

Greenhouse gas emissions from Heavy Duty Vehicles in the EU

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Content

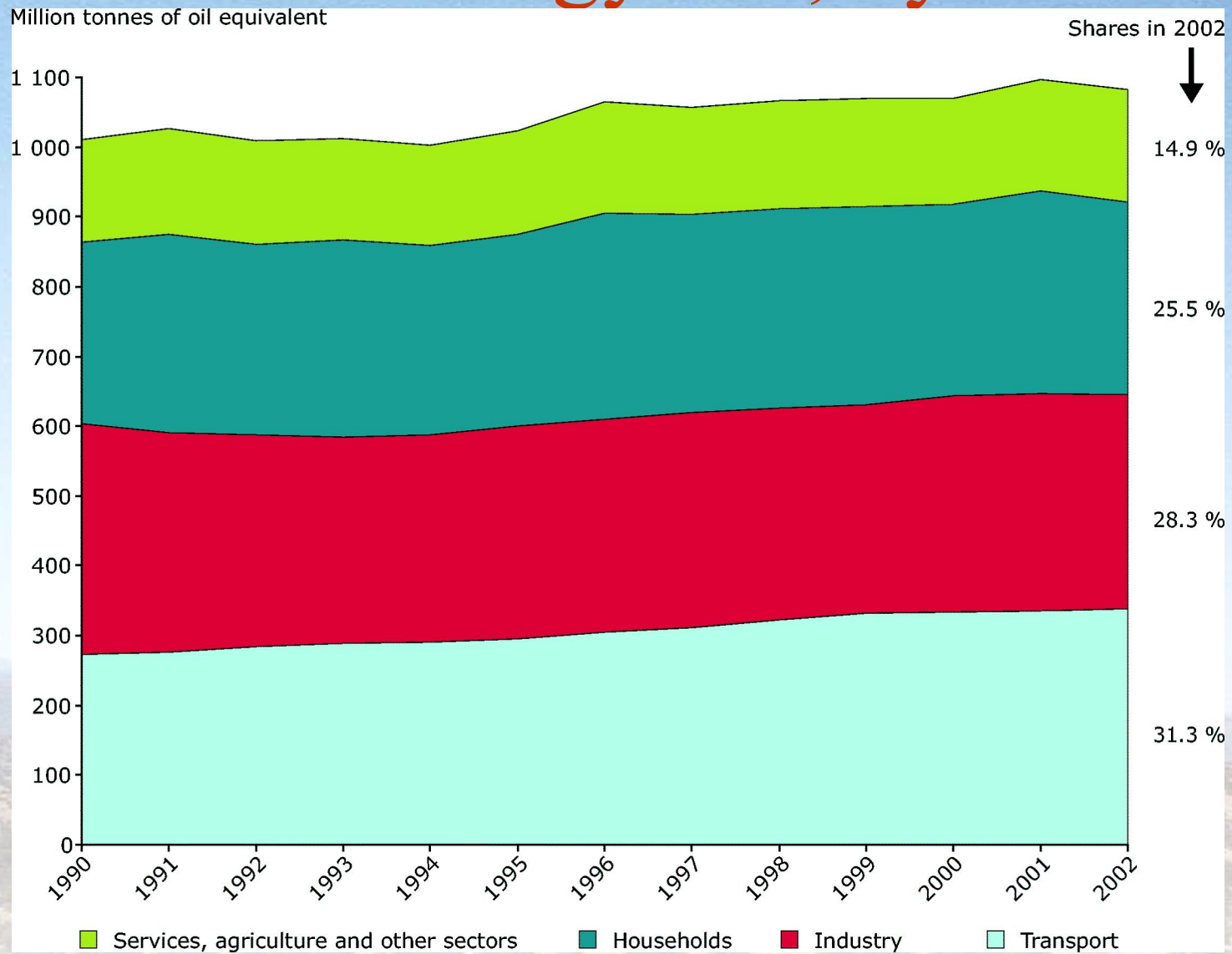
1. Introduction
2. Options for improvement
3. Some relevant activities
4. Hypotheses for further work

1. Introduction

- Why should we care:
 - Climate change
 - Security of energy supply
 - Economic efficiency



