Policy framework for utilisation

A pillar of better accessibility

Ministerie van Verkeer en Waterstaat

Policy framework for utilisation

A pillar of better accessibility

4 January 2008

Contents

Summary

The Mobility Document as a guiding force

The Mobility Document contains ambitious goals to deal with current and anticipated traffic and transport problems: door to door, faster, cleaner and safer. Work is being done on the Building and Road pricing pillars; Utilisation is elaborated further in this policy framework.

Utilisation policy framework

This policy framework defines utilisation as the best possible handling of traffic demand (a given demand) over a road infrastructure supply (a given supply). The purpose of the policy framework is to describe the direction of development of utilisation, indicate actions that are required and provide perspective on the expected effects.

Utilisation offers opportunities

The total contribution by utilisation measures to the reduced increase in the number of lost vehicle hours between 1996 and 2005 was 25%. Measures must be implemented in a focused manner, because effectiveness varies from one measure to another and is also very location-specific.

Utilisation, building and road pricing complement each other

Utilisation can increase the capacity of road infrastructure and also improve the use of infrastructure. This causes the yield of infrastructure investments ('building') to increase. Utilisation measures and Different Payment for Mobility ('road pricing') can also be implemented jointly. For example, travel information already caters to road users' need for custom solutions. The two pillars can also complement each other in gathering data and distributing information, both in terms of in-car equipment and required communication systems and new services (including mobility services). ICT applications are being developed for levying and collecting that may also work for utilisation.

Shift from roadside to vehicle technology

Road users must be able to rely on good, reliable quality of movement from origin to destination. Extensive cooperation between road administrators is therefore essential. The rapid and inevitable rise of vehicle systems is also visible. These systems focus on information (personalised) and navigation or driving assistance, for additional safety, for example. Travellers and traffic management also have more and better multimodal information and real-time data available to them. Vehicle systems are becoming more important, while roadside systems decrease in terms of relative importance and size.

Rapid changes in technology and the market result in new relationships between the stakeholders involved. The role of industry (including the vehicle industry) in development and implementation is unmistakably growing and the role of governments and road administrators requires reassessing.

Final situation: deployment of modern technology

Travellers travel door to door based on personalised travel advisories with a choice of means of transport, choice of route, expected travel time and cost. During the trip, they are able to make different choices based on current information. The market for mobility services has grown further. Road administrators are adapting more to changing traffic conditions with the application of rule scenarios in the event of disruptions, guiding and managing traffic streams at nodes and dynamic speeds that allow better and more flexible use of available space (including environmental space). In 2020, vehicles will not only be more economical, cleaner and quieter but will also have driver-assistance equipment, such as adaptive cruise control. These form the initial approach to more guided vehicle systems.

This situation will become more established in the coming years. The outcome depends in part on dynamic developments in technology and the market. This means a long-term policy vision or weighing of long-term investments is not currently feasible or even desirable.

Policy choices

Strong dynamics in technology and the market therefore result in the following policy choices for utilisation:

- the government is actively joining in with the inevitable development of vehicle systems;
- the innovation potential of the market will be encouraged and facilitated as well as circumstances will allow;
- a development will be initiated from the current corridor approach to a regional network approach in which the underlying road network is involved as well as the main road network;
- as much connection as possible to international (European) developments regarding joint ventures, technology, standardisation and regulation;
- work is being done on the change from local (stand-alone) measures by the side of the road to the use of coherent measures at the network level;
- a solid supporting evaluation and monitoring programme will be set up to research the effectiveness of new utilisation tools in context;
- utilisation will be addressed with a programme approach through the Infrastructure, Space and Transport Multi-year Programme. This reduces the administrative burden, structure selection processes and further professionalises the area-focused approach.

Embedding in a Utilisation programme

Utilisation is part of a fairly short tradition in which various parties each take action based on their own responsibilities. A logical next development is the transition to a coherent, integrated approach. Opting for phased policy development, featuring bi-annual reassessing, for example, seems self-evident. This is in line with the dynamic Implementation Agenda in the Mobility Document.

Lines of action

Investments will be directed to four lines of action:

1. Encouraging and facilitating smart vehicles and cooperative systems
Development towards a dominant position for vehicle systems is being exploited. This requires focused investments by the government in basic conditions and also stimulating the innovative potential of the market.

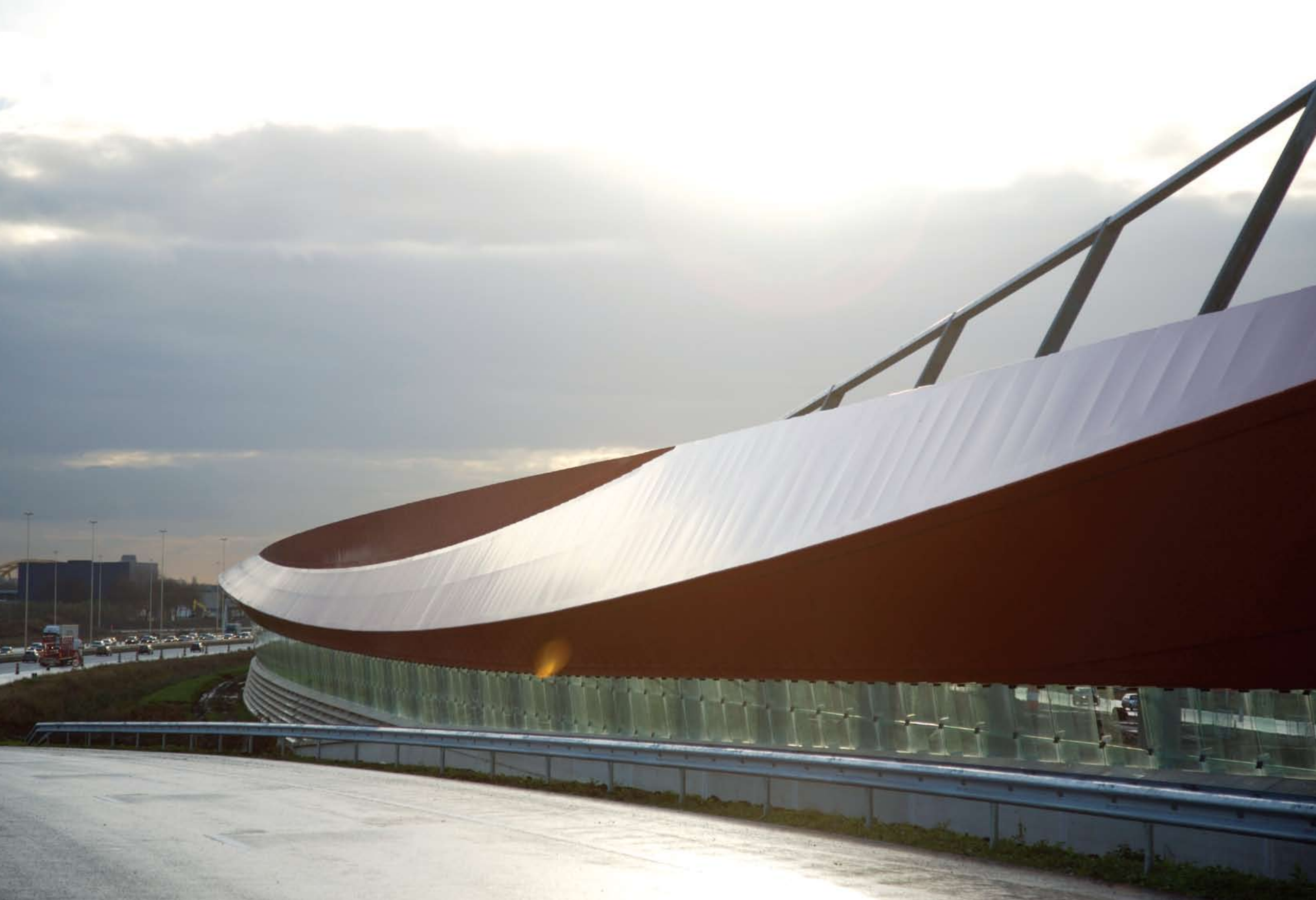
2. Promoting network management at the regional level
The core of this line of action is effective cooperation between road administrators at the network level. This is linked to the recommendation titled From Road Management to Network Management, recently issued by the Transport, Public Works and Water Management Council.

3. Updating and adding to remaining local measures
These are local measures by which concrete results are quickly achieved in specific situations on the basis of measures tested in practice.

4. Knowledge development and innovation
The trend towards more coherence and the rise of new measures requires additional knowledge. An evaluation and monitoring programme, as part of knowledge development and innovation, is therefore necessary.

The lines of action have been worked out as specific actions, primarily aimed at creating order in basic conditions for utilisation, and three practical tests to increase knowledge of the effectiveness of utilisation tools (new and coherent).

There is much to be gained with new policy in the 2008-2020 period. The precise extent of the effects of new instruments and measures can be determined with the evaluation and monitoring programme.



1. Introduction

1.1 Background: Mobility Document

Faster, cleaner, safer

The goals and frameworks for traffic and transport policy for the Netherlands to 2020 are described in the Mobility Document. Whereas government policy previously viewed mobility as a problem or as something permissible, the assumption is now that mobility is a must. Mobility, for people as well as goods, is a prerequisite for society and the economy to function well.

The Mobility Document contains ambitious goals to deal with current and anticipated traffic and transport problems: door to door, faster, cleaner and safer. Three interrelated pillars are to help achieve these goals: Building, Road pricing and Utilisation. Work is being done on the Building and Road pricing pillars; Utilisation is elaborated further in this policy framework.

Three pillars of mobility policy

- Building: creating and adapting infrastructure
- Road pricing: having road users pay to use the infrastructure
- Utilisation: making the best possible use of available road capacity

Commitment to the Dutch House of Representatives

Based on previous results, utilisation is expected to bring the ambitions of the Mobility Document closer. Depending on the specific measure, utilisation will allow some of the mobility problems to be addressed quickly, flexibly and cost-effectively. Utilisation can also be effective for other problems in combination with Building and Road pricing. For this reason, a policy framework for utilisation measures was promised to the Dutch House of Representatives on 18 October 2006[1].

[1] Parliamentary document 30 800 XII, no.12, 2006-2007 session.

1.2 Goal: elaborating the Utilisation pillar

The Policy Framework for Utilisation is an elaboration of the Mobility Document for the 2008-2020 period and aims for faster, cleaner, safer travel from door to door. The purpose of this policy framework is to describe the direction of development of utilisation, in terms of content as well as process, to indicate actions that are required and to provide perspective on the expected effects.

The policy framework is in line with current developments or plans, caters to new opportunities (technological and otherwise), encourages the innovative potential of the market and provides room for joint ventures between the government and the market. It will result in actions for the short term and provide direction for activities and developments for the longer term.

This policy framework answers the following questions

- How can utilisation contribute to the goals from the Mobility Document?
- How can utilisation be made an effective, coherent pillar of policy?
- What policy choices must the government make with regard to utilisation?
- What is the desirable future role of governments and market parties with regard to utilisation?
- How can utilisation be implemented in the short term?
- What is the outlook for utilisation over the long term, in relation to building and road pricing?

