

Pricing kilometres in The Netherlands

The system in 2010, effects and future developments

Henk Meurs

Radboud University/MuConsult

Netherlands

Objectives and content

- **Objective:**
 - Share the Dutch approach to pricing road transport including recent developments
- **Content:**
 - Characteristics of the system proposed in 2010
 - Effects on car fleet, mobility, emissions and revenues
 - Stakeholder analysis;
 - Dealing with privacy
 - New developments since 2010
 - The (near) future of charging in The Netherlands
 - Conclusions

The system as proposed in 2010

Objectives for 2020

- Acceptable and predictable travelling times
- Reliable & sustainable mobility system

The measure proposed:

- Paying per kilometre driven instead of for ownership
- Throughout the Netherlands (even if driving does not occur on congested roads)
- A basic rate per kilometre, differentiated according to environmental characteristics
- A peak rate for busy times and places
- Kilometres driven are recorded using satellite technology
- Fixed motor taxes: motor vehicle tax, provincial surcharges and purchase tax to be abolished
- Revenue from road pricing will go to the Infrastructure Fund covering maintenance and new construction of roads, public transport infrastructure and so on

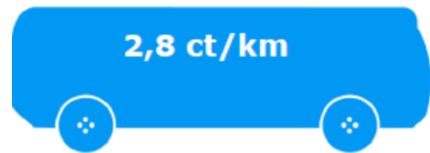
Costs structure

Tariff at start of implementation

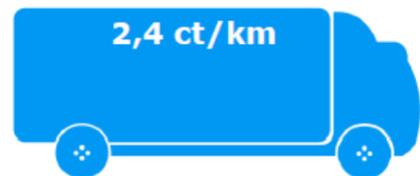
Tariff at full implementation



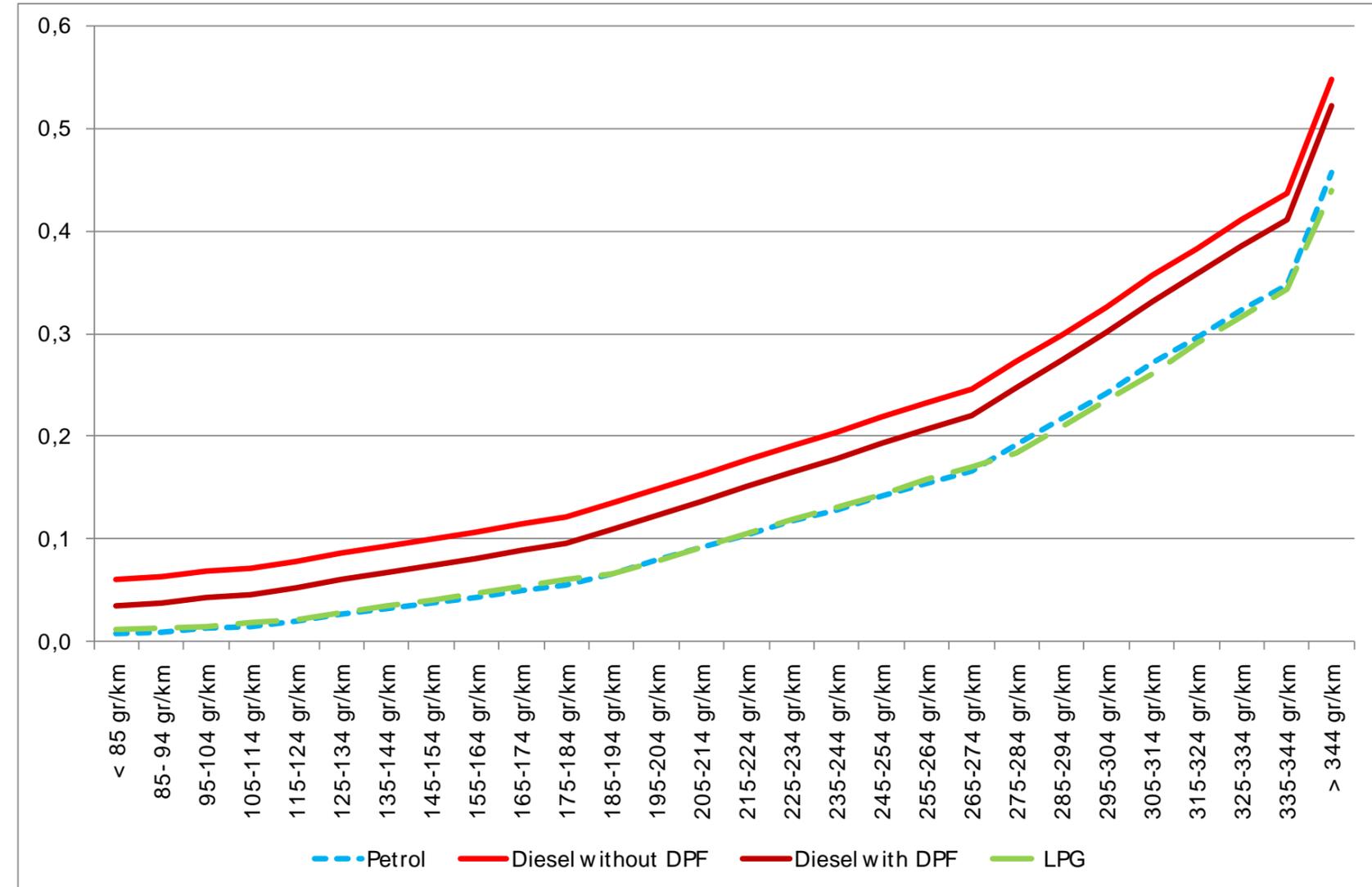
- Commercial vans



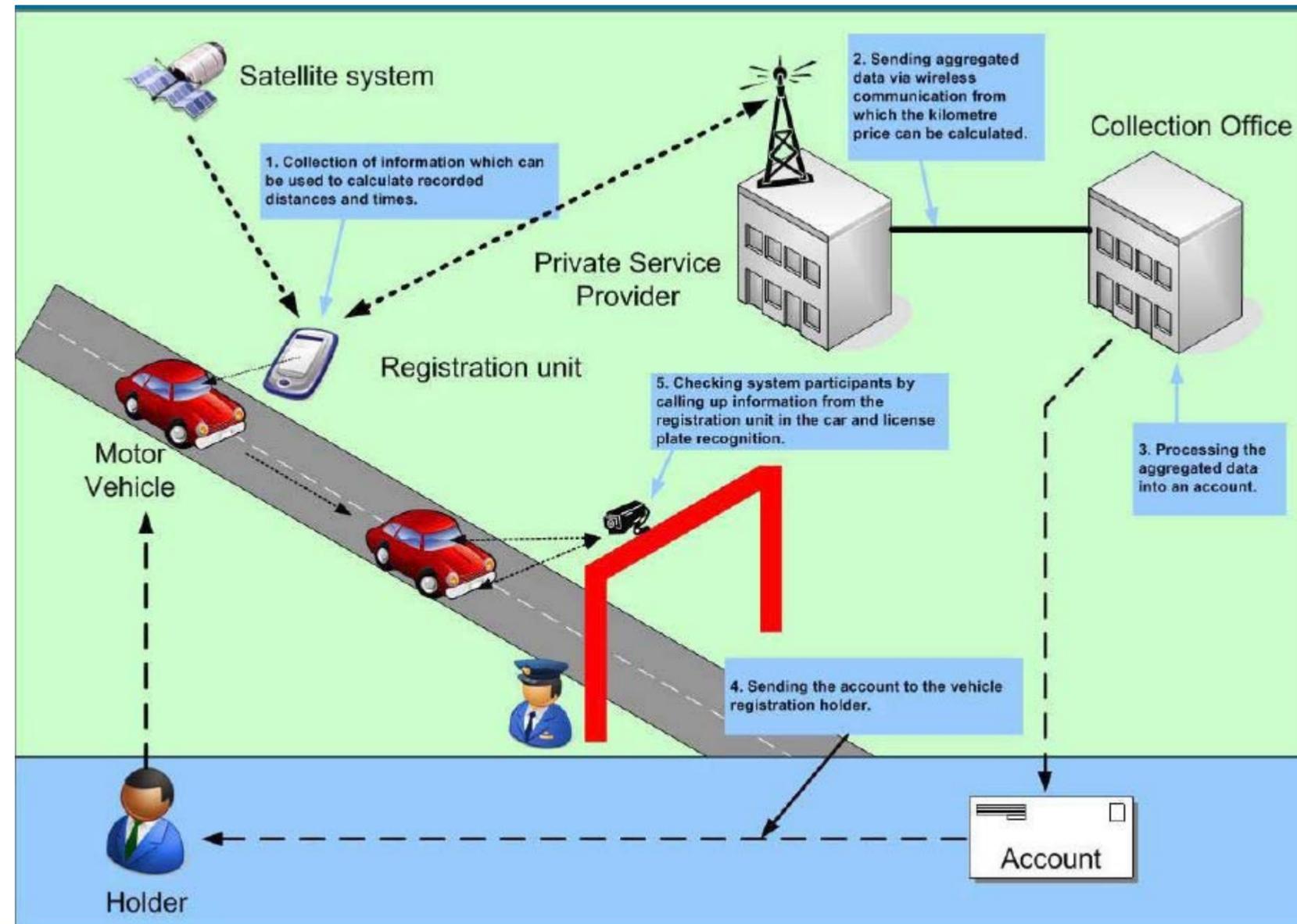
- Busses (non-public transport)



