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**CHALLENGES FOR THE SUSTAINABLE
DEVELOPMENT OF ROAD SYSTEMS**

GENERAL REPORTER

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ABSTRACT

The following national report of Austria tries to give an overview on the sustainable development of primary road network, which is operated, financed, constructed and maintained by the National Motorway and Expressway state-owned company called ASFINAG. The importance of sustainable development in all economic spheres – so in the road sector as well - is growing. Therefore ASFINAG decided to publish its first sustainable development report in October 2006. In the so called “open planning process” ASFINAG tries to involve different stakeholders in the infrastructure projects in order to increase their acceptance in the public and to meet the needs of environment, affected people and cost efficiency. Distance and time-related tolls for passenger cars and trucks are identified as efficient and fair funding allocations for road investments. A new PPP project started for the first time in Austria, is another method for securing financial resources in road investments by risk minimisation. During the last two years ASFINAG started to reorganise its corporate structure in order to concentrate all its core competences under one group umbrella, what improved our performance. On the way to an “intelligent road”, ASFINAG applies traffic management information system, which makes our primary road network safer by realising higher cost efficiency.

1. THE POLICIES ADOPTED IN THE DIFFERENT COUNTRIES TO ACHIEVE SUSTAINABLE DEVELOPMENT OF THE ROAD SYSTEM

Implementation of highway construction projects in Austria is an extremely complex, multi-layered issue. Varying processes and requirements arise during the individual phases of implementation (Preliminary survey – Project planning – Construction). The significant difference between these is how the requirements of different environments are considered. For instance, involving affected members of the public during the planning and implementation of road projects is increasingly becoming a key factor for the acceptance and appreciation of road construction.

Organisations like ASFINAG who are in charge of developing new infrastructure have to take the responsibility given very serious, since they also play a crucial role in achieving sustainable solutions for the society as well as for the environment. Of course this can only happen, when social, environmental and economic factors are treated in an equal and balanced way. CSR – Corporate social responsibility is a rather new instrument to reach that goal. ASFINAG in Austria is seeking to implement CSR as part of a management system in 2006 including publishing its first sustainability report.

1.1. CSR – Corporate Social Responsibility

The first CSR reports appeared during the 1970's and 80's alongside concepts such as sustainable development and the triple (economic, environmental and social) bottom line.

Many organisations, including those in the road sector, can benefit from implementing a CSR policy and reporting on progress. However, take-up is still relatively low in the road sector with some private companies implementing environmental and CSR policies and only a few public organisations following them on this path. The apparent late development of CSR amongst road sector public organisations can be attributed to the fact that most public agencies already implement sustainable principles when carrying out their mission. Through compulsory regulation or need to act as a role model, some public organisations have however started to monitor their own operations' impact on their environment and

communities. CSR policies are likely to play a greater role in the roads sector with the emergence of guidelines for public sector reporting and as private sector organisations respond to the requirements of public sector agencies, investors and other stakeholders.

Until now the road sector has generally not been one of the leading branches when it comes to the implementation of CSR concepts. As a KPMG survey has shown in 2005 (Source: KPMG International Survey of Corporate Responsibility Reporting 2005, www.kpmg.co.uk), the sectors “Transport” and “Construction and Building Material” were lagging behind when compared with other industrial sectors with relatively high environmental and societal impact. This is especially true when it comes to public sector institutions in the road sector.

1.2. What is CSR

The World Bank defines Corporate Social Responsibility as *“the continuing commitment by business to contribute to sustainable economic development by working with employees, their families, the local community, and society at large to improve their quality of life, in ways that are both good for business and good for development”*.

Corporate Social Responsibility is closely related to the wider concept of sustainable development. This connection appears clearly in the model of the Triple Bottom Line commonly used to describe, assess and report CSR. The Triple Bottom Line describes all three dimensions of sustainable development and how they apply to organisations through CSR:

- the economic bottom line refers to the organisation’s financial performance but also to the philosophies or values behind an organisation’s strategy or behaviour;
- the environmental bottom line describes the impact of the organisation’s products or operations on the environment; its emissions, soil pollution, energy use and waste and how it is dealing with them; and
- the social bottom line refers to issues such as ethnic and gender diversity, working hours and wages, staff security and health within the organisation as well as its contribution to community services or facilities.

1.3. The Relevance of CSR for the Road Sector

Some of the companies included in the “Transport” and “Construction and Building Material” categories for the KPMG survey are involved in infrastructure and road projects. However, construction companies and transport operators are not the only actors in the road sector. Public agencies, government departments, public and private investors, engineering consultants, construction companies and network operators are all taking part in the development and maintenance of road networks around the world. Although these actors can be very different (public/private, funders and investors/technical capacities, etc.), CSR could bring benefits to road sector organisations, including:

1.4. Benefits of CSR

As stated, Corporate Social Responsibility means taking the economic, social, and ecological impact of a business seriously. However, CSR is not only a defensive strategy. Most institutions employing CSR related measures do have a certain “enlightened self-interest” in “doing good”, i.e. their businesses profit from their CSR-standards. This is certainly true for the following areas:

- In every infrastructure project, there are stakeholders with very specific interests: employees, suppliers, customers, various affected communities, NGOs, various levels of government etc. CSR is a great means of managing stakeholder expectations throughout a project and may thus help to reduce high conflict costs at a later stage of an endeavour (also avoiding legal risks). So, CSR is a means of risk management and reduction.
- CSR helps building a better corporate image. This is true when it comes to employee relations (better motivation; image as a good employer) as well as certain stakeholders (like critical NGOs) or the general public. Sustainability measures might also help to manage growing investor pressure.
- When implementing CSR-measures, a company or public agency might also gain the status of a role model in a specific sector. Out of that, even a competitive advantage might evolve. Therefore, CSR is not only about meeting general corporate governance standards but also about profits when it comes to the economic bottom line.

Whereas CSR standards, e.g. integrated management processes, are not very widespread in the road sector, various elements of CSR already do exist.

As compulsory reporting on sustainability and CSR probably will become even more widely spread, the road sector has to react to that development more thoroughly than it has up to now. Some countries already do produce this public reporting and work on the implementation of a concrete CSR policy.

CSR in the roads sector can best be seen as a further broadening of the responsibilities of both public and private organisations in planning, designing, constructing, operating and maintaining roads. In the same way as the roads sector adapted decision-making arrangements and institutional structures to embrace sustainability agendas, the road sector is likely to have to broaden its horizons further to demonstrate greater levels of corporate social responsibility.

Further research will be valuable to confirm the current level of commitment and adoption of CSR policies, the approaches being taken and sources of knowledge exchange thereby allowing roads organisations to demonstrate how they are taking responsibility for economic, environmental and social progress both in developed and developing countries.

2. HOW ROAD ADMINISTRATION CAN MAINTAIN LEADERSHIP IN PARTICULAR WITH THE COORDINATION OF THE DIFFERENT STAKEHOLDERS

2.1. Public Participation and Stakeholder Consultation in Infrastructure Projects

Infrastructure projects must be realised in a way that is transparent and understandable even to non-specialists – by exchanging information as well as specifically involving the public in the planning process. Ignoring or even completely contradicting the public's needs and anxieties has been shown to have a diametric influence on the chances of road projects being implemented.

In the process of motorway construction Environmental Impact Assessment (EIA) has become a crucial part of the planning process. For this purpose in Austria ASFINAG has implemented the so called "Open Planning Process" to meet the needs of environment, affected people and cost efficiency.

Involving stakeholders and the population affected by the planning and execution of road construction projects at a very early stage has become an essential factor in the acceptance and understanding of road construction. Infrastructure projects need to be carried out in a way that is transparent and easily understandable for lay people, by exchanging information with the population concerned but also by actually involving it in the planning process.

Concerning planning-projects for motorways in Austria, ASFINAG tries to involve the local population in an iterative process (working group) to discuss the project itself and e.g. the pros and cons of "extreme solutions" such as mile-long tunnels. Ultimately this process usually results in an entirely objective approach to what had initially been a highly charged emotional issue. By involving the population in the planning process it proved possible on the one hand to achieve a greater level of understanding among the local communities for the implementation of several measures and, on the other, a greater acceptance of the project as a whole. The representatives in the working groups also acted as multipliers in the local communities, which means that it is possible to achieve a more objective discussion throughout the region as a whole.

The view that such an approach simply makes projects far more expensive is essentially incorrect; indeed, nowadays projects are generally planned using other standards with regard to environmental repercussions. The advantage of what is referred to as the "open planning process" is undoubtedly the implementation of projects drawn up in this way and above all the greater acceptance of road construction in Austria as a whole.

One of ASFINAG's objectives has always been to make planning transparent and easily understandable. A whole range of instruments has been established to involve the general public, and these instruments are regularly adapted and modified to suit individual projects. Ultimately the public's participation cannot be achieved using a purely standard programme. Each project imposes different requirements on its promoter. It takes a precise and meticulous analysis of the circumstances and situation on site to bring off the difficult balancing act between successfully involving the population and simply overwhelming it with information.

3. IDENTIFICATION OF EFFICIENT FUNDING ALLOCATION FOR ROAD INVESTMENT (FINANCING EVALUATION METHOD, ROAD PRICING) AND QUANTITATIVE PROJECT EVALUATION

Initial situation

Geographically speaking, Austria is located in the centre of Europe and therefore constitutes an essential hub for international passenger and goods transportation.



Figure 1 - The Austrian motorway network – as per 30 June 2006

2060 km of the Austrian motorways are in operation, 1920 km of which are toll routes and about 140 km special toll routes. Another 401 km of Austrian motorways are being planned and about 34 km are under construction.

3.1. Survey of the Austrian Toll Systems

All revenues generated by ASFINAG from toll proceeds are earmarked and used for financing the construction, maintenance and operation of the Austrian motorways and expressways.