1.3 Reading guide

Chapter 2 describes the policy background for utilisation, the Mobility Document. Chapter 3 analyses the accessibility issue. Chapter 4 describes the problem experienced by road users and addresses the services provided by market parties to road users. Utilisation is defined in chapter 5, partly in relation to Building and Road pricing. Relevant developments to the elaboration of Utilisation are given in chapter 6. Chapter 7 presents the vision of Utilisation. This vision is based on the preceding chapters and will be elaborated along four tracks. The policy framework concludes with an implementation strategy. Specific actions are indicated in appendix 1 to this policy framework. Appendix 2 contains an explanation of terms and abbreviations.

Relevant literature references are formulated in the original (Dutch) language when no English translation is known.

2. Policy background: the Mobility Document

Traffic and transport policy in the Netherlands is described in the Mobility Document. The Dutch House of Representatives agreed to this document in December 2005, establishing the outlines of national mobility policy for the coming decades and further elaborating spatial policy as set out in the Space Document. This chapter examines the goals of the Mobility Document and the role of utilisation.

2.1 Goals in the Mobility Document

The core of the Mobility Document is achieving greater reliability, speed and safety from door to door. The document sets ambitious accessibility goals, focusing on three aspects: reducing traffic jams, increasing reliability and shortening door-to-door travel times. These goals are quantified as follows:

1. **traffic jam severity** in lost vehicle hours on the main road network (MRN) must be back at the 1992 level in 2020;
2. **reliability** on the main road network must improve so that travellers in 2020 are on time in 95% of rush-hour trips[2];
3. **travel times** must be acceptable, with the following target values applying to the main road network:
   - For motorways between cities, the average travel time at rush hour is no more than one and a half times longer than at off-peak times. For a distance of 50 kilometres, for example, this is no more than 45 minutes;
   - On motorways around cities and non-motorways that are part of the main road network, the average rush-hour travel time is no more than twice as long as at off-peak hours. For a distance of 10 kilometres, for example, this is no more than 12 minutes.

[2] 'On time' means, for greater distances (more than 50 kilometres), no more than 20% earlier or later than the expected travel time and for shorter distances, no more than 10 minutes shorter or longer than the expected travel time at a given time of day.

The Mobility Document contains target values for the main road network only. For the remainder of the road network, decentralised governments must indicate their aims and the improvements they intend to carry out in provincial and regional plans. Together with the target values in the Mobility Document, this results in target values for door-to-door travel times.

2.2 Utilisation as one of the three pillars

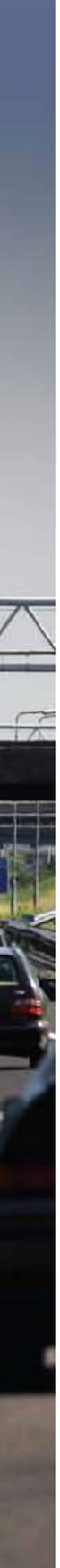
Utilisation is one of the pillars of the Mobility Document. This relatively new policy pillar does not yet have an integrated programme approach as is the case with Building and Road pricing. Those two pillars are set out in structural programmes such as the Infrastructure, Space and Transport

Multi-Year Programme (MIRT) and the Different Payment for Mobility programme. Both pillars will not be completely implemented until later.

Regarding the third pillar, Utilisation, the Mobility Document expresses the expectation that it can contribute to better reliability, speed and safety in the short term. Utilisation is also expected to be effective in the long term in combination with Building and Road pricing. Utilisation focuses on making the best possible use of available road capacity.

Initiatives to 2006 that included utilisation

In 1995, the Ministry of Transport, Public Works and Water Management began the Traffic Control Programme. The impetus for this was the document titled More Utilisation, Fewer Traffic Jams (1994), drawn up as an elaboration of the Second National Traffic and Transport Structure Plan (SVV II, 1991). The programme was stimulated in 1996 by the publication of the document titled Working Together on Accessibility. In 1998, it was decided that all current and new route/environmental effects studies on the main road network would include utilisation variants. In 2000, as part of the Randstad Accessibility Offensive, utilisation agreements were reached with three regions.
The National Traffic and Transport Plan (NVVP, 2000), as the successor to the traffic control programme, included a Traffic Renewal Programme. In the summer of 2003, the Road Widening Emergency Act came into effect. Under this law, a large number of rush-hour and plus lanes were created as part of the Visible, Smart, Measurable traffic congestion plan (ZSM) and the subsequent ZSM II. Since 2006, the Ministry of Transport, Public Works and Water Management has had the 'jam-proof' programme. As part of this programme, a large number of ideas from officials and citizens for relatively simple measures are being implemented that can reduce traffic jams in the short term.



3. Accessibility issue

The amount of traffic on the Dutch road network increased greatly in the period from 1996 to 2006. While the road network itself was expanded to a limited extent, there are more cars doing considerably more driving. This increased traffic performance in part means that the Dutch economy can grow, but it is also accompanied by poor throughflow and unreliable travel times. This issue and its causes are analysed in this chapter. Since accessibility problems also have consequences for safety, liveability and climate, we will be discussing those issues as well.

3.1 Current and expected throughflow problems

Increased delays on main road network, reduced reliability

The number of lost vehicle hours rose greatly in the 2000-2006 period. The average increase in the number of lost vehicle hours in traffic jams on the main road network was about 9% annually between 2004 and 2006. Total accumulated delays in traffic jams on the network approached 44 million lost vehicle hours in 2006. If delayed handling (speeds between 50 and 100 km/h) is included, the total number of lost vehicle hours is 62.7 million.
Most of this increase (67%) was caused by more intensive use of the road, including growth in terms of population and employment. There are more and more traffic jams and they are getting longer and longer. Peak periods are also longer and beginning earlier and earlier. Average reliability of travel time on the main road network also decreased in 2002-2006: from 94% to 91%.[3]

[3] AVV 2007: Bereikbaarheidsmonitor

Comparable problems on underlying road network

There is a lack of a reliable view of the scope of delays on the underlying road network. It was determined in 2000, however, that at least half of the number of vehicle kilometres is driven on underlying roads. The situation is comparable for the distribution of lost vehicle hours on the main and underlying road networks: 50-75% of those hours arise as a result of regional traffic[4]. The scope of delays on the underlying road network may therefore be on the same order of magnitude as on the main road network.

[4] AVV 2004: Ontwikkelingen verkeer en vervoer 1990-2020; probleemverkenning voor de Nota Mobiliteit

Major economic damage

The total cost of traffic jams on the main road network was estimated in 2006 at € 2.6-3.4 billion[5]. With gross national product of € 529 billion in 2006, this means the economic damage caused by

[5] KiM: Mobiliteitsbalans 2007

traffic jams amounts to 0.5-0.6% of the size of the economy. About 80% of traffic jams occur in the Randstad. The cost of traffic jams there amounts to 1% of the gross regional product.
This means the Netherlands has higher traffic jam costs (as a percentage of gross national product) than comparable countries in Europe.

Delays to increase further

The growth in the number of lost hours was estimated in 2004. Based on the CPB's *European Coordination* scenario, growth of about 40% is expected in 2020 compared to 2000, taking into account the utilisation and building package of € 14.5 billion in the Mobility Document.

Since 2006, calculations have been made using four prosperity and living environment (PLE) scenarios drawn up by the combined planning offices. According to the PLE scenarios, which assume continuation of the building programme, autonomous growth will plateau after 2010 on the basis of societal developments, and hence the traffic burden as well. Many of the building projections (including the creation of rush-hour lanes) included in the PLE scenarios, however, have been delayed by various procedures. The development of congestion will thereby be more unfavourable. The *Global Economy* scenario continues the rising trend in the number of lost vehicle hours.

3.2 Structural and incidental traffic jams

Traffic jams can be structural or incidental. Structural means that they regularly recur on the same roads at the same times because the traffic demand is greater than the available road capacity. Incidental traffic jams are the result of accidents, roadworks, major events, etc. These can be predictable (such as in the case of roadworks and planned events) or unpredictable (accidents).

The ratio of structural to incidental traffic jams on the main road network is estimated at 70-30% in multiple studies by AVV and TNO. It is precisely these incidental traffic jams, particularly the unpredictable ones, which cause a great deal of inconvenience to road users.

The primary causes of structural traffic jams on the main road network are[6]:

1. *Stagnation on merging lanes and discontinuities*
   Traffic jam formation where lanes merge and near junctions and connections.
   This involves much exchanging of traffic that disturbs the handling of traffic.
2. *Structural congestion in and around urban areas*
   Where main connecting axes change to urban networks, problems begin.
   Half of all movements via the main road network are less than 30 km.
3. *Mixing of through traffic and regional traffic*
   Many local movements are handled on the main road network in urban areas. There are many connections and through traffic and local traffic are mixed, causing many disruptions.
4. *Poor exchanges between the main and underlying road networks*
   Problems occur at transitions between the main and underlying road networks.

[6] RWS 2006: Visie Verkeersmanagement 2007-2020.

The primary causes of incidental traffic jams are:

5. *Vulnerability to incidents and disruptions*
   The heavy strain on the road network means just a small disruption can cause traffic jams (e.g., a motorist braking slightly too hard). These disruptions quickly affect other parts of the road network.
6. *Traffic accidents*
   Accidents are among the most important causes of the problem of traffic jams. They account for 21% of lost vehicle hours and 28% of unreliability.

3.3 Traffic jam problems inside and outside the Randstad

The problem of traffic jams is greatest in the Randstad. Most of the top 50 traffic jams and delays are concentrated on the main road network there. Many connections and junctions are overburdened in the rush hour and there are virtually no alternatives via the underlying road network. The urban main structure also comes to a standstill at rush hour.

Problems growing around the Randstad

In the transitional zone (adjoining the Randstad: Brabantstad, Arnhem-Nijmegen junction and the western part of Flevoland), problems are increasing. Delays often occur in rush hour on the urban main structure (city ring roads and urban radial roads), on connections with the main road network and near prime locations. Here, too, the number of possible alternative routes via the underlying network is limited. There are also many delays on the main road network where there is a connection to the Randstad.

The problem is limited in other parts of the Netherlands. Since there are fewer motorways, problems are concentrated mostly on the underlying road network. Eighty per cent of delays are attributable to the underlying road network. The total number of lost vehicle hours, however, is smaller in absolute terms than in the transitional zone and much smaller than in the Randstad.

In 2020 (according to model studies carried out in network analyses), the size of these problems will have increased by 40%. The problem will also shift from the Randstad to the transitional zone and from the transitional zone to other parts of the Netherlands.

3.4 Traffic jams also affect safety and liveability

The traffic burden (congestion) also has consequences for safety and liveability. Better utilisation will enable results to be achieved in these areas as well.

More accidents on more roads with traffic jams

Roads that experience congestion have a higher risk of accidents. Traffic jams forming on the main road network can also shift traffic flows to the underlying network, which has consequences for traffic safety. The main road network is, after all, less risky than the underlying road network by a factor of 3 to 5.5 per vehicle or motor vehicle kilometre.[7]

[7] RWS AVV 2006: Verkeersveiligheid op het hoofdwegennet.