- Trucks



The registration of kilometres



Expected effects by 2020

- Kilometres travelled - 10 to 15%
- Travel time - 40 to - 60%
- CO₂ emissions by passenger cars - 19%
- PM₁₀ - 10%
- NO_x - 10%
- Travelled km's bij public transport + 6%
- Traffic safety + 7%
- Number of vehicles + 2 to + 3%

Bron: Joint Fact Finding 2007 en Muconsult 2009

Role of the market

- Principle: free access to the road pricing system by accredited suppliers of products (guarantee track) and services (main track)
- Market provides:
 - Tendering
- Components for performing government tasks (enforcement equipment, trusted elements [passports], back office)
- Products and services for a large-scale system test in 2010
 - Certification
- (certified) services: installation and service
- (certified) products: OBE

Project costs

- Condition of parliament: operational costs less than 5% and investments costs as low as possible
- Implementation 3.8 billion (Incl. project costs)
- Exploitation 1.8 billion (during scaling-up period)
- Total (u/t 2018) 5.6 billion
- Of which contingency (P50) 1.4 billion (25%)

Implementation costs:

- Main cost Drivers
- Unit Price OBE
- Installation time per vehicle
- Amount of vehicles (about 9 mio)
(of which about 1 mio trucks, lorries, busses and other special vehicles)

Exploitation costs:

- Data communication between OBE and back office

Results of stakeholder analyses

The actors agree on the following issues:

- The problem perception: car mobility causes accessibility and environmental problems.
- The solution: a nationwide kilometre charge (levied on motorways and the underlying roads) that is differentiated in place, time and on environmental characteristics.
- The preferred technology: a GNSS/GSM system.

Factors of failure:

Lack of agreement between involved interest groups and public and political support

- The desired effect of road pricing: governments and the environmental organizations are in favor of regulation, whereas representatives of businesses and road users are in favor of establishing a mobility market in which supply and demand of infrastructure are coupled by a price for road use
- The spending of revenues: on mobility in a broad sense (including e.g. public transport) or solely on the construction, management and maintenance of roads.
- Privatization of road management including construction of new roads with revenues vs public decisionmaking

Privacy (1): the issue and scenarios

- Issue: determining a location of the vehicle using a small device in the vehicle (On-Board Equipment,OBE)
- A number of scenarios were considered differing in the level of autonomy in the OBE: how much information is processed in the OBE and are the data stored and analyzed on the OBE or in the central back office?

