
- Crossings under the Oude Maas and Spui rivers are made using a submerged tunnel.
- Design of the cross section is based on the ROA guidelines (Dutch design guideline for highways).

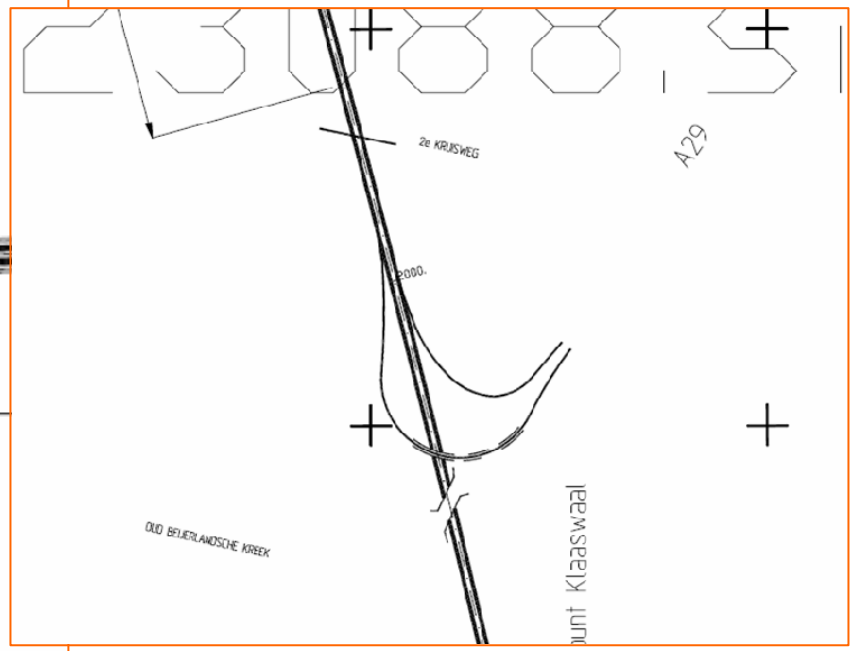
The estimations include the following cost drivers:

- Construction costs for the physical development of the infrastructure, including technical installations.
- Real estate costs for the acquisition of land
- Engineering costs (technical, juridical, environmental and organisational aspects)
- Other extra costs, e.g. for the acquisition of permits
- Miscellaneous costs
- VAT

X 1000	DIRECT COSTS	TO BE SPECIFIED	SUBTOTAL	object miscellaneous	TOTAL
CONSTRUCTION COSTS					
A4 Klaaswaal link	€144	€14	€ 158	€70	€ 228
Secondary roads	€7	€1	€ 8	€3	€ 11
Engineering constructions	€212	€11	€ 223	€98	€ 321
	€364	€26	€ 390	€171	€ 561
REAL ESTATE COSTS					
A4 Klaaswaal link	€151	€15	€ 166	€35	€ 201
Secondary roads	€8	€1	€ 9	€2	€ 11
	€159	€16	€ 175	€37	€ 212
ENGINEERING COSTS					
A4 Klaaswaal link	€20	-	€ 20	€2	€ 22
Secondary roads	€1	-	€ 1	€0	€ 1
Engineering constructions	€28	-	€ 28	€3	€ 31
	€49	-	€ 49	€5	€ 54
OTHER EXTRA COSTS	€6	€0	€ 6	€1	€ 7
		BASIC CALCULATION			€ 832
		project miscellaneous			€166
		INVESTMENT ex VAT			€ 998
		Value added tax			€162
		TOTAL INVESTMENT INCL. vat			€ 1.161

Costs for maintenance are not included in this estimation. The base year for the calculations (price level) is 2005. This results in a total estimation of M€ 1.161,-.


660 m
380 m
Aansluiting Spijkenisse
MV.0.10+
SPUI
BRUG OVER SPUI


2e KRUISWEG
A29
OUD BEIJERLANDSCHE KREEK
unt Klaaswaal

Chapter 13: Tolling strategy and OPEX

The PMZ network is heavily used and is characterised by high traffic volumes and intensities. The concession strives to realise a better mobility in the region, with higher comfort, decreasing travel times and efficient use of budgets. The tolling strategy is based on the same principles. This means first of all that for the levying of the tolls, a free flow system will be applied. This means that customers have no nuisance what so ever from passing a collection point and the toll collection will have to be handled electronically (see figure).

The way in which tolling can be introduced for PMZ is highly depending on the proceedings of *Anders Betalen voor Mobiliteit* (ABvM, the national road pricing policy). Because at present, it is unsure how ABvM will work out (technically, market structure, enforcement, etc.), for PMZ the tolling strategy will be described for two possible scenario's: with the introduction of ABvM and without ABvM. For each scenario the technical lay-out of the system, the market structure, the enforcement, costs and some risks are discussed below. For both scenario's, European legislation on tolling and interoperability applies. This is briefly explained towards the end of this chapter.

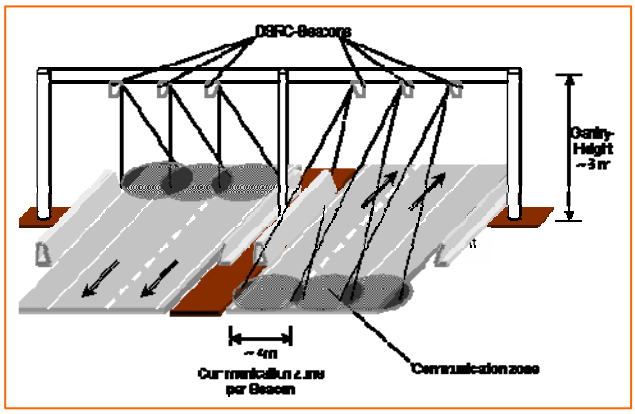
Option 1: PMZ tolling without the introduction of ABvM

Without the introduction of ABvM, no infrastructure for tolling will be in place. The concessionaire will be responsible for the development, maintenance and operations of the free flow tolling system. The concessionaire might use a subcontractor for this.

For levying the tolls, gantries will be placed above the roads. The gantries contain beacons that receive a signal from an On Board Unit (OBU) in the passing cars. These OBU's are connected to a service contract; OBU users are the customer of the concessionaire. Incidental users without OBU, can buy one in gas stations or customer service points that are located on several point in the vicinity of the network. Payment for incidental users can also be obtained by internet, Mobile phone or cash payments (man –operated toll boots).

To seduce customers to use the OBU, a discount on the toll prices can be given for OBU users (for example, customers of the Westerscheldetunnel get discounts up to 20%!).

Enforcement of the tolling is the responsibility of the concessionaire. Because the tolls are levied based on a B2C contract, the concessionaire can economically optimise the rate of enforcement: the last 2% of enforcement might be more expensive than the toll income of this 2%, therefore the concessionaire can accept a 98% enforcement rate (a typical rate for private concession enforcement). Enforcement takes place by adding a second gantry to every few gantries, that makes photo's of all cars without OBU or vehicles that are detected as another vehicle class than indicated by the OBU. These photographs are used for penalising non-payment (fines up to 1000% are not uncommon).



The investment costs (capital expenditure, CAPEX) for tolling depend on the length of the network and the number of stretches in it. For a DSRC based system, on each stretch of road a gantry will have to be installed (cost including installation and power € 100.000,- each). All gantries will have to carry antenna's (beacons) and other equipment for the road pricing (€ 50.000,- per ganrty, including installation, etc.). Enforcement can be executed using less measuring points, depending on the suitable strength of the enforcement system and the number of OBU users (typically every 3 stretches an enforcement point). Each point costs € 300.000,- (equipment, including installation, including the gantry). In the Netherlands already a lot of gantries are in place, so the actual number of these gantries has great influence on the total costs.

Besides that the initial acquisition of OBU are incorporated in the CAPEX. A DSRC[13] based OBU costs about € 15,- and takes 15 minutes to install (costs for installation €45 per hour). It should be noted that the installation costs can be reduced to almost zero, when the OBU is attached to the front window screen by the customer itself. Experiences with free flow tolling in Portugal, Austria, the Czech Republic and other countries outside

[13] DSRC: Dedicated Short Range Communication: one of the European standard technologies for interoperable tolling

Europe underline that with a good enforcement organisation, fraud will be very low and all customers will place the OBU in their vehicles. Assuming 1.000.000 customers within the PMZ network, the CAPEX for the OBU are € 15.000.000,-

Besides the costs for the acquisition, installation and maintenance of OBU's, the costs for the back office will be important. Experience from other European countries prove that the CAPEX for this back office are between € 5.000.000,- and € 10.000.000,-. This includes the development of a back office organisation, setting up the database, equipments (computers, cables, etc) and information systems (software).

CAPEX		Number of units			Capex		
	unit cost	scen 1	scen 2	scen 3	scen 1	scen 2	scen 3
OBU	€ 15,00	1.000.000	1.000.000	1.000.000	€ 15.000.000,00	€ 15.000.000,00	€ 15.000.000,00
Backoffice	€ 7.500.000,00	1	1	1	€ 7.500.000,00	€ 7.500.000,00	€ 7.500.000,00
Gantries	€ 100.000,00	2	9	21	€ 200.000,00	€ 900.000,00	€ 2.100.000,00
Equipment toll	€ 50.000,00	2	9	21	€ 100.000,00	€ 450.000,00	€ 1.050.000,00
Equipment enforcement	€ 200.000,00	1	3	7	€ 200.000,00	€ 600.000,00	€ 1.400.000,00
gantries enforcement	€ 100.000,00	1	3	7	€ 100.000,00	€ 300.000,00	€ 700.000,00
TOTAL					€ 23.100.000,00	€ 24.750.000,00	€ 27.750.000,00

The operational costs (operational expenditure, OPEX) for the DSRC based OBU consist of replacements of broken OBU's and the replacement of expired batteries. The battery of the DSRC OBU is the weakest link for operational costs. About every 5 years (3 to 9 years) this battery will have to be replaced (total operation costs € 6,-). On the other hand replacements of the OBU itself are only necessary for less then 1% of the OBU's (based on experiences in Portugal).

OPEX		Number of units / year			Opex		
	unit cost	scen 1	scen 2	scen 3	scen 1	scen 2	scen 3
OBU	€ 6,00	200.000	200.000	200.000	€ 1.200.000,00	€ 1.200.000,00	€ 1.200.000,00
operations	€ 54.000,00	20	87	201	€ 1.080.000,00	€ 4.698.000,00	€ 10.854.000,00
Gantries	€ 100.000,00	0,1	0,5	1,3	€ 12.000,00	€ 54.000,00	€ 126.000,00
Equipment toll	€ 50.000,00	0,1	0,5	1,3	€ 6.000,00	€ 27.000,00	€ 63.000,00
Equipment enforcement	€ 200.000,00	0,04	0,18	0,42	€ 8.000,00	€ 36.000,00	€ 84.000,00
gantries enforcement	€ 100.000,00	0,04	0,18	0,42	€ 4.000,00	€ 18.000,00	€ 42.000,00
TOTAL					€ 2.310.000,00	€ 6.033.000,00	€ 12.369.000,00

The calculation of the OPEX for the road side equipment is based on the assumption that every year 6% of the equipment will have to be replaced. This percentage is based on experiences in other countries. The operational costs for the back office consist of the processing of transactions, billing and other administrative costs. Furthermore, there should be a customer care centre (call centre and helpdesk). Based on the Portuguese

situation, our estimation is that OPEX count up to € 54.000,- per kilometre per year. This is including the development of mobile enforcement teams.

NB for the business case analysis, in the predictions on revenues (based on the traffic volumes) and OPEX, the introduction of ABvM is taken into account. Toll option 2 as described below is assumed to be in place, conform the present ABvM policy and time scheme.

Option 2: ABvM will be introduced before the start of the concession

Introduction of the national road pricing scheme, ABvM, will have a great influence on the toll operations of the PMZ concessionaire. If managed well, these consequences are mainly positive.

The national road pricing scheme is based on a flat fee of 3,4 cents per kilometre on all roads, highways as well as secondary and municipal roads. The fee furthermore applies for all vehicles and at all times. Later on the prices might be made variable as a function of the time (rush hour more expensive), location (urban area's more expensive) and vehicle characteristics (more polluting cars more expensive). One very concrete idea for this is levying a congestion fee of 11 cents per kilometre on all roads with a maximum speed higher than 70 km/h, that show an Volume / Capacity rate of more than 0,8[14].

ABvM will have to start in 2011, but there is no deadline for the system to be fully operational. It has not been decided yet whether the prices will be seen as a private toll fee or as a public tax and what the market structure of the scheme will be. However, the government gives a very important boundary condition on the costs of operations: OPEX can not exceed 5% of the collected fees.

A full introduction of ABvM before the start of the PMZ concession would mean that the toll collection system and the

[14] After executing all works from MIT and NoMo, the main Dutch policy documents that give an overview of works and project of the Ministry of Transport

enforcement organisation will already be in place, under the responsibility of the government. The toll collection of the concessionaire will be done by the government, and collected revenues will –in the central back office of the government- be allocated to the concessionaire. Enforcement will also be the responsibility of the government. CAPEX for the concessionaire will decrease[15], and OPEX will be determined by the government. The latter works as follows:

- The PMZ concessionaire buys the toll collection from the government (or the organisation that collect on behalf of them); they will not develop a toll collection system themselves.
- The government will set a price for this toll collection that delivers no profits for them, but will also not cost them any money.
- OPEX for the government are set to be 5% of the collected revenues
- The price of the tolling will be 5% of the revenues.

As an indication, the OPEX for tolling conform this methodology are given below for each geographical scenario.

Estimation of tolling OPEX *X1000*	Indication Minimum	Indication Maximum
Scenario 1	€ 1.000,-	€ 2.000,-
Scenario 2	€ 3.000,-	€ 6.000,-
Scenario 3	€ 6.000,-	€ 12.000,-

It can be seen from this table that costs for toll operations when ABvM is in place are comparable with OPEX when tolling is done by the concessionaire.

For the concessionaire's business case, the relation between individual toll projects and the overall system of road pricing (ABvM) will be very important; especially the decision whether or not the ABvM fees and the individual tolls will accumulate or not.

- From a business point of view this should not be the case: cumulating the fees and tolls will lead to higher prices, and thus to a decreased number of customers. It will be harder to develop a suitable business case for PMZ.
- But also from a 'fairness' point of view, it can be stated that ABvM fees and individual tolls should not accumulate. The concessionaire has the responsibility for all

[15] However, the total CAPEX of the project will not significantly be influenced due to the fact that CAPEX for the development of the infrastructure exceed CAPEX for the tolling system by far.