The number of traffic fatalities decreased by 35% to 817 in the period from 1996 to 2005. In 2006, there were 811 traffic fatalities; virtually constant compared to 2005. The decrease in the previous year (in 2004) was greater: almost 20% (some 200 fewer fatalities). These figures indicate that there was a one-time decrease with a lasting effect. There is no scientifically accountable explanation yet. SWOV found four factors to explain it: less speeding, less alcohol consumption, less moped traffic with inexperienced riders and more seatbelt use. The sharp decrease in 2004/2005 led to the goal for 2010 being made more stringent for the maximum number of traffic fatalities, from 900 to 750.

Utilisation benefits safety

An initial study has shown that opening rush-hour lanes and plus lanes has not resulted in an increase in traffic fatalities and injuries requiring hospitalisation. Reduced congestion as a result of this measure has made a positive contribution. The traffic safety effects of these measures are currently being studied in more detail for the Ministry of Transport, Public Works and Water Management. Better information on delays on the main road network has also resulted in better motorist perception and less evasive traffic. This also benefits safety[8]. We can conclude from this that better utilisation often supports traffic safety as well.

[8] Evaluatie reistijd-DRIP A13, TNO in opdracht van RWS-AVV, 2000.

Consequences for air quality and greenhouse effect

More traffic, and especially congestion, results in more emissions of exhaust gases - specifically, particulates and nitrogen oxides, which are harmful to the health of people in the vicinity of roads. CO_2 emissions contribute to the greenhouse effect. The traffic and transport sector is an important cause of emissions: about 34% of the controllable part of particulates emissions and 59% of NOx emissions in the Netherlands comes from this sector, as well as 21% of CO_2 emissions. Within the sector, road traffic is by far the biggest polluter. Road traffic accounts for 65% of particulates emissions, 60% of Nox and 88% of CO_2.[9] Emissions of carbon dioxide are increasing virtually in proportion to the number of vehicle kilometres driven. Better flow as a result of better utilisation contributes to emission reduction.

[9] CBS/RIVM 2007. Milieucompendium: www.mnp.nl/mnc.

Utilisation also favourably affects noise

A few years ago, the decrease in noise caused by road traffic between 1990 and 1997 came to an end. The decrease in the early 1990s was the result of noise standards for new road vehicles, noise screens being installed and the use of quieter asphalt (extremely open asphalt). The increase since 1997 is the result of more intensive road traffic[10]. Source policy in particular can reduce noise even further. Better utilisation can also help, particularly through speed restrictions (including dynamic restrictions) and by preventing traffic from diverting to quieter roads.

[10] CBS/RIVM 2007.

In summary

- Traffic jam problems are serious and increasing. After 2010, traffic jams may level or decrease. However, other model calculations and network analyses anticipate an increase of 40% by 2020.
- Structural traffic jams account for 70% of all lost vehicle hours. The remaining 30% are caused by incidents.
- The problems are the most serious on main roads in the Randstad.
- In the transitional zone to the Randstad, problems are increasing, especially on the main urban structure, on connections to the main road network and near prime locations.
- Increasing congestion also leads to more problems regarding safety and liveability.

4. Focus on road users

The Mobility Document places road users at the centre, forming the basis of goals for greater reliability, speed and safety from door to door. Utilisation must also be used to improve travel quality for road users. This chapter describes how road users experience the accessibility issue and notes that services (including information) are becoming more appealing to road users as well as market parties.

4.1 Problem as experienced by road users

Based on a large number of studies and surveys in recent years, road users' experiences are being understood. Relevant conclusions from these studies for this policy framework will be summarised in this section. It should be emphasised that these are subjective experiences by road users that do not all correspond to objective research results, nor do they need to.

Inaccessibility is primarily a societal problem

Traffic and transport were fourth on the list of the most important problems in Dutch society in 2006. According to citizens, it is also a growing problem, rising one place compared to the two preceding years. In traffic and transport, people in the Netherlands see limitations in accessibility (congestion and traffic jams) as the biggest problem. Societal awareness of the problem is higher than personal awareness: road users consider traffic jams to be worse for society than for themselves [11].

[11] AVV 2006: Draagvlakonderzoek.

Unreliable travel times especially inconvenient

Road users indicate that two issues are relevant to accessibility: how quickly they can reach their destination and the reliability with which the travel time can be predicted. Structural traffic jams reduce speed, incidental traffic jams reduce speed and often reliability as well.
Road users experience unreliability as a very great problem[12].

[12] AVV 2006: Gebruikerstevredenheid hoofdwegen.

Are rush hour lanes safe?

Sixty-four per cent of people in the Netherlands consider traffic safety a problem. Awareness of the problem decreased slightly compared to 2005, both in personal and societal terms[13]. Road users are also concerned whether utilisation measures are in fact safe. This is the case for rush hour lanes, for example, because there is no emergency shoulder[14]. On the other hand, they also expect these measures to be the most effective in increasing accessibility[15].

[13] AVV 2006: Draagvlakonderzoek.
[14] AVV 2006: Nota belevingsonderzoek spitsstroken.
[15] AVV 2006: Draagvlakonderzoek.

Air quality is particularly a concern

Fifty-nine per cent of people in the Netherlands consider liveability as a problem[16]. Liveability is seen more as a societal problem than a personal one. An ANWB study[17] indicates that air pollution is mentioned as the biggest problem, followed by noise and use of space. The question is what new measurement would bring: discussions on sustainability have put this issue at the top of the agenda again.

[16] AVV 2006: Draagvlakonderzoek.
[17] ANWB 2005: Kiezen voor mobiliteit.

4.2 Services (including information) for road users

Traffic jam and route information wanted

Road users indicate that they are looking for traffic jam and route information in particular.
Road users who often travel the same stretch are aware of traffic jams and often of alternative routes as well. They want traffic information for exceptional situations only, or when they are driving in an unknown area. This information enables road users to plan their trips better and determine when to leave. They also mention a need for good information (times and diversion routes) for road work, events, incidents and bridge openings.

Positive view of systems in vehicles

Half of the Dutch population has a positive view of in-car systems[18]. As soon as specific types are asked, the number of people in favour even increases, to 80% for lane departure warning systems and 77% for navigation systems. In late 2006, 22% of vehicles had cruise control and 23% had a navigation system.

[18] AVV 2006: Draagvlakonderzoek.

Road users realise that the use of information systems has positive aspects for them ('convenience' and 'increased safety') and for society ('better flow'). The biggest disadvantage they see is a potential decrease in traffic safety due to distraction[19].

[19] AVV 2005: Mensen over de weg.

The most popular information services among road users are travel time prediction, up-to-date travel information, traffic information and up-to-date route calculation. They also indicated an interest in in-car safety and warning packages: showing information from electronic information panels in cars, temporary speed measures for road works, events and incidents, permanently showing the speed limit, speed warning, sharp curves and road narrowing[20].

[20] TNS-NIPO 2005: Wijzer op weg.

More and more commercial services

Road users have been 'discovered' in recent years by market parties as consumers of commercial services (including mobility services). Systems focusing on information (real time) and navigation, driver assistance, safety or comfort are increasingly popular. Trends in the car industry and research programmes (including European ones) show that more and more systems are being developed. Road users benefit from these systems because better and personalised services become available. For market parties, these are evidently commercially interesting. Such a 'return on investment' model is a strong stimulus for innovations from the market, which appears to be confirmed by recent acquisitions of cartographers by suppliers of navigation systems and mobile service providers (including mobile telephony). Development of such applications may be further accelerated by technologies to charge and collect the cost of use for kilometres driven (for the Road pricing pillar).

The profit for market parties is a stimulus for more and more of such services (including mobility) to be developed and offered. This can be exploited in the elaboration and implementation of the Utilisation pillar.

In summary

- Limitations on accessibility, congestion and traffic jams are experienced as the largest problem in traffic and transport.
- Safety is a prerequisite for utilisation measures.
- Liveability is primarily seen as a societal problem.
- Road users need travel information and have a positive view of in-car systems.
- Services to road users are becoming more and more appealing to market parties as a commercial business model. This can be exploited in the implementation of this policy framework.

5. Utilisation

This chapter discusses the meaning of utilisation. Utilisation is defined and delimited, the relationship to Building and Road pricing is outlined and finally the results achieved by the current utilisation tools are described.

5.1 Definition and delimitation

The following definition of utilisation is used in this policy framework:

Utilisation is the best possible handling of traffic demand (a given demand) over a road infrastructure supply (a given supply) by

i optimising road capacity in relation to current traffic demand;
ii optimising traffic handling (longitudinally, laterally and at intersections);
iii spreading traffic demand over the network and over the day by informing road users and potential road users;
iv guiding and directing traffic, especially in special situations.

Explanation of definition and delimitation

Mix of goals

This definition involves a conscious choice of the phrase 'Utilisation is the *best possible* handling'. Following on from the Mobility Document, flow on the main road network is especially relevant at first (accessibility and reliability - see also chapter 2). With increasing attention to liveability and safety, utilisation will also be used for this purpose (e.g., speed limits for air quality), especially as decentralised road administrators are setting conditions. The aim is therefore an optimal mix of goals from the Mobility Document. The mix is different in each area. There is emphasis on the fact that utilisation is not always about being able to handle even more vehicles on already overburdened roads and main roads, as this can also lead to reduced reliability. For this reason as well, Utilisation is aimed at an optimal, area-specific mix of goals.

Optimising given road capacity (i)

This is aimed at eliminating all sorts of bad points in the existing road network that restrict the handling of traffic. Specifically, this refers to small infrastructural adjustments such as extending sorting or exit lanes, improving connections or creating rush-hour and plus lanes. Because these are small, focused infrastructural adjustments, these measures (including rush-hour and plus lanes) are part of utilisation; major adjustments to road infrastructure (as described in MIRT) are not covered.

Optimising traffic handling (ii)

This is aimed at making traffic handling 'smoother', e.g., by placing traffic lights and inflow management facilities or roundabouts (for handling at intersections), using signals to warn incoming traffic of low speeds ahead of them, and to warn of dangerous locations and situations (tight curves, wind, slippery roads, etc.). This also includes in-car systems that can support the driver's driving task, directly or otherwise. Examples include adaptive cruise control (for longitudinal handling) and lane departure warning (for lateral handling).

Spreading traffic demand by informing road users and potential road users (iii)

This involves spreading traffic demand over time or space: leaving earlier or later, choosing different means of transport or a different route. The ability of traffic to organise itself is at the forefront. The policy framework is aimed at relatively small and focused applications of this traffic demand. Influencing traffic demand (as with Different Payment for Mobility and mobility management) is not part of utilisation.

Guiding and directing traffic (iv)

As with information, this involves finding the best possible distribution of traffic over the road network. It is not the self-organising ability of traffic that is of primary importance here but guiding and directing. This assumes that it will be necessary under certain conditions for a road administration to take action to handle traffic. This is the case when there is (a) a major shortage of road capacity, (b) unwanted violations of limits to liveability and safety or (c) serious sudden disruptions. This is also referred to as traffic management. In accordance with jointly agreed choices (set out in a rule strategy), the shortage of road capacity is distributed.