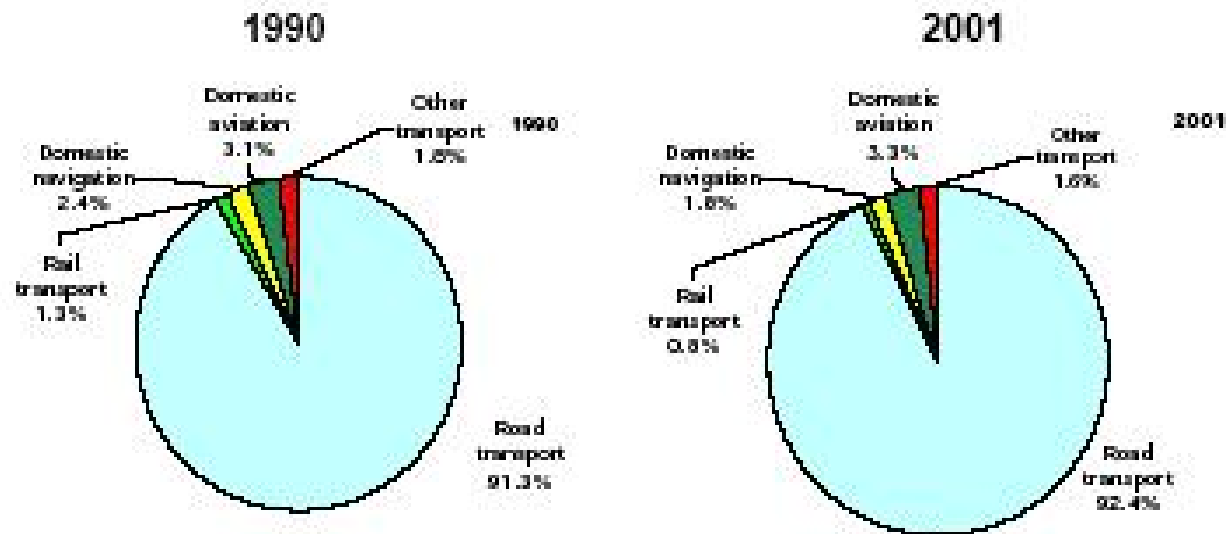
EU final energy use, by sector



Source: EEA

Transport CO₂ emissions, by mode

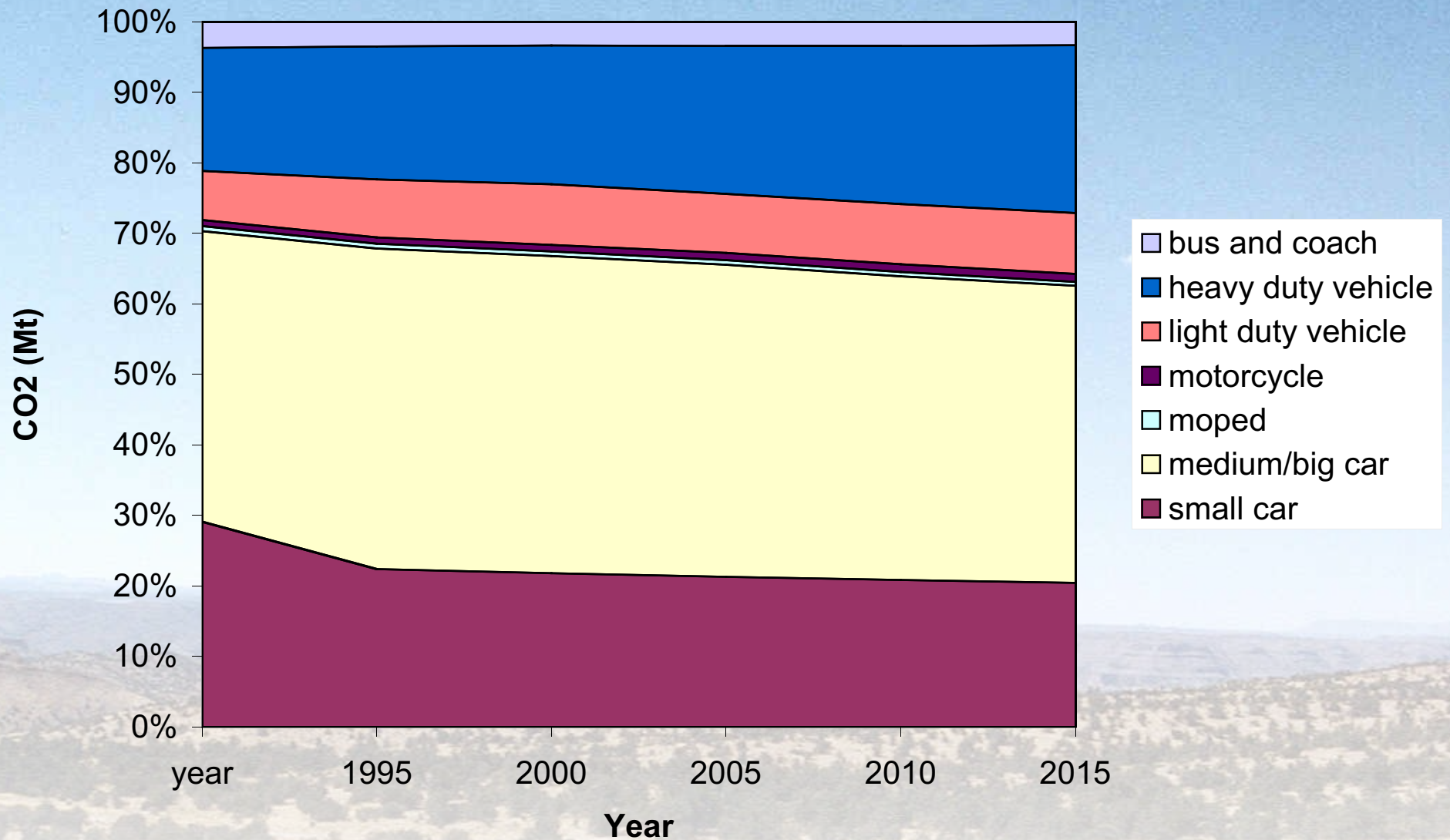
Figure 4: EU-15 CO₂ emissions from transport by mode, 1990 and 2001



