

Development path of HeavyRoute systems

– impact and socio-economic consequences.

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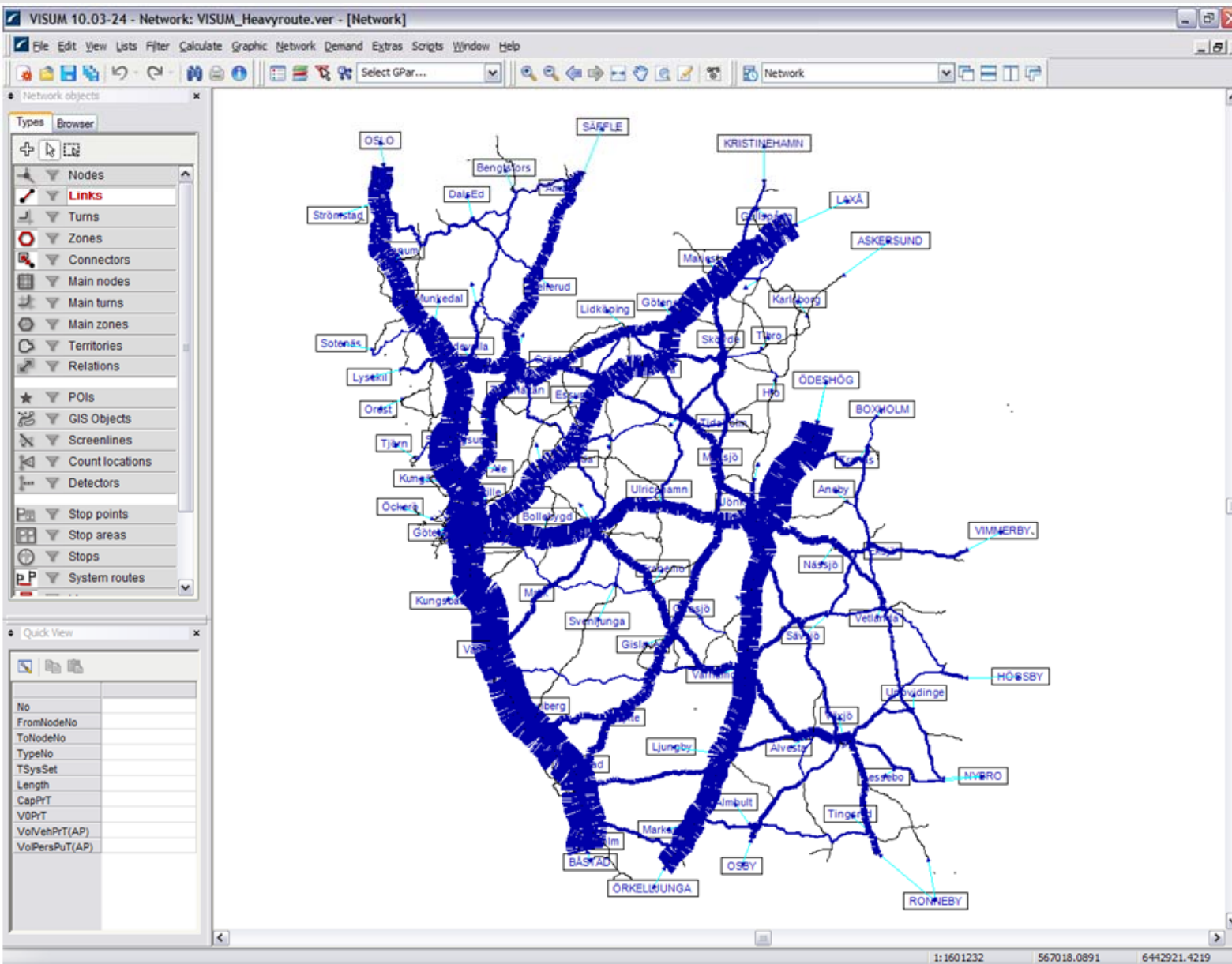
» VTI

Objective and method

- » Analyse different configurations
- » Discuss costs, benefits and policy
- » Limit to the pre-trip application
- » Simulate the use of the application in an area of Sweden