On busy roads, road capacity (i) and traffic handling (ii) are often already optimised.

With a high degree of utilisation, the potential consequences of even more traffic or disruptions on these roads are great. Above a certain limit[21], road capacity decreases greatly and with it, the driving speed. Utilisation is therefore intended to delay as much as possible the point at which traffic jams form, for example, by means of inflow management facilities. Much can also be achieved with rule scenarios to divert traffic flows (preventively and otherwise). Incident management can move the point at which traffic moves again forward, because the road is cleared more quickly. These measures together lead to a considerable reduction in delays.

[21] This involves the relationship between traffic intensity and road capacity; serious delays occur at values between about 0.8 and 0.85, but these depend on local conditions.

This definition leads to some issues that will be addressed in the follow-up to this document:

- Points of reference (i) and (ii) are aimed at optimising road capacity and traffic handling. According to the goals of the Mobility Document, this should result in a better quality of travel from door to door. This almost always occurs on the roads of multiple road administrators. The question is: what cooperation is needed between road administrators and other parties (providers of mobility services and other relevant government and market parties, etc.) to be able to optimise this?
- Systems by the roadside as well as in-car systems play a part in (ii), (iii) and (iv). The question is: how will both systems relate to each other in the future?

- Point (iii) assumes the self-organising ability of traffic and (iv) focuses on guiding and directing traffic. The question is: what can be left to the self-organising ability of traffic and when should action be taken?

This policy framework for utilisation measures deals with the fifth step in the 'Verdaas seven-step'.

As part of the Implementation Agenda of the Mobility Document, regional network analyses were created in 2006. The Dutch House of Representatives decided to use the 'Verdaas seven-step' for a systemic elaboration of these network analyses. This system features seven solutions for better accessibility:

1. A spatial vision and programme
2. Different payment for mobility
3. Mobility management
4. Optimisation of public transport
5. Utilisation
6. Adjustments to existing infrastructure
7. New infrastructure.

Although utilisation is limited in this policy framework to the fifth step, it does intersect with the first four solutions (influencing traffic demand) and the last two (adjusting the infrastructure supply). This policy framework briefly discusses the relationship with the other solutions and the other two policy pillars (see 5.2). All other solutions have now also been set out and the government has promised the Dutch House of Representatives that it will present an integrated Mobility Vision in 2008.

5.2 Relationship to Building and Road pricing

The Utilisation pillar offers specific added value in addition to the Building and Road pricing pillars, not only in advance of the completion of both pillars but certainly in combination with them as well. The relationship between utilisation, road pricing and building is described below, assuming three traffic characteristics of utilisation (see next text box).

Relationship to Road pricing

In road pricing, payment for vehicle ownership shifts to payment for vehicle use. Users pay a price per kilometre. Paying depending on time and place can influence mobility behaviour. If driving on busy stretches becomes more expensive in rush hour, for example, motorists will choose different routes or means of transport and/or travel at different times. This will cause demand for these 'more expensive' stretches to decrease but road users will also demand better handling on these more expensive stretches than before.

Ex ante studies show that road pricing results in a decrease in traffic demand and with it in traffic problems, but it does not solve all problems. For example, utilisation can contribute to this higher quality on more expensive stretches through the use of rule scenarios.

Moreover, evasive traffic can occur because people attempt to avoid the more expensive stretches. This will require limitation measures such as inflow management, traffic lights and flexible closures. Road pricing and Utilisation are thereby extensions of each other. Utilisation can already be achieved in the short term, less generically and more dynamically than Road pricing. Utilisation measures can therefore be used to achieve concrete results even in advance of full implementation of road pricing and then to support road pricing for the structural traffic problems that remain and certainly the non-structural ones as well.

After introduction, utilisation measures and road pricing can be implemented jointly, party depending on trends in function and technology. For example, travel information already caters to road users' increasing desire for custom solutions. The Utilisation and Road pricing pillars can complement each other in gathering data and distributing information, both in terms of in-car equipment and required communication systems and new services (including mobility services).

Relationship to Building

Combined with Building, Utilisation also offers significant added value. Utilisation allows the capacity of road infrastructure to be increased. Because utilisation measures can be carried out relatively quickly, the worst traffic problems can be reduced until the new infrastructure has been built. The Mobility Document therefore mentions building as an option only if utilisation offers insufficient results, even in the long term, and if it is economically desirable. Explorations of building issues are therefore devoting more and more attention to a utilisation variant. Utilisation can, however, also improve the use of infrastructure, increasing the return on infrastructure investments. Utilisation can also make the use of rigid infrastructure more flexible and more dynamic. This allows disruptions such as incidents, road works, events, major congestion and bad weather to be better managed. Utilisation is already being applied as more or less standard procedure with road works.

Three traffic characteristics of utilisation

Cost-effective

Capacity can be increased in a very focused manner with limited adjustments to road infrastructure. This may include extending sorting or exit lanes, creating inflow management facilities and adapting connections. These measures can be implemented quickly and relatively cheaply and have a reasonable to major effect in situational terms. Traffic performance increases and with it the cost-effectiveness of investments in infrastructure.

Flexible and dynamic

Many utilisation measures are dynamic in nature. This means the use or effect of a measure may vary based on current or expected traffic conditions. For example, rush-hour lanes are opened only during rush hour and during major congestion, and in the event of sudden disruptions or incidents, speed limits are dynamically adjusted or traffic is directed or informed by means of incident management. One example of flexible use of infrastructure is reversible lanes. Flexible use of a shared lane can prevent the need for expensive expansion.

Road users are central

The Mobility Document devotes increased attention to road users as clients. Customer satisfaction research among road users show that some utilisation measures make positive contributions to the quality perceived by road users. Utilisation allows focused services to be provided to road infrastructure users. Examples include rush-hour lanes, green waves, travel and traffic information and the no-overtaking rule for trucks. This increases the quality that road administrators can offer their 'clients'.

5.3 Current utilisation tools and effects

Current utilisation measures

The first utilisation measures were introduced starting in the late 1970s as traffic safety measures: traffic lights and traffic signals. In the '90s, attention shifted to better flow. Most current utilisation measures were developed in that time, such as inflow management facilities, red crosses, green arrows, differentiated speeds, dynamic route information panels and traffic centres. These measures were intended to eliminate local flow bottlenecks. Until the early '90s, these measures were implemented on a relatively small scale, particularly on the main road network. Under the programmes and initiatives mentioned earlier (in chapter 2), these local measures were then implemented on a large scale throughout the Netherlands. This also includes relatively new measures such as rush-hour lanes and plus lanes. Particularly since the '90s, in-car systems have become more prominent. These include systems for navigation and driving assistance such as intelligent cruise control. An inventory created for this policy framework indicates that there were already nearly two hundred different utilisation measures in 2007, both roadside and in-car applications. The measures are very diverse in terms of implementation and function. Most measures relate to guiding and directing traffic.

These measures are effective

Research by KiM[22] indicates that all policy measures combined have resulted in an increase in lost vehicle hours between 1996 and 2005 of 'just' 53%. Without these policy measures, the increase would have been 90%. This involved demand-oriented policy (-2%), new roads (-10%), additional lanes, including plus and rush-hour lanes (-7%) and utilisation (-18%). This analysis examines the policy measure of utilisation, not including rush-hour and plus lanes, in contrast to this policy framework. The total contribution by utilisation measures to the reduced increase in the number of lost vehicle hours between 1996 and 2005 was therefore 25%.

[22] KIM 2007: Mobiliteitsbalans 2007.

What portion is attributable to roadside measures and what portion to in-car systems?

- We know little about the effects of roadside utilisation measures. Where effects are known, they vary by location: the degree to which the effect occurs therefore depends on the specific situation. Based on available studies, the effect (measured as a restriction of the number of lost vehicle hours) is generally between 0% and 20%. Negative effects and effects over 20% are exceptions. A recent study[23] estimates that an expected increase of 17% in lost vehicle hours can be levelled off to 5-10% with the effective use of traffic management, incident management and traffic information. Another study[24] shows that incident management can result in a decrease in lost vehicle hours of approximately 7%. This is on the condition, however, that incident management will be used as a total (organisational) set of measures.
- Measures, however, do not only affect the stretch of road but also the rest of the network. Better flow on a stretch of road has a positive effect on flow 'upstream' as well. 'Downstream', however, there may be a negative effect because the problem shifts to there. By taking this into account, good effects can be achieved at the network level. Preventing blockages at the network level ('secondary congestion') can also result in significant gains. Extensive study results determining the effects of measures relative to each other (at the network level) are not yet available in 2007. However, much may be expected on the basis of traffic logic (see chapter 7 as well).
- Some European studies have been carried out into the effectiveness of in-car systems. An example is *e-Call*, a system that automatically warns the 112 emergency number centre in the event of an accident. According to these studies, in addition to a 5-to-15% reduction in victims (due to shorter arrival times), *e-Call* also results in savings of 10 to 20% on traffic jams. Adaptive cruise control saves 4000 rear-ending collisions when 3% of vehicles are equipped with it. LDWA (Lane Departure Warning Assistant) and Lane Change Assistant save 1500 incidents with 0.6% penetration, 14,000 incidents with 7% penetration.

[23] McKinsey 2005: Potentie van verkeersmanagement op de korte en de lange termijn.

[24] OC&C Strategy Consultants 2007: Second opinion op het voorstel 'Verkeersmanagement 2007-2020'.

Development of a coherent evaluation and monitoring programme is recommended for better evaluation of the effect of measures, especially in relation to each other. The results of this programme can be used to evaluate future investment proposals.

In summary

- The Utilisation pillar offers specific added value in relation to the Building and Road pricing pillars, not only in advance of the completion of both pillars but certainly in combination with them as well.
- Utilisation increases the cost-effectiveness of investments in road infrastructure. It makes traffic more flexible and more dynamic, and places road users at the core.
- The existing utilisation tools reduce the number of lost vehicle hours by an estimated 25%.
- The effectiveness of utilisation measures varies from one measure to another and is strongly associated with the area in which they are implemented.


80
80

6. Relevant developments

This chapter outlines the developments that are relevant to the future of Utilisation. This involves technological and traffic developments as well as societal changes. Finally, the international context of utilisation is outlined. The vision of utilisation in the next chapter indicates how desired changes can be encouraged and restrictions can be eliminated.

6.1 Technical, traffic and societal developments

Technical developments

- *From technology-oriented to goal-oriented*

  Utilisation began with the technical opportunities that emerged: technology made it possible to inform, direct and guide road users during their trips. Over the years, a change has occurred: road administrators are increasingly making the transition to being 'traffic administrators'. The roads themselves are less the centre of attention, quality for clients more so. Technical measures are more of a means to offer services to road users than before.