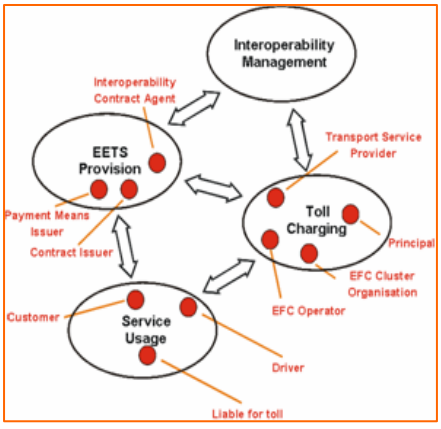
developments, maintenance and operations of the highway network, and thus carries CAPEX and OPEX for this as well. Customers pay for the services of the concessionaire by paying the tolls. In this way, in case of a concession, there is no fair relation between the ABvM fees and the services that are provided: the ABvM fees should not be levied on the private network.

Finally ABvM could be a great chance for PMZ, because ABvM is still looking for pilot projects that give insight in customer behaviour when confronted with direct payments for road use, the working of the technical systems or enforcement schemes in a free flow situation. PMZ could profile itself as the first real PPP step towards large scale road pricing in the Netherlands.

European legislation on interoperability

For passenger cars there are no EU directives as yet. For freight traffic the existing directive 2006/38/EG gives constraints and possibilities for the heavy trucks (> 12 tons) on highways. These constraints will have to be met (werkprogramma "anders betalen voor mobiliteit, DGP/WV/AbvM/U.06.00220"). This means for instance that for this category road pricing is not allowed on roads other than highways. For PMZ and the geographical scopes we have chosen, this has no consequences (for ABvM of course it has!).

A special feature is the Eurovignette treaty, this forbids an extra road pricing for the area where a Eurovignette counts. Within the PMZ concession approach, as drawn up in this report, this extra road pricing is necessary. The Netherlands will have to follow Germany, and cancel the Eurovignette treaty (also from the perspective of ABvM this might be necessary). In proposal 2003/0175 (COD) it is recognised that road pricing, only for trucks >12 tonnes on highways, has unwanted side effects. So it is proposed to make it possible to impose road pricing on all trucks > 3,5 tonnes on TEN highways and lateral main roads. Also it will be possible to set up a pricing system for all vehicles on all (other) roads.



Also of interest is the proposal 2003/0081 (COD) about the developments on financing and on interoperable tolling. The proposal about financing agrees with the general line of the plans for PMZ, and gives no constraints so far. The proposal about interoperable tolling states that

only three technologies will be used: satellite navigation, GSM-GPRS communication and DSRC microwave technology (band 5,8 GHz).

The European CESARE projects give guidelines for interoperability in Europe. One of the main agreements is on the market structure for road pricing. This structure is known as the EETS model, as explained in chapter 6 (see figure on the previous page).

It is advisable to incorporate the EU directives in the implementation as much as possible. If not, there will be a serious risk of procedures from private persons and organisations against aspects of the tolling scheme. The EU directives have not all been crystallised yet. So it is difficult to assess the risks at this moment.

The Dutch Law: Wet Bereikbaarheid en Mobiliteit (WBM)

The existing law "Bereikbaarheid en Mobiliteit" only covers the possibility of pricing in three cases:

- Toll: only for new roads or for works to increase capacity;
- Express- lane tariff: a tax in relation with the traffic-intensity. The tariff is valid on a special lane, the "express lane";
- Pricing per kilometre, to be regulated by further detailed regulation.

At present, no pricing has been based on this law. Recently plans have been developed to update the WBM to new insights, especially to make ABvM possible. Most important features in relation to PMZ are:

- The proposal incorporates only instruments for financing new infrastructure, not for road pricing on existing roads. This constitutes a problem for PMZ, because scenario's 2 and 3 incorporate tolling on existing infrastructure.
- The existing law and proposal define the mobility tariff (all sorts of road pricing) as a tax. This means that the tax laws are applicable. This means, among others, 100% enforcement. It is preferable that the mobility tariff is defined as a toll or fee that is regulated by the government. In this way there are more possibilities for the PMZ concessionaire to organise billing and enforcement;

- The proposal gives no possibility for payment afterwards (service contracts); the possibilities are: payment in advance, on passage and immediate after passage. This constrains the services to the PMZ customer (mobilists).
- Positioning of the pay points need a joint decision of the ministers of V&W, VROM and finance. This constraints the PMZ concessionaire in their liberty to operate the network as they think is best.

In order to open the possibility for toll schemes within PMZ, WBM must be changed. PMZ can for this hook up with ABvM, because for this national road pricing scheme, the WBM will have to be altered as well.

Chapter 14: Maintenance and Operations: OPEX

Maintenance and operations are the key cost drivers during the operation phase, besides the financing costs. An optimal design and management of these two aspects contribute to high availability – and thus revenues - and low operational costs. This chapter discusses the strategy and cost estimations for maintenance as well as operations.

Maintenance strategy

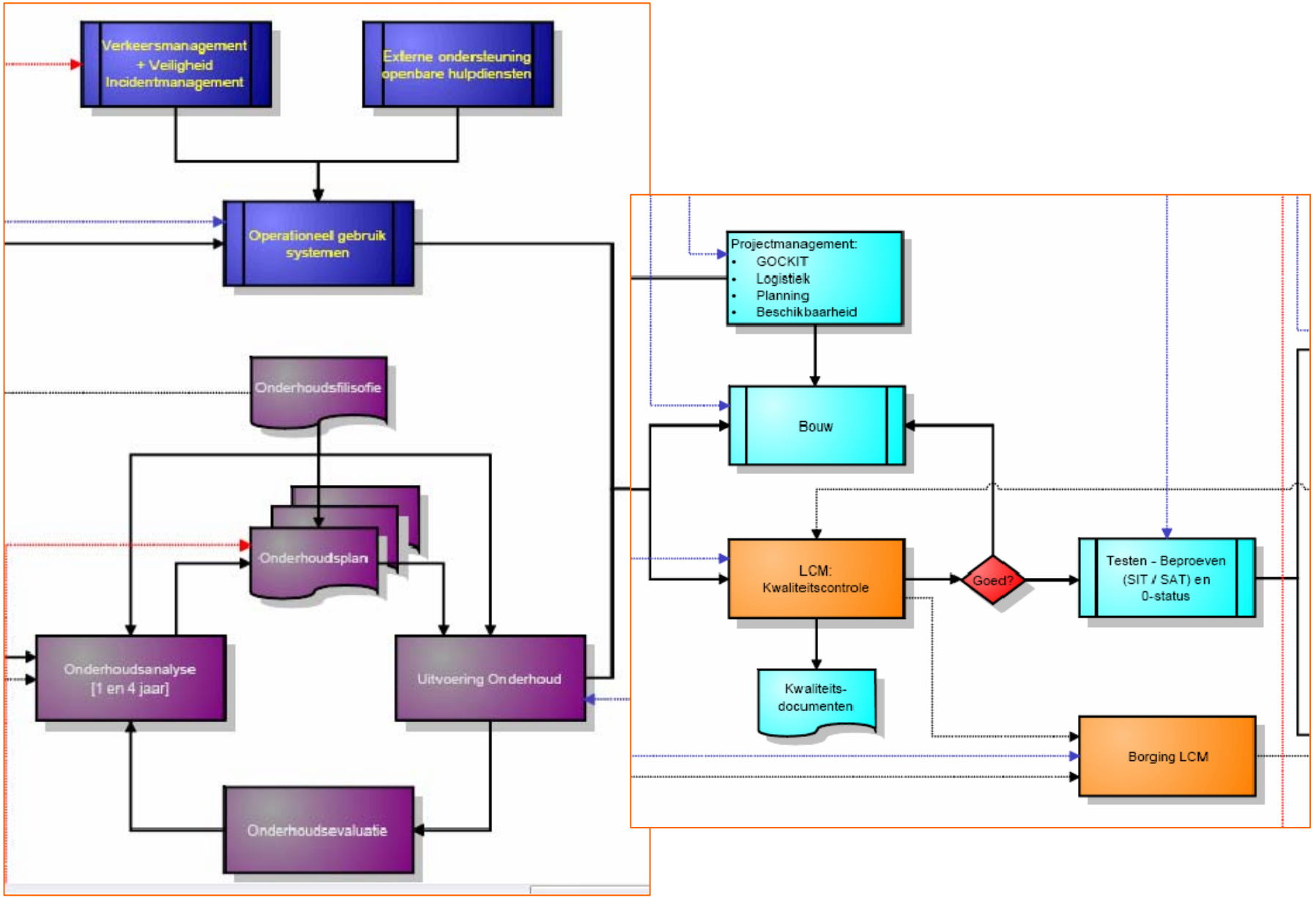
The maintenance strategy for PMZ is based on a lifecycle approach, using Life Cycle Cost management (LCM). This means that the strategy takes into account all the phases of the project (Design, Construction, Maintenance and Operations) and optimises total costs for the project. The approach results in optimal, efficient and effective allocation of money and personnel during the whole lifespan of the project, bounded by availability and quality requirements.

One of the fundamental notices of the LCM approach is that choices that were made in the design phase, combined with the quality of the construction, are leading in the success of the approach. Not only the functional requirements are important, but also the technical and material choices during the design phase. This implies that LCM delivers the best results, when applied from the very start of the project. LCM can however add value for existing infrastructure, although not as high as for non-existing.

Translation of requirements into technical design

LCM is dependant on the one-on-one translation of the projects' functional requirements (based on wishes and demands of the principal, the users, the environment and the investors) into technical requirements, relating to all the project phases.

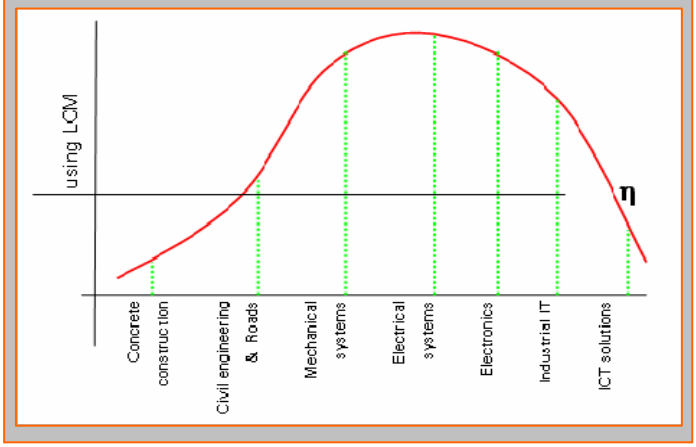
During the design phase, the translation from the functional requirements to the technical demands, for delivering the needed asset, has to be based on the combination of defining the main systems that are necessary for the functional output, the relations between these systems and the parameters of the lifecycle analysis (cost for construction, lifespan, cost for repair).


Verkeersmanagement + Veiligheid Incidentmanagement
Externe ondersteuning openbare hulpdiensten
Operationeel gebruik systemen
Onderhoudsfilisofie
Onderhoudsplan
Onderhoudsanalyse [1 en 4 jaar]
Uitvoering Onderhoud
Onderhoudsevaluatie
Projectmanagement:
GOCKIT
Logistiek
Planning
Beschikbaarheid
Bouw
LCM: Kwaliteitscontrole
Goed?
Testen - Beproeven (SIT / SAT) en 0-status
Kwaliteits-documenten
Borging LCM

This strategy gives room to design in corridors, which means that the asset, e.g. a tunnel, is divided in different parts which all have the same technical lay-out (see also the discussion on standardisation in chapter 7). The outcome of this approach is a simple and duplicable way of designing the asset and an optimal layout to perform maintenance activities in the most efficient way.

Applicability LCM

It is important to realise that not all technical disciplines are well manageable by these techniques. With some of the disciplines the constructions investment risks are too high or the lifespan is too short or long to expect an acceptable output from LCM.



The advantage of this approach is when, during maintenance, you take one part out of operation, e.g. the power supply, the rest of the system is still functioning, so the asset stays available. Maintenance will be planned in a way that all parts of one subsystem within the corridor will be maintained at the same time.

The maintenance approach is based on the measurement of the condition of the subsystem and a set of well defined intervention levels to trigger the maintenance activities. The reliability of the systems, in relation to their function, has to be analysed using a Failure Tree Analysis (FTA). This analysis is a top down approach and gives good insight into the reliability of the critical systems. If the information is not enough, a bottom up approach can complement the data. For this a Failure Mode Effect and Cost Analysis (FMECA) is used. Obtained results give a good, static overview of the needed maintenance activities and the inspection regime for the condition based maintenance activities.

Life span info used for PMZ refurbishing calculations		
Asset	Action	Period
Industrial IT	Upgrade	7 Years
Industrial IT	Replace	15 years
Right road deck ZOAB	Replace	10 years
All road decks ZOAB	Replace	16 years
Dynamic route information pannels	Replace	15 years
Electrical & mechanical installations	Replace	25 years
Energy systems	Replace	35 years
Structural works	Renovate	50 years

The data collected with all these analysis have to be combined with the lifecycle data and the technical layout of the corridors. After a thorough inspection of the status quo of the systems and structures, a detailed maintenance plan can be developed and executed. All this

leads to the optimum maintenance investment on the total lifecycle of the assets and maximum availability of the assets for the customers. During the lifespan of the asset, data has to be adjusted to the real behaviour of the systems. To do so, a well developed maintenance management and information system is needed.

Operations strategy

Private operators of toll roads depend on their customers for their income. That puts the customer in the heart of their operation. The focus is on customer satisfaction, optimal safety and maximum availability; the same items as the main public goals. Mobility and convenience are the advantages with which EETS-providers generate extra value for toll-customers. Their marketing strategies attract customers by providing OBU's that are easy to use, interoperable and offer supplementary services. These services include vehicle-related Electronic Fee Collection (EFC) services for car parks and areas, gas stations, and access control to specific terrains or areas.

Operations and life cycle management

Input of the operator during the design process will improve usability of the systems and availability of the network. Especially for the tunnels, availability is influenced strongly by technical malfunctioning and incidents. In the design process, the wishes of emergency services and operations, should be translated in the devices and in the control system. Availability and safety should also be secured in the In the M&R-contract.

Organisation

In the organisation of the private road operator, processes and thinking start from the customers demands. The operations strategy puts the customer first. The services department, with customer relations, traffic- and incident management and tolling, is in the lead and acts as a principal to the technical department, that enables maximum availability and safety. Maintenance and repair are seen as supporting processes in meeting the customers needs. Private operators have an integrated approach, employees receive direct feedback from their customers, and they are able to adapt their services to their customer's demands faster than public parties can.

Customer Service

Customers of toll roads pay a price for using the roads, and thus expect a high level of service from road operators and EETS-providers. Safety, availability and information are the main wishes. Road operators use modern traffic management

and communication techniques to supply the latest traffic information and advice to the customers on their route.