TOC

- » 1. Evaluation area
- » 2. Scenario
- » 3. Result
- » 4. Benefit and Costs
- » 5. Policy



an area

Road length
13869 km

OD-matrix with
HGV

- » 20953 daily trips with HGV
- » of which 1069 transit trips

2. Scenario

3 vehicle types

| Vehicle class | Vehicle profile | Type | Type | Gross weight (tons) | No axles |
|---------------|-----------------|-------|-----------------------------------|---------------------|----------|
| 1 | Nordic European | TT/AT | Semi trailer or articulated truck | 50-60 | 7 |
| 2 | Mid European | TT/AT | Semi trailer or articulated truck | 34-40 | 5 |
| 3 | Rigid truck | RT | Rigid truck | 14-20 | 3 |

Additional

- » Vehicle mix – no congestion (100%), linear cost functions

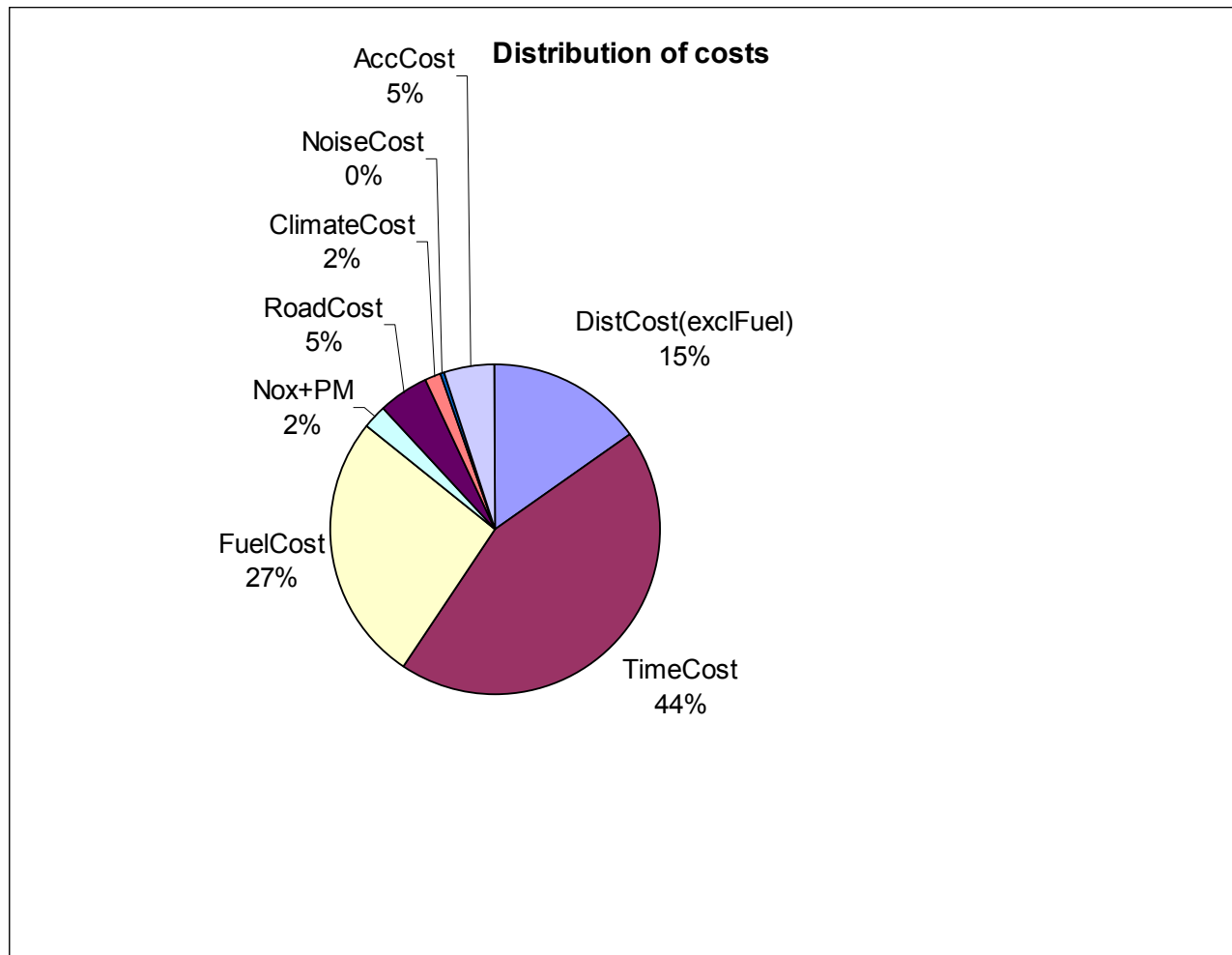
- » Two allowable routes
 - » Shortest path and next shortest path
 - » Choice of cheapest path with cost function

