

## Smart Mobility in the City of Leuven

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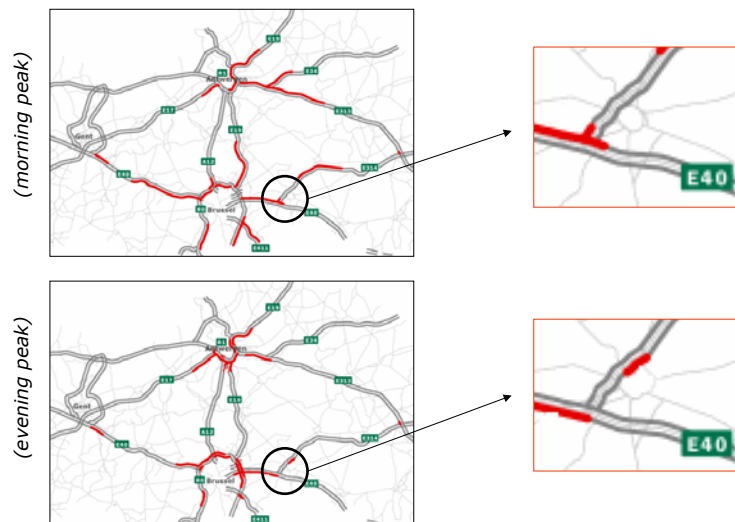
# Smarter Planet Week

May 31- June 4

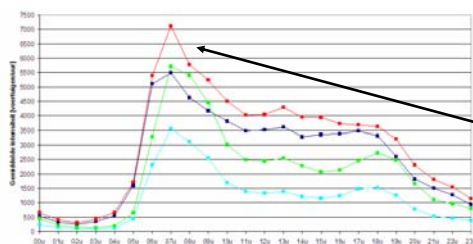
**Mobility in numbers**  
External costs of road traffic  
Congestion pricing as part of the solution  
Deriving a pricing scheme

**Jams and more jams: where?**  
Jams and more jams: when (E40)?  
Jams and more jams: evolution?

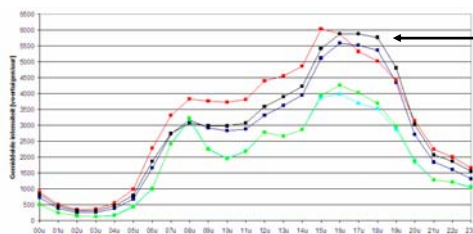
### Jams and more jams: where?



### Jams and more jams: when (E40)?



**Direction Brussels:**  
**Morning peak!**



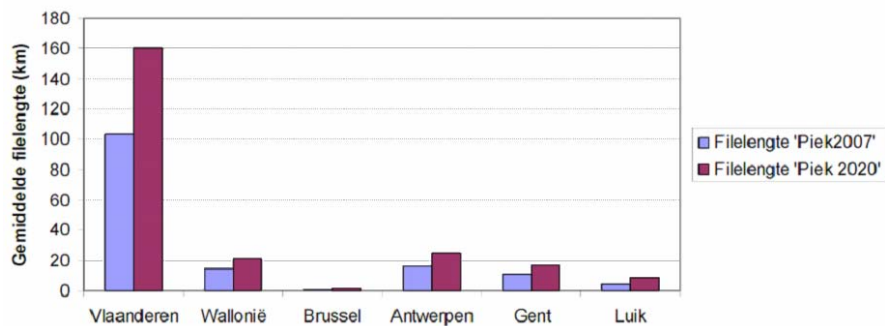
**Direction Liège:**  
**Evening peak!**

**N2 and N3:**  
**In both directions!**

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### Jams and more jams: evolution?



- If no action is taken: doubling of jam lengths expected by 2020.
- 91% of all congestion is in Flanders.
- **There are about 4x more vehicle loss hours on the underlying road network!**

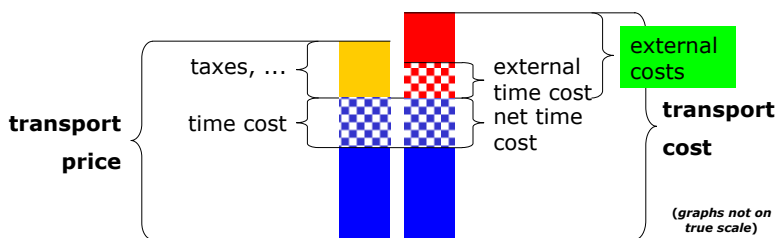
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## What are external costs?

- External costs are costs to society and are by default not considered by travellers; this leads to welfare loss.
- What kinds of external costs exist?
  - **Scarcity of infrastructure:** travel time loss, reliability, damage, ...
  - **Accidents (traffic safety):** risks, material, medical, production loss, pain, suffering, and mourning, ...
  - **Environment:** emissions, noise hindrance, public health, long-term risks, climate change, ...