- **Passenger car distance-dependent toll:** In Austria, tolls have been collected on selected motorway sections since 1968. Since then, this distance-dependent toll has been collected on six toll sections covering a total of around 140 km (A 9, A 10, A 11, A 13, S 16).
- **Passenger car time-dependent toll:** As of January 1, 1997, also a time-dependent toll (toll sticker) was introduced for all other motorways and expressways in the Austrian road network for vehicles having a maximum admissible total weight of up to 3.5 t.
- **Truck distance-dependent toll:** As of January 1, 2004, a distance-dependent toll was introduced for vehicles with a maximum admissible total weight of more than 3.5 t. This system is based on micro-wave technology and toll is automatically collected via an on-board unit (GO-Box). All those vehicles must be equipped with a GO-Box (ETC – electronic toll collection).

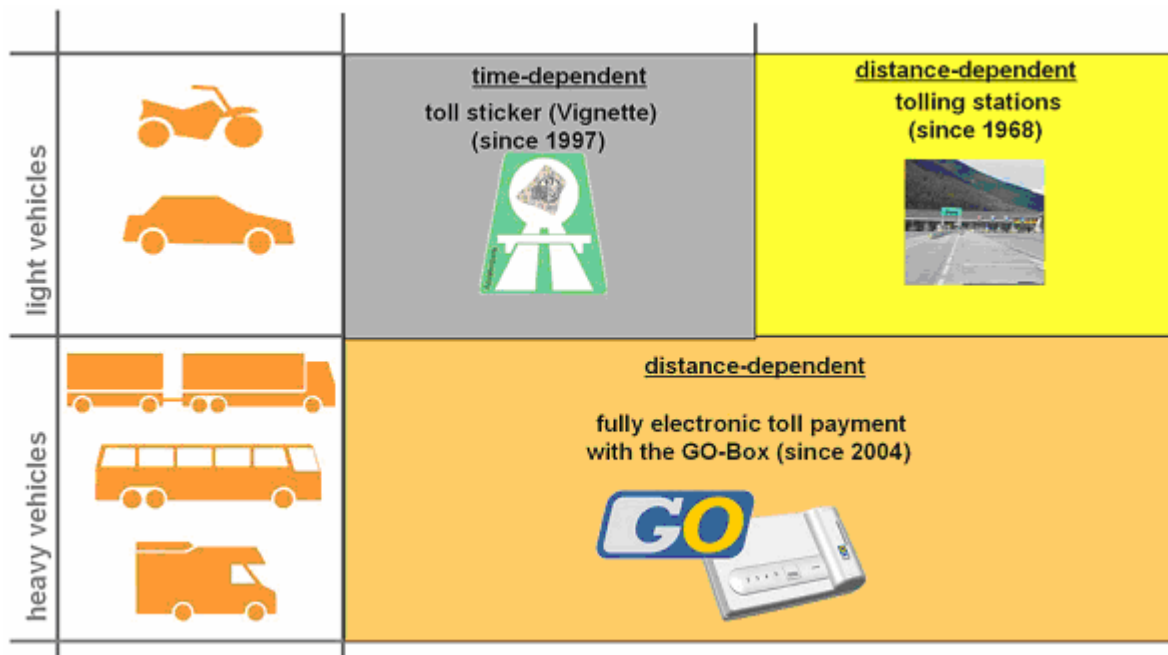


Figure 2 - Tolling systems in Austria

3.2. Drawbacks and Benefits of the Individual Tolling Systems

- The time-dependent toll for vehicles weighing up to 3.5 t generates only limited income and is not a fair system because all users have to pay the same toll – regardless of the number of the actually covered kilometres on the motorways. The system benefits frequent travellers and is a drawback for those covering only short distances within the motorway network.
- The distance-dependent toll in Austria for vehicles weighing up to 3.5 t is not available on the entire Austrian motorway and expressway network. The construction of toll stations is very costly, and more staff is needed for manual toll collection. The distance-dependent toll is fair because it is paid only for the kilometres actually covered.
- The distance-dependent toll introduced in Austria in 2004 for all vehicles with a maximum admissible total weight of more than 3.5 t is state-of-the-art and fair because costs depend on the actual road use. The target of the distance-dependent toll is to allocate to users only such costs they have actually caused.

Customer satisfaction is of utmost priority to ASFINAG. This is why ASFINAG's toll collection system aims at enabling users to pay for their road-use in the most convenient way.

3.3. Development of Toll Income

When looking at the development of toll income generated over the past three years until now, it becomes clear that revenues from time-dependent toll are stagnating. By contrast, income from distance-related toll is steadily increasing.