- » VISUM simulation

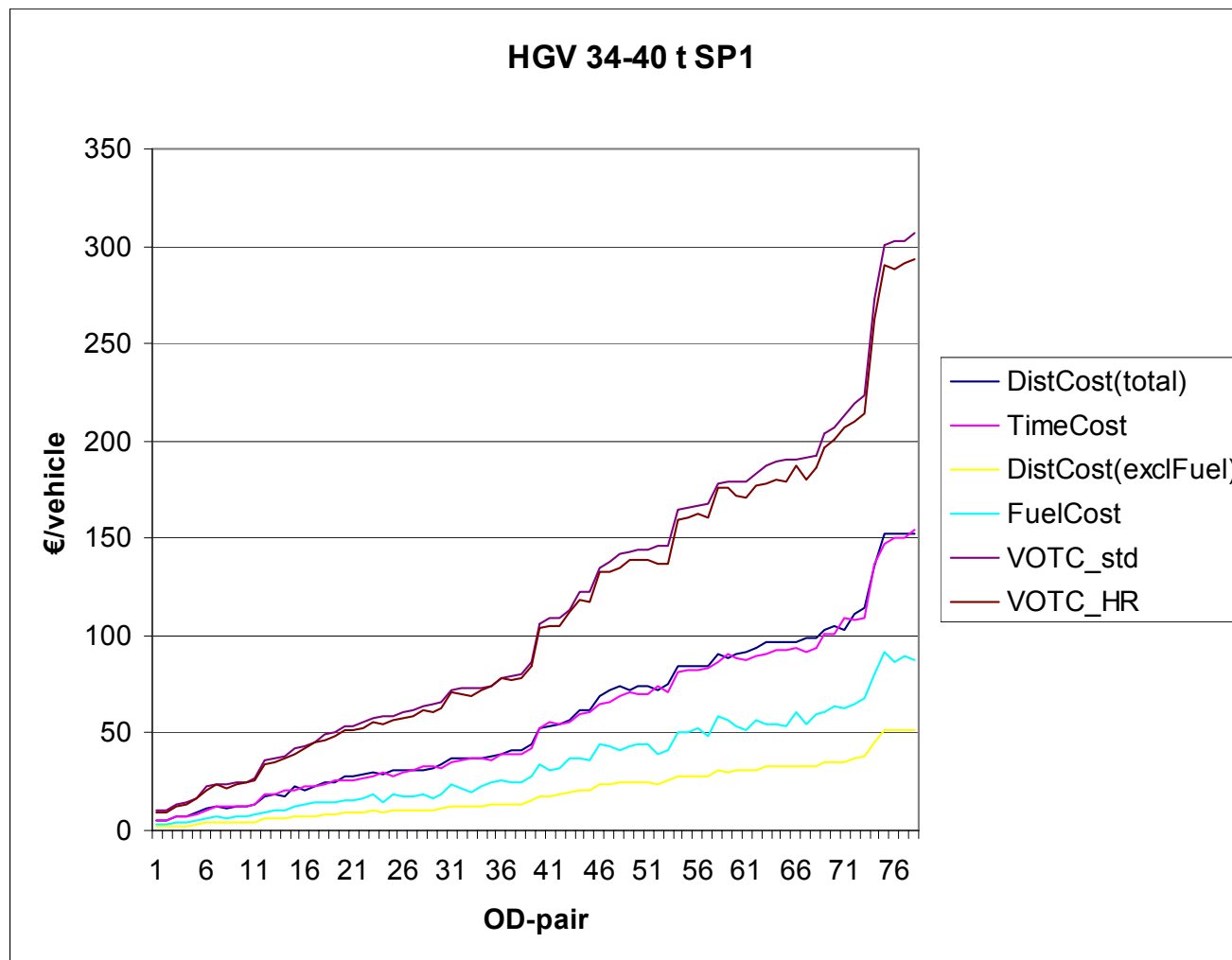
3. Results

- » i) Total cost – evaluation area
- » ii) From std time + km -> HR detailed fuel cost + time + dist
- » iii) Net benefit scenarios
- » iv) Importance of cost functions