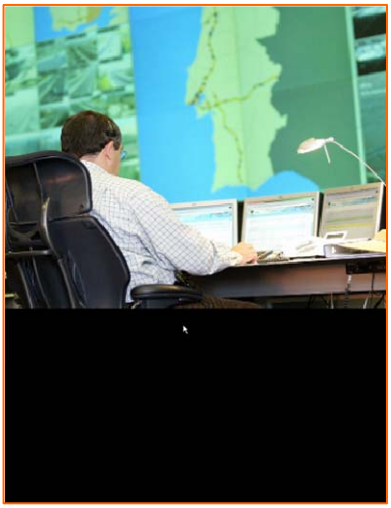
Customer information channels

- *Variable Message Signs on strategic locations*
- *Website road operator and EETS provider*
- *Information panels with direct access to provider's internet site*
- *Hotline to the customer service*
- *In gas stations and selling points of the EETS provider*
- *In customer care centre's along the network*

In geographical scenario 1, EETS-providers will focus on internet and gas stations to provide customers with their tags and service. In the other scenario's, contact points will be build along the highways. These customer centres provide customers with information, do compliant handling and are selling points for the OBU's.

Traffic management

For the traffic management, European and Dutch legislation set the boundaries within which an optimum between traffic flow and safety is found. Traffic management will be organised differently, for the various geographical scenario's. In scenarios 1 and 2, traffic management will be the responsibility of the road operator, but daily operations are subcontracted to a traffic management centre, like Westerscheldetunnel or the traffic management centre South-West in Rhoon. Contacts with public authorities, emergency plans, the development of the safety management system and availability policy are executed by the concessionaire. In the safety management systems, procedures for traffic- and incident management, informing customers, optimising availability and evaluation of incidents will be in place. As availability and safety are importantly influenced by the performance of the traffic management centre, the safety management system is part of the contract with the traffic centre. The concessionaire however, sets the boundaries and strategies for the traffic management centre.



Operating the entire network, as in geographical scenario 3, leads to economies-of-scale and the actual possibility to guarantee availability of the north-south connection at all time. Dynamic traffic management gives the operator the possibility to influence and in doing so optimise the flow of the traffic, and thus deliver the highest service (mobility) to the customer.

Incident management

Road operators take full responsibility for incident management. A strong incident management organisation with key players from the operator's organisation focuses on maximum safety and availability during incidents. Strong cooperation with emergency services, realistic approach of risks, based on experience of and trust in all parties, simple but strict procedures, education, training and evaluation make sure that safety and availability are well balanced, and delays are minimized.

Road stewards cover the entire network. Their activities are incident support (protection and assistance), mechanical support and road patrol. Towing companies are contracted to deliver fast services. Incident managers are involved as soon as availability is at stake. Their main focus is on keeping the traffic flow. A communication manager makes sure information about travel time and incidents is immediately at the disposal of the users.

Operational expenditure (OPEX)

OPEX are highly dependant on the magnitude of the road network. Therefore, OPEX estimations are made for all three geographical scenario's within the PMZ business case. Costs for toll collection (5% of the revenues as elaborated before) will not be added to the OPEX in this chapter; they will be added to the financial model directly. Starting point for this chapter is that all costs are for the account of the concessionaire; the budgets for maintenance and operations that are reserved for these tasks (NPV M€1.237,- based on a 30 year concession and geographical scenario 3; see table chapter 17) by Rijkswaterstaat fall back to the government, and can be seen as public savings.

Scenario 1: Klaaswaal link

This is a 2 x 2 lanes highway with emergency lanes connecting the A29 at Klaaswaal to the A4 at Hoogvliet. The total length of this new road is 11km. There will be two tunnels

in this area, one under the "Oude Maas" and one under "het Spui". The road will have four connections and 4 crossings with the existing road network.

Within this scenario, traffic management will be outsourced to an existing traffic management centre. There will be no additional infrastructure for tolling[16]. The roads will be provided with Variable Message Signs.

OPEX calculation scenario 1	concession period		
	30 year	40 year	50 year
Total annual costs scenario 1	€12.245.105	€12.245.105	€12.245.105
Total cost	€367.353.150	€489.804.200	€612.255.250
LCC Costs (refurbishing)	€54.000.000	€91.550.000	€136.130.000
Insurance CAPEX	€40.000.000	€40.000.000	€40.000.000
Total General	€461.353.150	€621.354.200	€788.385.250
Total General per year	**€15.378.438**	**€15.533.855**	**€15.767.705**

The maintenance strategy as described in this chapter is fully applicable on this scenario, because the infrastructure within the scope of this scenario will have to be developed yet. The OPEX for scenario 1 for the 3 concession periods are given in the table. Total annual costs for this scenario are explained in appendix VIII.

OPEX calculation scenario 2	concession period		
	30 year	40 year	50 year
Total annual costs scenario 2	€20.847.377	€20.847.377	€20.847.377
Total cost	€625.421.310	€833.895.080	€1.042.368.850
LCC Costs (refurbishing)	€106.450.000	€210.600.000	€312.825.000
Insurance CAPEX	€40.000.000	€40.000.000	€40.000.000
Total General	€771.871.310	€1.084.495.080	€1.395.193.850
Total General per year	**€25.729.044**	**€27.112.377**	**€27.903.877**

Scenario 2: A4 corridor

The area of scenario 2 is the complete A4 and A29, within the project area, including the area as described in scenario 1. Added to the area of scenario 1 there will be 38 extra structural works, 17.8km 2 x 3 lanes highway and 48.8km 2 x 2 lanes highway. All with emergency lanes on the side. There are 2 additional bridges in the area, the Volkeraksluisen and the Haringvlietbrug and 2 additional tunnels, the old and new Heinenoordtunnel.

The maintenance strategy as described above is fully applicable on scenario 2. For the infrastructure that already exists the LCC will have a less optimal return in comparison to infrastructure which has to be developed, using the described strategy.

[16] Tolling will be managed by the national road pricing scheme. Costs will be 5% of the revenues. This is not included in the OPEX calculations in this chapter, but will be included in the financial modelling of the business case.

Traffic management will be outsourced to an existing traffic management central. There will be no additional infrastructure for tolling[15]. Parts of the roads will be provided with Variable Message Signs.

The OPEX for scenario 2 for the various periods are given in the table. Total annual costs for this scenario are explained in appendix VIII.

Scenario 3: the PMZ network

The area of scenario 3 is an extension of scenario 2. The total A4, A16, A17, A58, A59 and A29 are added to this area, as far as positioned within the PMZ area. There will be a total of 136,6km 2 x 2 lanes highway, 59km 2 x 3 lanes highway, 13,3km 2 x 4 lanes highway, 1,4km 2 x 5 lanes highway, 145 structural works, the Volkeraksluizen, Moerdijkbrug, Haringvlietbrug, Heinenoordtunnels, Drechttunnels and the tunnel of the "Klaaswaal verbinding".

OPEX calculation scenario 3	**concession period**		
	30 year	40 year	50 year
Total annual costs scenario 2	€36.964.056	€36.964.056	€36.964.056
Total cost	€1.108.921.680	€1.478.562.240	€1.848.202.800
LCC Costs (refurbishing)	€253.500.000	€331.050.000	€537.880.000
Insurance CAPEX	€40.000.000	€40.000.000	€40.000.000
Total General	€1.402.421.680	€1.849.612.240	€2.426.082.800
Total General per year	**€46.747.389**	**€46.240.306**	**€48.521.656**

The maintenance strategy as described above is fully applicable on scenario 3. For the parts of infrastructure that already exist the LCC will have a less optimal return in comparison to infrastructure which has to be developed, using the described strategy.

Traffic-management will be executed by the organisation itself as well as incident management. There will be no additional infrastructure for tolling[15]. All of the strategic points in the network will be provided with Variable Message Signs.

The OPEX for scenario 3 for the 3 possible concession periods are given in the table. Total annual costs for this scenario are explained in appendix VIII.

Conclusions on various OPEX

To get better insight in the different OPEX for the various scenario's and concession terms, the table below summarises the OPEX.

Scenario one is the most expensive scenario for the OPEX (per kilometre). The main reasons behind this are the ratio between the roads and the tunnels (9 km : 2 km) and a relatively large maintenance organisation for a small stretch of infrastructure. The tunnels are a substantial part of the area and are cost intensive to maintain. For a large proportion, the costs for the maintenance organisation consist of non-marginal costs. For such a small stretch of road it might be wiser to 'buy' capacity from an existing maintenance organisation. The costs per year within this scenario are approximately the same. The reason for this are the higher refurbishing costs within the 40 and 50 years' concessions.

Comparisson costs Scenario and concession terms	Total cost per year	Total costs per year per km
Scenario 1 for 30 years	€15.378.438	€699.020
Scenario 1 for 40 years	€15.533.855	€706.084
Scenario 1 for 50 years	€15.767.705	€716.714
Scenario 2 for 30 years	€25.729.044	€297.102
Scenario 2 for 40 years	€27.112.377	€313.076
Scenario 2 for 50 years	€27.903.877	€322.216
Scenario 3 for 30 years	€46.747.389	€232.574
Scenario 3 for 40 years	€46.240.306	€230.051
Scenario 3 for 50 years	€48.521.656	€241.401

Scenario two has substantial more roads in the area, 82,6 km, in comparison to the bridges and tunnels, 7.5 km. This results to a better kilometre cost price. The OPEX is higher when a longer concession is taken, because the refurbishing cost in relation to the ratio roads and structural works, are still substantial and therefore influence the total OPEX. The yearly costs of €300.000,- per kilometre is slightly more economical than the broadly accepted reference numbers, regarding maintenance costs.

Scenario three is the most economic advantaged scenario. The reasons for this are the ratio roads, +/- 200 km, and the bridges / tunnels, 10,3 km and economies of scale in comparison with the other scenario's. Because of the better ratio, the costs for a 40 year concession is also economically better than 30 years. The higher OPEX on the 50 years concession is due to the high amount of structural works in the area, which all have a lifecycle of about 50 years. The yearly costs of €230.000,- per kilometre is substantially more economical than the broadly accepted reference numbers, regarding maintenance costs. This profit is the result of using the maintenance strategy as described previously in this chapter.

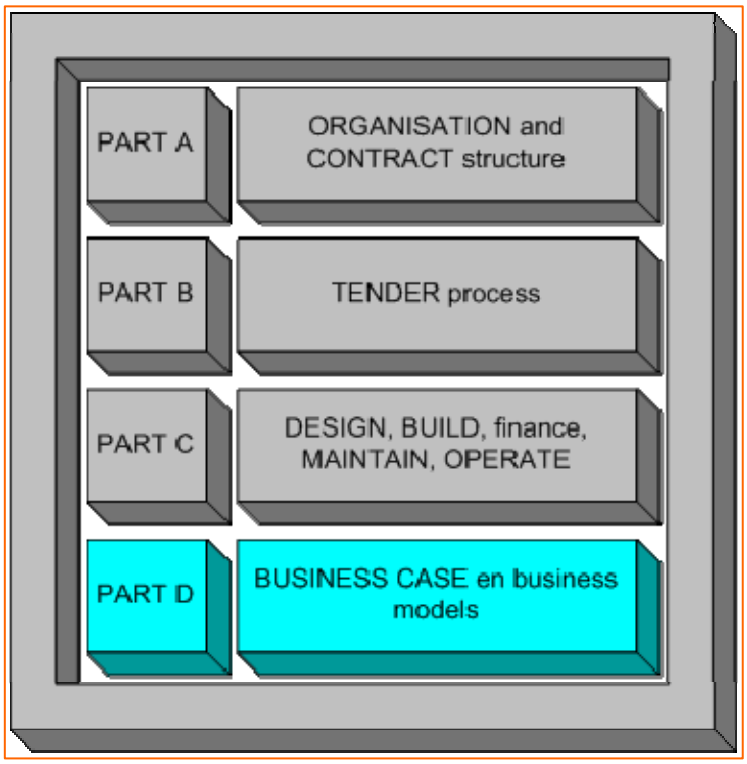
Starting points for the OPEX calculations

Moerdijk bridge is being maintained at the moment. It is assumed that this project results in a bridge that doesn't need reconstruction works for the rest of the concession period.

We assume that all other bridges and tunnels within this area are handed over in good condition and don't need large reconstruction works within the concession period; as stated in the documents of PMZ.

Part D:

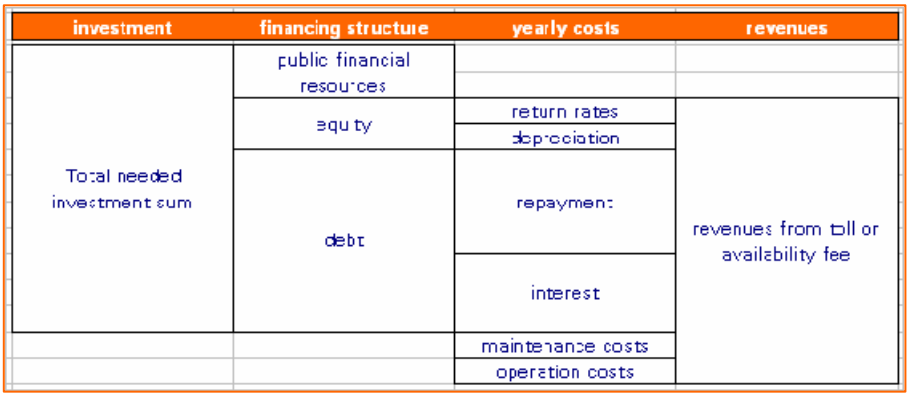
The BUSINESS CASE



Chapter 15: Business Case Approach

Searching for a suitable scope can be approached as a business case analysis project. This chapter describes the typical approach for such a project.

For a limited range of geographical and institutional scope assumptions, Capital Expenditure (CAPEX, or investments) and OPEX are estimated. CAPEX are to be financed using various sources (public financing, private equity, debt and loans, etc). Most of these sources come with yearly costs (equity comes with dividend, debt with interest and repayments, etc.). These costs combined with the costs for maintenance and operations (Operational Expenditure OPEX) will have to be paid by the yearly income; for PPP infrastructure projects this means toll income or an availability fee (see figure below).



Usually, in finding a suitable scope the figure will be followed in an oppposite direction: from traffic studies maximum income is calculated. OPEX are subtracted from these revenues to obtain the yearly income available for tax, interest, depreciation and debt repayments (EBITDA). Based on this available income, and given a certain debt-equity ratio and certain interest and return rates (among others) the maximum financing capacity can be calculated.

