

## 200 years of Dutch transport policy

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*Transport history, transport policy, policy lessons*

### Summary

In this paper eight stories are told about Dutch passenger transport history. The first story is from 1814 about building the first national paved road network suitable for stagecoaches; the last is from 1997 and is about the decision to construct a high speed rail link from Amsterdam to the Brussels. The aim of the paper is to identify policy lessons. These lessons may be useful in shaping current and future sustainable transport policies. Three key policy lessons are identified in this paper. Firstly, history demonstrates a seeming inevitability in the development of passenger transport towards increasingly faster modes of transport. A financial crisis may cause a temporary dip but history shows a strong long-term trend to using increasingly faster modes, despite some deep economic crises. Secondly, EU emission standards for new cars have proven to be very effective policies in reducing air polluting emissions. Regarding the current opposition to implementing strict CO<sub>2</sub> emission standards for new cars it would probably be wise to show political courage and implement strict standards worldwide in the near future. 'The pain is often only in the change', as the history of Dutch transport policy-making shows. Thirdly, Dutch transport history makes it clear that railways can be identified as the 'weak' transport mode, repeatedly requiring large amounts of government money to survive. The lesson from railway history is that an open mind is needed in sustainable policy-making. It is conceivable that part of the tax payers' money spent on railways could have been used in a more beneficial way for society. This hypothesis may also be valid for future decisions on investments and subsidies for railways.

### Introduction

Since the 1990s many governing bodies have aimed explicitly at sustainable transport<sup>1</sup>. The idea behind sustainable transport is '*efficient mobility without negative side effects*' to quote from a European Union press conference in 2005 where the policy document 'Keep Europe Moving – Sustainable mobility for our continent' was presented. Other policy documents use slightly different definitions, although all documents point out that policies for sustainable transport aim to balance the economic, social and environmental impacts of transport.

In the scientific literature the concept of sustainable transport and the subsequent policy measures is given a huge amount of attention. To name some very recent 2009 publications: May *et al.* (2009) describe sustainable transport policy decision support systems; Greenaway *et al.* (2009) and Gasparatos *et al.* 2009 analyse transport emission trends and effective reduction measures; Moriarty and Honnory (2009) comment on the long-term future of sustainable transport.

Despite the huge amount of literature, long-term retrospective studies on transport policies are hard to find. One could argue that it makes no sense to look at long-term sustainable transport policies before about 1986, because it was only then that the terminology was

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<sup>1</sup> See for example for the UK: <http://www.dft.gov.uk/pdf/about!strategyJtransportstrategyidastslxec>; for Germany: <http://www.bmvbs.de/en/Transport/Mobility-and-Technology-.21111Sustainable-mobility.htm>; for the Netherlands: <http://www.notarnobiliteit.nl/pdf/nm4/pkb4.pdf>; for the European Commission of the European Union: ([http://ec.europa.eu/transportlstrategiesI2006\\_keep\\_europe\\_moving\\_en.htm](http://ec.europa.eu/transportlstrategiesI2006_keep_europe_moving_en.htm)). All these sites visited at 03/21/2009

popularised in the famous Brundtland report (UN WCED, 1987)<sup>2</sup>. In the Brundtland report the often quoted definition of sustainable development is: '*a development that meets the needs of the present without compromising the ability of future generations to meet their own needs*'. Using the notion of sustainability in this modern sense on transport policies in the nineteenth century would be a prochronism, like a tenth century British peasant earnestly describing his village as an anarcho-syndicalist commune in the famous movie 'Monty Python and the Holy Grail'.

We intend in this paper to analyse Dutch transport policies since roughly the end of the eighteenth century. By doing so, our purpose is not to evaluate if these policies were sustainable in any modern way - to do so would be rather silly indeed. Our aim is to see if lessons could be learned from transport history in the past 200 years. These lessons may be useful in shaping current and future sustainable transport policies.