i) Distribution of costs base case

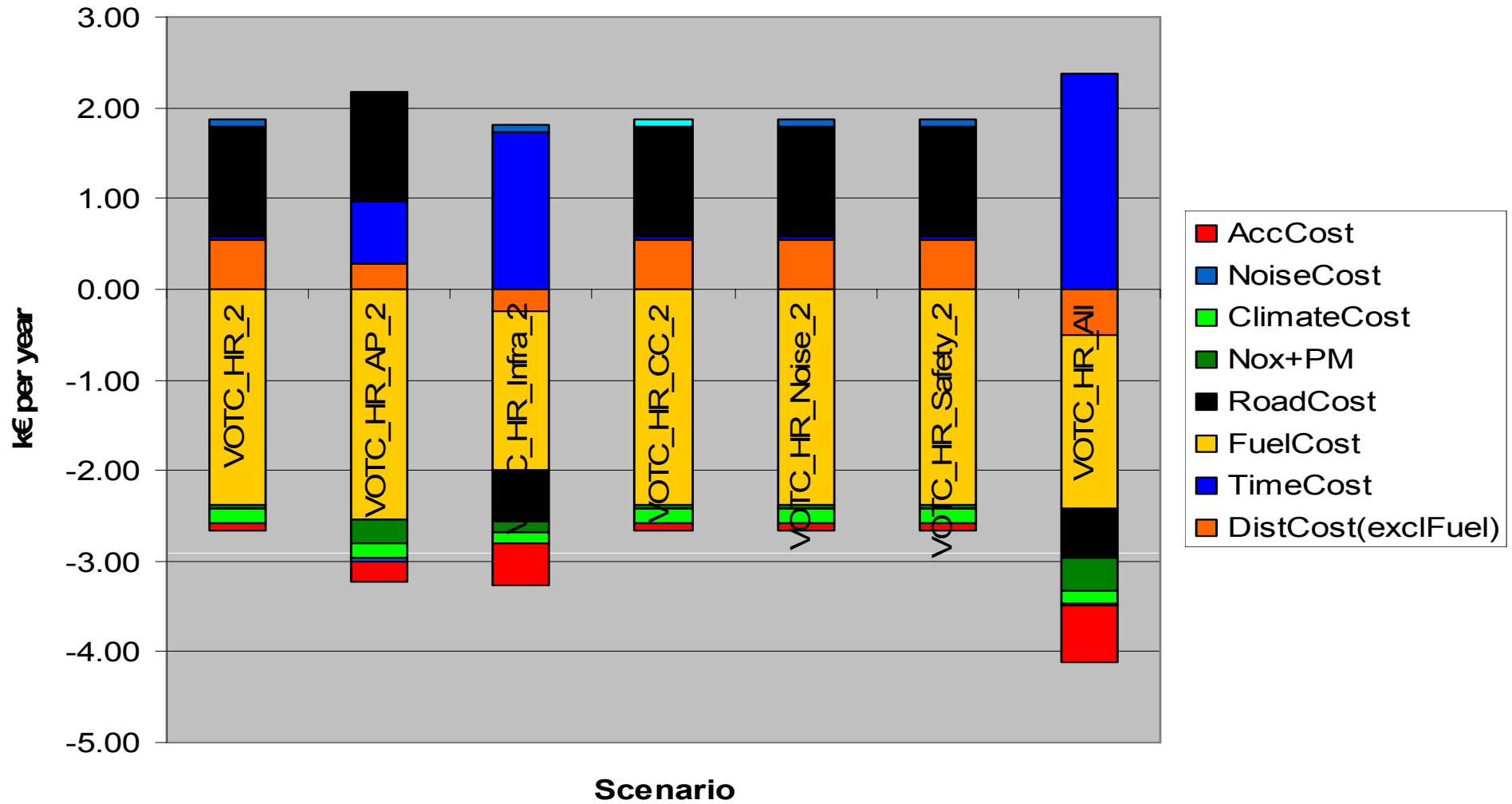


ii) Improved VOC

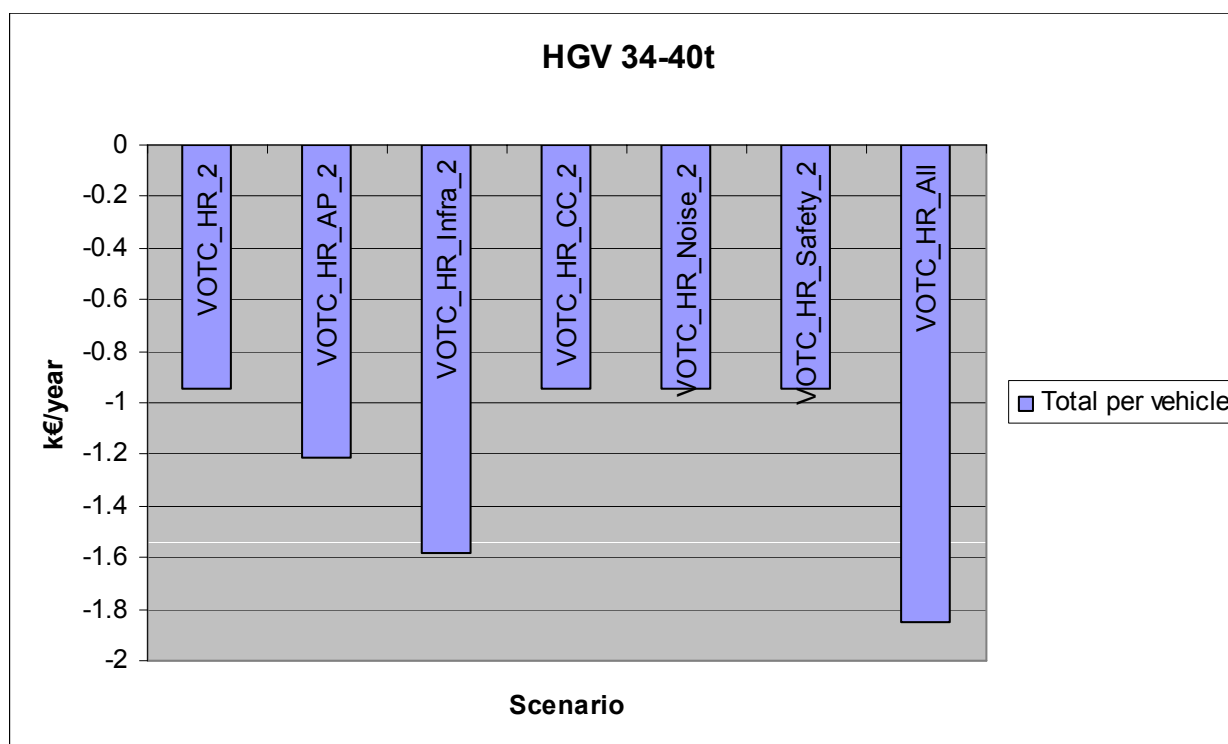


iii) Net benefit

HGV 34 - 40t



Net benefit



iv) Importance of Cost functions

| | VOTC_HR_All | | Scenario | | |
|--------------------|---------------|------------|-------------------------|---------------|------------|
| | € per vehicle | Percentage | | € per vehicle | Percentage |
| DistCost(exclFuel) | -0.51 | 27.7% | | | |
| TimeCost | 2.38 | -128.3% | VOTC_HR_2 | -0.94 | 103.6% |
| FuelCost | -1.90 | 102.5% | <i>marginal effects</i> | | |
| RoadCost | -0.56 | 30.2% | VOTC_HR_Infra_2 | -0.64 | 70.1% |
| Nox+PM | -0.36 | 19.6% | VOTC_HR_AP_2 | -0.27 | 29.9% |
| ClimateCost | -0.13 | 6.8% | VOTC_HR_CC_2 | 0.00 | 0.0% |
| NoiseCost | -0.03 | 1.6% | VOTC_HR_Noise_2 | 0.00 | 0.0% |
| AccCost | -0.61 | 33.2% | VOTC_HR_Safety_2 | 0.00 | 0.0% |
| Total per vehicle | -1.85 | 100.0% | VOTC_HR_All | -0.91 | 100.0% |

4. Benefit and costs

» Costs

- » i) Collection of input data (27€/km)
- » ii) Integrate it into map database
- » iii) Cost functions
- » iv) Application

» Economic Public good characteristics (non-rivality)

- » Network information – pure public good (by vehicles) for a given network size
- » Cost function – pure public good
- » HR application – add on functionality

“Public good”

- » Optimal provision of a public good?
- » $MC = MB_1 + MB_2 + MB_3 + \dots$

- » HR is one of the marginal benefits
 - » i.e. has a positive willingness-to-pay for the public information infrastructure