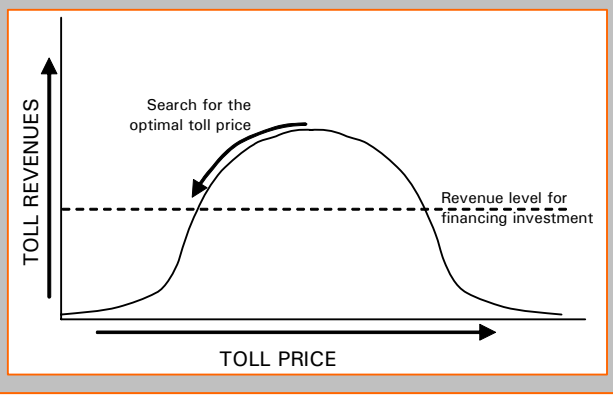
When this capacity is lower than the needed investment, there is no suitable business case. Public resources will have to come in to develop the project, or the following iterative search process starts: another scope might provide more toll income, but may cause more costs as well. Another financing structure may cause finance costs to decrease, but may require another risk allocation (contract structure) as well. Another tolling regime or other toll prices may change income predictions, etc.

When the financing capacity is higher than needed, toll prices can be lowered to find the lowest possible toll price for a suitable business case (see text box).

Optimal toll price

*Toll prices cannot limitlessly be increased to search for higher revenues. The figure below draws the typical relation between toll prices and revenues: with very low prices (P), there will be a lot of cars (Q), but P*Q will remain low, due to the low prices. Very high prices result in low P*Q as well, because there will be only few cars on the road.*

Searching for the optimal price, means searching for the maximum revenues and from there lowering the price until a income level has been reached that corresponds with the needed yearly income for OPEX and financial costs.



From the operators view, the focus will be on the roads in the corridor. When searching for a feasible business case, adding more highways or other roads will be the first step in broadening the scope. Only if necessary, *red, green or blue projects* will be added to the scope. This may lead to an 'all road solution' with the only effects other than mobility effects the ones from the legislative procedures during the planning phase.

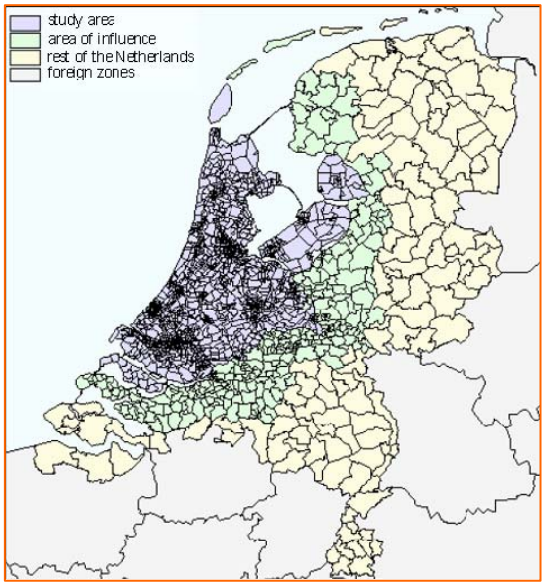
For defining the scope of the project the following items were considered:

- Time: a concession for a minimum period within a feasible business case. The technical solutions in the case however, must be future proof and will solve the mobility problems in 2020 but with a vista to 2040.
- An integral development scope: not only describing a clear vision on traffic management, maintenance and tolling but also on project finance, legislation, design and building. Starting point for all running projects (A4-South, MaVa) in the area is that they are procured in a classical way (DC/RAW), to make sure the maintenance of the projects can be included in PMZ (or that they can be transferred into the concession without additional costs for the concessionaire);
- Area: limited to the area as described by the PMZ-project. For a feasible business case a network approach is necessary. Starting point is that authorities are willing to bring in parts of the network in the PMZ-area.

– Public policy and boundary conditions: meet present environmental and safety requirements (e.g. no more environmental pressure on the region than presently available), optimise the use of infrastructural capacity by appliance of Dynamic Traffic Management and road pricing, and give thorough attention to the positioning of the PMZ initiative in the national road pricing developments (ABvM).

Chapter 16: Income and Revenues

Revenues are obtained by levying tolls for the use of the highway network. In a business case study traffic behaviour is predicted, to analyse traffic intensities during the concession periods, for several toll price scenario's. This analysis is executed using a traffic forecasting model; for PMZ this is the NRM model. It's feasibility for business case analysis is discussed in the first paragraph of this chapter.



The second paragraph discusses the way NRM was used for this case and presents the results (traffic intensities and total revenues) of the modelling.

Because tolls are the only source of income[17] for the project, project finance is highly dependant on the cash flow predictions. Prediction always incorporate uncertainties, so the reliability of the traffic predictions will have to be examined. A first reliability analysis for the PMZ traffic studies is described in the final paragraph of this chapter.

NRM Randstad model; feasibility for PMZ toll study

In general the NRM model procedure is a well designed model structure. It suits the purpose for which it is built: distribute central government funds to regions for infrastructure projects.

However to make detailed assessments of the use of toll roads, the NRM procedure is too coarse (zones and network). The NRM Randstad specifically has a problem that part of the project corridor is in the area of influence of the model (and therefore not in the study

[17] As a starting point, tolling is defined as the only potential source for revenues. As a part of the sensitivity analysis, and possibly to make a non-suitable business case work, an availability fee for maintaining and operating the network might be introduced into the business case.

area). The alternative model, the NRM Brabant, would however have similar issues (vice versa). Some combination of both models would be best, but is not easy to construct.

In the assignment, NRM doesn't take into account the distance (fuel) costs. This is of importance when modelling toll roads. Tests have been run to investigate the effects of taking into account the distance costs in the assignment. The effects were different for different toll locations, but they can be very large (positive or negative) depending on the route alternatives. The advice is not to take distance costs into account because the NRM Randstad is too sensitive.

The values of time used in the NRM model procedure come from stated (mode) experiments. These do not resemble a willingness-to-pay for a toll road.

Toll prices in NRM for the various vehicle categories are dependant on each other: the NRM asks for a multiplication factor as general input to apply to car tolls to calculate the toll prices for freight traffic. This makes it impossible to forecast the effects of changing this proportion between cars and trucks for certain roads (for example to create a freight highway and a car highway).

Conclusion

The overall judgement is that the NRM Randstad procedure is useable, but the network and zones should be more detailed around the project corridor and especially in Brabant. The model should be further validated against independent sources of data (demand and assignment result) including travel time validations. The assignment should be improved to include junction delays such that route becomes more reliable and can include distance costs as well. The latter is not possible using the current software. Besides improvements to the model, the sensitivities of the model towards different input assumption should be better understood.

Appendix VI elaborates on the NRM feasibility for toll studies.

Traffic model and results

The NRM traffic model that was used for this business case takes into account the introduction of road pricing (ABvM). A major concern in the current implementation is the congestion charge in the morning and afternoon peak. The locations are determined by V/C-ratio's and this will probably not hold in a political debate and are hard to explain to road users. For this study ABvM is modelled as a flat fee of 3,4 cents on all roads, except for the roads that are part of the concession agreement. Above that, for the roads outside the concession agreement with a maximum speed of 70 km/h or higher, and a V/C ratio above 0,8, a congestion charge of 11 ct/km was introduced.

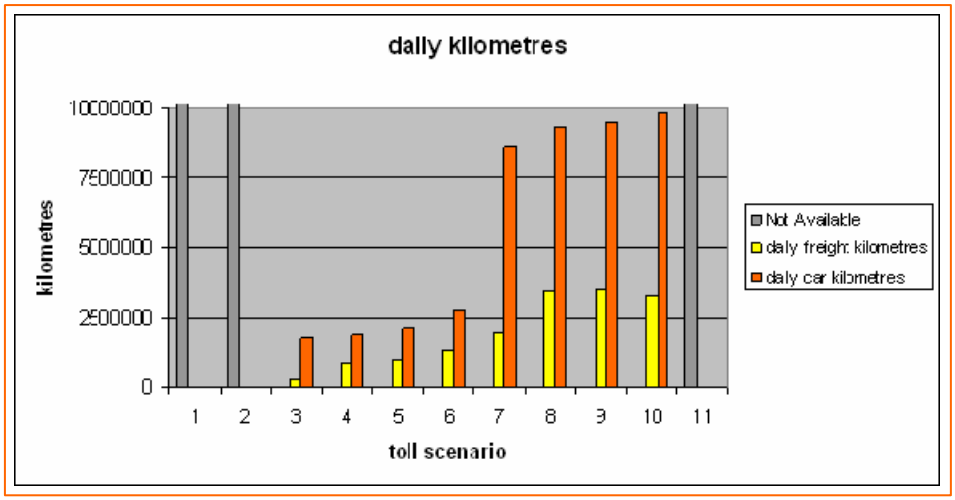
For the PMZ network the following toll regimes were elaborated (price level 2007):

Nr.	Geographical scenario	Toll concept Collection points	Prices cars	Prices Trucks
1	A4 Klaaswaal link	Toll in tunnel	€ 0,725	€ 2,176
2			€ 1,451	€ 4,353
3	A4 corridor, including A29	Price / driven km	€ 0,080	€ 0,239
4			€ 0,065	€ 0,196
5			€ 0,051	€ 0,152
6			€ 0,022	€ 0,065
7	PMZ Highway Network (A4, A29, A16, A58, A17)	Price / driven km	€ 0,080	€ 0,239
8			€ 0,022	€ 0,065
9			€ 0,017	€ 0,052
10			€ 0,025 on A4 corridor	€ 0,037 on A4 corridor
			€ 0,012 on other roads	€ 0,074 on other roads

NB scenario 7 introduces also the A27 to the scope of the calculations. Besides these scenario's PMZ already analysed a scenario with a toll collection point on each of the three river crossings in the PMZ network, with toll prices of € 1,45,- for cars and € 4,35,- for trucks (scenario 11 below).

These scenario's were run in the NRM model, giving in the driven kilometres and revenues[18] as seen on the next page. For some toll scenarios not all data were available.

[18] Price level 2020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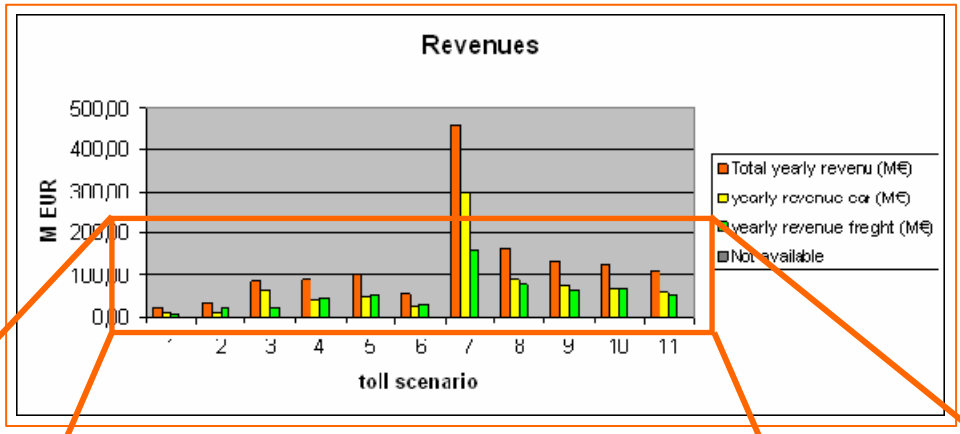
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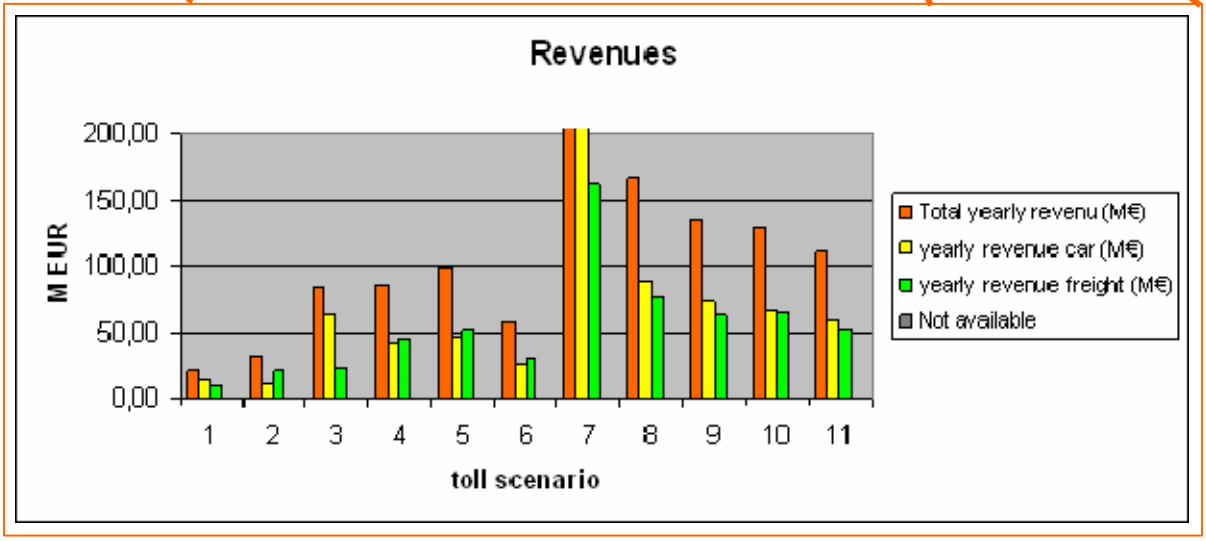
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Total yearly revenu (M€)
yearly revenue car (M€)
yearly revenue freight (M€)
Not available

Sensitivity analysis

Traffic risk is a key determinant of the potential success of a toll road project. Examination of the risk analysis will assist in identifying the modelling assumptions required for a downside traffic forecast for Lenders. This may include lower forecasts of GDP growth, omission of all but committed major developments, use of lower income elasticity for car and truck usage and truck willingness to pay, tougher modal and route competition and extended ramp up. Risk assessment for PMZ has been executed in two ways:

- Quantitative risk assessment, where spreadsheet-based models were developed and applied to incorporate the key risk factors and investigate their influence on traffic and project revenues. The analysis has been undertaken using Monte Carlo-type simulation and @Risk software.
- Qualitative risk assessment, where the Standard & Poor (S&P) risk index was adopted to identify nearly 40 risk factors to rate the traffic risk on a 1 to 10 judgemental scale, supplemented by comments on the basis for our ratings.

Percentile / probability	Cars (# and %)	Freight (# and %)
P50	9,513,045	3,435,996
P90	9,252,462	2,928,970
P95	9,173,705	2,793,954
P99	9,041,900	2,527,900
P90 factor	*-2.7%*	*-14.8%*
P95 factor	*-3.6%*	*-18.7%*
P99 factor	*-5.0%*	*-26.4%*

Both risk assessment are further explained in appendix VII.