- *Rise of in-car systems*

  The industry has made a huge leap in recent years in making various vehicle systems commercially available. Examples of commercially available driver support systems are collision avoidance, lane keeping, blind-spot monitoring, road condition warning, speed assistant and e-Call.
  An essential distinction among in-car systems is the degree of communication with the road: there are (a) independent systems, (b) systems that interact with roadside systems and service provider centres, (c) systems in which vehicles communicate with each other and (d) roadside systems in which vehicles and the roadside cooperate ('cooperative vehicle/roadside systems' – see also chapter 7).

  Such systems are making more and more personalised services (for mobility and information) available to road users. These partly complement road administrators' roadside systems but also overlap with them in part. For example, navigation systems in cars provide route information, as do DRIPs over the road. This requires transparent, consistent choices on phasing out certain roadside systems and focused incentives or facilitation for certain vehicle systems and services.

- *Need for standards*

  Most utilisation measures are examples of dedicated developments. These are systems developed specifically for a given purpose. An example of this is the signalling system. Maintenance and expansion require custom work and are relatively inconvenient and expensive. The need for standards (including open standards) is increasing among market parties (the traffic and vehicle industries) as well as among governments. Open standards are publicly available specifications that allow hardware and software to be exchanged. Examples of open standards for utilisation are the Dutch IVERA protocol for uniform connections to traffic regulation facilities, open telematics platforms and communication protocols. There are still very few standards, open or otherwise, for roadside systems and traffic centres.

Traffic developments

- *More coherence needed between measures*

  Various packages of measures such as traffic management, traffic jam prevention, rush-hour lanes and improved incident management, have addressed increasing traffic congestion.
  It is becoming increasingly difficult to find room to resolve traffic problems on the busy road network. Previously, problems could be dealt with locally in many cases. To address problems in busy areas of the road network, measures must now be implemented in relation to each other. Subsequent improvement in efficiency requires network-wide implementation of various measures.

- *Increasingly sensitive to disruptions*

  Increased traffic performance is making the road network increasingly sensitive to disruptions. In 2006, the proportion of lost vehicle hours on national roads resulting from unexpected disruptions was already 30%. Preventing disruptions, such as by means of incident prevention and scheduling of roadworks and events, is thereby becoming more important. However, more attention is also being paid to the availability and reliability of systems.

Societal developments

- Individualisation

  In addition to strong economic growth, individualisation is one of the causes of the major increase in mobility and additional attention to road users. Both the government and the market are responding to the latter factor: the government by placing road users at the centre and focusing on door-to-door travel; the market by developing new personalised products and services aimed at the individual road users as a client.

- Cooperation between road administrators

  The government's desire to serve road users from door to door, the increasing need to take utilisation measures in relation to each other and increasing traffic problems at connections between road networks of different road administrators is making more extensive cooperation between road users necessary. Cooperation between road administrators as well as between other governments, mobility service providers and providers of other means of transport is an important success factor.

- Cooperation between governments and market parties
  Market parties are increasingly able to develop a return-on-investment model for mobility products and services. This creates a strong incentive for innovations by the market. Information is provided at a high rate on multiple means of transport and real-time developments. For example, navigation systems will identify data on the location, speed, origin and destination of a vehicle more and more actively. The data is partly complementary to the data collected by governments for traffic management. The role of market parties will increase and the government will need to consider its role. New cooperation models will emerge between governments and market parties.

6.2 International developments

Internationally, ITS (Intelligent Transport Systems) is the common denominator in utilisation trends. Compared to the Netherlands, many countries are more actively entering into forms of cooperation with market parties. The Dutch government participates in international forums and consulting bodies for knowledge exchange and cooperation, but has lost its leading role.
The experiences described here may provide guidance for the Netherlands.

Europe
A White Paper has been drawn up for European transport policy. Although the White Paper directs future European developments in utilisation, it is still in limited use in the Netherlands.

Actions in the White Paper illustrate the importance that the European Union assigns to intelligent transport systems:
- the need for road infrastructure to become more intelligent by sending/receiving traffic data;
- exploring cooperation between roadside systems and in-car technologies by coordinating the relevant stakeholders;
- launching a programme to prepare intelligent road systems for cooperative systems;
- developing an open architecture for the Galileo location system to ensure flexible development of future applications, including traffic information and traffic management systems.

Legislation exists, or is being developed further, for interoperability, tolls, urban traffic, the environment, vehicles and other issues. Standardisation through CEN (European) or ISO is important for harmonisation and tendering. One important initiative is the ITS Plan of Action that the European Commission would like to establish by the end of 2008 – a very broad plan (for vehicles and roadside, multimodal, policy, tools from legislation to joint financing) to exploit the potential of ITS in practice.

Vehicle industries in Europe are working in framework programmes on technical harmonisation and standardisation for in-car systems and their interaction with roadside systems. In view of earlier European directives with far-reaching consequences, it is recommended that the Netherlands align itself with European directives to develop utilisation measures further. In addition, standardisation in particular can be an incentive to implement utilisation in the Netherlands.

United States
In the United States, ITS is the vehicle for utilisation measures. ITS America has described the national ambition. The ITS America steering group involves cooperation between local ITS organisations, departments of transportation, industry and research institutions. Implementation of the policy lies with the various departments in each state. At the national level, ITS features both technical and organisational thematic programmes. Working under an ITS architecture is a prerequisite for financing and implementing projects. One specific development is the Vehicle Infrastructure Integration initiative to provide vehicles with information in various ways and to make increasingly intensive use of vehicles as active components of the traffic management and information process.

Japan
In Japan as well, all measures (including utilisation) are covered by the term ITS, including traffic information and tolls. The Japanese government is particularly active in ITS and deliberately seeks cooperation with market parties. For example, the Japanese government, together with the market, has been developing advanced in-car systems for many years. If tests are successful, these are implemented nationally. The VICS system for in-car information is a strong component of an infrastructure that already includes 50,000 infrared beacons and millions of onboard navigation systems. Japan is advanced in the area of floating-car data.

United Kingdom
The UK has one national traffic centre and seven regional centres. The regional centres are public. The national centre, created in 1996, is a private company whose task is to inform road users well and make travel times more reliable. In 2004, the Highways Agency contracted out work at the national traffic centre to Traffic Information Services for ten years. This is a consortium of private businesses implementing the Highways Agency's policy. The ministry encourages private initiatives for data collection and travel information. In principle, it is assumed that the market will fulfil needs and oversee quality. If no initiative for a desired service has been developed after two years, the government has the right to do so itself.

Austria
Austria has one organisation, one system and one traffic centre to manage traffic on motorways. The entire national road network is privatised and in the hands of a holding company (ASFiNAG), consisting of four subsidiaries: Maintenance, Tolls, Traffic Management and Construction. ASFiNAG enters into agreements with cities on links to local measures. Where possible, the aim is to separate local from regional traffic. ASFiNAG's system architecture is three years old and is based on open standards. Roadside systems are comparable to those in the Netherlands in terms of function, but are more advanced due to their new structure.

In summary

Relevant developments to the future of Utilisation are:

- Transition from technology-oriented to goal-oriented applications
- Rise of in-car systems
- More coherence needed between measures
- Network increasingly sensitive to disruptions
- Individualisation
- Cooperation between road administrators and other governments
- Cooperation between governments and market parties
- Working under a European architecture.

IInternationally, ITS (Intelligent Transport Systems) is the term for utilisation measures. Compared to the Netherlands, many countries are engaging more actively in cooperation with market parties. The Dutch government participates in international forums and consulting bodies but has lost its leading role therein.

7. Vision of utilisation

Based on the preceding chapters, it can be said that:

- utilisation offers opportunities, precisely in conjunction with Building and Road pricing;
- good effects have been achieved in recent years with Utilisation and more effects are possible;
- further implementation of Utilisation requires new cooperation models, both between governments and between government and the market;
- return-on-investment models encourage the market's innovative potential;
- new products and services are emerging that partly complement and partly overlap with roadside systems.

This leads to the conclusion that further development and introduction of the Utilisation pillar seems to make sense for the Netherlands, but requires principled choices. These will be elaborated in the following section. Four tracks will also be identified in the vision of utilisation and their effects will be estimated.

7.1 Strategic choices

Two main questions can be derived from the above findings that determine how the Utilisation pillar can be further developed and implemented in the Netherlands.

1. What role does the Dutch government want to fulfil in terms of utilisation?

The first factor here is public-public partnership. The growing need on the part of both the government and road users for good, reliable quality of travel from door to door requires more cooperation between road administrators and also between means of transport. It also requires working across administrative limits and taking each other's goals and interests into account. In terms of organisation, far-reaching regional cooperation between municipalities, provinces, water boards and Public Works and Water Management is an eventual possibility[25].

A second factor is public-private partnership. The rapid rise of in-car systems is leading to personalised services that optimally serve individual interests. Road administrators want to direct and guide based on collective interest. In addition to this potential tension between individual and collective interests, this is also an explicit opportunity to create a win-win situation through cooperation. For example, road administrators, in consultation with cartographers and navigation system suppliers can make agreements on preferred routes, unwanted evasive routes and rule scenarios, taking into account the creation of personalised route advisories. Road administrators and market parties involved have already started to make such agreements on desired routes for goods traffic. There is a clear trend towards more cooperation between road administrators and other governments among themselves (public-public) and between government and market (public-private) with

[25] On 28 November 2007, the Transport, Public Works and Water Management Council provided a recommendation in Van wegbeheer naar netwerkbeheer (From Road Management to Network Management) on organising road management differently.

increasing input from market parties. As a road administrator, the government will have to continue to carry out the following main tasks based on societal interest:

Main tasks of the government (state government and others) in terms of Utilisation

- formulating and establishing societal prerequisites, such as throughflow, reliability, liveability and safety;
- monitoring compliance with these societal prerequisites by incentives and dialogue and, if necessary, additional enforcement;
- being able to act by directing and guiding traffic streams in the event of unwanted violations of standards for accessibility, liveability and safety and in the event of serious sudden disruptions such as incidents or emergencies.

This means the government can more emphatically focus on societal prerequisites than before. A specific example is dynamic speeds, which may optimise throughflow within the established environmental use area.

2. Which roadside systems should be maintained or created for Utilisation to be well implemented?

Assuming the self-organising nature of traffic, road users have a particular need for good information (including traffic information) to be able to make choices. Private parties are well suited to providing such individual services, for safety and comfort as well. The substantial growth of in-car systems is unavoidable.

Generally, in-car systems will particularly reinforce the self-organising ability of traffic, whereas roadside systems will assure societal interests in particular. More specifically, the question arises of which roadside systems will eventually be needed for good utilisation. This means that investments with the same functions as in-car systems will require their usefulness and necessity to be considered.

Examples of systems that partly overlap each other are traffic signals and adaptive cruise control (both systems increase safety) and dynamic route information panels and navigation systems (both provide road users with up-to-date information). This raises the question of to what extent and for how long it will still be useful to continue to expand the current array of traffic signals and information panels by the roadside. Implementation is conceivable at a basic level for travellers without an in-car system (or without a functioning one), combined with a timely supply of relevant information for service providers, which will serve travellers who do have in-car information systems.