## Transport price versus transport cost



- Fiscal proceeds of passenger cars in Belgium according to Budget 2008:
  - Total revenue: **6.67 billion euro**
  - Estimated total external costs (GRACE'04): **21.33 billion euro**

➡ **Differs by a factor of ~3!**

*(98 billion kilometre driven in Belgium, FOD 2008)*

## Existing VAT and taxes

- They are nowadays hardly coupled to the external effects.
- They are too low to cover the external costs.
- They barely give incentives to reduce the external effects.
- **A more precise tool is needed:** appropriately paying for each kilometre driven (strive for an optimal criterion per type of external cost).

## Central idea behind internalisation

- Internalisation is done by the government:
  - Travellers have to pay for the implications caused by their use of the transportation system.
  - Travellers need to think how to transport themselves at minimal social costs instead of minimal private costs; they make choices.
  - This leads to a more efficient use of the road infrastructure and reduces the negative effects of traffic.
  - It stimulates fairness among users: the user/polluter pays.

## Goal for the City of Leuven in this project

- Ease trips by reducing their total impedance:
  - More fluid.
  - Safer.
  - More accessible (for all traffic modes).
  - More liveable (environment and noise).
- ➡ Inform the City of Leuven and support them in creating a pricing scheme as a possible means to improve mobility.

## Social debate

- Social **misunderstanding**:
  - The goal is not to chase people out of their cars.
  - It is to give incentives in order to cause less external costs.
- “Don’t the **fuel taxes** already suffice?”
  - Partly: fuel consumption is 1-on-1 related to CO<sub>2</sub> emission.
  - But fuel taxes do not cover all the external costs: travel time losses due to congestion are not captured with CO<sub>2</sub>!
- “Doesn’t this lead to an **increased crowding on the secondary road network**?”
  - Tuning between primary and secondary road network is necessary for alleviating traffic congestion, maintaining liveability and safety, ...

## Social debate

- “Will the **home-work trips** be more difficult?”
  - Rush hour drivers will ‘*bleed doubly*’: they have to pay more for the congestion problem that was already affecting them.
  - However, socially seen: there are more travel time savings for those who pay than there are welfare losses for those who abandon.
  - Mobility plan, company cars, teleworking, ...
- “My **privacy** is violated!” → **Misinformation**.
- “Is it a **social** measure?”
  - Traffic poverty develops: however, the ‘poorest’ have no cars; it’s the layer just on top of them.
  - The ‘richest’ can afford themselves to pollute; however, they already inflict more damage on the environment, they just don’t pay for it yet.

## What are the effects of internalisation?

- The result is a change in behaviour:
    - Cleaner and safer cars.
    - Avoid rush hour & locations (*not necessarily modal shift*).
    - People optimise their own transportation.  
(has more effect than only those who chose for public transportation)
- ➡ **Maximum decrease of ~12% in passengerkm and ~9% in tonnekm with full internalisation (~29 cent/km).**
- Source: GRACE (TREMOVE), TML
- Social support for pricing policy:
    - Stands or falls with the clarity of the useful (!) **expenditures** of the proceeds.
    - Possible expenditures: lowering the income tax, investment in infrastructure, public transportation, health care, education, ...

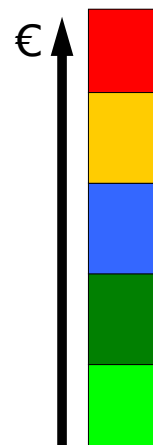
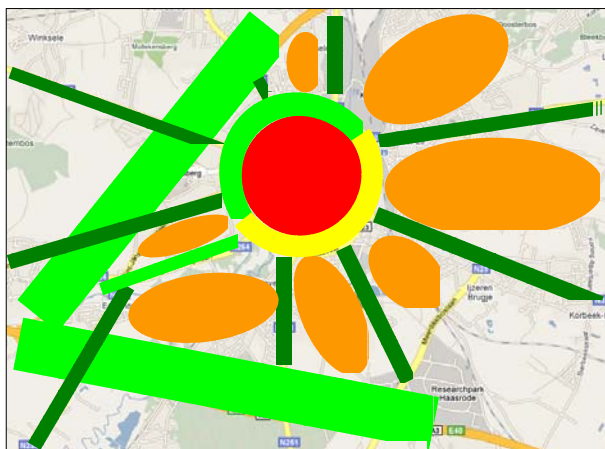
## An intelligent kilometre pricing

- Goal for Flemish government: make optimal use of the road network's hierarchy.
  - Use the highest level as much as possible, avoid rat runs: keep habitable areas liveable and highways flowing.
  - **Requires a differentiation in space.**
- However, capacity of the road network is limited: congestion.
  - **Requires a differentiation in time.**
- On top, different kinds of vehicles:
  - Difference in emissions, noise, harmful effects, ...
  - **Requires a differentiation to type of vehicle.**