For PMZ an initial sensitivity analysis was being made. The main points this analysis raised were as follows:

- The freight traffic forecast is subject to more risk than the car forecast; which is reflected in the respective spreads for these two modes, trucks having more spread.
- The table above confirms this with the P90 ratio[19] being -14.8% for freight traffic as compared to just -2.7% for car traffic.
- This is not surprising, however, since freight traffic is forecast to increase by 81% between the base year and 2020 compared to just 9% in the case of cars. Increases above base year volumes clearly have more risk attached to them than the base year volumes themselves.

[19] P90 factor = (P90 factor/P50 factor)-1

– In the cases of both car and freight traffic, the variables with the most risk attached to them were the annualisation factor (1.0) and the toll elasticity (-0.23 in the case of cars and -0.29 for freight traffic). See also tables below.

distribution key resk factors cars						
Risk factor	Elasticity	Distribution	std. deviation	Coef. of variation	Min.	Max.
Toll elasticity	-0.23	Normal	0.33	-1.41	- ∞	+ ∞
Traffic growth rate	0.0045	Normal	0.25	55.41	- ∞	+ ∞
Growth in VOT	0.10	Normal	0.40	4.18	- ∞	+ ∞
Annualisation factors	1	Normal	0.25	0.25	- ∞	+ ∞
distribution key resk factors freight						
Risk factor	Elasticity	Distribution	std. deviation	Coef. of variation	Min.	Max.
Toll elasticity	-0.29	Normal	0.33	-1.14	- ∞	+ ∞
Traffic growth rate	0.0301	Normal	0.25	8.31	- ∞	+ ∞
Growth in VOT	0.04	Normal	0.40	10.27	- ∞	+ ∞
Annualisation factors	1.00	Normal	0.25	0.25	- ∞	+ ∞

These sensitivities are used to determine the downside case scenario in the next chapter.

Chapter 17: Financial Modelling

This chapter explains in its first paragraph the assumptions within the financial modelling of the business case. The model that was used is a non detailed financing model, to investigate possible PPP structures. The second paragraph shows some sensitivities the financial model shows for certain input parameters. The chapter ends with a summary of the results.

Model assumptions and general structure

The model aims to investigate, the possibilities for financing the PMZ concession – including the various scope scenario's- by using private financing resources. Based on several input variables and assumptions concerning the development and maintenance of the PMZ highway network, the model generates the main financial results. Depending on the chosen scenario's and the financial structure with its boundary conditions (financial variables), the return on the invested equity is calculated.

The model assumes the founding of a SPC for the PMZ concession, solely responsible for executing the concession for as long as the concession period (30, 40 or 50 years). It is assumed as a starting point that all revenues will be made by levying tolls on the network within the scope of the concession.

NPV Maintenance budgets Rijkswaterstaat based on unit cost of k€ 320 per year per km		
30y concession	scen1	€ 123.040.872
	scen2	€ 532.766.975
	scen3	€ 1.233.560.763
40y concession	scen1	€ 144.900.759
	scen2	€ 627.420.286
	scen3	€ 1.453.252.626
50y concession	scen1	€ 157.661.129
	scen2	€ 682.672.688
	scen3	€ 1.584.494.344

Note that in reality this latter doesn't necessarily have to be the case. Rijkswaterstaat has since long allocated budgets for maintenance of the existing highway network within PMZ. They might allocate these budgets to the business case, as is examined in some scenario's later in this chapter. The Net Present Value (NPV)[20] of the savings that Rijkswaterstaat achieves when the concessionaire becomes responsible for the maintenance costs are

[20] Based on 2,5% inflation and a WACC of 6%.

given in the table. This table is based on a unit costs for an average road, the PMZ unit costs will be higher due to relatively many engineering structures in the network. Therefore, in reality NPV of the savings will be higher.

The next tables give an overview of the most important assumptions and model inputs.

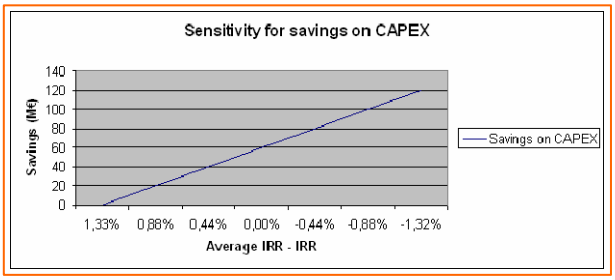
Project and macro economic Inputs	
OPEX	OPEX are assumed as calculated in this report (chapter 13 toll OPEX & chapter 14 maintenance)
CAPEX	CAPEX are assumed as calculated in this report (chapter 12); The construction period is assumed to be 3 years during which 15% of the CAPEX are allocated in year 1, 50% in year 2 and 35% in year 3.
Revenues	Revenues are assumed as calculated in chapter 16
Project Exit	The model assumes no residual value for a concession or for infrastructure
Inflation	Inflation is set to be 2,5% per year. Costs, and revenues are indexed with 100% of the inflation.
Tax	The model assumes an effective tax percentage of 25,5%. Tax is dependant on compensation of losses in the beginning of the concession period.

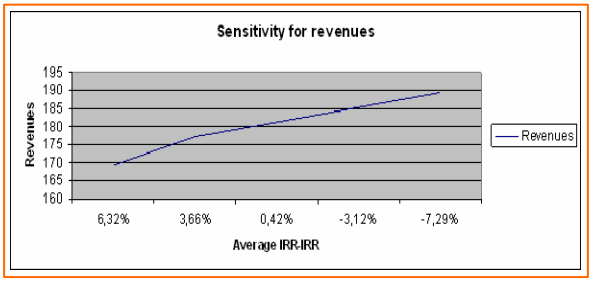
Financial inputs[21]	
Interest	Interest is calculated based on Euribor plus a margin of 100 bps. On August 28th 2007 the 12 month Euribor basic interest level was 4,72%, resulting in an interest rate of 5,72 %.
DSCR	The Debt Service Coverage Ratio ("DSCR") is assumed to be 1.25 (without cash)
Fees	The model doesn't assume up-front financing fees
Target ROI	Is considered to be competitive information.
Equity debt ratio	The debt equity ratio is assumed to be 80% vs 20%.
Depreciation	The model assumes a linear depreciation method. The total depreciation period equals the concession period minus two years. According to IFRS (international accounting standards) depreciations can be indexed to traffic annual growth rates; in some cases this can be advantageous for the concession. This is not explored.

[21] The given financial inputs and underlying assumptions are based on an aggressive financing structure and strategy. For instance, the model assumes an equity bridge during the construction period, which is only possible when the EPC construction company is also a shareholder in the SPC, and risks can be transferred back-to-back to the EPC. Also the debt facility is quite aggressive. All this is possible under certain circumstances concerning the project, the economy in the Netherlands and the international financial market. Due to recent developments in especially the international financial market, it is not sure how the assumptions in the model stand in the (near) future. This may affect the presented results.

Sensitivity analysis

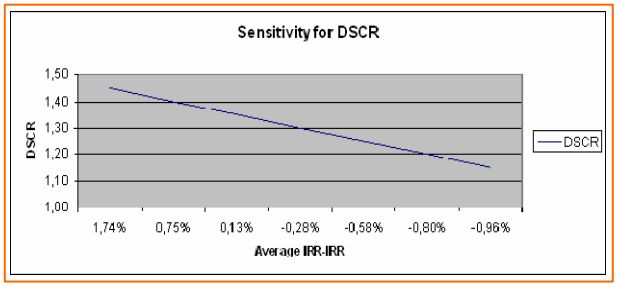
The tables below give an overview of the sensitivity of the financial model as a function on various model input parameters. First of all the sensitivity for the calculated CAPEX and revenues was analysed.

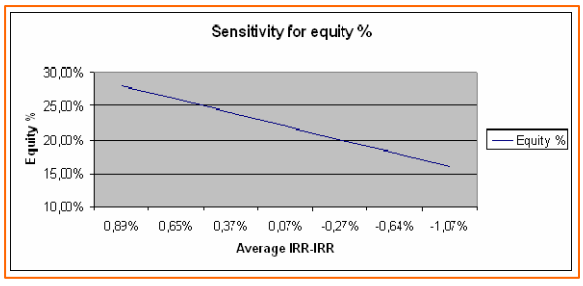




As can be seen from the tables above, savings on CAPEX of M€ 20 (about 1,4%) results in an increase in IRR of about 0,4% and a change in income of M€ 5 a year (about 2,5%) results in 3 to 4 % increase of the IRR. The model is quite sensitive for changing these parameters, also in a negative direction. It is therefore in the interest of the concessionaire to manage construction costs and be very careful with the income predictions.

The sensitivity of the financial model for the concession period is quite low. A 10 year extension of the concession period, results in an IRR increase of about 0,15%.





Also the financial input parameters contribute significantly to the model results. A change in the minimum DSCR of 4% results in a changing IRR of 0,5% and increasing the leverage (the debt equity ratio) from 20 top 16% equity results in a 0,4% change in IRR. As a result of this, analysing the potential financial structure of the project becomes very important. The possibilities are highly depending on the project characteristics and the financial market circumstances. As stated before, the financial market is experiencing some rumour at the moment. Together with uncertain project conditions, the results as presented in the next paragraph may change significantly in the near future.

Financial results for toll and geographical scenario's

The financial model was used to calculate commercial feasibility of several tolling and geographical scenario's. The results of this analysis are presented in this paragraph; all results are presented price level 2007. Because of the nature of this study, there remains a relatively large uncertainty in the presented results. This may affect presented toll prices and investments; positively or negatively.

Geographical scenario 1: A4 Klaaswaal link.

The development, maintenance and management of this stretch can not be paid for by levying tolls alone. The revenues from tolls (€ 1,45 for cars; € 4,35 for trucks) don't exceed M€ 22 per year, while OPEX count up to M€ 17 (maintenance plus tolling). This leaves only M€ 5 per year for financing cost obligations; this is not enough.

Introducing an availability fee instead of or besides tolling gives an opportunity for this scenario, as well as public co-financing of the CAPEX does. The following budgets should in these cases be obtained from the government:

- Availability fee of M€ 60 per year, besides the right to levy tolls; or
- Availability fee of M€ 85 per year, instead of the right to levy tolls; or
- Investment subsidy of M€ 1.000, and allocation of public maintenance budgets conform the unit cost as described earlier[22] in this chapter; besides the right to levy tolls.

This scenario with tolls on the three river crossings generates a yearly income of about M€ 110. This would be sufficient for the development, maintenance and management of the A4 Klaaswaal link.

Geographical scenario 2: the A4 corridor (including A29)

Within the margins of uncertainty of this study, it cannot be determined whether or not the development, maintenance and management of the Klaaswaal link, together with the maintenance and management of the whole A4 corridor can be financed by levying tolls alone. Introducing a toll of 5 cent per kilometre for cars and 15 cents for freight traffic,

[22] k€ 320 per kilometre, per year. When the State allocates maintenance budgets conform OPEX calculations in this report, an investment subsidy of M€ 850 will do.

results in toll revenues of M€ 72 per year. With OPEX for maintenance being M€ 26 and for tolling M€ 4 a year, this leaves not enough for financing the construction of the Klaaswaal link.

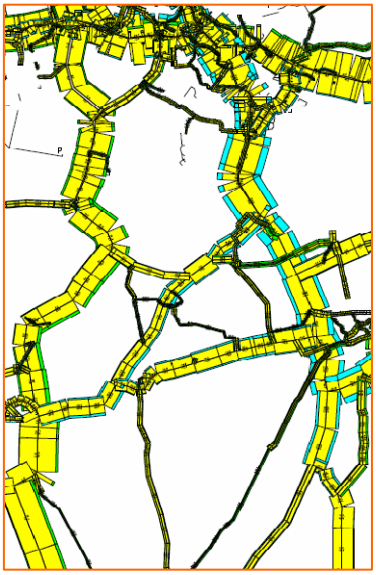
When public maintenance budgets (k€ 320 per year per kilometre) are allocated to the project, there will be a suitable commercial business case for this scenario.

When the government allocates an investment subsidy of M€ 500 to the project, together with the public maintenance budgets, toll prices can drop towards 2 cents per kilometre for cars and 7 cents for trucks.

This scenario with tolls on the three river crossings generates a yearly income of about M€ 110. This would be sufficient for the development, maintenance and management of the A4 Klaaswaal link, when public maintenance budgets were allocated to the project.

Geographical scenario 3: PMZ network

When a toll is levied on the entire network, prices as low as 2,2 cents per kilometre for cars and 6,5 cents for trucks, would be sufficient to maintain and operate the network, and to construct the missing A4 Klaaswaal link.



The A4 corridor as a freight route, scenario 10 in chapter 16 (with toll prices on the A4 corridor of 2,5 cent per kilometre for cars and 3,7 cents for freight traffic; and on the other roads 1,2 cents for cars and 7,4 cents for freight); is also possible when a part of the maintenance will be paid for by the government. A further optimisation of the toll prices for this scenario may even lead to a commercially suitable business case without allocating maintenance budgets to the project. The figure shows the difference in truck intensities over the network between this scenario and the scenario with equal prices all over the network (of 2,2 and 6,5 cents) – green means more traffic in freight lane scenario, blue means more traffic in the 'regular' scenario-.

When maintenance budgets conform calculated OPEX (lower then the presently reserved budgets) are added to this scenario, there will be sufficient income for paying the EUS as mentioned in chapter 5 as well. The in the same chapter proposed Environmental

Investment Fund would have at least M€ 275 to invest in environmental compensation and mitigation measures. This scenario is possible even if traffic develops conform the downside case scenario as developed in the previous chapter.

In this situation, if there is no EUS payment to be done by the concessionaire, toll prices can drop below 1,7 cents per kilometre for cars and 5,2 cents for trucks. This scenario is also possible even if traffic develops conform the downside case scenario as developed in the previous chapter.

Chapter 18: Scope Definition and Results

To conclude this report, this chapter gives a summary of the choices that were made by the Delta Network. These choices were made, as a result of analysing the various questions as a function of the following goals:

- Commercial feasibility (suitable business case, understandable project structure)
- Public acceptance (low toll prices, low extra nuisance);
- Political acceptance (environmental goals, Corporate Responsibility)

This leads to the following choices:

Geographical Scope

Transferring all highways within the PMZ area towards a private concessionaire (geographical scenario 3) , enables the concessionaire:

- to levy very low tolls;
- to attain economies of scale in maintenance and toll OPEX
- to guarantee availability of the North-South connection between Rotterdam and Antwerp
- to introduce active traffic management
- to optimise customer relations and services

That is why this scenario has been chosen, despite of possible problems with public and political acceptance (manageable risk because only highways are included in the scope). To implement government policy, the A4 –and accommodating toll prices- can be adapted to facilitate for the A4 Freight Transport Route.