As a result of the developments outlined, vehicle systems will become more important. This does not take away from the fact that specific roadside systems will remain necessary (see next text box). In-car and roadside systems, as parts of a cooperative system, complement each other and cannot entirely replace each other.

With Utilisation, roadside systems remain necessary

- to be able to offer a minimum basic level to road users without in-car systems (or without working in-car systems), aimed at information, safety and possibly comfort;
- to support the operation of systems in vehicles, for example, when vehicles are not within range (communicating range) of each other;
- to be able to direct and guide traffic flows under the aforementioned conditions of scarce road capacity, unwanted violations of societal standards and sudden disruptions[26];
- to be able to engage in additional enforcement where necessary.

[26] All images shown with electronic signal providers along or above the road for which non-compliance may result in a punishable offence will remain necessary outside vehicles as long as there is one vehicle still moving independently for which it can legally be demonstrated that the driver could not have received and presented the signal shown in the vehicle with 100% certainty.

Policy choices

Further development of Utilisation results in the following strategic policy choices:

- the government is actively joining in with the inevitable development of vehicle systems;
- the innovative potential of the market is used as much as possible (and, if desired and necessary, encouraged and facilitated);
- as much connection as possible to international (European) developments regarding joint ventures, technology, standardisation and regulation;
- work is being done on the change from local (stand-alone) measures to the use of coherent measures at the network level;
- a development will be initiated from the current corridor approach (through routes) to a regional network approach in which the underlying road network is involved as well as the main road network;
- a solid supporting evaluation and monitoring programme will be set up to research the effectiveness of new utilisation tools in context;
- utilisation is dealt with using a programme approach through MIRT. This reduces the administrative burden, structure selection processes and professionalises the area-focused approach.

7.2 Four tracks

Final situation

The vision is that in 2020 there will be reliable, acceptable travel times for the entire trip, as expressed in the Mobility Document. Important steps will then have been taken in informing travellers, road administrators' response to changing conditions (including traffic conditions) and in-car support for travellers. In the final situations, travellers travel door to door based on personalised travel advisories with a choice of means of transport, choice of route, expected travel time and cost. During the trip, travellers are able to make different choices based on current information. The market for mobility services has grown further. Road administrators are adapting more to changing traffic conditions with the application of rule scenarios in the event of disruptions, guiding and managing traffic streams at nodes and dynamic speeds that allow better and more flexible use of available space (including environmental space). In 2020, vehicles are not only more economical, cleaner and quieter but facilities assisting the driver, such as adaptive cruise control[27], will be applied in new vehicles on a large scale and are the first steps towards more guided vehicle systems.

[27] Adaptive cruise control as a driver assistance system that actually takes action by automatically braking if the distance to the vehicle in front becomes too short.

Because it is technically impossible and functionally unnecessary to achieve this final situation everywhere in the Netherlands immediately, the result is an approach on four tracks.

Track 1: Local measures

The first utilisation measures arose on national roads in the 1980s and much earlier, in the form of traffic lights, on underlying roads. Measures on national roads (traffic signals and later inflow management systems, dynamic route information panels and rush-hour lanes) were separate, stand-alone systems without interaction. Except for traffic lights, they were primarily used on the main road network to achieve better local throughflow. Most utilisation measures are still local measures.

Especially on motorways in the Randstad, many utilisation measures have been taken around most bottlenecks. The first track has by now been utilised. Investing in even more local measures will not have much more of an effect. However, problem-oriented expansion of local utilisation tools on national roads (particularly for discontinuities and the top 50 traffic jams) and decentralised roads makes sense on a limited scale, provided that it is taken into account that the new measures will be useable later on the second tracks and that in-car systems will be broadly adopted over time.
It also makes sense to implement pilot projects with new local measures more broadly, as in the 'jam-proof' programme.

In addition to new measures, this track also involves updating current measures. Since most measures were achieved some time ago, the effect of many of these measures can be optimised with relatively little effort and at relatively low cost. For example, good experience has been gained in the 'jam-proof' programme with a 'green wave team' for resetting traffic regulation facilities to be able to handle increased traffic demand more efficiently. This applies to measures on national roads as well as on decentralised roads. Moreover, measures can be taken to eliminate obstacles to liveability and safety. These are also covered by this track.

Opportunities for local measures are mainly in the transitional zone consisting of the ring around the Randstad (roughly, the provinces of Gelderland, Noord-Brabant and Flevoland). Traffic problems are rapidly increasing in this area and utilisation measures have scarcely been applied in the past. Local measures on national and underlying roads are therefore still effective in this area. Here, too, it is important to take into account the fact that these measures will later be able to be used network-wide and that in-car systems will take over in part. In the transitional zone, it also makes sense to involve liveability and safety more explicitly and update utilisation measures previously taken.

The problem in the rest of the Netherlands is limited and so utilisation measures will need to be carried out at specific bottlenecks on a limited scale only. The emphasis is on decentralised roads, as most bottlenecks are on such roads in the rest of the Netherlands. Liveability and safety play a relatively large part on these decentralised roads, therefore it is certainly not just throughflow bottlenecks that need to be examined.

Track 2: Network-wide approach
By 1990, because there were more and more utilisation measures on the roads, it became increasingly important to align them with each other. Reciprocal synergy is thereby used and throughflow is improved over the entire network instead of at one point or on one road. This track is in full development: dynamic route information panels, traffic management facilities and traffic signals are aligned with each other and regions are considering rule scenarios and regional traffic management centres. Collecting, processing and distributing information is also in the spotlight in the form of the National Road Traffic Database (NDW) and regional road traffic databases (RDWs).
These are needed to deploy utilisation measures network-wide.

This track refers primarily to the networks (including urban networks) within the busy Randstad. The effects of local utilisation measures are already maximal here and traffic problems are still increasing. In principle, this involves the same measures as on the first track, but they need to be complemented with measures specifically aimed at the network-wide approach.

A proven effective utilisation measure is incident management (to a potential reduction of 7% of lost vehicle hours). Particularly in the busy Randstad, incident management can limit the occurrence of disruptions and their negative consequences. This does require, however, incident management to be part of a total (organisational) set of measures rather than being limited to additional cameras, for example.

This track also requires the development of a new generation of utilisation measures. An example is dynamic speeds, allowing the speed limit to be adjusted to unexpected and changing situations such as the weather, congestion or accidents. This can improve throughflow, increase traffic safety and limit the environmental burden. These new measures require pilots, after which they can be pursued if shown to be cost-effective.

To guarantee that local elaborations such as Area-Based Utilisation by regional partners do not conflict with national interests of the national spatial main structure in the Space Document and the Mobility Document, local elaborations must take into account the effective frameworks for national corridors. The Public Works and Water Management elaboration for traffic management on the national road network can be used.

The greater penetration of in-car systems means that the previously outlined contrast between the self-organising ability of road users and guarding societal standards (especially liveability and safety) already emerges on this track. The need for road administrators to guide and direct is thereby increased. There is still little knowledge and experience of how this should be configured in practice; pilot projects are needed. Growing congestion on main roads and additional information and navigation systems in vehicles will cause the traffic burden on the underlying road network to increase, forming an additional incentive for a network-wide approach.

Finally, this track focuses on implementing the measures in relation to each other. This coherent implementation will be aimed at informing and advising but also directing and guiding, under certain circumstances. The use of utilisation measures, or day-to-day operations, requires rule scenarios and possibly regional traffic management centres. Furthermore, the organisation of road administrators must also adapt to this. By 2015 there could be an efficient and effectively functioning network-wide approach to the Utilisation pillar.

Over time, due to increasing growth in traffic, this track will also become applicable to the transitional zone to the Randstad and ultimately to the rest of the Netherlands. Since in-car systems are currently not widely available, this track involves road administrators' roadside systems in particular. Because the aim is to serve road users from door to door, the emphasis with this track is on intensive cooperation between road administrators (and other governments). It seems advisable to be reticent regarding major investments that overlap in terms of functionality with future possibilities for in-car systems. For example, it will not make sense to expand the arsenal of dynamic route information panels on a large scale and roadside DRIPS may be a cost-effective intermediate solution on the way to the third track.

Track 3: In-car and cooperative systems
The introduction of systems in vehicles has a long history, of which radio traffic information and Traffic Message Channel are the best known examples. The past decades have seen a huge amount of development in in-car systems. This is characterised by the fact that nearly all initiatives originate in the market because it can achieve a return-on-investment model, a business case. For the implementation of cooperative systems in the Netherlands, the market parties need better basic conditions, which improve the various individual business cases. A characteristic of these prerequisites is that standardisation means that the same technical platform makes multiple return-on-investment options possible simultaneously, greatly reducing the cost per business case.
The government can play a part in initiating this standardisation and cooperation, taking the following anticipated development phases into account:

Phase 0. Autonomous in-car systems
The simplest in-car systems provide driver assistance and navigation advice without communicating with the surrounding environment. Examples of advanced driver assistance systems are systems warning road users of dangerous situations (such as vehicles in the blind spot and stationary traffic) or even supporting or taking action in certain situations (such as intelligent autonomous cruise control, ABS, anti-collision systems, anti-tipping systems for trucks and automatic driving (including in traffic jams)).

Phase 1. Interaction between vehicles and roadside systems and service provider centres based on mature technology
In addition to autonomous in-car systems, there are more and more systems in vehicles communicating with service provider centres. Examples include mobility services using current traffic information or information on destinations, route navigation and e-Call. With the definition of the GST (Global

System for Telematics) open platform, a vision has now been established in a European context for interaction between vehicles with roadside systems and service provider centres.
The GST project has thereby provided a very detailed view of the countless options that can arise if vehicles can interact with roadside systems and service provider centres via an open protocol.
Both the market and the government, however, are not yet finding it easy to define sound business cases allowing the number of interactive vehicles to increase rapidly. The fact that there are not enough interactive vehicles with affordable systems and open architecture means that the market and the government cannot acquire relevant experience quickly of which applications have greater or lesser value in relation to cost. The government could have an important incentive function to break this impasse.

Phase 2. Interaction between vehicles and with roadside systems, as well as cooperative vehicle-infrastructure systems using an array of radio systems.

Developments in advanced wireless systems with more flexible bandwidth and/or direct reciprocal communication ('mesh') are continuing. It is conceivable that these developments will result in new business cases. Therefore it is desirable for these developments to be monitored actively.

The majority of motorists currently do not yet have interactive systems in their vehicles. However, the penetration of navigation systems is rapidly increasing. In 2006, the degree of penetration was already slightly higher than for cruise control. The smart version, adaptive cruise control, which adjusts speed to the vehicle in front, had a penetration rate of 3% in 2006.

In terms of content, this track is a further continuation of the network-wide approach on track 2, the important difference being that there will ultimately be interaction between roadside systems and in-car systems. Good cooperation by cooperative systems means better services for road users, commercially attractive business models for market parties and less effort in terms of time and money for the government. This requires good public-private cooperation to ensure that the desired systems become available in vehicles and can be used in the desired manner. Major growth in this generation is expected to occur before 2020, with a peak by 2025.

