

# “Global view”

## Stef Proost

- for EU and by an economist
- Initial observation:
  - Easy estimate for cost of reducing 1 ton of CO<sub>2</sub> in a sector is the level of current carbon taxes in a sector – for cars these are 250 to 300 \$/ton of CO<sub>2</sub> fuel taxes
  - Perceived costs by consumers, car manufacturers and environmental ministers are much lower because they reason in consumer prices and neglect the fuel tax component

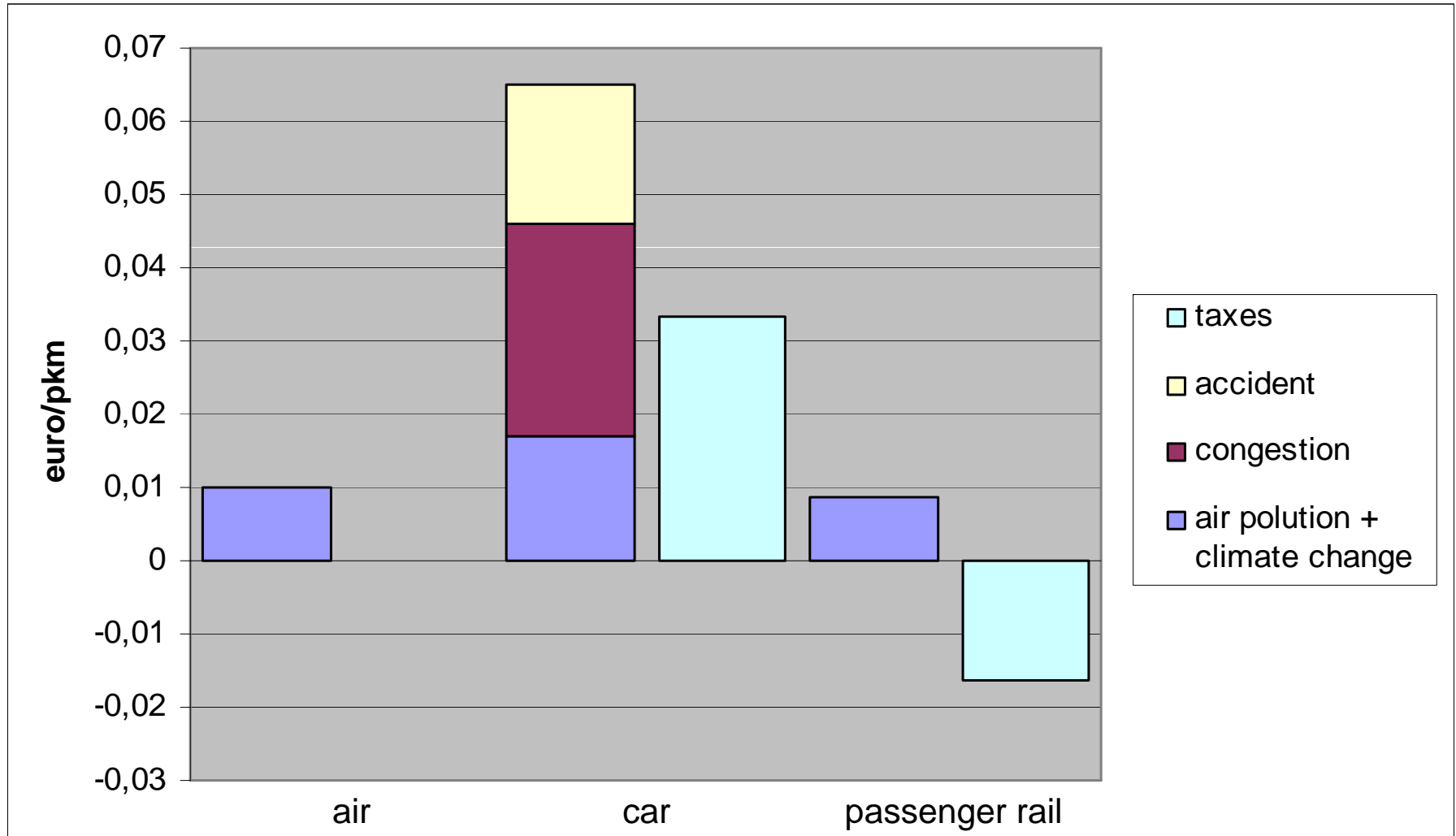
# 3 Questions

- “Transport sector perspective”