Functional Scope

The Delta Network is an operators consortium, with great experience in commercially operating highways. This is why there has been chosen to include only the highway operations into the business model. This means that costs for financing new infrastructure,

and maintaining and operating (including incident management, Dynamic Traffic Management, et cetera) the entire network have to be paid for by income derived from tolling. This is already possible with very low toll prices; 2,2 cents per kilometre (price level 2007; 3 cents per kilometre price level 2020) for cars is enough. As a comparison: the national road pricing scheme assumes a flat fee of 3,4 cents per kilometre!

Tolling introduces a solid base for Corporate Social Responsibility. It puts people –customers- first in line when thinking about business optimizations and strategic corporate choices: people –customers- are the main or only source of income, and thus the most important focus for a concessionaire.

Tolling can be 'bought' from the national government, as soon as the national road pricing scheme is in place. The price for this will be 5% of the revenues. Toll roads should be excluded from the national scheme, because tolls levied on the road are sufficient for development and maintenance of the infrastructure.

One can argue that maintenance budgets that are already reserved for the network by the government are allocated to the project as well. This opens possibilities to pay for environmental impact of the network as well. Calculations indicate that in that case, and with the introduction of an Environmental Investment Fund, this fund can invest around M€ 275 in environmental compensation and mitigation measures. It is the Delta Networks' opinion however, that present legislation on spatial procedures (e.g. MER) are sufficient to guarantee responsible use of the Environmental Utilisation Space.

Revenues from spatial development or other sources like gas stations or highway restaurants are left out. Revenues from spatial development are very hard to quantify, let alone to allocate them to the project. Furthermore, compared with the costs for the development of infrastructure, they are not significant.

Institutional Scope

The Delta Network proposes to constitute a Regional Public Authority (RPA) that acts as a grantor for the PMZ highway concession and possibly other service concessions as well. This RPA is also shareholder in a Environmental Investment Fund, that is responsible for compensating and mitigating projects within the region. This way, above benchmark revenues from tolls can be returned to the regional inhabitants, by means of lowering local taxes. The RPA is run as a company, and in case more services are granted, financing can be attracted in this RPA, thus sharing risks between the various projects.

The PMZ highway network can be privatised using a concession agreement. Although a PPP Joint Venture structure has the advantage that it incentivises both the concessionair and the grantor in the same direction, a concession structure is less complex, and is better equipped to transfer risks towards the parties best capable of managing them.

The concession agreement starts with the beginning of the construction of the A4 Klaaswaal link. It is not acceptable to levy tolls before opening of the new infrastructure, o tolling starts only after completion of this link. It is however possible to have the concessionaire to maintain the existing infrastructure sooner, using a maintenance contract based on an availability fee.

The business case is not too sensitive for changes in the concession period. For acceptance reasons it is therefore recommended that the concession period will have a fixed end date, 30 years after starting date.

The tender procedure for PMZ should be based on a bid for the lowest toll prices. This way the customer (road user) has best value for money and construction and availability risks are best transferred to the market. Tendering the PMZ project will take at least another 30 months. Assumed that construction of the Klaaswaal link requires another 3 years, first cars will not drive this new A4 link before 2014.


einde tolweg
goede reis!

Appendices

Appendix I: List of abbreviations

ABvM	Anders Betalen voor Mobiliteit, Dutch Road Pricing Policy
ADT	Average Daily Traffic
BOT	Build Operate Transfer
BOOT	Build Own Operate Transfer
CAPEX	Capital Expenditures
CO2	Carbon Dioxide
CPB	Central Plan Bureau
CPI	Critical Prestation Indicator
CSR	Corporate Social Responsibility
DBFM(O)	Design, Build, Finance, Maintain, (Operate)
DSCR	Debt Service Coverage Ratio
DSRC	Dedicated Short Range Communication
DVM	Dynamic Traffic Management
D&C	Design and Construct
EBITDA	Earnings before Interest, Tax, Depreciation and Appriciation
EETS	European Electronic Toll Services
EFC	Electronic Fee Collection
EIB	European Investment Bank
EIF	Environmental Investment Fund
EPC	Engineering, Procurement and Construction Special Purpose Vehicle
ESA	European System of Accounts
EUS	Environmental Utilisation Space
FMECA	Failure Mode Effect and Cost Analysis
JV	Joint Venture
LCC	Life Cycle Costs
LCM	Life Cycle Cost Management
MER	Environmental Impact Assesment
MIT	Long term Infrastructure Planning Ministry of Transport
M&R	Maintenance & Repair and Service Special Construction Vehicle
NoMo	Nota Mobiliteit: Policy document on mobility Ministry of Transport
NOx	Nitrogen oxide
NPV	Net Present Value
NRM	Nieuw Regionaal Model (traffic forecast model)

OBU	On Board Unit
O&M	Operations and maintenance
OPEX	Operational Expenditures
PFI	Private Financing Initiative
PM	Particulate Matter
PMZ	Project Mainportcorridor Zuid
PPP	Public Private Partnership
PSC	Public Sector Comparator
ROI	Return on Investment
RPA	Regional Public Authority
RSD	Rine-Scheldt Delta
SLA	Service Level Agreement
SOx	Sulfur oxide
SPC	Concessionaire Special Purpose Vehicle
TEN	Trans European Network
V/C-ratio	Volume / Capacity ratio
WBM	Wet Bereikbaarheid en Mobiliteit: Law on Accessibility and mobility

Appendix II: Answers to the PMZ questions

a clear description and motivation of the premises on which the report is based:	whole report; especially chapter 9
a description of the major risks:	chapter 6
a list of all source information used;	appendix IX
intrinsic assumptions (including investments, depreciation, turnover and tariffs)	chapter 17
financial assumptions (including discount rate, risk supplement, broad outline of financial structure (proportion internal/external capital, how possible predictable losses are viewed):	
Net Present Value (NPV) including corresponding cash flow (costs and revenues):	chapter 16 for income, chapter 12 and 13 on costs
the scale of the geographic scope:	chapter 9 / chapter 18
the scale of the functional scope	
the possibility of levying tolls (in addition to the kilometre charge) on the planned A4 South in order to arrive at a balanced business case;	chapter 13 / chapter 9
the possibility of levying tolls (in addition to the kilometre charge) on the entire A4 corridor in order to arrive at a balanced business case	
the income profile (sources of income other than tolls) for the situation wherein the investment costs in the A4 South have been recouped by tolls, meaning that no further tolls may be levied during the remaining concession period;	
the effects of variation in toll tariffs as an instrument to anticipate demand for road use by each type of road user;	chapter 16
life cycle optimisation as a means of achieving a balanced business case; interpreting the dual objective with regard to accessibility the related quality of life:	chapter 14
the role of private parties in traffic management:	
the risk profile:;	chapter 6
the added value (to society, in the sense of: accelerated decision-making, efficiency, higher quality, lower costs, reduction in journey times, external effects including environment and safety):	whole report
your well-founded arguments for changes that you feel need to be made to the geographical and/or functional scope	chapter 9 / chapter 18
the usefulness in this of the opportunity cards that have been supplied	
the desirability of coupling infrastructure and forms of territorial development	
the consequences that your proposed changes will have on the business case (costs and revenues)	chapter 17, chapter 9
the consequences that your proposed changes will have for the realisation of the dual objective with regard to accessibility and the related quality of life	
the consequences that your proposed changes will have for the risk profile	
the effects that toll levying on other parts of the main road network will have on the financing of the A4 South	
the effects of variation in toll tariffs as an instrument for anticipating road-use demand per type of road user	
the vision on the chosen concession system (including flexibility during the concession period, change to scope)	chapter 7
the optimal/most feasible length of concession period:	chapter 17
allocation of risks in the chosen concession system:	chapter 6 / chapter 5
rights and duties of the commercial operator of the A4 corridor:	
rights and duties of public parties:	
a remuneration system based on free flow as opposed to availability:	chapter 17, chapter 7
the level of required tangibility of projects that might be integrated into the scope (either already elaborated in fine detail or still as rough outlines):	chapter 9
land ownership ratios in the corridor:	not included;
other, and, in your opinion better, possibilities for public – private partnership (for example: DBFMO, Joint Venture) in the development and commercial operation of the A4 corridor and/or your proposed scope: choice is for concession model	chapter 5, chapter 6

the various interests and roles of the government (policy-maker, competent authority, enforcement and supervision, possible shareholder and/or administrator);	chapter 5
the organisation of the public sector when allocating the above-named roles;	
the level of public solidarity/involvement, particularly concerning striving towards an administrative agreement or a public – public agreement including the pos sible related phasing:	
the design of the public – private interaction in the various phases:	whole report
rules for the government regarding its own discretionary power:	chapter 2, chapter 5
the required changes to laws and regulations:	chapter 5, chapter 7, chapter 11
your opinion concerning environmental utilisation space as a pre-condition to the commercial operation:	Chapter 5
possible improvements to the application of environmental utilisation space as described in section 5.4.4 of the Information Document and in other documents that will be made available at a later date:	
what instruments do you anticipate needing to be able to remain within the confines of the established environmental utilisation space:	
your opinion concerning Corporate Social Responsibility (CSR) as relevant to this project, what subjects could be incorporated into the philosophy:	
your opinion concerning CSR as a criterion for the selection, and as a precondition for the commercial operation and how this is carried out:	
the form of the follow-up procedure(s) in defining the final project specification:	Chapter 11
the preparation time that you feel to be necessary for this, plus possible bottlenecks:	
the form of the procedure(s) from the commencement of the project specification;	
the sequence taken by (planning) procedures (for example, should decision-making about the route take place prior or after private party involvement?) and the role of the private parties in this:	
the content of the political decision-forming;	
go/no-go moments for public parties in the follow-up process;	
go/no-go moments for private parties in the follow-up process	

Appendix III: Public Private Partnerships in the EU

	Austria	Belgium	Czech Republic	France	Germany	Hungary	Italy	Netherlands	Poland	Portugal	Slovakia	Spain	UK
Airports	---	---	LP	LI	---	LI	---	---	LP	---	LI	C	C
Defense	---	C	LP	LI	P	LI	---	F	LP	---	LI	---	C
Health	C	---	LP	P	C	LI	P	---	LP	C	LI	C	C
Housing	---	C	LP	LI	---	LI	---	---	LP	---	LI	---	C
Ports	---	---	LP	C	---	LI	P	F	LP	C	LI	C	---
Prisons	---	---	LP	P	P	LI / P	---	F	LP	---	LI	C	C
Railways	P	C	LP	LI	---	LI	---	C	LP	C	LI	C	C
Light Railways	---	C	LP	LI	---	LI	P	---	LP	C	LI	C	C
Roads	C	C	LI	C	P	LI / P	P	C	LP	C	LI / F	C	C
Schools	---	C	LP	C	C	LI / P	---	C	LP	---	LI	---	C
Sports and Leisure	---	F	LP	C	C	LI	---	---	---	C	---	---	C
Water & Waste	C	C	LP	C		LI	C	C	LP	C	LI	C	C

LP = Legislation Planned; P = Significant number of projects in procurement; LI = Legislation Implemented; C = Significant number of projects closed; F = Future Projects Planned

Source: www.pfie.com

United Kingdom

The UK set the pace for the global development of PPPs. More than 700 PFI contracts have been signed to date. Although UK model cannot be copied directly to other jurisdictions, their lessons (successful and bitter cases) can be shared with public and private sector bodies of other EU members.

Portugal

Portugal was one of the early members of the EU to enroll in PPP models, primarily driven by budgetary constraints and the need to meet EU convergence criteria: deficit below 3% and accumulated Public Debt less than 60% of the GDP.

The European Investment Bank (EIB) played a significant role in the introduction of PPPs and has assisted in financing a large number of road projects throughout the country. However, refinancings have failed as well as some models like the "shadow toll" road pricing that transfer state funding to the operational life of the projects, with significant budgetary impacts, remaining as lessons learned for other jurisdictions.

Netherlands

National PPP market is relatively advanced. Highlights include the construction of the A59, the N31, the Westerscheldetunnel, the substructure for the HSL-South High-Speed Railway Link and the commercial operation of this link. The projects relating the HSL, although based very much on the UK PFI model, showed that the Dutch authorities are willing to learn their own lessons and to adapt accepted risk profiles to achieve value for money.

Excessive bid costs in this jurisdiction may (unless addressed) prove to be an unintentional brake on Netherlands' ability to enhance the eagerness of its PPP market participants

Italy

Italian law recognizes several different forms of PPP/PFI. Legislation has been in place since 2001. There are more than 700 PFI including roads, water provision and healthcare. Many of those are less than EUR 5 million, being of little interest for international players.

France

France has a long history of private sector involvement in the provision of public services , although not necessarily by way of PPPs. The French government launched its Partnership Ordinance in June 2004, designed for contracts like the PPP agreements.

The most significant till now is the EUR 1.4 billion financial close for the Perpignan-Figueras PPP rail link.

Belgium

Belgium's governmental model, with its federal, regional and municipal levels of competency, means that PPP laws arise at several levels of authority. The Belgium autonomous municipality enterprises for urban regeneration are one type of existing PPP projects. Many of these projects are large and complex. However, the largest Belgium PPP to date is the Diabolo project for access to Brussels National Airport.

Ireland

Irish PPP legislation is in force, Ireland having decided to follow its own path with regards to risk allocation and model contractual terms.

Road as well as school projects are up for tender or have been closed.

There is a query whether a market that fails to attract new entrants once mature will truly provide value for the relevant authorities.

Appendix IV: The market for debt funding

There are three major potential sources of debt funding:

1. European Investment Bank (EIB)
2. Commercial bank market
3. Debt capital markets

The depth of appetite, cost and likely market conditions attached to each of these forms of finance is considered briefly and in general terms below.

European Investment Bank

There is an internal EIB guideline that limits EIB lending to the level where total funding from the EIB and other EU is at 90% of total project costs, however it is unlikely that this limit will be reached in practice. Subject to these limits, in theory, there are no constraints on the amounts that the EIB could lend the developer of the scheme, however in practice the EIB have budget allocations for sectors and countries and large projects require special negotiation.

EIB is typically able to lend at very competitive rates with maturities in excess of 30 years. While pricing is usually significantly cheaper than bank or bond debt, EIB finance can often have other associated costs. For example, on revenue risk projects, the EIB usually requires that any EIB debt is supported by a guarantee or a "wrap" from a bank or other financial institution such as a monoline insurer (an insurer than specializes in providing guarantees of credit risk) in exchange for a guarantee fee. The value of the guarantee would typically be reduced over time as the perceived risk in the project diminishes. The EIB has recently indicated some limited appetite for taking traffic risk, however, it is unlikely that it would consider lending significant amounts without a wrap or guarantee.