NB: Modal split is based on EU-12 and excludes emissions from international bunkers. See the note to Table 3 for details for other country groups. 'Other transport' includes pipeline and some off-road transport.

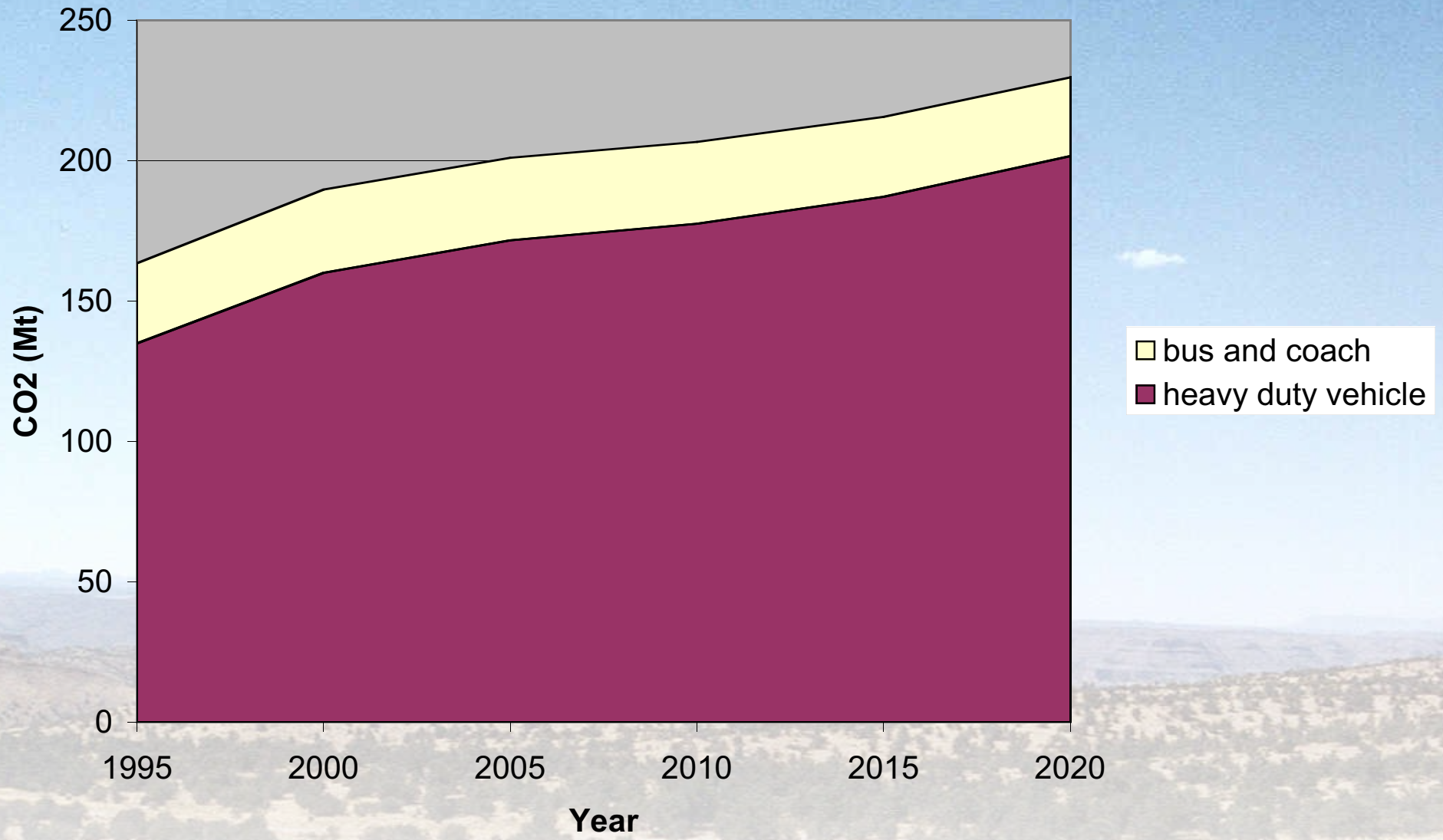
Source: EEA, 2003b.