### Methodology

Our methodology is basically to tell eight stories about the past (table 1), and subsequently analyze these stories to see if lessons can be learned. We did not choose to use modern political theories when telling the eight stories. By doing so we tried to avoid the so-called historian's fallacy, which occurs when one assumes that decision-makers in the past viewed events from the same perspective and with the same information as those subsequently analyzing the decision (Fischer, 1970). In the second step (analyzing the eight stories) we did use some modern theories.

In this paper we tried to avoid detailed analysis. In our view detailed analysis of past policy performance is highly valuable, but in this paper we thought it would be useful to maintain a 'helicopter view'. By doing so, we aimed to identify major historical trends and lessons.

In this paper we have limited ourselves to land-based passenger mobility. The reason is pragmatic: by expanding our paper to the history of policy-making in aircraft and freight transport, we would lose too much detail despite our attempt to keep a broad outlook.

### Eight stories

In this paper we are indebted very much to the great studies of Filarski and Mom (2008) and Mom and Filarski (2008). In 2008 these Dutch researchers published two very rich and detailed books on Dutch transport history since 1800 (approximately 1000 pages in total). We have summarized their work in Table 1, focusing on the role of Dutch governments in the transport market. Admittedly, in summarizing the very detailed work of Filarski and Mom in only one table, we have lost many subtleties.

*Table 1 Eight stories about the history of transport policy in the Netherlands (Filarski and Mom, 2008; Mom and Filarski, 2008)*

<b>Story 1: National network of paved roads was built (1760 -1850)</b>	
Context	The most commonly used form of passenger transport in the Netherlands at the beginning of the 19 <sup>th</sup> century was the horse-drawn barge. In the second half of the seventeenth century horse-drawn barges had a share of around 70% in public transport capacity. This share remained roughly the same until the start of the nineteenth century.
Role of government	At the end of the eighteenth century stage-coaches became more popular for the rich people. Stage-coaches became technically more comfortable and stage-coach users could travel faster than horse-drawn barge passengers, especially on paved roads. In 1769 the first paved roadway was built. The Dutch monarch King William I saw opportunities for a national network of paved roads to facilitate the increasing demand for stage-coach use because that network would lead to industrial

<sup>2</sup> According to historians the concept received its first major international recognition in 1972 at the UN Conference on the Human Environment held in Stockholm. The term was at that time not referred to explicitly, but nevertheless the international community agreed to the notion that both development and the environment, hitherto addressed as separate issues, could be managed in a mutually beneficial way (<http://www.sdcommission.org.uk/index.php>). We visited this site at 03/22/2009.

	development and to more welfare in general, in his view. In 1814 King William I presented the first Dutch paved road network plan. This first plan was considered by parliament to be too ambitious - too costly – and after some political deliberations a less ambitious and smaller plan came into force. The 'new' paved roads followed in most cases the trajectories of the old non-paved roads.
Debate	In 1769 fierce opposition arose against building the first paved roadway between the Dutch cities of The Hague to Harlem. Locals (landowners and farmers) feared that they would have to pay for the road by means of tolls and argued that the advantages of the time gained by the few travelers would be at their expense. In more cases opposition arose against paved roads because local, private or business interests would be at stake. Also, 'conservatism' (in the sense of a fear of new things in general) was a main factor in the protests. Finally, as Filarski and Mom (2008) observed: <i>'when the first paved roads were finished opposition disappeared quickly'</i> .