Unless EIB is taking revenue risk, it does not typically charge an arrangement fee in the manner that a commercial bank would. EIB's repayment terms are generally very flexible compared to the commercial bank market. It is not uncommon for most of the repayment of principal on EIB project loans to be scheduled to occur close to the final maturity of the loan (which is often very close to the end of the project's concession). Again, this is not necessarily the case where the EIB takes traffic risk, in which case the EIB usually requires that EIB debt is repaid no slower than any commercial senior debt in the project.

Commercial Bank Market (senior debt)

Commercial banks have an established track record lending to infrastructure projects. Banks have developed a good understanding of the risks. Their supervisory role as a capital provider, underpinned by their ultimate rights to "step-in" and take over an underperforming or defaulting project is a strong disciplinary force for project managers and is considered an important part of the rationale for PPPs. The commercial bank market for project loans is dominated by European players, although there are an increasing number of North American, Australian and Japanese banks who are active in the sector.

Market appetite for a well structured project with a risk profile that is acceptable to banks is likely to be very strong. As the early privately financed projects have come to maturity in recent years, the banking market has become increasingly comfortable with project investment. The key driver of market appetite will be the perceived risk of the project. This will, of course, depend on the structure of the procurement and the credit of the borrower. For a PPP like concession based procurement, the most difficult risk area for banks will be demand risk. While banks are able to accept some element of demand risk, market appetite is not likely to be strong and the cost of finance high. Capping or limiting demand risk in the financing may therefore offer better value for money[23]. Construction risk is well understood by banks, who would expect most of the borrower's exposure to be passed down to sub-contractors or covered through insurance arrangements.

The banking market could lend up to EUR 3 billion for a single project at one time and it may be possible to borrow more. A recent development in the bank project debt market is the introduction of "wrapped" bank debt. This is a project loan that benefits from a guarantee in much the same way as an EIB loan. This may serve to boost market capacity as it means that project risk can be passed outside the banking sector for example to monoline insurers.

Financing costs are generally higher than EIB debt. Recent loans for European DBFM-type transport infrastructure projects based on an availability payment structure with a BBB credit rating have been priced in the region of 1.0% - 1.2% above EURIBOR. Banks will impose certain restriction on the borrower in exchange for providing debt funding. These restriction (or covenants) include maintaining a specified level of debt service coverage and

[23] Right balance between cost outturn and quality along project life cycle

other financial ratios, restrictions on the distribution of dividends to shareholders, the need to maintain cash reserves at agreed levels to support future debt service (typically six months to one year's forward debt service), capital or major maintenance expenditures. Some of these covenants, such as any requirements to maintain cash reserves, may impose additional costs on the borrower, which need to be considered when comparing bank debt to other forms of finance.

Debt Capital Markets (junior or mezzanine debt)

The bond markets have a significantly larger appetite than the bank market. Primary purchasers of infrastructure bonds tend to be institutional investors such as pension funds; however, there is now an active secondary market where infrastructure bonds are more widely traded. Almost all recent large project bond issues have been credit enhanced or wrapped, the guarantee most often provided by a monoline insurer. Unlike in the bank market, a single transaction could raise well over EUR 3 billion through a wrapped bond issue.

Pricing is usually better than bank debt, even after taking into account the guarantee fee charged by the monoline insurer. Maturities of 30 to 50 years are achievable with principal amortization profiles that are significantly back-ended (i.e. the bulk of the repayment occurs on or close to the final maturity of the bond).

The cost of the monoline guarantee will depend on the structure of the project and the degree to which project cash-flows are exposed to revenue risks. For a predominantly availability based DBFM structure fees are likely to be in the region of 0.30% per annum of the amount of debt guaranteed. There are only three large monoline insurers and it is unlikely that a single monoline would be prepared to wrap in excess of EUR 1-1.5 billion however, this should not pose a problem for the scheme since the monoline insurance industry has seen a number of smaller new entrants which should present sufficient capacity to generate competitive tension.

Bondholders typically require similar covenants to bank lenders. One area in which bond finance imposes additional rigidity and cost over bank finance is in the drawdown of funds. While bank finance can be drawn down by the borrower as and when the funding is required, bond proceeds are generally all raised at the time of issue. This poses two difficulties for the concessionaire: managing the uncertainty over the financing requirement and mitigating the "burden cost" of holding unused bond proceeds waiting to be utilized.

Appendix V: Traffic information in the tender phase

All bidders need information about the traffic forecasts and associated toll revenues. This information should at least contain base year model information, forecast year model information, forecast results for different alternatives and scenario's. These items are elaborated below.

Base year model information

The base year model is of importance because it is the basis for the forecasts and it provides information about the validity of the model and its explanatory power. It is therefore of importance to show that indeed the model validates well and that it has enough explanatory power to produce forecasts. The base year model information should include information about:

- The general model structure. What travel choices are included in the model, what techniques are used to model them.
- The model parameters. What model parameters are used, how are they calibrated and how valid are these parameters (bandwidths). Specifically the demand model parameters and network coding issues (speed-flow relationships) need to be addressed.
- How does the model validate. For validation independent data sources need to be used. So traffic count data used to determine base year matrices cannot be used to validate the model. It is also essential to validate the travel times in the model against independent observations. This should include information about mode share, trip length, comparisons of model and measured data, selected link and matrices, travel times, compressed matrices, etc.

Forecast model information

Depending on the duration of the concession it will be necessary to provide more than one forecast year, where years close to the opening of the infrastructure are more important. The forecast model information should provide confidence in the resulting toll road forecasts and should include:

- The general forecast structure: what travel choices are included, what techniques are used to model them, how are the base year matrices used in producing forecasts.

- A detailed description of all forecasts assumptions and possible parameter changes. What economic scenario is used an how does it affect the forecasts. Is induced demand taken into account. What socio-economic growth, infrastructure changes and policy measures are planned. Are they used in the forecasts and how certain are these (in time planning and size).
- Comparisons of forecast and base year model, both matrices and assignment results.

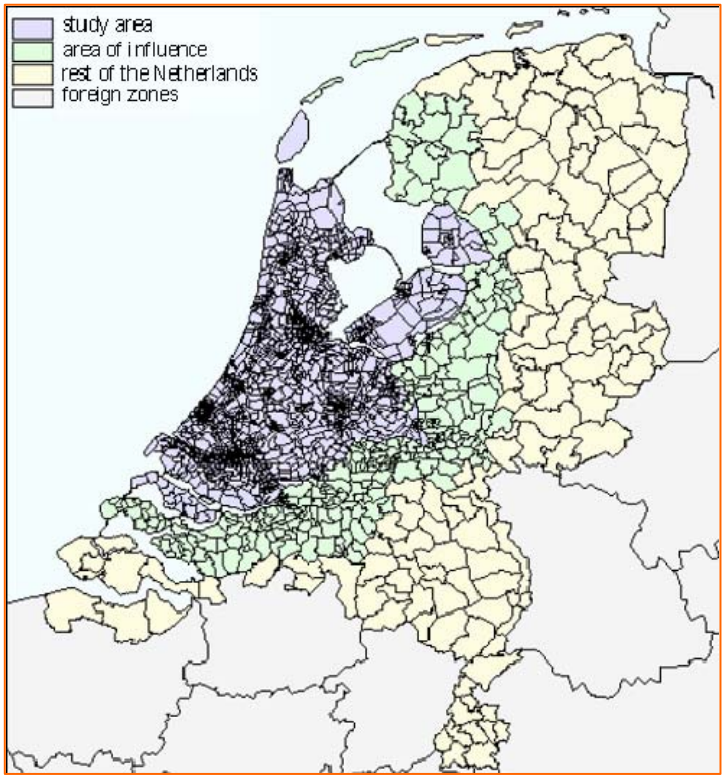
Forecast results for different alternatives and scenario's

One of the means for optimising the financial structure of the project is to use the toll revenue predictions for various scenario's to interact with the best suitable financial structure. Optimising the income predictions and minimising –or at least analysing- forecast uncertainties are of utmost importance in this. This means that:

- traffic predictions resulting from different toll price levels should be included. These results should at least be presented in tables with volumes on different segments, assignment plots, resulting skim matrices, V/C-ratio's, and selected link analysis.
- if applicable, any restrictions towards toll levels and toll level growth rates should be included in the model document.
- Any bidder will produce a central case forecast together with one or more downside and upside cases. These downside and upside cases can be constructed by used specific model runs or by risk analysis. These risk analysis use the elasticity's of the model towards different input parameters. Normally this is anticipated and information is provided about the sensitivity of the model towards changes in base year model elasticity, economic growth, uncertain land use developments, infrastructure projects and policy measures, values-of-time and toll levels

Appendix VI: NRM feasibility for PMZ toll study

In general the NRM model procedure is a well designed model structure. It suits the purpose for which it is built: distribute central government funds to regions for infrastructure projects. However to make detailed assessments of the use of toll roads, the NRM procedure is too coarse (zones and network). The NRM Randstad specifically has a problem that part of the project corridor is in the area of influence of the model (and therefore not in the study area). Furthermore there are uncertainties in the level of demand. These uncertainties and other aspects are discussed below.

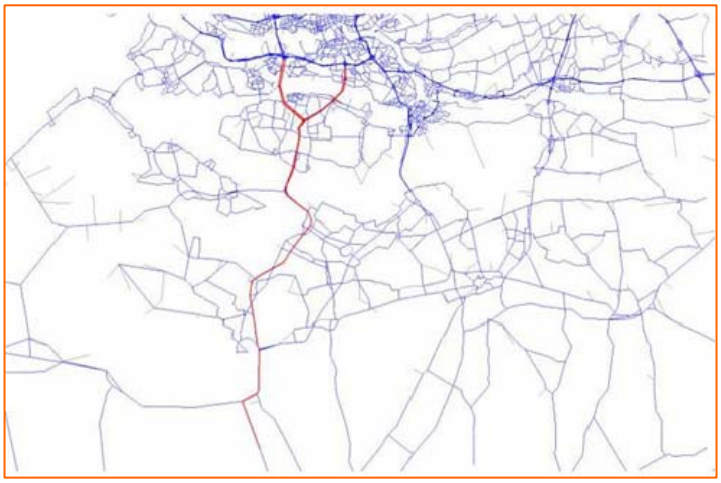


The NRM Randstad in a partially non-Randstad project

The NRM Randstad, in particular the forecast year model, only models the car traffic which is related to the Randstad and an area of influence (see figure). This is only part of the demand matrix. The rest of the traffic is taken from the Dutch National model. This is a more strategic model with less spatial detail, but more complex choice models, feedback loops, etc. Since the toll schemes under investigation in this project extends outside the Randstad, covering travel demand not actually forecast by the NRM Randstad itself, the appropriateness of the NRM Randstad can be questioned. This is mainly the case for traffic from Zeeland, south and east part of Brabant and Belgium. The alternative model, the NRM Brabant, would however have similar issues (vice versa). Some combination of both models would be best, but is not easy to construct.

Another issue with using the NRM Randstad for the PMZ study is that the zones get larger in the area of influence, the rest of the Netherlands and foreign zones. This, in itself, is normal for any model, but in this case the corridor through Brabant, connecting Rotterdam

and Antwerp should preferably be modelled in more detail. In the figure the NRM Randstad network is compared to the actual road network (2007) from the national road database.



Modelling congestion

The purpose and focus of the NRM models is to evaluate the network flows on the motorways in a consistent manner throughout the Netherlands. As a result, NRM's are less accurate in their prediction of flows in congested areas, with alternative routes on lower level roads.

The NRM assignment techniques do not take into account junction delays. Especially in urban networks this may lead to overestimation of routes on lower level roads. The assignment is a static equilibrium assignment which tends to underestimate the travel times when congestion occurs. The level of network detail, combined with the assignment technique used, cause the model to be less accurate in route choice, especially when toll is introduced.

Toll variations

Toll prices in NRM for the various vehicle categories are dependant on each other: the NRM asks for a multiplication factor as general input to apply to car tolls to calculate the toll prices for freight traffic. This makes it impossible to forecast the effects of changing this proportion between cars and trucks for certain roads (for example to create a freight highway and a car highway). Furthermore NRM allows for only four toll prices to be modelled in one run.

Matrix estimation

Since an alternative and unknown approach for base year matrix estimation was used by the PMZ

traffic consultant, it is hard to estimate the quality of the matrix structure. Also, the OGM procedure based on the disaggregate choice model is somewhat of a black box, where questions of transferability to a regional level remain. Overall the structure of constructing matrices with feedback loops for congestion, including different trip purposes does seem well designed.

Economic growth predictions

The current version of the OGM uses an economic scenario EC from the Central Planning Bureau as a starting point. In this scenario, GDP growth, population growth, population distribution, car ownership, fuel costs, fuel efficiency, etc. are determined. Recently the CPB has produced new economic scenario's for the Netherlands up to 2040. These new scenario's show less growth for the Netherlands than the old scenario's. Other sources for economic growth scenario's (banks, EIU) still show higher growth for the Netherlands and tend to find the new CPB scenario's conservative. Besides the available scenario's, the future developments are certainly a source of uncertainty and this should somehow be reflected in the traffic forecasts or sensitivity analysis.

Freight traffic predictions

The OGM covers only the car traffic of the forecast. The freight matrices come from the national model and are regionally disaggregated to the NRM zonal system using distributions of different types of work places in each zone. The freight matrices have later been improved to better resemble the freight pattern around Rotterdam. For this purpose the RVMK (another model for the region of Rotterdam) freight matrices have been used as input. Road pricing is assumed not to have an effect on freight demand. Also, the freight demand is reduced by 10% because of assumed changes in efficiency of transport companies. The question is if these efficiency gains will actually take place. An important reason for growth of freight is the port extension Maasvlakte II. It is still unclear how this extension will be used and to what traffic demand this will lead. Currently a container scenario is used in the model, which leads to approximately 25% more traffic from Maasvlakte II compared to one of the earlier scenario's.