Road transport CO₂ - shares



Source: TREMOVE baseline 2.41

CO₂ from HDV



Source: TREMOVE baseline 2.41

The oil price 1997-2005



Source: NYMEX via Google

“The market takes care of this issue”

- Share of fuel costs in freight operator costs:
 - 25% (IRU March 2005)
 - other studies indicate higher share depending on location (US/EU) and
 - type of application (long-haul vs distribution, urban start/stop)
- Projections indicate that fuel cost will dominate the economics of long-haul trucks in the future (above powertrain cost)
- Studies have shown that substantial improvements are technologically feasible and would pay for themselves within the vehicle’s useful life.
- However, market trends to not reflect these findings.

2. Options for improvement

Freight transport

- Taking into account the structure of the freight haulage industry
- Driver behaviour
- Logistics / “decoupling”
- Powertrain
- Alternative fuels

Passenger transport

6. Urban buses

Freight transport

- The GHG emissions of HDV transport are the result of

The vehicle:

- Vehicle type and age:
engine, transmission
- Tyres
- Type of fuel
- Vehicle body
- Level of maintenance

How it is used:

- Road transport demand
 - Tonnes lifted
 - Location of activities
 - Load factor, logistics
- Traffic conditions
- Driver behaviour
 - Driver skill
 - Time pressure

2.1 Structure of the industry

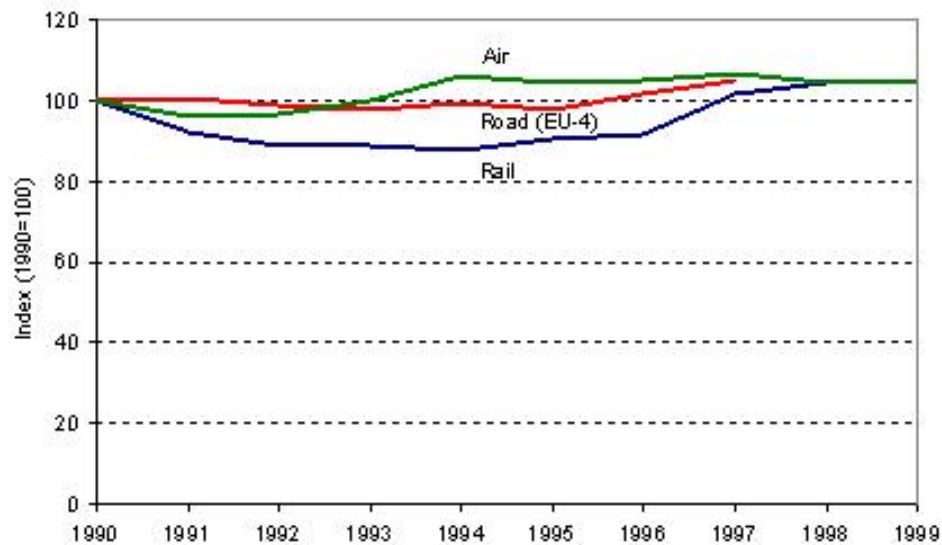
5. Road freight profit margins are thin ($\leq 1\%$ according to IRU), making fuel-saving investments difficult
 - Fragmented market in road haulage, small businesses
 - Logistics shareware for small businesses
 - HDV market in EU tends to be a leasing market, people do not own their vehicles, fuel consumption may play less of a role