### Story 2: The start of railways 1837 -1859

Context	England was technically ahead in the development of railways. In 1830 the final breakthrough for steam railways took place with the opening of the Liverpool-Manchester line. A Dutch army engineer visited the opening of this line and reported enthusiastically about this new technology to the Dutch King, to important Amsterdam traders and in an important Dutch newspaper.
Role of government	An important driving force for building the first railways in the Netherlands was the Dutch monarch King William I himself. There was some hesitant interest from private parties for building and utilizing some railways, but it was the king who finally came through with the plans to build the first railway lines. His main motives seem to have been his own ambition and his feeling that 'the Dutch should not lag behind other nations'. The King's financing of the lines was rather dodgy and the revenues highly unclear (the amount was unclear and it was unclear in which pockets the revenues ended up). After the death of King William I (1843) several Dutch governments had to deal with high governmental budget deficits. In 1856 these financial problems were solved because of relatively large colonial revenues and a large subsidy was given to the railways. However, politically there was a great deal of dissatisfaction with the railways. In 1860, after a long and complex political debate a law on the Dutch railways was decided upon. This law resulted in a unique railways governance: part of the railway infrastructure became state owned; part privately owned; and all railway transport was carried out by private companies. Due to a severe accident in 1856 (three railway passengers killed in a collision), in the new law rules were also included concerning traffic safety and state supervision of the private exploitation.
Debate	In building the first railway lines there was a debate about land property rights and there was fear for the new in general, as in the paved road case. However, the fiercest debate was political. In the 1810-1840 period a new class of well-to-do citizens arose who claimed political influence and who had liberal economic ideas. In their view state interference in building railways lines was not obvious. Proponents of state interference pointed at the public interest of railways. In their view railways were a monopoly per definition and it would be better if a monopoly (especially one which is good for the general interest like the railways) was constructed and exploited by the state. The proponents also saw a need for railways because a railway network would make the Netherlands more competitive and it would make remote areas in the Netherlands accessible.

### Story 3: Increasing state interference in the railways market (1860 -1900)

Context	As travelers and shippers got used to rail transport, they demanded more quality. In the period 1860 - 1900 the quality of the railways improved,
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	albeit slowly: a more complete network emerged, railway coaches and stations became more comfortable, the connections improved, travel speed increased and the number of through-trains increased. However, dissatisfaction remained.
Role of government	The political landscape changed in the 1870's: a new force of 'young' liberalism appeared with catholic and protestant politicians gaining growing influence. The new liberals were the force behind a broad political movement in favor of greater state interference to improve the Dutch economy and welfare. There was general dissatisfaction with the Dutch railways, and so a new railways law was passed in 1875 which gave the government more influence over use of the railways: for example, within one city the private railway companies were obliged to transport their passengers to a competing company's station. The law did not result in all the desired improvements. In 1882 Dutch parliament carried out a thorough inquiry into the quality of Dutch railways. The inquiry concluded that the Dutch railway system still had severe imperfections. Six years later the government reacted by reorganizing the sector somewhat and making some new financial arrangements between the state and the private companies. A state committee around 1900 concluded that these two 'solutions' had not been fully completed and that the financial arrangements between the rail companies and the state in particular were highly unclear.
Debate	The main debate was about the extent of state interference in the railways. Although the support for state interference increased, a complete nationalization of the rail infrastructure and exploitation was politically out of the question. The result of this debate was the existence of two large separate private railway companies in the Netherlands which competed with each other and each had a monopoly in large parts of the Dutch territory.

#### **Story 4: Tram ways (1875 -1900)**

Context	In the period 1870 - 1920 cities in the Netherlands expanded for the first time since the seventeenth century. The political scene changed again at the end of the nineteenth century: radical-liberals and socialists entered Dutch parliament and local governments which meant even greater political support for state interference in the transport market.
Role of government	Population growth in cities, increased distances between job locations and dwellings and city industrial production growth were important driving forces for the need of new transport means within cities. In rural areas a 'secondary' - relatively cheap - rail alternative like tramways was promoted by local politicians because that would further improve accessibility to remote areas. In cities the demand for new faster transport resulted initially mainly in horse-drawn trams and omnibuses. In rural areas the steam-driven trams quickly became popular. The government was, generally speaking, sympathetic towards private tram companies. Concessions were granted easily, especially in the beginning of the tramways development. However, it soon became clear that it was impossible for private steam-driven tram companies in the sparsely populated rural areas to survive without subsidies. In 1894 the national government started to financially support the construction of local tram or railways. As Filarski and Mom (2008) put it: around 1900 disguised state-owned tram companies in rural areas appeared.
Debate	Most people at the time considered the trams to be an improvement. However, there was opposition. In cities well-to-do people and shop-owners were afraid that the trams would negatively affect their living environment and the amount of customers. Furthermore, they questioned the traffic safety. In rural areas there was opposition to the steam-driven trams too. In the small city and village centers it was very difficult to fit in the new tram lines. The steam-driven trams also had undesired impacts on the cities and villages like smoke, noise and soot. Also, there were deeply