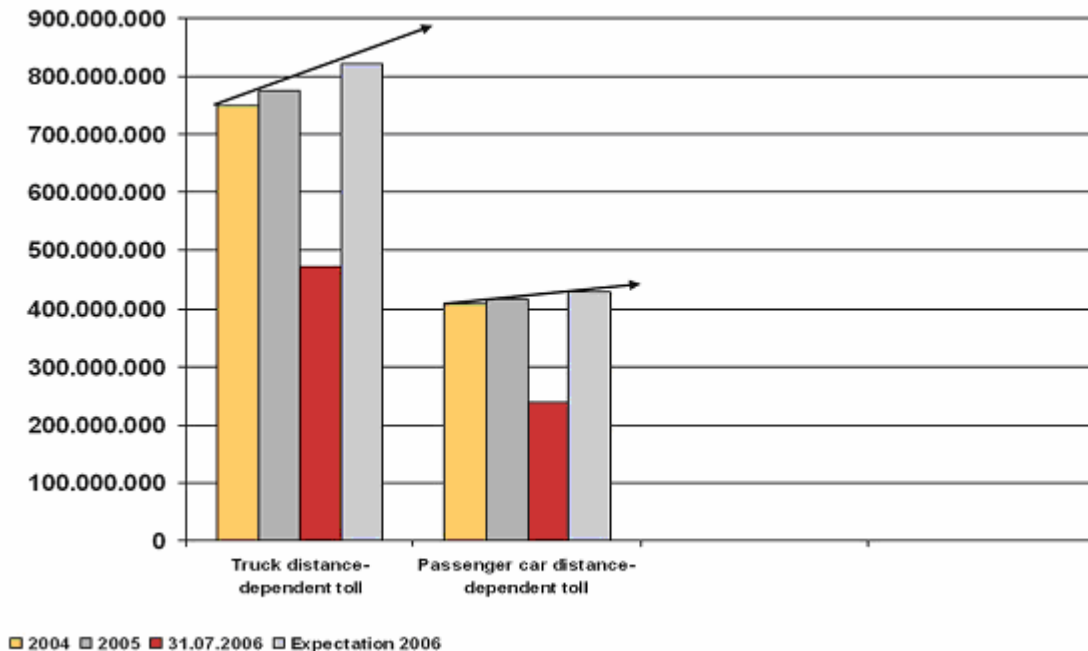


Figure 3 - Development of toll income since 2004 (amounts in EUR)

3.4. Outlook

The time- and distance-dependent toll income secures efficient management to the benefit of our customers. In order to offer the road network users optimally designed traffic routes with the highest possible comfort at a fair, performance-related price also in future. ASFINAG is increasingly investing in extending the distance-related tolling system, even for vehicles with a maximum admissible total weight of less than 3.5 t. Distance dependent tolling is the only fair method of financing by the users. This will secure further investments in the Austrian motorway and expressway infrastructure and is the prerequisite of individual mobility and effective goods logistics on the road.

For further information please go to: www.asfinag.at or www.go-maut.at

4. PPP – ALTERNATIVE PROCUREMENT FOR EFFICIENT COST STRUCTURES IN MOTORWAY MANAGEMENT

In 2004 ASFINAG - the Austrian motorway company made the first steps of towards new routes in the procurement of primary road infrastructure in Austria. Now, two years later, it is time to share some few important experiences learnt during the tender process of one of Europe's largest road PPPs.

4.1. Project Scope and Expected Goals

In 2003 ASFINAG's owner, the Republic of Austria, recommended that the urgently needed primary road infrastructure in the "Ostregion" – the north-eastern region of Vienna - should be procured as a PPP under a series of concession contracts. So ASFINAG – responsible for planning, building, financing and operating the entire Austrian motorway and expressway network of more than 2000 km - initiated a process under which, for the first time in Austria, a private partner will be awarded a concession for the detailed design, construction, financing, operation and maintenance of motorways and expressways.

As part of a €3.1bn construction programme comprising approximately 110 km of new motorways and expressways in the Ostregion, Package 1 – the most developed package, comprising 52km of new road sections – has been out to tender since May 2005. It is intended that in total four work packages will be procured as PPP projects, providing the bids for Package 1 confirm that the approach offers value for money compared to traditional procurement. For smaller packages, ASFINAG may, in addition, decide to transfer the operation and maintenance of existing adjacent road sections into the procurement.

The expected benefits of this concession model lie in the efficiency gains generated i.e. by economies of scale, economies of scope, private innovation and competition and in the efficient risk transfer to the private partner. The economic advantage of a PPP approach in comparison to ASFINAG's traditional procurement of road infrastructure has to be confirmed by reference to the Public Sector Comparator for the project. This style of procurement also meets the recommendations of the Austrian "Masterplan in Traffic and Transport" (Generalverkehrsplan 2002) and the objectives of the "European Growth Initiative" published by the European Council in December 2003.