2.2 Driver behaviour

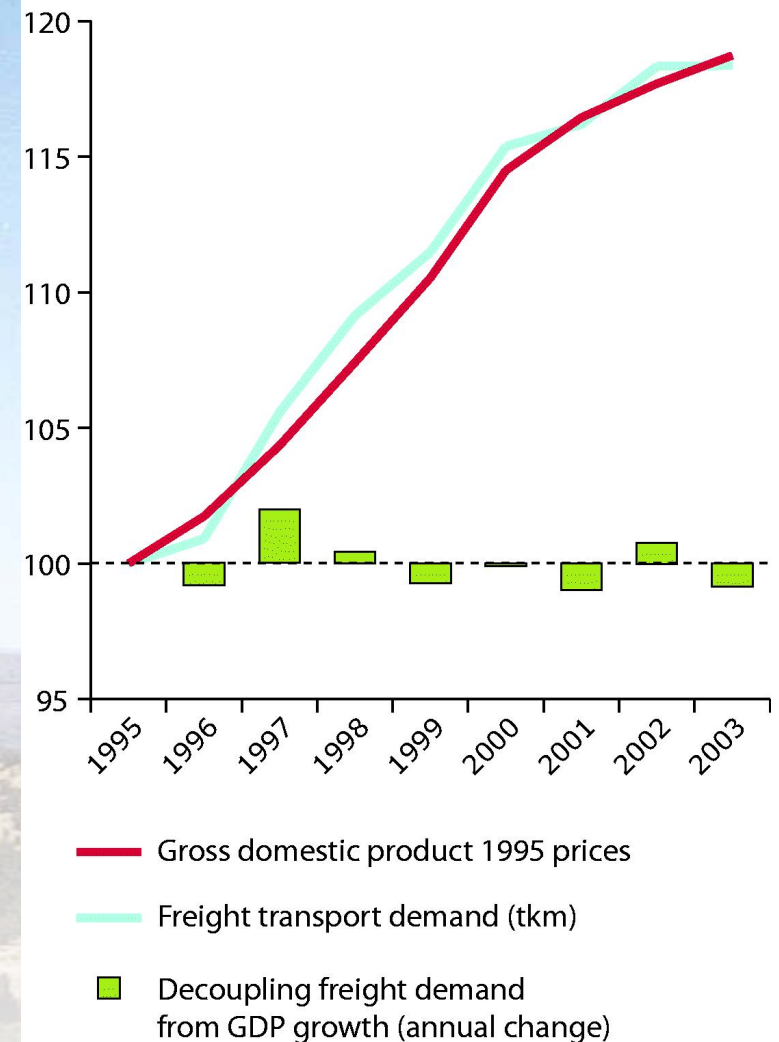
- Driver de-skilling
- Driver training programmes
 - Onboard technologies (gearshift indicators, fuel economy meters, onboard computers)
[disappointing results in Stockholm buses]

2.3 Logistics and “decoupling”

- Continuous improvement is possible – a Kaizen philosophy in transport?
- Load factors
 - often low
 - Decreasing in some EU countries
- City logistics