	felt concerns related to traffic safety.
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<b>Story 5: The electrification of city tram ways (around 1900)</b>	
Context	The inner-city areas of the larger Dutch cities were confronted with ever-increasing traffic which meant congestion. The horse-drawn trams and omnibuses (see story 4) were too slow to meet the demands for faster travel which resulted from the continuing city-development (enlargement).
Role of government	Since 1870 a technical search had begun in various countries for new forms of faster public transport in cities. Electrified trams, steam-driven trams and other techniques (like cable-trams) were studied and sometimes implemented (for example in the USA and UK). Dutch engineers debated the pros and cons of the different technical possibilities and - based on the foreign experiences - decided around 1900 that electrification of the city trams would offer the best performance. At the same time political debates started in the local governments of Dutch cities about the advantages of transforming the private city tram companies to public companies. Cities in England had shown that public tram companies had many advantages compared to private companies: it had led to better transport quality and it generated public funds for further improvements. The Dutch political debates were complex and they took a long time. In the debates it was not only questioned whether government interference in this market was justified at all. Additional complexity arose because local authorities debated the need for building public electrical power plants for which electrified trams would be an important 'launching customer' (to use a modern phrase). In most of the large cities the local governments eventually chose public electricity-driven tram companies (or for private companies with more public control). The decisive factor in political decision-making was that electrified trams with overhead wires were quicker, more reliable and cheaper than the alternatives.
Debate	As well as opposition in the political arena, there was also resistance from the general public. Some people opposed especially the 'ugly' overhead poles and wires. In their view the poles and wires would destroy the beautiful looks of the old Dutch cities. By showing in test cases that this problem could be solved (for example, by designing tasteful poles), local authorities managed to silence this opposition.

<b>Story 6: The first bikes and cars (1890 -1915)</b>	
Context	Well-to-do citizens started pioneering with a new means of transport: bicycles and cars. Both new vehicles were at first considered 'adventure machines' for the Dutch elite.
Role of government	In the beginning cycling and car driving technology was diverse and not standardized. The Netherlands was relatively late in adapting the new technologies, so for cars the internal combustion engine quickly became the dominant technology. In other countries like USA and UK competing technologies (steam-driven, electric cars) were in vogue for a longer period. The government was hesitant in the beginning, but a permit system for cars was introduced after a while. The government was pliant in granting permits to people who wanted to drive a car on public roads. Regulations (for example on traffic safety issues) were unclear because both the national government and the local authorities issued rules. The tension between national and local governments also resulted in the very slow development of roads suitable for car traffic. A car lobby developed, which devoted itself to promoting a car road network. One of their main arguments was the dust problem. They argued that cars caused dust on the old roads which was not only inconvenient for the other road users, but the dust also had negative health impacts. Finally, in 1915 the national government decided on a coherent road building plan.
Debate	People less well-off than the elite protested fiercely against the car. They considered the car as useless and they found cars dangerous.