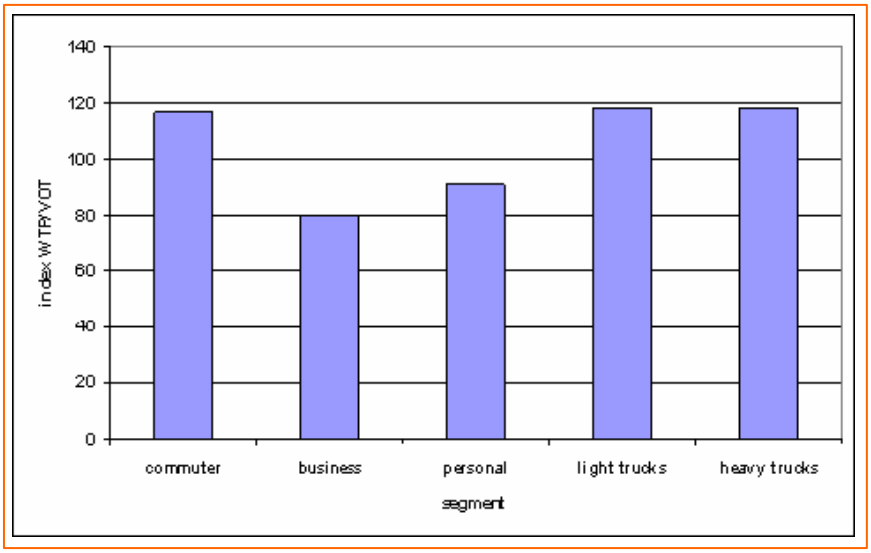
Distance costs in assignment techniques

Also in the assignment, the distance (fuel) costs are not taken into account. This is of importance when modelling toll roads. Tests have been run to investigate the effects of taking into account the distance costs in the assignment. The effects were different for different toll locations, but they can be very large (positive or negative) depending on the

route alternatives. The advise is not to take distance costs into account because the NRM Randstad is too sensitive.

Secondary roads

When applied for other toll road (and sometimes using other NRM models), the capacities on lower level competing routes to the toll road have been lowered. First an assignment was done without toll on the new infrastructure. The capacities on the lower level competing routes were set to the assigned volumes in this situation plus 15%. Then an assignment with toll was run. This way the problem is avoided that large volumes of traffic avoid using the toll road. It is however also an extreme manipulation of the model, which makes the model results questionable.



Value of Time

The values of time used in the NRM model procedure come from stated (mode) experiments. These do not resemble a willingness-to-pay for a toll road. The figure shows a comparison of willingness-to-pay values estimated for another Dutch toll road project, compared to the Dutch national values-of-time. The Traffic Research Centre has investigated the sensitivity of the NRM Randstad towards different values-of-time for two hypothetical toll roads and have found changes in volumes between 5% and 27% depending on the time of day and toll road.

Besides a difference between mode choice value-of-time estimates and toll road willingness-to-pay values, both are sensitive towards: 1) type of data used to determine value-of-time and willingness-to-pay and 2) model specification and estimation technique. The growth of values-of-time for forecast years are determined based on half the growth in GDP. This is also a not too well validated assumption. To summarize, the values-of-time are bandwidths more than exact values, the effect of which should be analyzed in sensitivity analysis of the model.

Validity of the base year model

It seems that the quality of the apriori matrices was too low to start the calibration process and as a result the differences between the apriori and aposteriori matrices must be significant. This will have an impact on the model forecasts, but it is very hard to quantify. When looking at the percentage difference between those two, it seems that the flows on motorways are generally under predicted and flow on secondary roads over predicted.

Conclusion

The overall judgement is that the NRM Randstad procedure is useable, but the network and zones should be more detailed around the project corridor and especially in Brabant. The model should be further validated against independent sources of data (demand and assignment result) including travel time validations. The assignment should be improved to include junction delays such that route becomes more reliable and can include distance costs as well. The latter is not possible using the current software. Besides improvements to the model, the sensitivities of the model towards different input assumption should be better understood.

Appendix VII: Sensitivity analysis of the traffic model

Traffic risk is a key determinant of the potential success of a toll road project. Examination of the risk analysis will assist in identifying the modelling assumptions required for a downside traffic forecast for Lenders. This may include lower forecasts of GDP growth, omission of all but committed major developments, use of lower income elasticities for car and truck usage and truck willingness to pay, tougher modal and route competition and extended ramp up. Risk assessment for PMZ has been executed in two ways:

- Quantitative risk assessment, where spreadsheet-based models were developed and applied to incorporate the key risk factors and investigate their influence on traffic and project revenues. The analysis has been undertaken using Monte Carlo-type simulation and @Risk software.
- Qualitative risk assessment, where the Standard & Poor (S&P) risk index was adopted to identify nearly 40 risk factors to rate the traffic risk on a 1 to 10 judgemental scale, supplemented by comments on the basis for our ratings.

Quantitative risk analysis

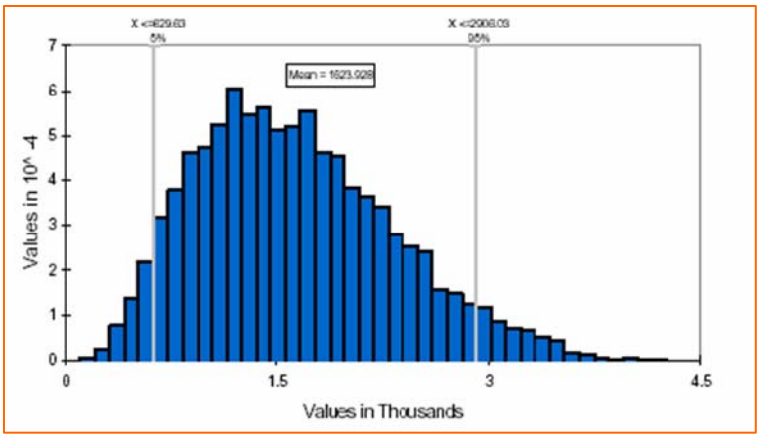
Lenders typically require a quantitative risk analysis (QRA) for debt sizing. In particular, they may often require Downside (Pessimistic or Low) Case forecasts. These are usually derived from either:

- Definition of a Downside Scenario: a set of more pessimistic assumptions for the key traffic drivers as input for a traffic model run. The output of this run is adopted as the Downside Case forecasts.
- Risk simulation: Monte Carlo analysis to determine a P90 or other pessimistic outcome which is then adopted as the Downside Case.

In most instances risk simulation is now the preferred method for determining the Downside Case. The process that was applied for PMZ is as follows:

- Specification of the forecast horizons and market segments to be analysed.
- Identification of risk factors. These differ between projects, especially between existing facilities (which have established traffic) and new facilities(where there is addition risk from attain initial, traffic as well as growth), such as toll rates and toll elasticity, traffic

growth rates, base year value of time and real increases in it through the concession period, GDP growth rate and elasticity.

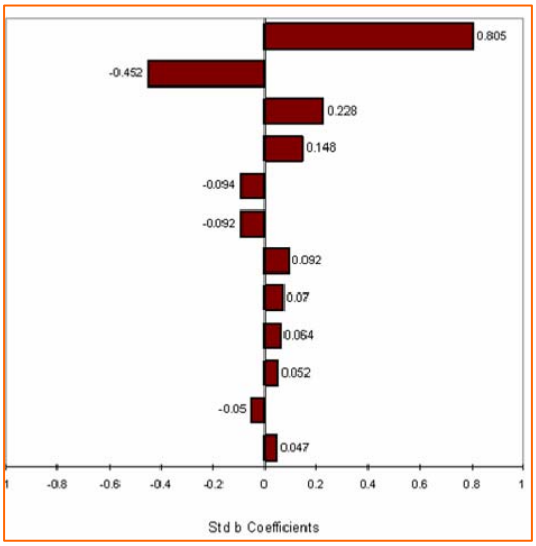


– Determination of forecast elasticity's: the sensitivity of traffic forecasts to changes in each risk factor were determined from sensitivity tests performed in the traffic model. These were incorporated within the risk analysis as proportionate changes (elasticity's).

– Specification of risk distributions (type of distribution, its parameters)
– Run of a 'Monte Carlo'-type (Latin hypercube) simulation using @Risk software with 10,000 iterations.
– Output risk measures: the estimated distributions of traffic outcomes in each forecast year, in detailed tabular form. Associated traffic distributions and tornado plots of the most influential risk factors.

Qualitative risk analysis

In September 2002, Standard & Poor (S&P) published research into the accuracy of traffic and revenue forecasting for toll road projects (Standard & Poor's Infrastructure Finance, Traffic Risk in Start-up Toll Facilities, September 2002). The research explored the project uncertainty and traffic forecast performance of 32 toll road case studies. The forecasts were drawn from a range of sources but fell into two broad categories, those undertaken for banks and those undertaken for others (government and concession bidders, etc.).



The research specifically looked at the causes of inaccurate forecasts and the nature of the projects. Based on this research, S&P developed a Traffic Risk Index. The index has a notional scale of 1 to 10; 1 being low risk and 10 high. For PMZ, the concession was examined against this Traffic Risk Index.

Appendix VIII: Cost for maintenance & operations

Geographical scenario 1: A4 Klaaswaal

Overview	OPEX	Costs		Scenario 1
	FTE		Annual Costs	2007
Members Board	3		€110.000	€330.000
Managers	5		€80.000	€400.000
Professionals	14		€70.000	€980.000
Employees	27		€50.000	€1.350.000
General costs	**Including**	Education & Exercise		
		IT		
		Legal		
		Consultancy		
		Marketing campaign		
				€2.357.269
Office Building				€216.000
Total	49			**€5.633.269**
Maintenance	**Including**	Equipment		
		Maintenance costs		
		Insurance opex		
		Damages		
		Energy costs		
		Winter management		
		QSHE costs		
		Costs tolling		
		Enforcement		
				€6.611.836
Total annual costs				**€12.245.105**

OPEX calculation scenario 1	concession period		
	X = 30 year	X = 40 year	X = 50 year
Total annual costs scenario 1	€12.245.105	€12.245.105	€12.245.105
Total cost per "X" years	€367.353.150	€489.804.200	€612.255.250
LCC Costs (refurbishing)	€54.000.000	€91.550.000	€136.130.000
Insurance CAPEX	€40.000.000	€40.000.000	€40.000.000
Total General "X" years	€461.353.150	€621.354.200	€788.385.250
Total General per year	**€15.378.438**	**€15.533.855**	**€15.767.705**

Geographical scenario 2: A4 Corridor

Overview	OPEX	Costs		Scenario 2
	FTE		Annual Costs	2007
Members Board	3		€110.000	€330.000
Managers	5		€80.000	€400.000
Professionals	15		€70.000	€1.050.000
Employees	32		€50.000	€1.600.000
General costs	**Including**	Education & Exercise		
		IT		
		Legal		
		Consultancy		
		Marketing campaign		
				€2.426.500
Office Building				€216.000
Total	55			**€6.022.500**
Maintenance	**Including**	Equipment		
		Maintenance costs		
		Insurance opex		
		Damages		
		Energy costs		
		Winter management		
		QSHE costs		
		Costs tolling		
		Enforcement		
				€14.824.877
Total annual costs				**€20.847.377**

OPEX calculation scenario 2	concession period		
	30 year	40 year	50 year
Total annual costs scenario 2	€20.847.377	€20.847.377	€20.847.377
Total cost	€625.421.310	€833.895.080	€1.042.368.850
LCC Costs (refurbishing)	€106.450.000	€210.600.000	€312.825.000
Insurance CAPEX	€40.000.000	€40.000.000	€40.000.000
Total General	€771.871.310	€1.084.495.080	€1.395.193.850
Total General per year	**€25.729.044**	**€27.112.377**	**€27.903.877**

Geographical scenario 3: PMZ Network

Overview	OPEX	Costs		Scenario 3
	FTE		Annual Costs	2007
Members Board	3		€110.000	€330.000
Managers	6		€80.000	€480.000
Professionals	20		€70.000	€1.400.000
Employees	62		€50.000	€3.100.000
General costs	**Including**	Education & Exercise		
		IT		
		Legal		
		Consultancy		
		Marketing campaign		
				€4.834.923
				€364.000
Office Building				**€10.508.923**
Total	91			
		Equipment		
Maintenance	**Including**	Maintenance costs		
		Insurance opex		
		Damages		
		Energy costs		
		Winter management		
		QSHE costs		
		Costs tolling		
		Enforcement		
				€26.455.133
Total annual costs				**€36.964.056**

OPEX calculation scenario 3	concession period		
	30 year	40 year	50 year
Total annual costs scenario 2	€36.964.056	€36.964.056	€36.964.056
Total cost	€1.108.921.680	€1.478.562.240	€1.848.202.800
LCC Costs (refurbishing)	€253.500.000	€331.050.000	€537.880.000
Insurance CAPEX	€40.000.000	€40.000.000	€40.000.000
Total General	€1.402.421.680	€1.849.612.240	€2.426.082.800
Total General per year	**€46.747.389**	**€46.240.306**	**€48.521.656**

Appendix IX: Information resources

The report is based on the knowledge and experiences of the people from the organisations that participated in the Delta Network: Brisa, Movenience and VolkerWessels. In some cases, these people used external information sources to verify their thoughts or back-up their findings. These sources are listed below:

- Lijesen and Shestalova, 2007, CPB Document No. 146
- OECD Territorial Reviews: Randstad Holland, Netherlands, April 2007
- NedMobiel paper on private financing of infrastructure, from proceedings of IABSE workshop 2006
- Guidelines on the national accounting treatment of infrastructure funding (ESA95) and its decision on the treatment of PPPs published on 11 February 2004.
- EU public sector procurement directive (2004/18/EC)
- The PMZ website www.pmz-rws.nl; and all presented PMZ documents on this site, given to the Delta Network by the PMZ project team or otherwise provided
- The Westerscheldetunnel; approaching limits; J. Heijboer, J. van den Hoonaard and F.W.J. van de Linde; 2004
- EU Directive 85/337/EEC on the Environmental Impact Assessment
- Project MEET – Methodology for Calculating Transport Emissions and Energy Consumption (EC, 1999)
- Financing Infrastructure Projects; Dr. Tony Merna and Cyrus Njiru; construction management series; 2002
- Basic DBFM Agreement Rijkswaterstaat

- 'Modulair Model Aanbestedingsleidraad DBFM-Basisovereenkomst'
- Verhoef (2006): 'Second-best road pricing through highway franchising'
- Engel et al (1997): 'Highway franchising: Pitfalls an opportunities'
- Aanbestedingsregelement ARW 2005
- "How to construct a Public Sector Comparator" – Technical Note nº5, Treasury Task Force Private Finance, UK
- Tempels bouwkosten advise; Kostenraming Mobiliteit Deltagebied; advice to the NV Westerscheldetunnel; 14 December 2004.
- Nota Mobiliteit; Ministerie van Verkeer en Waterstaat, 30 september 2004
- Report 'Nationaal Platform Anders Betalen voor Mobiliteit' 2005
- werkprogramma "anders betalen voor mobiliteit, DGP/WV/AbvM/U.06.00220")
- EU directives 1999/62/EG
- NV Westerscheldetunnel paper on maintenance and operations of private infrastructure, from proceedings of IABSE workshop 2006
- Various inputs from Jacobs and Goudappel Coffeng, who were Technical Advisor to the Delta Network.