  - What is the effect of replacing current fuel taxes by taxes more geared to the different externalities in transport?
- “National energy use view”
  - Share of transport sector in reaching an absolute national emission reduction goal in a cost effective way?
- “World economic view”
  - What is shadow value of CO<sub>2</sub> emission permits to use in an international perspective?

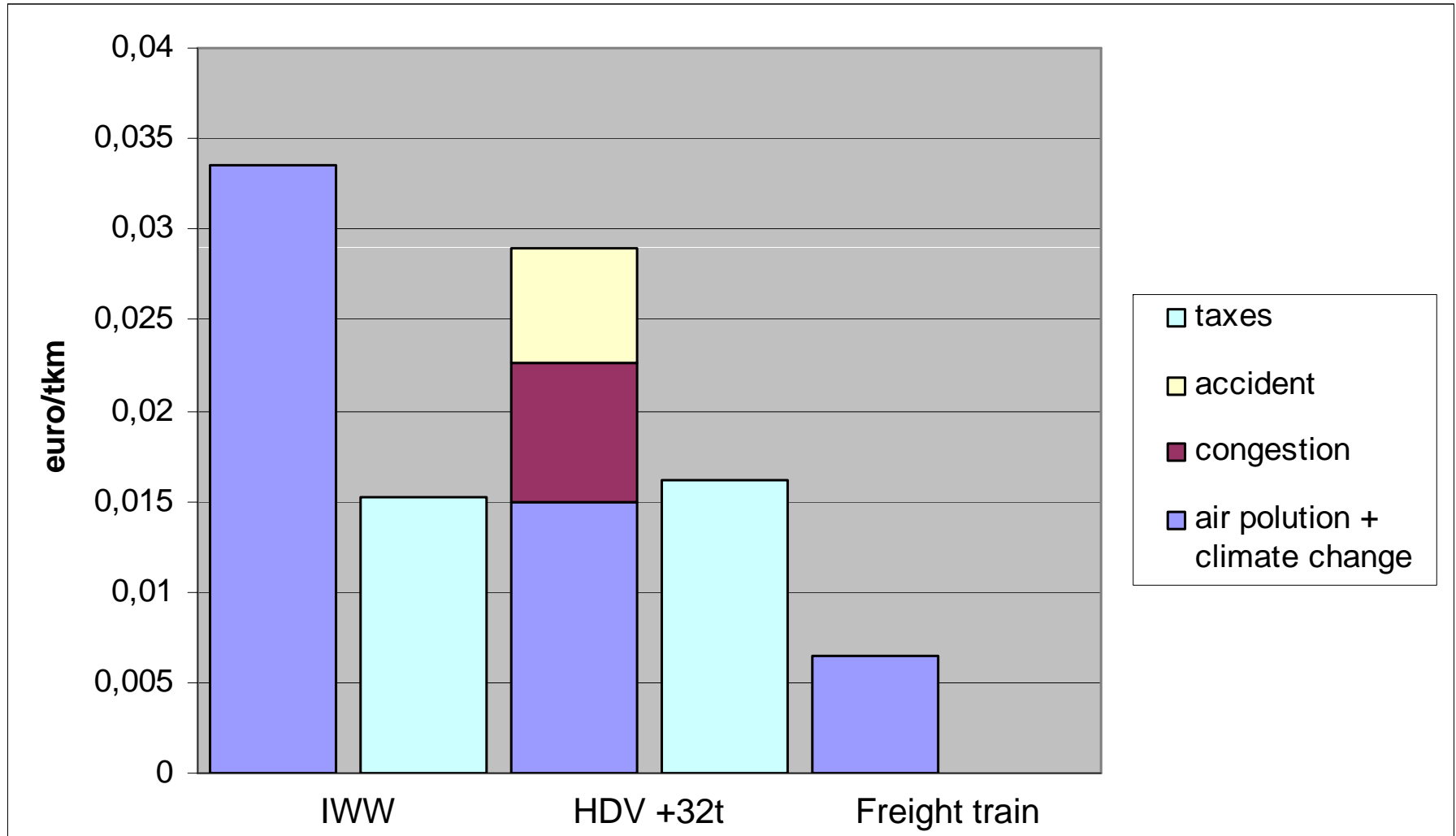
# **1. Can we do better in the transport sector than using high fuel taxes and what would be the outcome?**