<b>Story 7: Inter bellum: the transport puzzle (1920 - 1940)</b>	
Context	In the 1920s the government had to decide on further investments in transport networks, because transport demand (passengers and freight) continued to increase. After World War I the rail companies made heavy losses which, following an agreement made in 1890, would be covered by the national government. The local rural tram ways were disappearing. There was also a deep economic crisis.
Role of government	In 1923 a state commission was installed to advise on transport policy. One of their questions was whether it was wise to limit people's freedom to choose a transport mode (in order to protect rail-based transport modes). Their conclusion was not to limit freedom of transport mode choice, because the commission found that all transport modes could play a role in boosting the Dutch economy. Based on the advice of the 1923 commission the government implemented a road tax in 1926. One reason was that it was considered unfair that road users did not have to pay for the infrastructure (unfair competition with the railways). Another reason was that the road tax revenues could be used to pay for further road building projects. The rural tramways disappeared because government support stopped. Another recommendation of the commission was to carry out drastic cost savings in the railways. This advice was quickly implemented, resulting in a decrease in railways staff from 51 000 in 1921 to 31 000 in 1939. Also, innovations in the railways were implemented by switching from steam to electricity and diesel power. Due to these measures the railway companies experienced a few good years financially, but after 1933 heavy losses were again experienced due to the economic crisis and the increasing competition from cars and autobuses. In the 1930s road taxes were increased and a so-called 'transport fund' was established. This new fund was meant to finance roads, waterways, and railways.
Debate	The debate in this period was mainly political. Some parties accused the governments of being far too slow or too unclear to solve the transport problems. Other political debates were about the pros and cons of limiting freedom to choose transport modes, and the extent of political interference in transport markets.

<b>Story 8: Transport explosion and the externalities (1945 - 2010)</b>	
Context	After World War II car ownership and use exploded. In 1948 passenger car and train use were equal, each with roughly 7 billion passenger kilometres per year. In 2008 train use was around 15 billion passenger kilometers; car use had increased to approximately 150 billion passenger kilometres (CBS 2009).
Role of government	The transport explosion took place especially in the 1950s and 1960s and was completely dominated by private vehicles – first mopeds but soon cars. Population and economic growth were important driving factors. The governments at that time facilitated car use demand by building and extending trunk roads and by building circular roads around the main Dutch cities. Within cities and villages local authorities demolished old roads and filled old canals in order to build relatively large city roads suitable for car traffic. Comprehensive spatial planning appeared. In the first plans suburbanization of the large cities as an 'inevitable' process was politically accepted, but the national government tried to manage the suburbanization process by developing new dwelling areas in villages relatively close to the large Dutch cities (roughly 50 kilometers maximum), well accessible by car. The railways experienced tough times in the 1970s, 1980s and 1990s due to car competition and required heavy government subsidies. In the 1970s railway exploitation deficits grew from 366 to 2000 million Dutch guilders per year. In 1972 the report 'Limits to growth' (Meadows <i>et al.</i> , 1972) appeared. Together with the oil crisis in the 1970s the report fuelled feelings that the increasing car use had many disadvantages. Air pollution, depletion of natural resources, traffic jams,

	and traffic safety became important policy topics. In 1991 the now famous Dutch Second Transport Policy Plan (V&W, 1991) was published. In this national policy plan the concept of sustainability was mentioned for the first time in relation to transport policy. In the plan the intention was to persuade people to use their car less and to promote car pooling and the use of public transport. Furthermore, the concept of kilometre charging was introduced as a way to beat congestion. In 1997 the Dutch government decided to build a high speed railway line from Amsterdam to Brussels. The objectives were to improve Dutch international accessibility and the environmental benefits that would arise from an expected shift from air passengers to high speed rail (V&W, 1994).
Debate	In the 1960s and 1970s the policy to facilitate car traffic demand seems almost undisputed. Then strong oppositional forces arose, highlighting the negative impacts of this policy. The government tried to balance economic and environmental interests by imposing all kinds of policy measures, all of which also met with opposition because in all cases there were 'losers' as well as 'winners'. One example is the ongoing political and societal debate on the pros and cons of kilometer charging. Business and the car lobby have opposed the initiatives for a long time because they were worried that charging would hurt their economic interests. Currently there seems to be a broad consensus (the intention is to implement kilometer charging in 2011), but politically it is very fragile. Another example of fierce opposition was the 1990 EU car emission standards for air pollution. The car industry argued that these emission standards would make cars too expensive, hurting their business interests.