	Thin	Slim	Smart	Thick
Collecting location data	OBE	OBE	OBE	OBE
Preparing location data	Back Office	OBE	OBE	OBE
Aggregating location data to road categories	Back Office	Back Office	OBE	OBE
Calculating road price	Back Office	Back Office	Back Office	OBE
Collecting the amounts due	Back Office	Back Office	Back Office	Back Office

Privacy (2): criteria for judgement

Conditions for the legal processing of personal data are (based upon European law):

- **Transparency** – for each data subject, it must be clear who processes which information of the trips and for what purpose.
- **Legal basis** – for the processing of personal data, for instance, billing data, there has to be a legal basis. Consent of the data subject can constitute such a legal basis, but it can also be arranged in the new law regarding road pricing.
- **Focus on the purpose** – for each form of collecting data, the purpose has to be clearly defined. Collecting data should be restrained and the data may not be used for other purposes after some time, such as marketing, travel advice or criminal investigation.
- **Quality of the data** – Data should be sufficiently accurate and, when necessary, should be updated. Data that are not accurate or complete, should be removed or corrected.
- **Rights of data subjects** – For data subjects there should be a possibility to inspect and amend (basic) data easily.
- **Security** – Adequate security should be ensured in order to prevent loss, unauthorized access or destruction of the data.
- **Balance:** privacy is an interest that should be balanced against other interests, including effectiveness, costs, enforcement and user friendliness

Privacy (3) : the outcome

- All scenarios have shortcomings on one or several points with regard to privacy and security.
 - Much in OBE: fraud-potential/enforcement but more privacy
 - Much in backoffice:
 - privacy concern: The privacy concern arises from the fact that a lot of information together offers a more complete personal profile and thus offers more insight in the lives of data subjects.
 - security concern. Stored data attractive for hackers
- Decision: leaving individual trip data in the OBE and checkable by personal PC
 - Employers may not take a look at data of employees driving ompagnie cars without consent

Note:

Scientific research in psychology showed that privacy was used as an argument by people that did not want kilometre charging at all. It was not the cause of abolishment

The program/bill was stopped in 2010

- In 2010, the house declared the project as “controversial”.
- The Minister of Transport, Public affaires and Water Management has given instructions to:
 - not undertake any new financial obligations in relation to the project
 - reduce the project organisation
 - suspend the process of tendering and certification
 - discontinue preparations for the intended roll-out of the system

Lessons learned in 2010

- Societal support is key driver (Stakeholder Requirements Analysis)
 - (or strong political will as in London)
- Political ambition versus Realistic Planning
- KISS: Keep It Simple (difficult enough) and Stupid this method is confirmed by the poll of the Royal Dutch Touring Club
- Think backwards (exploitation, expand, test, build, develop) and incorporate (virtual, if necessary) corresponding stakeholders
- Keeping the basic principles of paying for use, revenue neutrality and refunding the revenues to Infrastructure.
- Communication strategy: focus on clear message why the system is necessary.
 - Originally support >60%, later on that disappeared to a large extent

Recent SCBA (2014)

System (a)	Pricing policy Congestion charge						Pricing policy Flat peak-hour charge					
	RC scenario			GE scenario			RC scenario			GE scenario		
	D	E	F	D	E	F	D	E	F	D	E	F
Costs												
Investment	-0.1	-0.3	-0.1	-0.2	-0.5	-0.1	-0.2	-0.4	-0.1	-0.2	-0.5	-0.1
exploitation	-1.3	-2.4	-1.3	-1.5	-2,8	-1,4	-1,6	-2,5	-1,4	-1,7	-2.9	-1.5
Total costs	-1.4	-2.7	-1.3	-1.7	-3.3	-1.5	-1.8	-2.9	-1.6	-1.9	-3.4	-1.6
Effects												
Travel time	2.6	~	~	6.0	~	~	1.9	~	~	4.0	~	~
Distance	0.0	~	~	0.1	~	~	0.1	~	~	0.1	~	~
Reliability	0.6	~	~	1.5	~	~	0.5	~	~	1.0	~	~
Drop in demand	0.0	~	~	0.0	~	~	-0.2	~	~	-0.1	~	~
Time administration	-0.8	~	~	-1.3	~	~	-0.8	~	~	-1.3	~	~
Indirect effects	0.1	~	~	0.3	~	~	-0.2	~	~	0.0	~	~
Excise duty	-0.3	~	~	-0.3	~	~	-1.0	~	~	-0.6	~	~
Road maintenance	0.0	~	~	0.0	~	~	0.0	~	~	0.0	~	~
PT subsidy	0.0	~	~	0.1	~	~	0.2	~	~	0.1	~	~
Road safety	0.0	~	~	0.0	~	~	0.1	~	~	0.0	~	~
Noise	0.0	~	~	0.0	~	~	0.0	~	~	0.0	~	~
Pollution	0.0	~	~	0.1	~	~	0.2	~	~	0.1	~	~
Total effects	2.4	~	~	6.2	~	~	0.8	~	~	3.4	~	~
Net effect	0.9	-0.4	1.0	4.5	2.9	4.7	-1.1	-2.2	-0.8	1.5	0.0	1.8