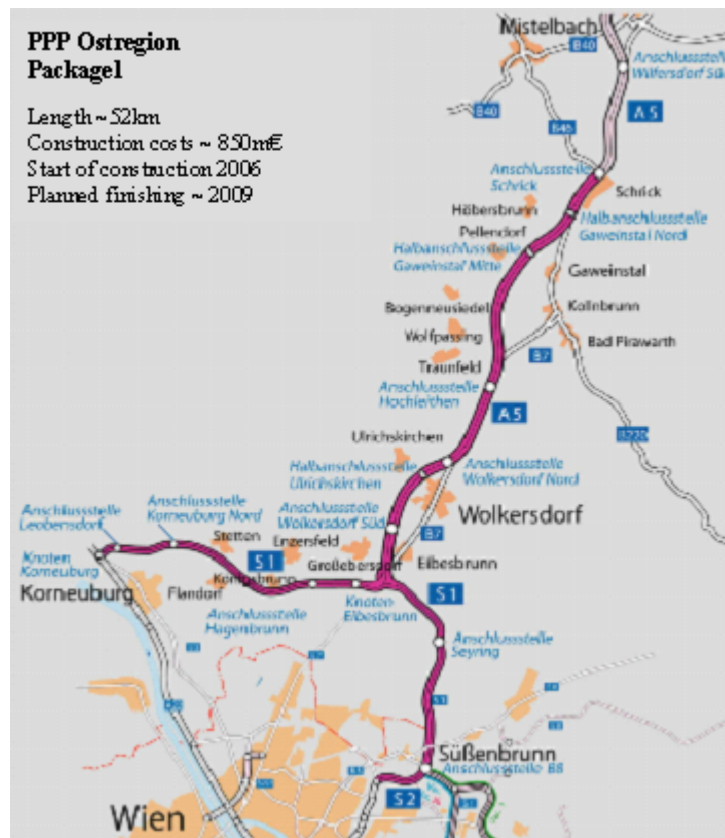


Figure 4 - PPP package 1: "Ypsilon" road network

4.2. The Tender Procedure

The tender process started in September 2004 with the publication of the pre-qualification notice in the Official Journal of the European Union. In May 2005 five pre-qualified consortia were invited to submit bids by September 2005. After an evaluation three of these bidders were short listed - each consortia comprised of internationally experienced contractors and operators - and negotiations commenced during November 2005. The negotiations were structured to cover all technical, legal and commercial issues and were mainly conducted by eight "preparation teams", each with a special topic and comprising ASFINAG's and the bidder's relevant experts. Additionally, negotiation rounds at director level were conducted, where the pre-agreed positions were made legally binding. After five months of intense negotiations, the three bidders were invited to submit their last and final offers at the end of May 2006, where after ASFINAG's evaluation procedure provided the best bidder in June 2006. ASFINAG will now finish the tender process with the best bidder, finalising the financial documentation to reach financial close with the official award of the contract, which is scheduled for September 2006.

4.3. Important Initial Situation

The specific Austrian structure of motorway and expressway management was the key influence in structuring the project and carrying out the whole tender procedure. This unique framework specified an "atypical" PPP model, which is not directly comparable with similar international projects.

The main reason for that is the status of ASFINAG - as the concession grantor - which can not be viewed as that of a traditional public authority. ASFINAG is a public limited company whose shares are wholly owned by the Republic of Austria; it receives no grants from the federal budget and generates its returns exclusively from road user charges. In

addition ASFINAG issues bonds in its own name via the capital markets - backed by an unconditional and irrevocable guarantee from the Republic of Austria, and as such benefits from the highest credit rating (AAA) by Moody's and Standard & Poors. As a result, and in accordance with the Maastricht criteria, ASFINAG's liabilities are not consolidated with the state's debt – a unique situation, audited and confirmed by EUROSTAT. Under these circumstances ASFINAG has developed from a public road administrator to a customer-orientated service provider. So the Austrian PPP structure has real differences from other PPP models; firstly the road user toll financed ASFINAG is not primarily seeking to relieve pressure on the federal budget, but rather to obtain efficiencies in construction, maintenance and operation, and secondly ASFINAG itself is already a kind of "PPP company" which is effectively seeking to grant sub-concessions for single stretches of road to private concessionaires. Hence ASFINAG has a different ability to bear risks under the (sub) concession agreement than most public authorities.

So one of the first challenges was to reflect this fact in the tender documentation, primarily in the concession contract, where the risk-sharing between ASFINAG and the concessionaire is described. This situation also left its mark during the whole tender procedure, leading to intense and time-consuming negotiations, especially concerning the terms of contract termination and compensation, liabilities of the Republic of Austria as ASFINAG's owner, obstructions and relief events - mainly initiated by the lenders of the bidding consortia.

4.4. Further Lessons Learned

Even before ASFINAG started to set up the first Austrian highway concession, the (local) construction industry expressed its strong interest in using a PPP solution for new primary road infrastructure and argued for a possible improvement of the traditional planning and approval procedures. This was also expressed by the industry's desire for an early operator involvement to input their know-how as soon as possible. So ASFINAG tendered the project based on a design level that guarantees a clear description of works and services for comparable fixed-price offers (with preliminary designs and environmental impact assessment) also leaves some room for manoeuvre for the concessionaire in design and approval procedures (detailed design, statutory approvals). As the tender procedure has shown, the private sector was very aware of the consequences of taking responsibilities for the planning and approval risks. Therefore it needed a lot of effort during the negotiations to shift those tasks to the concessionaire. This was also confirmed by the fact that only a few non-essential technical alternatives were submitted with the bids.

Another (really not new) experience was the private sector being averse to taking traffic risk. However where additional instruments to mitigate this risk were put in place, a sufficient amount was transferred. The payment mechanism envisages a remuneration of the concessionaire consisting of usage fees in the form of traffic-related shadow tolls (~ 30% of payments) and performance-related availability fees (~ 70% of payments). Further the bidders had the opportunity to bid the shadow tolls for different traffic frequency bands based on their own traffic forecast, e.g. mitigating the traffic risk with higher toll rates for lower traffic volumes. This mechanism created a significant level of discussions during in the tender negotiations but due to the inherent legal nature of a concession it was absolutely necessary to transfer a sufficient amount of demand risk in form of traffic risk to the concessionaire.