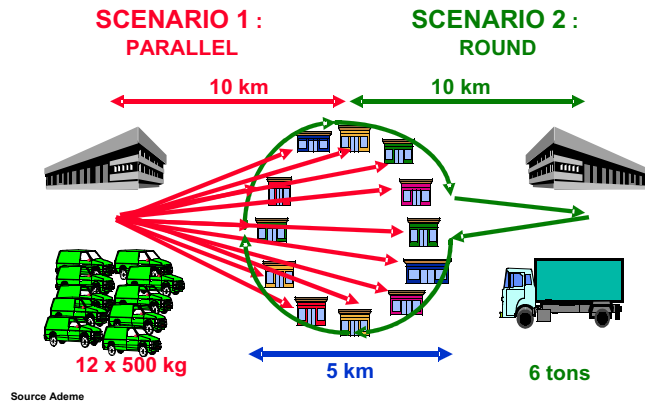


Index: EU-25 in 1995 = 100

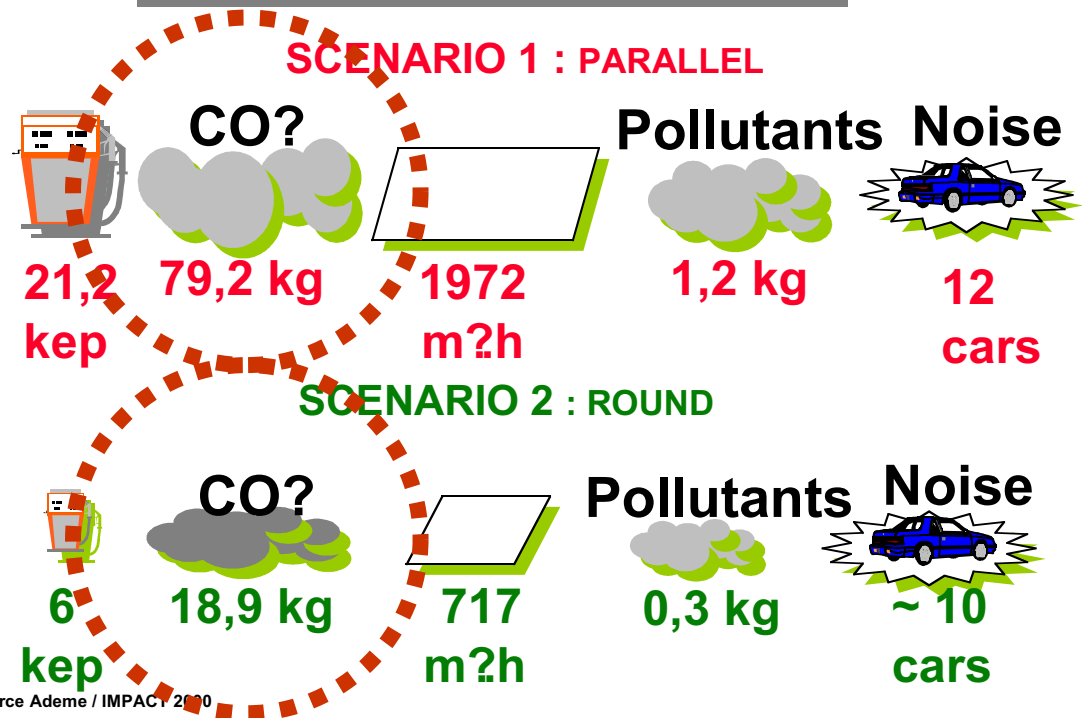


Urban logistics

PARALLEL DELIVERY OR ROUNDS ?



ENERGY / POLLUTION BALANCE



Outlet format:

Even larger CO₂ differences between out-of-town hypermarkets and urban shops (factor 60)

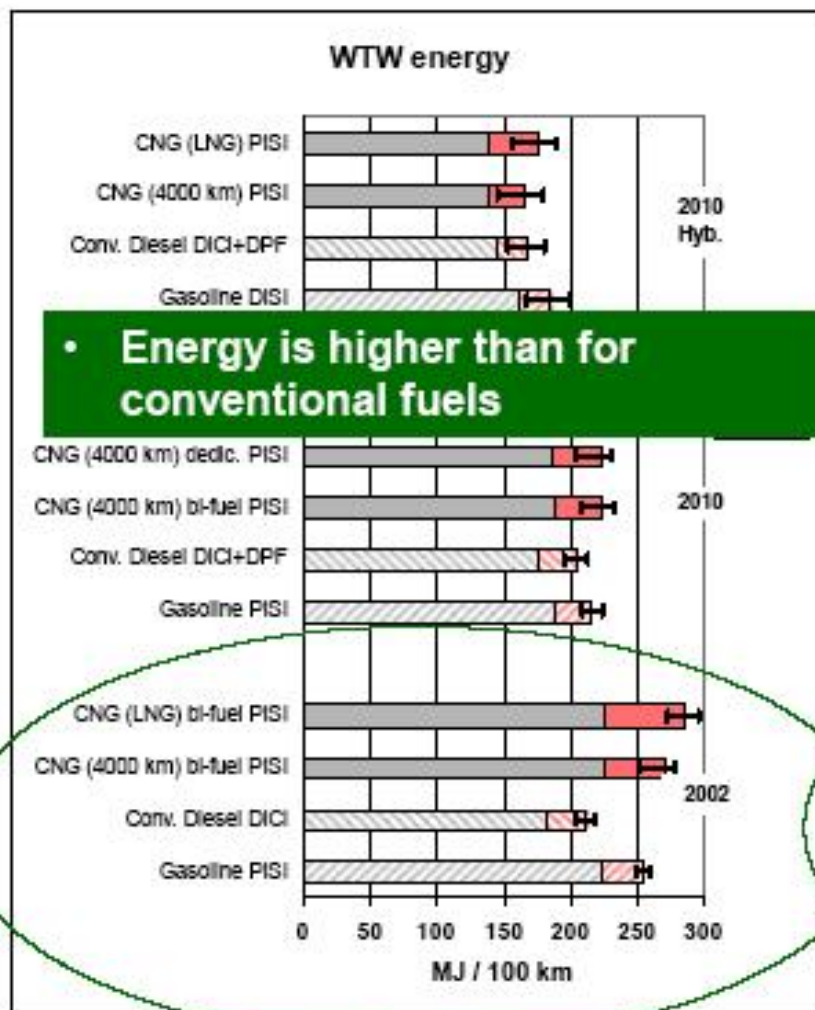
2.4 Powertrain

- From one study:
 - Baseline: HDV engine efficiency improves ca 0.2%/a on average over the long term
 - Advanced diesel technologies offer 2 to 5% on top of this by 2020
- New transmissions are entering the field
- Hybrid technologies (electric, hydraulic)
 - Promising for urban start/stop duty cycles
- Fuel-efficient tyres