(a)

D: an ANPR system (with registration via the vehicle registration plate)

E: a DSRC system (with registration via a tag in the car)

F: a smart vignette (sticker in the car and registration along the way)

Note:

Effect depends on system

- ANPR and smart vignette

Depends on economic scenario

- RC=low growth

- GE=high growth

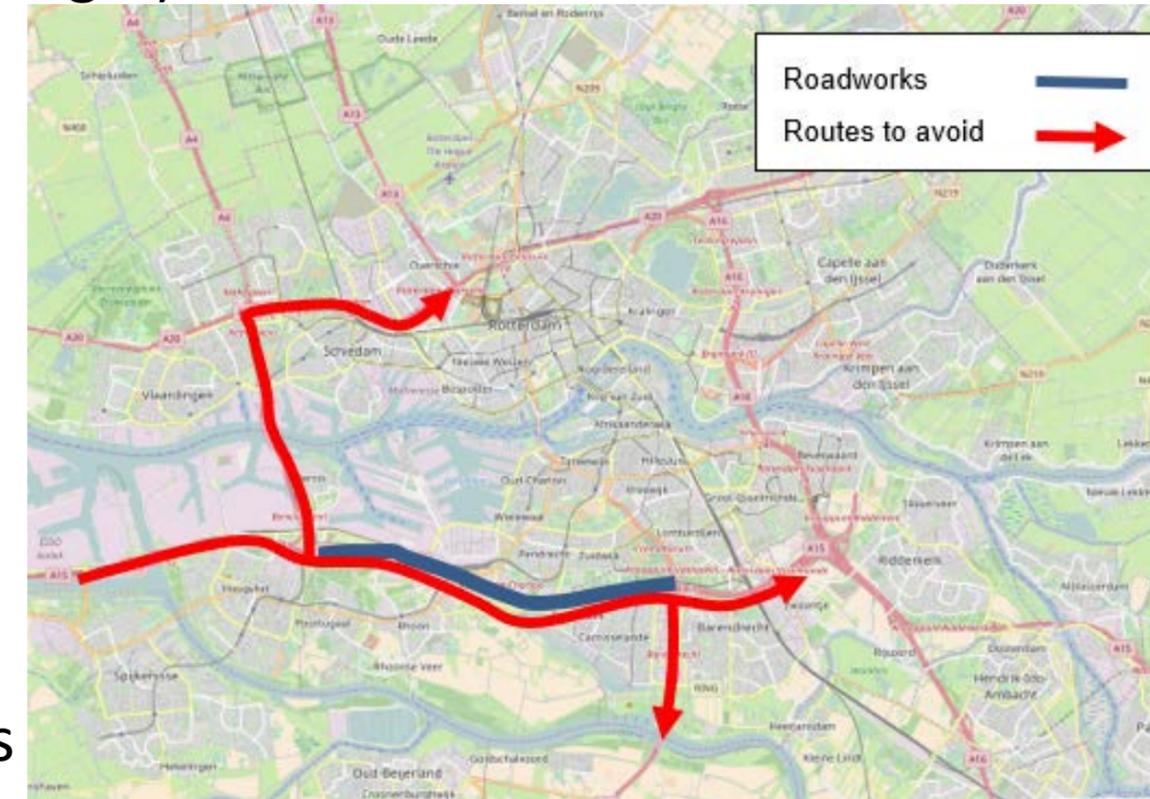
Congestion charging better than flat rate