### Analysis

In analyzing the eight stories (table 1) we have identified five interesting observations.

The first observation is that - not surprisingly - there has always been a clear demand for faster transport modes: from horse-drawn barges to state-coaches on paved roads to trains to cars, and so on. Historically, Dutch governments have always supported and facilitated this demand for faster transport modes, as shown in the eight stories in table 1, albeit sometimes after some hesitation as shown in the case of the arrival of the first cars (story 6). The increased demand for faster transport modes is not surprising because this phenomenon fits in perfectly with the worldwide observation by Shafer and Victor (2000) that on average a person spends 1.1 h per day travelling and devotes a predictable fraction of income on travel. Shafer and Victor (2000) have shown that these time and money budgets are stable over space and time. They have used these budget constants for projecting future levels of mobility and transport mode. We use the budget constants to explain the past. Dutch welfare and income have risen enormously over the past 200 years. Because of the income growth and the predictable fraction of income spent on travel, in absolute terms people have obtained more money for travelling, making it possible for them to use more expensive and faster transport modes. In most stories (see table 1), it was the well-to-do people who initially switched to the faster modes, before the faster modes also became financially accessible for the average citizen. The faster travel modes enabled people to travel more kilometers per year within a fixed time budget. In combination with the growth in the population since 1800 the increased mileages per person explains the Dutch transport explosion of the past 200 years. An interesting question is: why do people on average want to travel more kilometers per year, or, why do people want, on average, to keep their time and money budgets for travelling constant? Does that make them happy? The answer to this question is not quite clear. Biological, economical and sociological reasons have been proposed to explain the constant travel time budget (V&W, 2002), but the final answer is not yet clear. Another interesting question is: why did the governments facilitate this strong historic force for more travel speed? Looking back over the past 200 years, the most important reason seems to be that the governments saw the new faster modes as an important means of improving the Dutch economy. Another reason seems to be a fear of lagging behind other nations (story 2, story 8). The trend towards increased use of faster transport modes has a very strong history.

This long-term ongoing trend can be observed over the past 200 years, despite sometimes deep economic crises (like in the 1920s and 1930s) and two world wars. So, the current financial crisis may show a dip in car sales and air transport world wide. But history shows that the dip will only be temporary.

The second observation is that Dutch transport history shows another remarkable stable trend: 'the pain is in the change' (see table 1). All eight stories show that a new technical development or policy proposal has met with sometimes fierce societal and/or political opposition, but that in most cases (story 1, 4, 5, 6, 8) any opposition disappeared rather quickly after implementing a new technology or policy measure.

The third observation is that the transport history of the Netherlands shows that the Dutch have never been frontrunners in new transport modes and technologies. All of the stories indicate that the initial technical development and application (trains, trams, electrification of trams, cars, and high speed trains) were carried out in other countries. This slow adaptation seems to confirm a famous quotation (anonymous, but often falsely attributed to the German poet Heinrich Heine): *'if the world perishes, I will go to Holland because there all things happen 50 years later'*. Of course there is a serious explanation for the Netherlands not being a frontrunner. In the Netherlands - a relatively small transport market - an important car, train or tram industry has never been established. So it is logical that new transport technology developments and experiments occur in other countries. In this sense the current initiatives in the Netherlands to introduce large scale electric vehicles as a way to reduce CO<sub>2</sub> emissions is not in accordance with our history and, thus, experience. Sovacool (2009) have analysed the transition from horses, bicycles, and steamers to electric vehicles and then to gasoline powered vehicles in the USA (around 1900). His main lesson about the acceptance of different modes of transport is that only an alignment of technical, economic, political and social conditions resulted in the acceptance of the gasoline car. This implies, in his view, that efforts to alter modern modes of transportation must not only respond to technical challenges, but also create proper economic incentives, engender political support, and shape social and cultural attitudes. Looking at the eight Dutch transport history stories (table1) it can be confirmed that the breakthrough of new transport modes is indeed not only dependent on technical characteristics, but also on the result of sometimes long and complex societal and political debates. So, a Dutch government promoting and subsidising a new vehicle technology like electric vehicles as a frontrunner seems to be carrying out a big gamble from a historical point of view.