Further it was the right decision to carry out these extensive negotiations with three bidders until the invitation to a last and final offer. ASFINAG was always anxious to

maintain competition - as one of the most important drivers for value for money in such projects – as far as possible in the procurement process and the value of this approach was confirmed by the beneficial changes between the first and second bids.

4.5. Summary

It was ASFINAG's primary intention to use PPP as an alternative procurement approach and tap into potential efficiencies for its core activities along the value chain of modern motorway management. The tender process for the project "PPP Ostregion – Package 1" has primarily shown that international standards can not be applied uniformly under all circumstances. Specific local legal structures require flexibility on the part of the public and private sectors, as well as significant effort to achieve the goals of such complex projects. For ASFINAG it also confirmed that the competitive bidding under the PPP model led to economic benefits over traditionally procured works and services. By contrast it was demonstrated that ASFINAG is more effective than the private sector in areas such as finance and operation.

5. MEASURES FOR ADMINISTRATION TO IMPROVE GOVERNANCE

5.1. Introduction

In order to improve its governance, ASFINAG started to reorganise its corporate structure during the last two years in order to gather all its core competences under the group umbrella. The only way for ASFINAG to fulfil optimally all the expectations of our customers – who expect services for the tolls they pay – is to be an independent and self – determined supplier of infrastructure. There are certain improvements for ASFINAG after the reorganisation, which will be mentioned in the following.

5.2. Foundation of ASFINAG

ASFINAG was founded in December 1982 due to a governmental decision. The company was in charge for financing of the construction activities in the infrastructure sector as well as for the financial operations of former special companies. The six special companies were founded between 1964 and 1978 according to a change of the Federal Act in 1964, which enabled the financing of constructional activities on the credit basis. The special companies were in charge for financing, tolling and operation of certain motorway sections. Due to an extreme rise in construction costs National Assembly decided in 1993 to consolidate the six special companies in only two subsidiaries (ÖSAG and ASG). For the operation and maintenance of motorways and expressways ASFINAG awarded the operational contracts to the road administrations of federal provinces. So the operation of the primary road network was carried out by 11 organisation (9 federal provinces, ÖSAG and ASG). In 1997 ASFINAG received the *usus fructus* right on all properties and assets of the primary road network. Due to the Federal Road Act since 1997 the time related tolling was applied on all motorways and expressways. In 2004 the electronic distance related toll for trucks above 3,5 tons based on micro-wave technology is applied on the primary road network. All toll revenues come to ASFINAG and are subsequently reinvested in the primary road network.

Since 2004, ASFINAG started with the changes in its internal organisational structure and with extending its international activities in the scope of consulting.

In 2005 the operational contracts with the federal provinces were terminated and the consolidation with the two subsidiaries ASG and ÖSAG was effected. The domains of planning and construction, operation and maintenance as well as tolling were transferred to self dependant subsidiaries and the field of traffic telematics was conveyed to a new subsidiary.

5.3. New Organisational Structure

After the termination of operational contracts with the federal provinces in 2005, all former outsourced core competences are now concentrated within the ASFINAG corporate group. Due this fact, ASFINAG is now one of the four leading primary road operators in Europe. It is now a strategic holding with 8 self-dependant group companies. Clearly defined fields of activities are bundled into separate subsidiaries (e.g. tolling, maintenance etc.) under the legal form of a limited liability company, while the parent company has the task to define the strategic framework and to govern the corporate group by the board of directors.