Peak spreading subsidies (1) the measure

- Peak-hour avoidance projects are aimed to persuade commuters to avoid driving by car during (afternoon) peak-hours on specific parts of the highways. Applied in situations of “structural congestion” as well as temporary (road maintenance works)
- These peak-hour avoidances can be accomplished by driving at a different moment by car (before or after the peak-hours), driving a different route by car (other parts of the main or secondary road network), using another means of transport (e.g. bike or public transport) or by not travelling at all (work at home instead of travelling to the work address).
- People that avoid the peak-hours and/or the specific parts of the network by car get paid a fee for not driving in these peak-hours at these locations. Cars are registered (before and during the project) by cameras alongside the highways
- Cameras on roads were used to:
 - Select participants (minimum number of passing corridors per week, say 3 but variable)
 - Determine number of participants required and approach them with letters
 - Offer them a reward per trip reduced in peak hours (€ 3-6 per trip)
 - Monitor compliance using the same camera’s (OBU were also tested but very costly and inconvenient for travellers)

Peak spreading (2) example: Rotterdam Ring roads

- 5.049 individuals participated
- 1.493 daily peak-hour avoidances (35% higher than the ex-ante target)
 - 45% avoided the area
 - 38% avoided the peak-hours,
 - 13% worked at home,
 - 3% took the bike (or e-bike)
 - 1% used public transport.
- Some travelers show longer lasting effects then project lasted
- Costs 4.2 milion euro, of which half is used to reimburse travelers
- SCBA sometimes positive, but not always (depends on size of congestion problem, the targeting of the respondents and costs of the project). On long-run SCBA often positive due to lasting effects



Peak spreading (3): Conclusions/lessons learned

- *Use a decreasing reward/flexible reward structure.* The reward people can get for avoiding peak-hours is the main reason for participation. Once people are part of the program, reducing the reward has no strong effect on the number of participants and peak-hours avoidances.
- *Think carefully about conditions for participation.* The (average) number of times people are observed before the start of the project plays an important role. The lower this number is set, the more participants will result.
 - More effective for (short term) projects aimed at reducing congestion during road. After the end of the construction work (often an expansion of the road capacity) participants are more likely to return to driving by car in the peak hours.
 - For projects aimed at achieving a long-term change in mobility (especially more use of bike and public transport and working more often at home) may be more efficient by using a higher selection criterion.
- *Build a relation with the participant.* Interaction with participants during the project increases involvement of the participants. Give them personalised information and feedback about their number of peak-hour avoidances (relative to other participants) and tips about how they can improve their performance. This will also lead to less participants ending their participation in the project.
- *Follow-up.* Use follow-up actions to continue behavioral change.

The (near) future under new government and in research (Autumn, 2017)

- Many uncertainties but parties forming new government agreed upon:
 - Charging trucks for usage of roads (see original German Maut)
 - “Open for new developments” without clear directions, but no kilometre charging
- New academic work is done on **tradable driving credits**
 - Tradable driving credits (TDC) schemes allocate credits to participants to spend on car driving.
 - Participants (individuals, households, car owners, etc.) need to redeem credits to, for example, use the road network, to enter a zone, or to drive on a certain stretch, throughout the day or in a particular time period.
 - Credits might represent a unit of distance, a unit of fuel consumption, passing a particular point, etc. The allocation of credits is regulated by an authority, that would define a cap (e.g. in terms of total kilometres, CO2 emissions, total times of passing a point)
 - Number of systems could be used to allocate credits to participants:
 - On an equal-per-capita principle or based on a proportional distribution according to historic car use patterns
 - Participants can trade these credits with other participants in a market (auction)
 - In an alternative form, credits can be sold back to the regulator at a predefined fixed price.

Conclusion

- **Dutch km-charging system is abolished, even in the near future**
 - “handicap of a head start” ?
- **However, follow-up project seem to hold:**
 - Peak avoidance projects
 - Truck charging
- **New developments in measures stimulated (“smart mobility”)**
 - Tradable driving credits
- **In the near future:**
 - Increasing congestion (expected) may change policies
 - Smart mobility may make paying per kilometre more acceptable