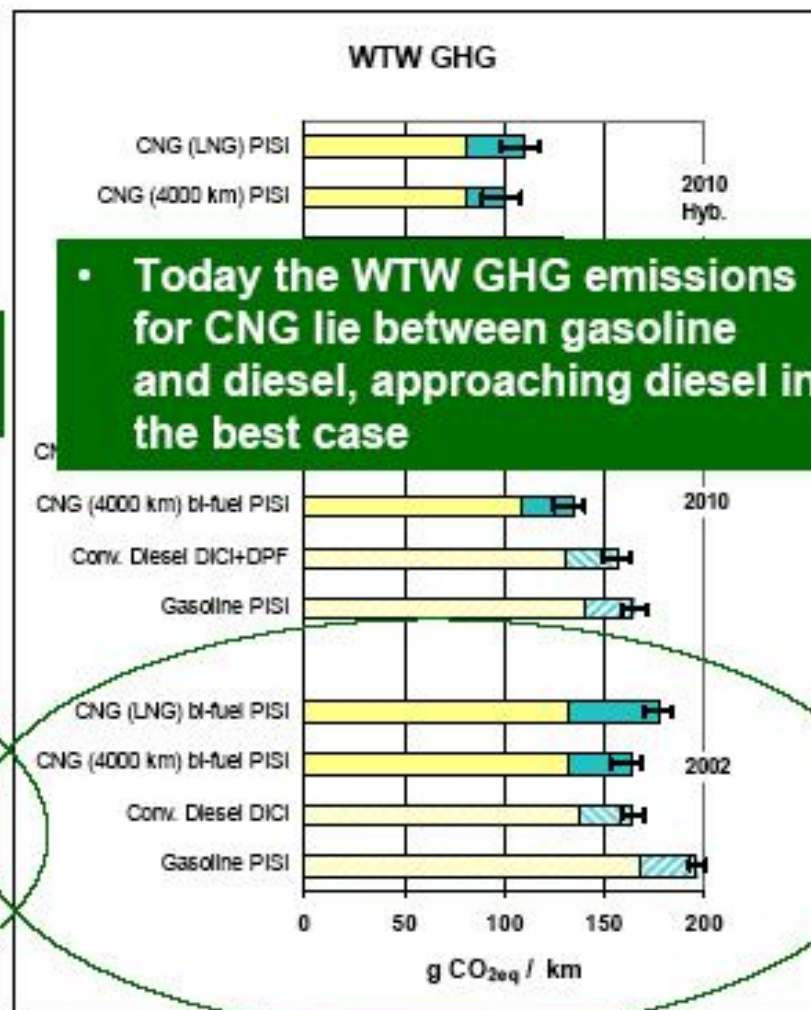
2.5 Alternative fuels

- Infrastructure requirement favours urban fleets
- NGV
 - co-benefits climate change/air quality
 - Pathway / source of the gas is critical

Compressed Natural Gas (CNG)