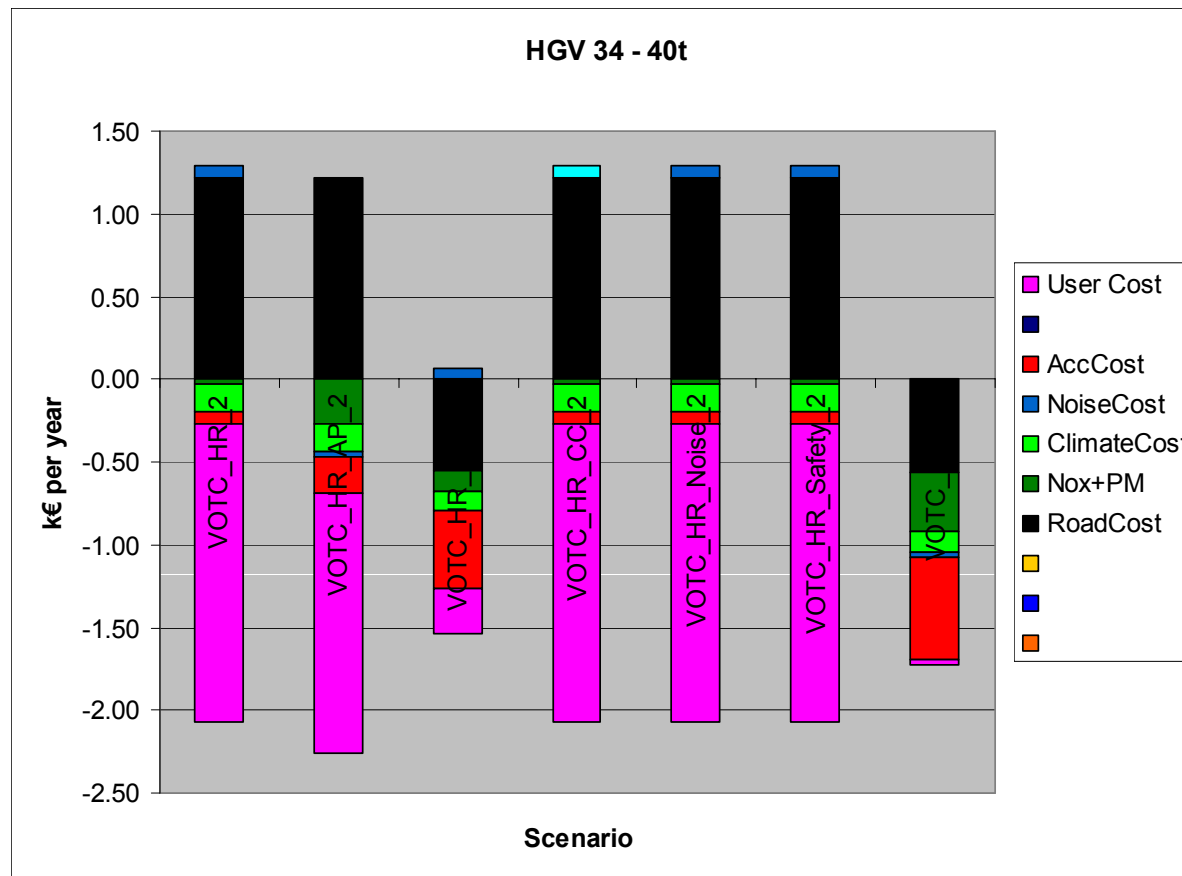
WTP

if all HGV use HR in the evaluation are

| Annual Benefit | 34-40t | WTP total k€ pa | per km road €/km | High density network (five times | per km road €/km |
|--------------------|---------------------------------|--------------------|---------------------|----------------------------------|------------------------|
| | WTP per vehicle €/vehicle | | | Q) | |
| VOTC_HR_2 | 0.94 | 19.7 | 1.42 | 98.7 | 7.12 |