The fourth observation is perhaps the most remarkable one for a conference about sustainability. Dutch transport history shows that the railways could be considered as being an 'unsustainable' transport mode. In stories 2, 3, 7 and 8 we can see that the railways repeatedly experienced tough times requiring large amounts of state subsidies. The phrase 'unsustainable' is meant here (a bit ironically) to explain that this mode could not have survived on its own. To remain operational the railways often required large amounts of tax payers' money to survive; money that could have been spent on other activities (education, social welfare, less national debt) with perhaps much higher societal benefits. Why have Dutch railways been kept alive historically despite their weakness? Perhaps the most important reason is 'path dependency'. In evolutionary economy path dependency is often bracketed together with concepts like 'suboptimal' and 'lock-in' (Magnusson and Ottosson, 1997). The concept explains that governments (or companies) sometimes continue a suboptimal activity either out of habit or because they have invested and subsidized large amounts of money in the activity in the past. And it would make no sense to them to stop spending the money; that would feel like a deep financial loss. In modern times an additional argument to invest and subsidize in public transport is that public transport benefits the environment. Annema (2005) showed, in reviewing EU studies on the environmental benefits of public transport projects, that the environmental argument is less straightforward than most people think. However, the historic lesson here is not: 'stop subsidizing and investing in railways'. In our view the historic lesson is more that it could be beneficial for society to be more critical towards railway investments and subsidies, in other words, to be less 'path dependent'.

The fifth observation is that the 1980s/1990s period can be characterized as a real change (story 8). Not that people or governments choose suddenly for slower transport modes. The Dutch government (V&W, 1991) made some halfhearted attempts to convince people to use their cars less, but these attempts did not appear to have any impact. No, the change is the notion that passenger transport growth had severe drawbacks which should be managed on a national and European scale. Figure 1 shows that the policies to manage these drawbacks since the 1990s were sometimes highly successful, especially, the European policy to set nitrogen oxide (NO<sub>x</sub>) and Particulate Matter (PM<sub>10</sub>) emission standards for new cars. The standards have resulted in the decrease in the emission of nitrogen oxide and particulate matter despite the increasing car traffic volumes (figure 1). Traffic safety policy since the 1970s has also been successful (figure 1). Examples of safety measures are the obligation to wear seat belts, EU safety standards for cars, speed measures, increased car inspections and infrastructural measures. Environmental measures for air pollution have been successful too (figure 1). Persistent car related problems seem to be the increasing carbon dioxide (CO<sub>2</sub>) emission and traffic jams (figure 1), despite the shift in policy attention to car externalities since roughly the late 1990s. After almost eighteen years of political debate kilometre charging as a means of reducing traffic jams has still not been implemented in the Netherlands. For us, before writing this paper, this seemed a long period, but after analyzing 200 years Dutch transport policy history (table 1), we have learned that long and complex societal and political debates about transport policies are the rule, not the exception.