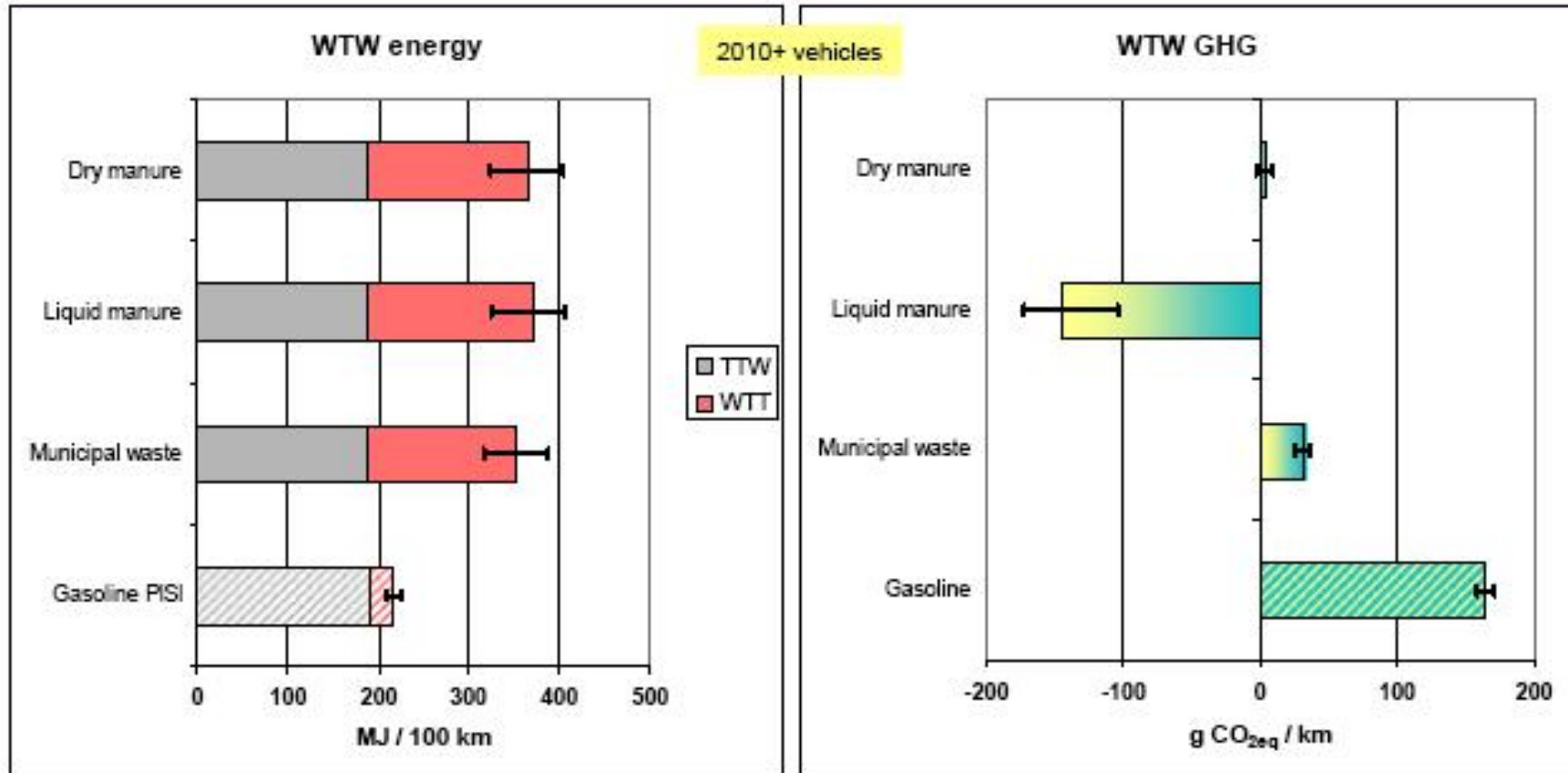


- Energy is higher than for conventional fuels



- Today the WTW GHG emissions for CNG lie between gasoline and diesel, approaching diesel in the best case

Compressed Biogas (CBG)



- Because it uses a waste product, biogas has a favourable GHG balance
- Using wet manure in this way stops methane emissions to atmosphere, the result of intensive livestock rearing rather than an intrinsic quality of biogas

2.6 Urban buses

- UITP gained experience on driver training
- Quality of the bus important (airco, electronic passenger info etc)



Some relevant ongoing activities, EU

- Modal shift: Marco Polo
http://europa.eu.int/comm/transport/marcopolo/index_en.htm
- Energy use in transport: STEER
http://europa.eu.int/comm/energy/intelligent/index_en.html
- Urban transport:
 - thematic strategy on the urban environment;
http://europa.eu.int/comm/environment/urban/home_en.htm
 - CIVITAS
http://europa.eu.int/comm/energy_transport/en/cut_en/cut_civitas_en.html
- Alternative fuels
 - Biomass action plan
http://europa.eu.int/comm/energy/res/biomass_action_plan/green_electricity_en.htm
 - Biofuels strategy
http://europa.eu.int/comm/agriculture/biomass/biofuel/index_en.htm
- European Climate Change Programme (ECCP)
<http://europa.eu.int/comm/environment/climat/eccp.htm>

Hypotheses for further work (1)

1. Improving technical efficiency is important but not sufficient
 - Must look at all options including education, demand management, alternative fuels, modal shift
2. The potential exists for further improving the technical efficiency of vehicles: power train, body, tyres
3. Improved logistics and siting decisions can reduce fuel consumption further – including new approaches on urban distribution
4. Driver de-skilling needs to be countered by more systematic training and forgiving vehicle design
 - UITP experience with bus driver training

Hypotheses for further work (2)

5. The freight haulage industry has a reputation of being conservative, could use help to accelerate innovation (best practice alert programmes)
 - Small operators lack analytical capacity and have unrealised fuel savings potential, could use help to identify and overcome obstacles
 - Large operators and shippers could be instrumental in introducing innovation
 - Public/private partnership programmes could help catalyse action
 - Involving operators and shippers could help verifying these hypotheses

Next steps

- DG ENV study on GHG emissions from HDV*
- Main issue: find the real obstacles to the take-up of cost-effective actions

*subject to budget availability