Track 4: Future traffic streams

In the future, cooperative systems will develop even further: there will be extensive distributed intelligence and even greater interaction between component systems. This will create new traffic streams enabling automated driving. The task of driving will be assumed (in part) by the vehicle, allowing travel time to be used functionally. A different way of dealing with mobility will arise: personalised mobility. Limits between personal and collective means of transport will become blurred.

On the fourth track, both the various solution directions (see chapter 5) and the various means of transport will be viewed in relation to each other. The development of the fourth track cannot be predicted accurately yet. The peak for this track can be expected to start in 2040.

Development of the tracks

Roadside systems are expected to dominate until about 2015. In-car systems are already experiencing a strong rise and are expected to attain a dominant position around 2020. Some of the roadside-linked systems will continue to exist in addition to in-car systems. Roadside-linked systems will remain necessary to direct traffic and to inform, advise or warn road users who do not have in-car systems (or whose in-car systems are not working). The relationship between both systems, however, will change in favour of in-car systems.

The tracks described above will overlap. The approach to each track is already visible in specific measures and systems and also through research results and pilots and does not immediately spell the end of the previous one. Elements of different tracks often go together very well. This diagram presents this development in schematic form.

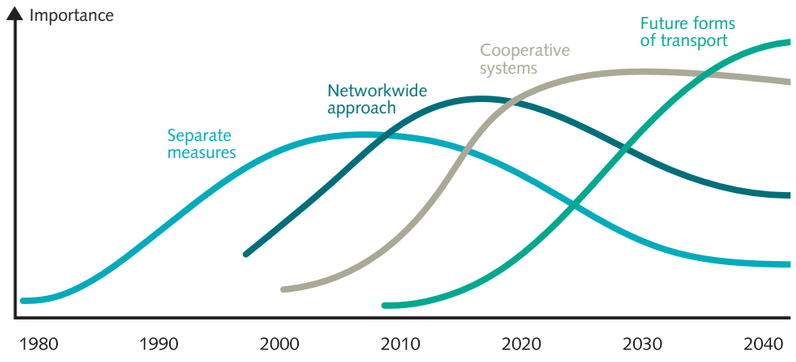


Figure: Development of the tracks

It is expected that each new track will contribute slightly more to better utilisation of existing road capacity. The first track does so locally. The second track generates additional effect because the road networks of all road administrators are considered as a whole. The third track creates a better distribution of vehicles, both very locally on roads (keeping distance, speed, lateral position) and on the network (informing & route guidance and guiding and directing). The potential effects will be explored further in the following section.

7.3 Expected effects

Chapter 5 indicated that there was limited knowledge of the effects of utilisation measures and that where effects are known, they vary by location. Nonetheless, the effects of the tracks can be estimated on the basis of previous results, traffic logic and expert opinions. Using insights from the pilots, a proper evaluation and monitoring programme and knowledge development, we can limit uncertainty regarding these figures. It should be emphasised that the stated effects cannot simply be added up. Track 4 (future forms of transport) will not be considered here.

Track 1: effects for each local measure
The local effects of measures will be comparable to the effects of utilisation measures previously achieved. For measures whose effects are known, these continually depend on the specific situation. Based on available studies, these amount generally to a restriction between 0 and 20% in the number of lost vehicle hours. The effects of 'heavy' measures such as rush-hour lanes and plus lanes are obviously greater.

Track 1: effects of local measures combined
The current transitional zone can be compared to the Randstad in the past. For this reason, comparable effects can be expected here to those of the utilisation measures previously taken in the Randstad (18 to 25% restriction in the rise in lost vehicle hours). This effect may be smaller because utilisation is already occurring in the transitional zone. The effect may actually be higher because there are more useable alternatives on the underlying road network in the transitional zone.

Track 1: effects of updating measures
Where existing measures are updated, an average improvement of about 10% is expected locally in the performance of a measure. This may rise to about 85%, but these are exceptions[28].

[28] The operation of many traffic lights is adjusted once every 10 to 15 years. Pilots such as 'jam-proof' show that updates to existing traffic lights enable the number of lost vehicle hours to be improved by up to 85%.

Track 2: normal effects of network-wide approach
By aligning measures in a region with each other and by aiming for a given shared network-wide mix of goals (such as in the form of a rule strategy, determining an area-focused optimum for throughflow, reliability, liveability and safety), the measures reinforce each other. Network analyses have provided indications that there are still many opportunities for optimisation on through roads in the underlying road network and at connections to motorways. Model studies (using the regional utilisation explorer) and network analyses (using various traffic models) present the prospect of a reduction of about 10 to 20% of the number of lost vehicle hours in a regional network under normal conditions.

Track 2: effects of network-wide regulation
According to research conducted for NWO, including traffic lights in a network programme can lead to a reduction of about 5% in lost vehicle hours. Including other measures in a network program as well causes these effects to increase. Model studies and limited empirical results (such as in a pilot in Alkmaar) provide the prospect of a reduction in lost vehicle hours on a regional network of about 10 to 15%. These effects apply for normal situations and are in addition to the local effects of the measures.

Track 2: effects in the event of disruptions
The outlook for effects in the event of disruptions is even greater. On busy networks, in fact, both the likelihood of disruptions and their consequences are great. Disruptions already cause 30% of lost vehicle hours, and this percentage is rising. With network-wide deployment of utilisation measures, the probability of disruptions can be limited (e.g., using incident prevention) and network-wide rule scenarios can be used to prevent the effect of disruptions on the rest of the network as much as possible.

Track 3: effects of in-car cooperative systems
With cooperative systems, the complementary characteristics of roadside and in-car systems can be combined. It can be argued that this is more effective than working with roadside systems along. However, there is still not enough knowledge to make reasoned statements about this. Results from TNO show that better (predictive) information with in-car systems can result in a 10 to 15% reduction in travel times. Road users receive better information and the self-organising capacity is increased. Other effects of cooperative systems are better services to road users (comfort and satisfaction), being able to use innovations (including market innovations) more quickly and increased availability of traffic information for both information supply and traffic management. This track also results in reduced spending and effort for the Utilisation by governments, as part of it is done by the market within the framework of society.

In summary

Road administrators, other governments and market parties take utilisation measures together by deploying both roadside systems and in-car systems. A combination of smart roads, smart vehicles and well-informed road users is the intended result. There will be more coherence between systems and strong cooperation between parties. Because it is technically impossible and functionally unnecessary to achieve this final situation everywhere in the Netherlands immediately, the result is an approach on four tracks:
Track 1: Local measures
Track 2: Network-wide approach
Track 3: Cooperative systems
Track 4: Future traffic systems

These tracks will overlap, with each new track contributing slightly more to better utilisation.


REGELAAR
86
2.0km
A4
7°C 15:51
De Bruyn Kopsstraat
Timbergenstraat
Delftweg
GPS
Via TMC
100m
E30 / A4
16:25 52km

8. Implementation strategy

The implementation strategy for the Utilisation pillar consists of four lines of action described below. An initial elaboration of these lines of action is included as appendix 1.

1. Encouraging and facilitating smart vehicles and cooperative systems
This offers attractive prospects for road users, the market as well as for the government. To be able to seize opportunities, the inevitable development towards a strong increase in in-car systems must be exploited. This requires focused investments by the government in basic conditions and also stimulating the innovative potential of the market. Based on international experience, this track can be expected to be already strongly developed in 2015 if investment occurs now.

2. Promoting network management at the regional level
The core of this line of action is effective cooperation between road administrators at the network level. Given the importance of robust embedding and the links in terms of content, it appears to be a good idea to opt for further professionalisation of the network approach. Regional utilisation proposals can be considered in their entirety in periodic consultation between the state and regions for the MIRT.

3. Updating and adding to remaining local measures
To some extent, these actions are already in progress, while others are being prepared. Concrete results can be achieved quickly in specific situations on the basis of measures tested in practice. These are primarily local measures. To be able to achieve results in the short term for the underlying road network and the main road network, a package of utilisation measures can be determined to promote throughflow in the most urgent locations.

4. Knowledge development and innovation
Research indicates that there are many opportunities for utilisation in terms of traffic logic. At the same time, knowledge of actual effectiveness is limited to a few instruments. The trend towards more coherence and the rise of new measures in fact requires additional knowledge to enable investment proposals to be evaluated well. An evaluation and monitoring programme, as part of knowledge development, is therefore necessary. Knowledge of new applications and opportunities for innovation is also desirable. There are also many other knowledge issues, such as solid insight into traffic handling, the role and structure of (regional) traffic centres for the network-wide use of utilisation measures, research and innovation, and training and education. Knowledge and innovation are an integral part of all lines of action described, but will also be addressed more specifically in the later elaboration of the policy framework.

In addition to these four lines of action, the implementation strategy also consists of the following three components:

Embedding in a Utilisation programme
Utilisation is part of a fairly short tradition in which various parties each take action based on their own responsibilities. A logical next development is the transition to a coherent, integrated approach. This can be done by incorporating initiatives (in utilisation and elsewhere) and new investments into a coherent Utilisation programme, at the regional network level and at the national level.

Phased policy development
Dynamics in technology, the market and cooperation require continuous development and flexibility to be able to detect and exploit opportunities. Growing in stages and investing in utilisation measures are in line with this. In this way, new initiatives and developments in the environment can easily be incorporated. Opting for phased policy development, featuring bi-annual reassessing, for example, therefore seems self-evident. This is in line with the dynamic Implementation Agenda in the Mobility Document, which is based on the same principle. It is preferable to develop utilisation policy further in consultation with the relevant parties as much as possible, such as administrative partners, market parties, knowledge institutions and interest groups.

From vision to completion
In addition to the long-term vision described, some specific short-term actions are mentioned as an appendix to this policy framework, particularly to create basic conditions for future utilisation measures. In 2008, a more developed investment strategy will be offered with the integrated mobility vision being developed.

It is important for the programme approach to Utilisation to take into account the fact that Utilisation is more than achieving measures. Good use of measures will become increasingly important on tracks 2 and 3 (see chapter 7). Therefore it is essential to pay attention to the other links of the utilisation chain as well, such as collection, traffic centres, vehicles, road users, infra-structure and organisation. Organisation in particular is important to be able to make good use of new utilisation measures. International developments show that other countries are already more advanced in this.

Appendix 1: Initiative for actions

The policy framework mentions four lines along which actions can be elaborated. The Ministry of Transport, Public Works and Water Management intends to elaborate the actions together with the parties involved. In 2008, there will be an initial Better Utilisation investment programme as part of the entire mobility vision. The following nine actions, primarily focused on basic conditions, are being considered for now.

Line of action 1. Encouraging and facilitating smart vehicles and cooperative systems
It is primarily the market parties who must make a move. The government, however, wishes to create the basic conditions to give the market's innovative potential some space. The government must also set limits for this type of system to safeguard societal interests. Central and decentralised governments are aiming to cooperate with market parties more than before. Cooperation with the Ministry of Economic Affairs is anticipated.