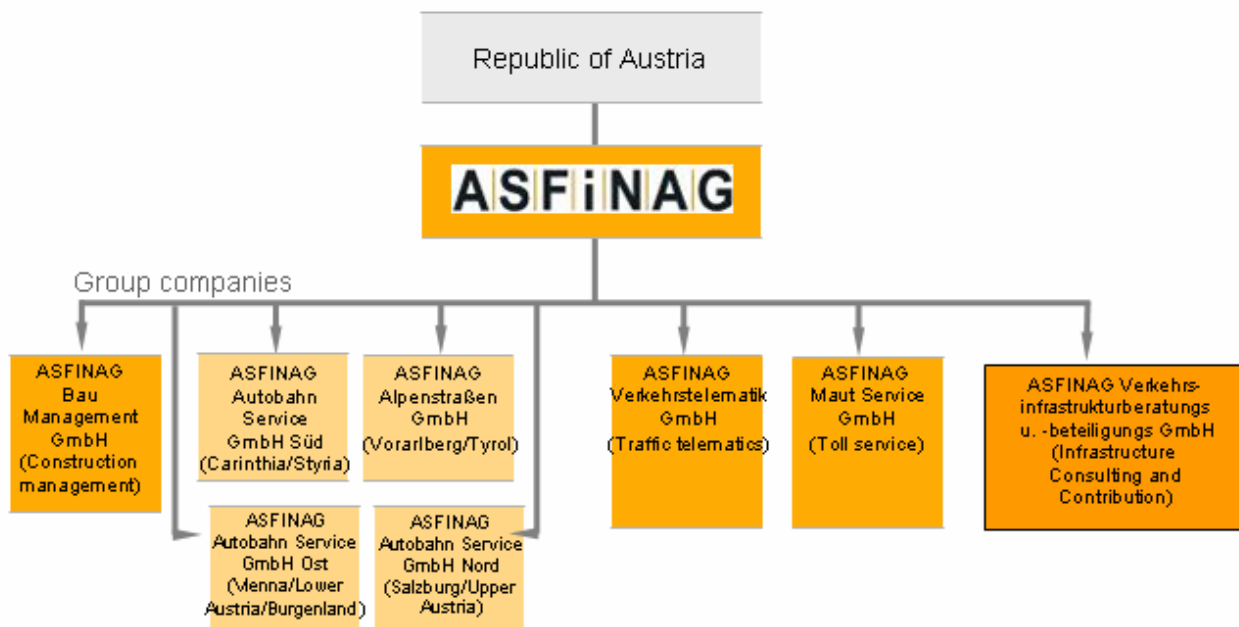


Figure 5 - New organisational structure of ASFINAG

There are certain advantages realised through the new organisational structure like short decision paths, high flexibility, simple organisational hierarchy and clearly defined organisational structure. From the point of view of ASFINAG an essential advantage of the new organisational structure is the financial aspect. Comparing to the old organisational structure cost savings in highway operation of 15% are anticipated due to the realised economies of scale, process optimisation (as e.g. by tunnel monitoring) and the reduction of maintenance service depots. Thanks to the new organisational structure ASFINAG managed to optimise the coordination of building sites for our customers and therefore to minimise the inevitable obstructions.

5.4. Tasks of Group Companies

a) ASFINAG Bau Management GmbH

This group company is concerned with the planning of green fields and construction of motorways/expressways, tunnels (in particular the construction of second tunnel tubes) and bridges. In the last 10 years there has been a significant progress in the length of the Austrian primary road network. In 1997 there were 1902 km in operation, in 2001 we had 1955 km and in 2005 there were 2046 km.

b) ASFINAG Maut Service GmbH

is in charge for all tolling activities (toll stickers, electronic tolling, manual toll stations) and enforcement.

c) ASFINAG Verkehrstelematik GmbH

The main tasks of this group company is the traffic data collection and their statistical evaluation, operation of traffic management and information centre and the networking of traffic telematics. By implementing the traffic management and information systems on the entire Austrian primary road network, the traffic safety can be increased significantly. Optimistic results have already been achieved.

d) ASFINAG Autobahn Service GmbH Nord, Ost und Süd and ASFINAG Alpenstraßen GmbH

As already mentioned on the beginning and following the old organisational structure the 9 federal provinces, ÖSAG and ASG were in charge for the operation and maintenance of the primary road network.

In the new organisational structure and after the termination of the operational contracts with federal provinces, these four group companies are presently in charge for operation and maintenance of the entire Austrian primary road network, each of them for one defined region in Austria.

e) ASFINAG Verkehrinfrastrukturberatungs- und –beteiligungs GmbH

With the foundation of this new group company, we laid the cornerstone for the internalisation of our business activity. The first successfully-completed consulting projects have encouraged further consulting activities, especially in the areas of toll collection and traffic management.

5.5. Optimistic Results

The organisational changes described here have after all significantly improved our governance and certain performance indicators. Thanks to the new organisational units mandated with the strategic development of the group and the control of the operative units, numerous internal processes were unified throughout the group and made more efficient. The main strategic target of ASFINAG in the middle run is to become an internationally-active corporation and to consolidate the ASFINAG balance sheet. And we are on the good way to achieve it!

6. ON THE WAY TO AN “INTELLIGENT ROAD“ – A MACROECONOMIC ANALYSIS

Traffic management and information systems have a considerable share in optimised utilisation of traffic routes and in securing mobility. Their bases are “Traffic Telematic Systems” which combine information technologies, telecommunication technologies (e.g. mobile radio, satellite based positioning systems) and automation technologies (control technology).



Figure 6 – ASFINAG Traffic Management and Information Centre (TMIC)

The new traffic management and information centre (TMIC) in Wien-Inzersdorf is the heart of an advanced “trendsetting” nationwide traffic management and information system (TMIS) for the Austrian motorway and expressway network with

- Centralised controlling of approx. 1100 km motorways and expressways through Traffic Control Systems (TCS) which are under implementation on neuralgic segments (defined by traffic density, accident rates) of the network
- Area-wide traffic data management of at present approx. 2070 km motorways and expressways, and
- A connection to national as well as to European traffic management and information centres for the harmonisation of cross border traffic management strategies



Figure 7 – Inside view of TMIC

From here

- Traffic control units, systems for ensuring the compliance with noise and pollutant emission limit values, furthermore systems for speed and distance control are observed and monitored,
- Traffic relevant data of the entire ASFINAG network is acquired, processed and displayed and
- Traffic information services for in-house and external customers are developed, managed and brought to the market.