- Assuming 80 Euro/ ton carbon damage, what would happen if one replaced the high fuel taxes by a 80 Euro/ton CO<sub>2</sub> carbon tax + km charges that better reflect the congestion, accident, other air pollution damage in transport?

# Marginal external costs versus taxes passenger km BAU 2020



# Marginal external costs versus taxes freight ton km BAU 2020



# **1. Can we do better in the transport sector than using high fuel taxes and what would be the outcome?**

- Replacing the high fuel taxes by a 80 Euro/ton CO<sub>2</sub> carbon tax + km charges that better reflect the congestion, accident and other externalities gives:
- GRACE (TREMOVE model): compared to reference
  - Welfare + govt revenues would increase
  - volume of traffic would decrease (all modes)
  - CO<sub>2</sub> emissions decrease slightly

## **2. What sectoral mix can achieve the required national reduction of CO2 emissions (30% in 2030)?**

- Using an energy model with technological cost information for all sectors
- only small contribution of transport sector in least cost mix

# 3. World view

- What is the global reduction we need and what is the corresponding shadow price of CO<sub>2</sub> emissions (2020 – 2050)
- Chances of successful international negotiations?
  - Scientists: Strong action needed
  - Economists: Hard climate agreements are rather unlikely to work, typical prisoners dilemma



# 3. World view

- Computation with GEM-E3 (EU+world model, including trade of CO<sub>2</sub> emissions)
- EU strategy:
  - “Cooperation” (the whole world commits):
    - Emissions: -30% in 2020 in EU and -25% for world
    - Price: 45\$ to 90\$/ton of CO<sub>2</sub>
    - Cost EU(without benefit CC): -2.3%
  - “Non cooperation”:
    - Emissions: -20% in 2020 in EU and -4% for world
    - Price: 6\$/ ton of CO<sub>2</sub> because it is bought in China
    - Cost (without benefit CC): - 0.6%

# Examples of GEM-E3 application

**Table 7. Costs and emission reductions of two EU climate change negotiation strategies**

% change compared to baseline with no reduction efforts	Cooperative scenario				Unilateral EU scenario	
	2020		2030		2020	
	Economic cost	Emission GHG	Economic cost	Emission GHG	Economic cost	Emission GHG
USA	-1.4%	-39.5%	-3.4%	-52.4%	0.0%	0.0%
EU27	-2.3%	-28.1%	-5.7%	-41.6%	-0.2%	-5.8%
Brazil	-0.3%	-4,8%	-1.5%	-15.0%	0.0%	0.1%
India	-0.9%	-0.6%	-1.6%	-23.3%	0.0%	0.0%
China	+0.3%	-25.9%	-0.8%	-32.8%	0.1%	-15.2%
World total	-1.2%	-25.9%	-3.4%	-37.2%	0.0%	-3.6%
Price of carbon (US\$/ton CO <sub>2</sub> eq)		45		93		6

# Conclusions

- EU shadow carbon values are less than 90 Euro/vkm
- Best is to address the different externalities in the transport sector by replacing the high fuel taxes by km based taxes + carbon tax
- Emission standard in the EU
  - Not really needed as long as we stick to present high fuel taxes
  - Could play a signalling role if we move to 90 \$/ton carbon tax