Action 1: Starting market-government dialogue
By facilitating this line of action, good interaction should be achieved between the government (at the national, decentralised and European levels) and the market. Encouraging the market's innovative potential is the central issue. The first step is to create an initial agenda and populate the consultation body. Initiatives and projects can then be started and presented for cooperation with the government. Activity in the short term involves appointing a trailblazer. The trailblazer is expected to be succeeded by a chairman. The following issues can be placed on the consultation agenda, with the assent of the participants:

- determining the necessity, desirability and direction of elaboration of system architecture for dynamic traffic management, in-car and cooperative systems, fitting within European agreements;
- National Road Traffic Database (NDW). The NDW, already being created, provides basic information on throughflow on the road network. It also provides basic information for service providers;
- setting up an in-car test platform facilitating regional pilots. This involves setting up and maintaining a practical and economically viable platform for various in-car applications. It seems obvious to use existing developments that are compatible with future European standards such as the Global System for Telematics. The Sustainable Mobility Platform ensures, preferably through the HiGrids foundation, that the platform and test results are public and that there is a connection to the 'car of the future' initiative. A potential platform can then create conditions for regional pilots and accelerate the development of various applications;

- suggestions for a plan of action to unlock, bundle and exchange basic travel information, which is a condition of better services to motorists and better traffic management. To shape the door-to-door ambition as set out in the Mobility Document, this involves different categories of roads, different means of transport and services related to such things as parking. This also includes information on roadworks, speed regulations, current travel information and current traffic information for the entire road network.

Outcomes of the dialogue may lead to additional investments, to be determined at the time of the biannual reassessing of the Better Utilisation programme to be set up or, if necessary, during the annual budget process.

Action 2: Test using smart cars and cooperative systems

Further exploration and encouragement of in-car applications, possibly in connection with roadside systems and/or encouraging driver-assistance applications at the network level. The results will be set out in an evaluation and monitoring programme.

- The basis consists of the international Field Operational Test Site as part of the European Seventh Framework Programme, aimed at achieving large-scale tests together with industry.
- There is an active automotive industry in the Brabantstad region that can be challenged to contribute to this innovation. This will allow connection to ongoing and proposed projects on ICT and Mobility, both in Brabant and in other regions, which can be combined in a proving ground for in-car applications and, if possible, contribute to the Field Operational Test Site.
- As part of the 'jam-proof' programme, a large-scale practical test of anti-accident systems is being conducted, with trucks equipped with informative, supporting and active systems. This is to reduce the number of accidents and prevent disruption.

Line of action 2. Promoting network management at the regional level

Regional governments will have more opportunities to assign a recognisable place to utilisation in their traffic and transport policy, in connection with the network approach. The need for cooperation at the network level between all road administrators and other relevant partners (market parties, providers of other modes) is growing. This is leading to professionalisation of area-focused utilisation and custom solutions at the regional level.

Action 3: Integrating utilisation as a full component of the network approach

A structured elaboration of the Utilisation component of the regional network analyses is desired to embed utilisation at the regional level. A uniform method of determining effects (see the evaluation and monitoring programme) will be created for comparison and selection of measures. Requests for support will be evaluated on the basis of effectiveness in a network-wide approach and possibly against criteria to be determined. For example, the regional elaborations must explicitly take into account the effective frameworks for the national corridors. The combined regional elaborations will have to contribute to the national spatial main structure in the Space Document and the Mobility Document. The region can develop and implement the measures as part of the network approach. In consultation with the regions, the ministry will develop a structure in which utilisation has its proper place. This will allow alignment with the MIRT working method.

Action 4: Accelerated expansion of incident management

Considerable gains can still be made in preventing unexpected disruptions (such as accidents) and limiting the impact of disruptions. As part of the 'jam-proof' programme, a number of promising measures are being tested. A structured approach to incident management is also being prepared. As soon as the most effective measures are identified in the total chain approach to network management and an approach is ready, effective measures can be scaled up. Options for application to the underlying road network must also be involved.

Action 5: Practical traffic management test

This practical test elaborates and assesses the concept of guiding traffic management. This project enables experience to be acquired with the coordinated use of traffic management measures and the means by which road users adjust their conduct to them. The test will be conducted on the road network around Amsterdam and in particular the A10 ring road with all its connections and junctions. The goal is to reduce congestion and with it, lost vehicle time. The intended result is an improvement in the reliability of travel times. The intended result of the practical test is needed in addition to the introduction of Different Payment for Mobility and reinforcement of Schiphol-Alm-ere link to bring the quality of connections to the level set out in the Mobility Document, especially around the Zuidas. The practical test involves:

- main roadway management: disentangling traffic, creating a more regular traffic situation;
- incident management 'plus': preventing accidents and detecting them as soon as possible, including faster removal of vehicles involved. Diverting traffic and creating additional capacity by using the shoulder as a lane are also part of the approach;
- keeping the A10 ring road 'going' by a coordinated use of inflow management facilities to and from the underlying road network and to and from national roads A1, A2, A4 and A8 (some of which lead to it).

The concept of the proposed test has previously been tested in practice on a smaller scale on the Alkmaar ring. Other ex ante studies have been carried out for the Amsterdam ring, showing a considerable reduction in the number of lost vehicle hours. The results of this test will also be documented in the evaluation and monitoring programme. Depending on the results, measures that prove to be effective can also be applied to urban rings in other networks.

Action 6: Rotterdam city region test
In addition to testing new technical developments, new cooperative models in mobility are being explored, precisely where public and private parties meet in (dynamic) traffic management and mobility management. This test can take place in the Rotterdam region, partly in view of the crucial importance of the accessibility of the Rotterdam port area to the Dutch economy. The initial parts of the programme involve intensifying regional cooperation, (public-public and public-private), incident management, multimodal travel information, floating car data for goods traffic and peak avoidance. Additional measures are possible as part of the programme.
The programme is being prepared by the Port of Rotterdam Authority and Public Works and Water Management, working closely with the Rotterdam city region, the municipalities of Rotterdam and Spijkenisse, Deltalinqs and the Rotterdam Chamber of Commerce, which signed a statement of intent on 31 October 2007. The means by which role assignment and the balance between public and individual interests are dealt with are explicitly part of the structure of the test. In addition to their expected traffic effects, the measures are also being seen as bearers of improvement and renewal in society. The specifically implemented measures must be part of the evaluation and monitoring programme.

Line of action 3. Updates and additions

This involves reinforcing a basic level of instruments and facilities for utilisation on the main and underlying road networks. Updating is about ensuring that the utilisation tools present are aligned with the current traffic supply, enabling it to function optimally again. Additional measures must be robust in terms of demonstrated effectiveness or on the basis of convincing traffic logic. Measures must be part of the evaluation and monitoring programme.

Action 7: No-regret measures on the main road network
Based on the vision in the policy framework, measures will be selected that can be introduced up to 2010. These are measures that demonstrably improve throughflow, reliability and safety on the main road network at points where the biggest bottlenecks currently occur. Measures are selected for expected cost-effectiveness and may be measures in the connections between the underlying and main road networks, placement of roadside DRIPs to give traffic information on alternative routes, supplemented by cameras in places in the top 50 traffic jams and where accidents are frequent.

Line of action 4. Knowledge development and innovation

As a result of rapid development of technology and the market, there is a growing need for more knowledge on new utilisation tools, new forms of cooperation and their combined effects. This is about developing new knowledge to further professionalise utilisation and rolling out existing knowledge.

Action 8: Developing evaluation and monitoring programme
The background to this action is the limited availability of effect measurements, which makes it difficult to weigh investment decisions accountably. The action involves defining the necessary indicators for effect measurement (including adjusting methods and integration in area-focused utilisation), further development of instruments such as the utilisation explorer, application in tests and integrating the results in the national approach and the network approach for utilisation. Regular periodic testing of the effects of instruments is also part of this. Implementation will take place in cooperation with knowledge institutions.

Action 9: Dynamic speed tests
Making speed limits dynamic allows the maximum speed on roads to be aligned with current traffic, road and environment-related conditions. Adjusting the speed limit to unexpected and changing situations such as weather, congestion or accidents can increase traffic safety, improve throughflow and limit the environmental burden. Four practical tests are expected in 2008/2009 to answer questions on basic conditions and effects.

Appendix 2: List of abbreviations and definitions

ANWB	Royal Dutch Touring Club
AVV	Transportation Research Centre
CALM	Continuous Air-interface Long and Medium range, communication protocol
CBS	Statistics Netherlands
CEN	Comité Européen de Normalisation, European standardisation committee
CPB	Netherlands Bureau for Economic Policy Analysis
CVIS	Cooperative Vehicle-Infrastructure Systems, a European project aimed at designing, developing and testing technology for communication between cars and roadside infrastructure
DRIP	Dynamic Route Information Panel
EOAC	Extremely Open Asphalt Concrete
Galileo	European civilian global satellite navigation system
GST	Global System for Telematics
HiGrids	Hybrid Intercity Grids, focused on IT solutions for sustainable mobility
Intersections	locations where traffic streams cross each other, such as junctions
ISO	International Standardisation Organisation
ITS	Intelligent Transport Systems
IVERA	data communication standard for traffic regulation devices
	‘Jam-proof’ programme Short-term approach to traffic jams by the Ministry of Transport, Public Works and Water Management

KiM	Netherlands Institute for Transport Policy Analysis
Laterally	from side to side (of a car or traffic stream)
LDWA	Lane Departure Warning Assistant, a warning system for vehicles at risk of leaving a lane
Longitudinally	from end to end (of a car or traffic stream)
LVH	Lost vehicle hours, a unit of traffic science expressing the total delay experienced by a number of vehicles
MIRT	Infrastructure, Space and Transport Multi-Year Programme
MRN	Main Road Network
Multimodal	across multiple means of transport
NDW	National Road Traffic Database
NVVP	National Traffic and Transport Plan
NWO	Netherlands Scientific Research Organisation
PLE scenario	Scenario for Prosperity and Living Environment
Plus lane	an additional left-hand side lane on a motorway, created by making the original lanes narrower
RDW	National Vehicle Authority
RIVM	National Institute for Public Health and Environment
Rush-hour lane	additional lane on a motorway that may be on the left or right and which may only be opened during rush hour or very congested periods
RWS	Ministry of Transport, Public Works and Water Management
SVV II	Second National Traffic and Transport Structure Plan
SWOV	Institute for Road Safety Research
TNO	Netherlands Organisation for Applied Scientific Research
TNS-NIPO	
Taylor Nelson Sofres	Market and Opinion Research Institute
Transitional zone	areas connected to the Randstad
URN	Underlying Road Network
VICS	Vehicle Information and Communication System, a Japanese system for traffic information for motorists
ZSM	Visible, Smart, Measurable

COLOPHON

The Policy Framework for Utilisation is developed with the contributions of many stakeholders of market parties, (local) governments, knowledge institutes and interest organisations.
The Ministry of Transport, Public Works and Water Management is responsible for the contents of the policy framework.

Client Ministry of Transport, Public Works and Water Management
Projectmanagement P2 Managers
Policy advice DHV, Grontmij, Marcel
Editing Mies Tekst en Training
Draft Things To Make And Do
Print OBT bv, Den Haag
Translation Tekom

www.delta-approach.nl/utilisation
Contact G. Draijer / 0031 70 351 11 05