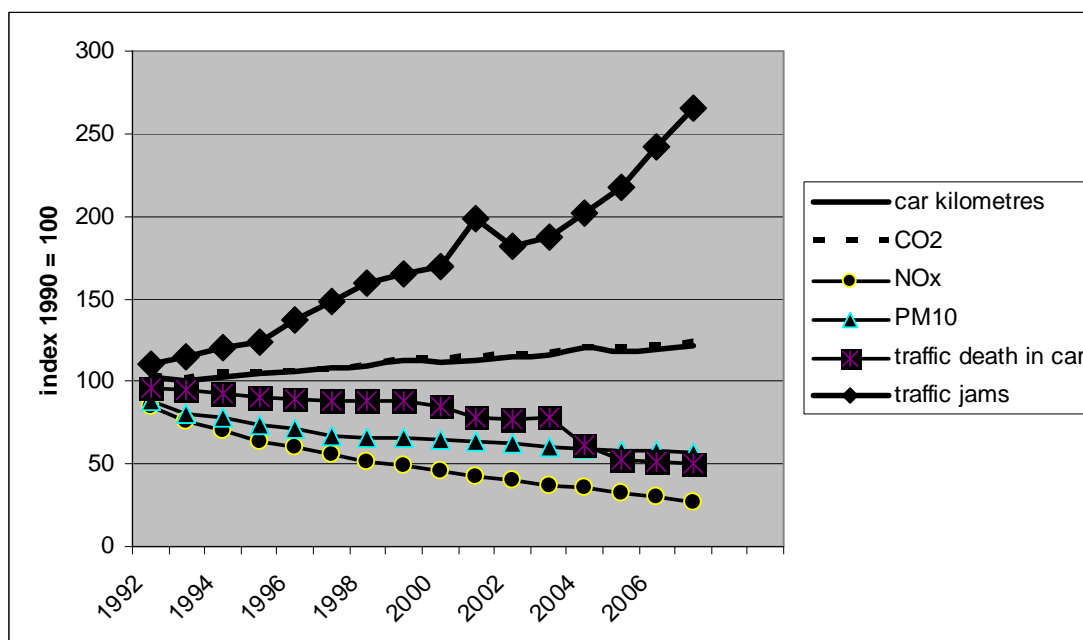


Figure 1 Dutch car use (in car kilometers per year) 1990 – 2007, compared to

- car emissions per year (CO<sub>2</sub>, NO<sub>x</sub>, PM<sub>10</sub>),
- car traffic safety (number of fatal casualties), and
- traffic jams (hours lost in congestion).

The development of car CO<sub>2</sub> emissions is hard to see in the figure because this development follows more and less car use development. Data compiled from CBS ([www.cbs.nl](http://www.cbs.nl), stat line, PBL ([www.pbl.nl](http://www.pbl.nl), environmental compendium, SWOV ([www.swov.nl](http://www.swov.nl), fact sheet about traffic casualties and KiM ([www.kimnet.nl](http://www.kimnet.nl), report on road traffic 2012, Van Mourik, 2008). All sites visited at 01/04/2009

## Lessons

This paper is written for a conference that focuses on the scientific analysis of the key factors explaining successes and failures in the many practices of implementation of innovations and governance for sustainable development. Based on 200 years transport history and transport policy making in the Netherlands, what key lessons can be learned for sustainable development in transport? We see three main lessons:

1. history shows that it seems inevitable that the future passenger transport development will be towards increased use of faster transport modes. Perhaps in countries like the Netherlands the trend will be towards the increased use of high speed trains and aircraft. In the fast-growing economies like India and China the trend will probably be towards more car use and increased use of high speed trains and aircraft (see also Shafer and Victor, 2000);
2. EU emission standards for new cars have proven to be very effective policies to reduce air polluting emissions. Analysis of this policy by CPB (2000) has also shown it as efficient (more benefits compared to costs). Regarding the current debates on CO<sub>2</sub> emission standards for cars it would probably be wise to show political courage and implement strict standards worldwide soon. 'The pain is often only in the change', as Dutch transport history shows. This reasoning about political courage could be applied also to the long Dutch kilometer charging debate. Looking at the relatively high growths of cars in traffic jams in the past (figure 1), a form of kilometer charging seems inevitable, as it does in many other countries. Again the change will hurt perhaps, but a few years after implementation we would not be surprised - looking at Dutch transport history –if there is a general feeling of satisfaction or indifference.
3. Dutch transport history shows that railways were the weak transport mode, repeatedly requiring large amounts of government money. The lesson from railway history is that an open mind is needed in sustainable transport policy-making, using societal cost-benefit analysis as an important decision tool. It is conceivable that part of the governmental railway money could have been spent in a more beneficial way for society. This hypothesis may also be valid for future investments and subsidies for the railways.

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