| VOTC_HR_AP_2 | 1.21 | 25.4 | 1.83 | 127.2 | 9.17 |
| VOTC_HR_Infra_2 | 1.58 | 33.1 | 2.39 | 165.6 | 11.94 |
| VOTC_HR_CC_2 | 0.94 | 19.7 | 1.42 | 98.7 | 7.12 |
| VOTC_HR_Noise_2 | 0.94 | 19.7 | 1.42 | 98.7 | 7.12 |
| VOTC_HR_Safety_2 | 0.94 | 19.7 | 1.42 | 98.7 | 7.12 |
| VOTC_HR_All | 1.85 | 38.8 | 2.80 | 194.1 | 13.99 |

5. Policy scenarios

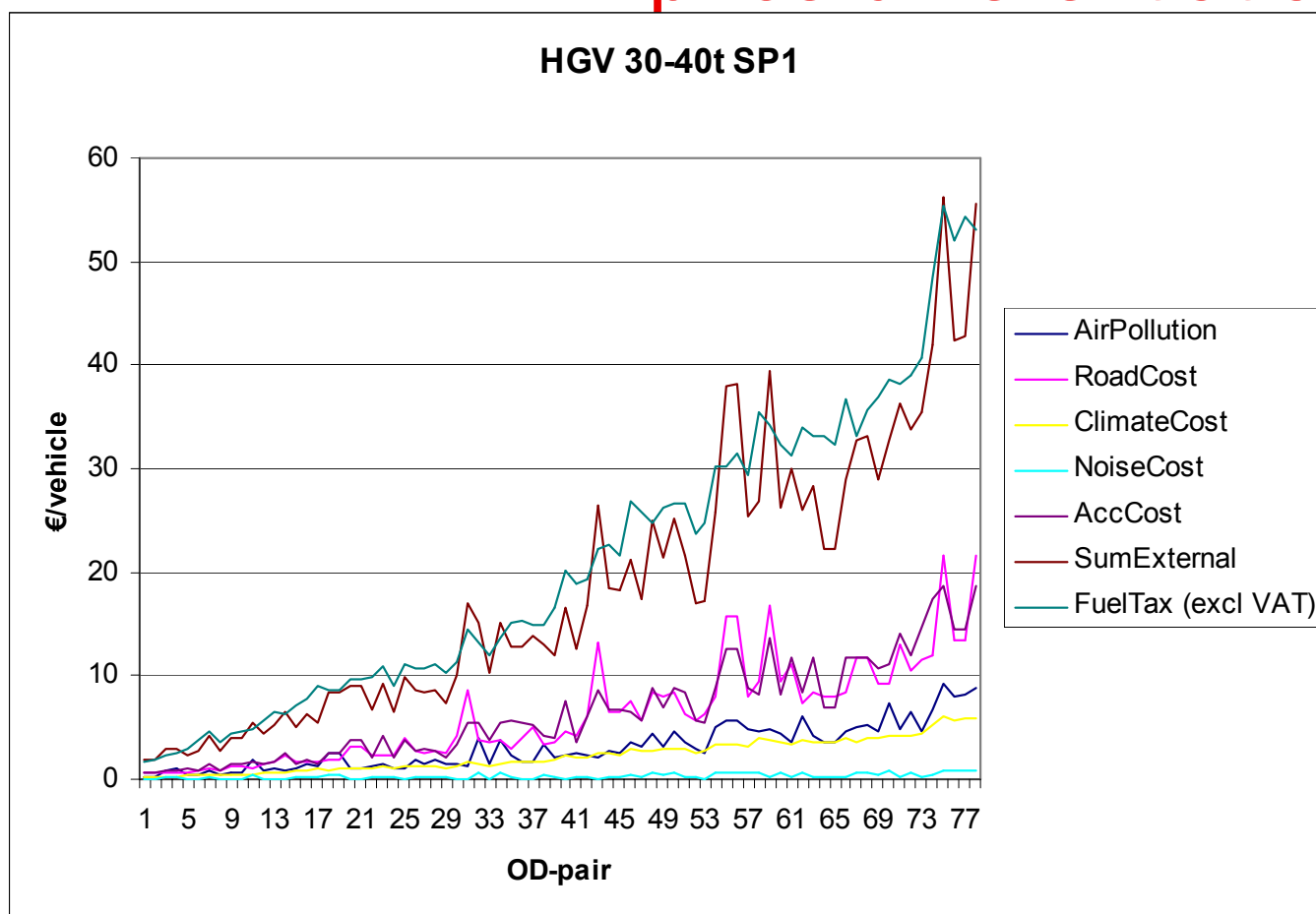
User and society benefit?
HR will have problems on the market