→ *Everything is possible: cordon toll, zoning, travel time, distance, ...*

## Pricing scheme for the region around Leuven

*(in cooperation with the City of Leuven)*



## Definition of base tariffs

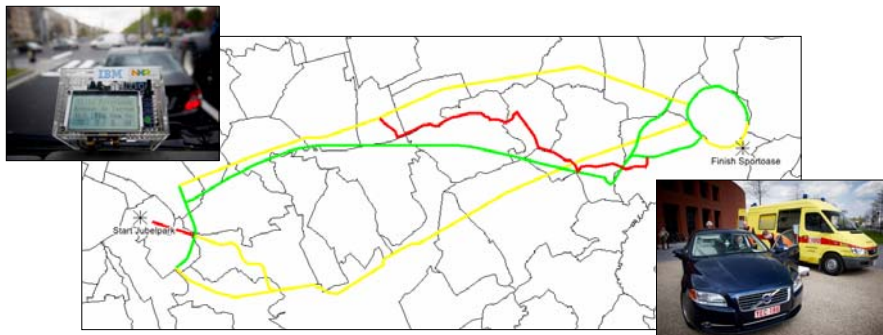
- **Cost neutral: users will together not pay more.**  
→ Or also: the average user pays exactly his road tax during 1 year.
- ↓
- Variabilising the existing road tax:
    - Is dependent on the type of vehicle.
    - Weighed by the external costs.
    - Incorporates driven distances (~15,000 km/year).
    - Politically defendable.
    - **However only limited 'control' possible!**  
(hence 'base tariffs')
  - Differentiation wrt. space.
  - Differentiation wrt. type of vehicle.
    - Car (1.6 l): 242.75 euro.
    - SUV (2.4 l): 532.36 euro.
    - Bus: 69.97 (!) euro.
    - Truck (E5): 1817,18 euro.
  - For now, no differentiation wrt. time.

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## Example of variabilisation: showcase 21/04/2010

- Car (1.6 litre), SUV (2.4 litre), autobus, and truck (Euro-5, 2+3 wheel axles, incl. Eurovignet).



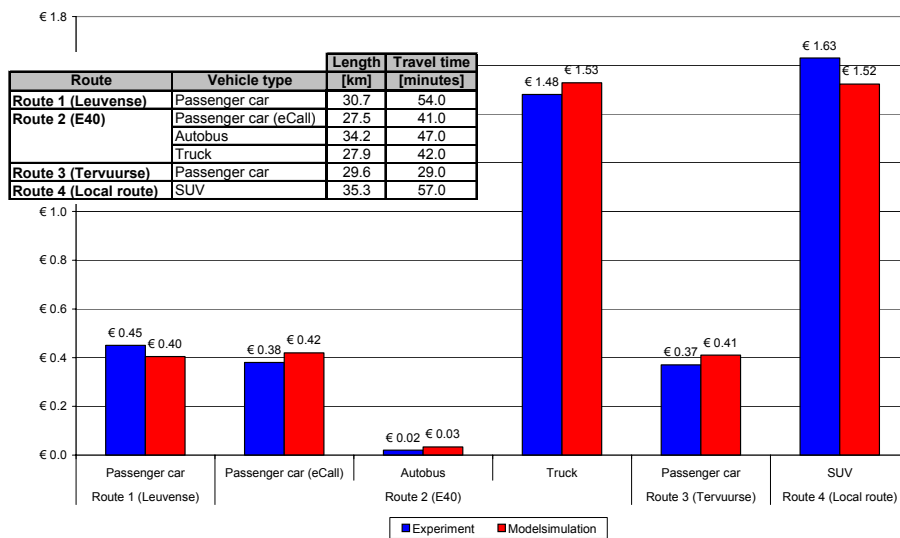
	Differentiated tariff [cent/km]			
	Car (1.6 l)	SUV (2.4 l)	Autobus	Truck (Euro-5)
Level 1 (highways, main roads)	1.2	2.7	0.1	4.6
Level 2 (secondary roads)	1.3	2.8	0.2	6.6
Level 3 (local roads)	3.0	6.6	0.2	7.3

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## Summary of total costs



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## Showcase: extensive press “LEUVEN.INC” LEUVEN INNOVATION NETWORKING CIRCLE.



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## Showcase: extensive pre "kanaal"



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## Internalise as best as possible

- An option is to fully internalise all external costs instead of just variabilising the road tax; consequences:
  - Much more expensive tariffs (cfr. factor 3).
  - Much larger effects.
  - Social optimum.

**No longer cost neutral!**

- BUT: pricing is not the only means for lowering the external costs, e.g.:
  - Oblige catalysts.
  - Speed limits.
  - Alcohol controls, speed controls, ...
  - Investments in infrastructure (e.g., black spots).

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## Final remarks

- **Finetuning** between different levels:
  - Integration is needed between primary and secondary road networks, cities and villages.
  - Same holds for Flemish, Walloon and Brussels regions.
- **Integrated policy:**
  - Public transportation, parking durations, ...
- **Communication** to the end-user:
  - User aversion for complex pricing schemes.
    - Aim for clear, concise, intuitive, understandable.
  - Also on guaranteeing privacy.
- **Questions?**
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