The traffic management and information system (TMIS) is the „soft“ information network, that is placed on the „hard“ road network by the ASFINAG – in order to ensure safe, comfortable and efficient routes of transportation. One further step to achieve the vision of an “intelligent road”.

At present the TMIC is pursuing the most modern concept all over Europe. There is only one centralised data handling, processing and monitoring point for all traffic control units (TCU), one uniform standardisation and quality assurance, as well as one single maintenance management for all components and no isolated applications. Thus every future development stage of TMIS can be monitored centrally by the TMIC of the ASFINAG Verkehrstelematik GmbH in Wien-Inzersdorf. This centralised system operation and management capabilities assure the avoidance of isolated applications and assure the application of harmonized traffic management strategies from one point of operation. The benefits of advanced ITS implementations can be categorized in benefits for road users:

- Shorter travel times – time savings by optimisation of traffic flows and thus increase the capacities of the network
- Higher traffic safety – considerably lower accident risk
- High service level (e.g. actuality, accuracy) and convenience of Traffic Information Services

For the environment:

- Less noise and pollutant emission by fluent traffic with dynamic control of speed limits

For the national economy:

- Less accident-related consequential costs
- Lower costs caused by traffic jams in terms of operational costs for vehicles
- Reduction of environment-related consequential costs

For the road management:

- Improved utilisation of the road and thus rescheduling of infrastructure expansion plans

For the road section operation (motorway maintenance agencies)

- Improved planning of resources, especially concerning winter service and construction site management

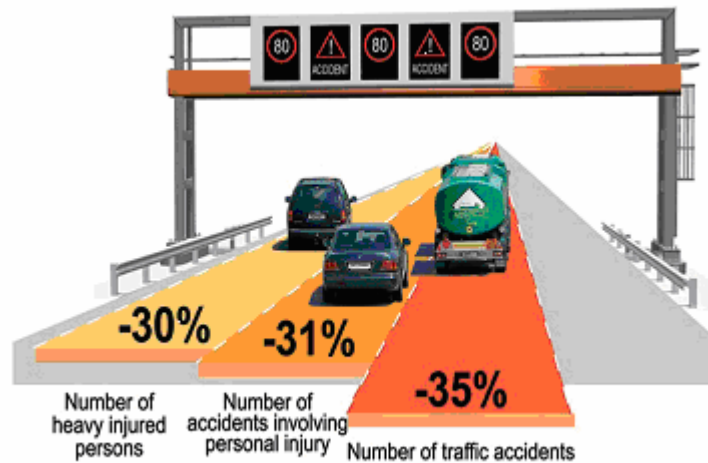


Figure 8 – Reduction of accident rates

6.1. What Are the Costs of Accidents?

Accident and road casualty savings can be expressed in figures. In the national economy one death casualty costs around one million EUR, a seriously injured costs around 55.000 EUR, a slightly injured costs just under 4.700 EUR, a serious material damage costs nearly 6.200 EUR, a slight material damage approximately 1.500 EUR.

6.2. What Are the Costs of Traffic Congestion?

On the Europe-wide route EU-15, 10 % of the road network, precisely a length of 7500 kilometres, is congested with traffic every day. The EU estimates the external costs of traffic congestion with approximately 0.5 % of the GDP, in the year 2010 they will be about 1 % of the GDP.

The increase in capacity by 15 % on Austrian motorways and a 3 % reduction of waiting time, due to traffic jams, result in savings of 190 million EUR per annum.

A loss of an hour time during rush hour costs 13.8 EUR, for HGVs even 38.1 EUR. If 20000 car drivers and 6000 lorry drivers spend one hour less in traffic jams, the time saving corresponds to a value of 0.5 million EUR. (Source: EU commission; MOVE Nr.4, Dec.04; Prof. Kummer, WU Wien)

6.3. Analysis of Macroeconomic Benefits of the Traffic Control Systems (TCS) in Tyrol

An ad hoc analysis of the Traffic management and information systems (TMIS) in Tyrol has shown in 2005, that a national profit by avoiding accidents (personal and material damage) of three million EUR in the first four months of operation - projected on the calendar year - of 9 million EUR has been generated. According to the investment costs of the Traffic Control System Tyrol (phase I and II) the socio economic value will be received within approximately 50 months of operation.

In order to verify on a rational basis the benefits of the implementation of TCS in Tyrol, a project has been started within ASFINAG Verkehrstelematik GmbH in 3Q/2006 with the aim of analysing the micro- and macroeconomic costs and benefits of the TCS in Tyrol.

This project will build on the experiences with the TCS in Tyrol and will extend the ad hoc analysis already available and widen it on economic benefits which will be quantified in

terms of money. In this view especially the parameters and costs of time, pollutant emissions, fuel, accidents and noise will be considered.

The applied calculation methods and cost rates will be based on an international desk research analysis in order to assure the transferability of the cost-benefits models to other TCS.

The results of the study can be expected on the beginning of 2007.

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