Incentives for HR

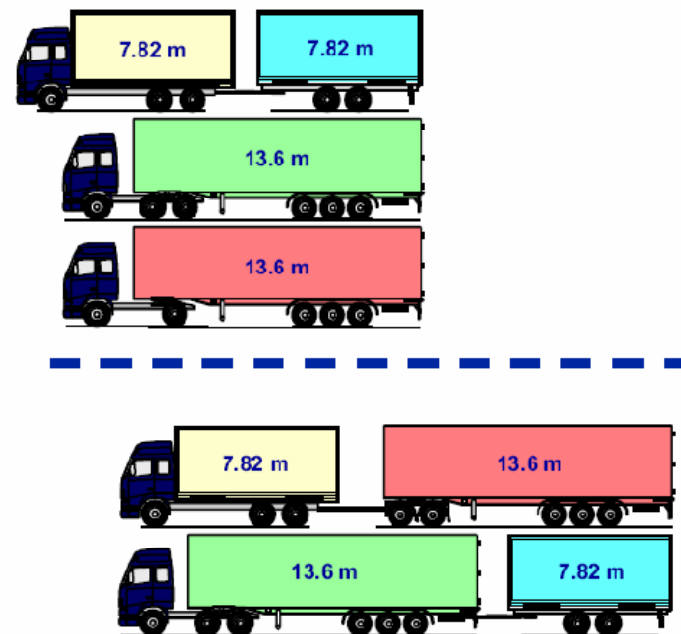
- » a) Externalities
- » b) Gigaliners
- » c) CSR
- » (subventions from infrastructure managers?)

a. HR better than fuel tax to internalise external costs w. voluntary price differentiation



b. “Gigaliners”

- » HR has shown that we can move towards less costly infrastructure
- » Replace general regulation with regulation
- » With HGV we can allow and direct “Gigaliners” to reduce transport cost



c. Corporate Social Responsibility

- » *“A concept whereby companies integrate social and environmental concerns in their business operations and in their interactions with their stakeholders on a voluntary basis.”*

Source: COM (2002) 347 final

Corporate Social Responsibility

- » Eco-label (e.g. EU flower), Social label (e.g. Fairtrade)
- » Environmental management systems (EMAS, ISO 14001 etc)
- » Green Heavy Route certificate?

Conclusion

- » Cost function will change routing
 - » However, user costs important
- » New routing will reduce external cost
- » HR has a positive WTP for public information infrastructure
- » “More/huge benefits if we can move from general regulation to specific regulation”