Do overarching mitigation objectives dominate transport-specific targets in the EU

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Outline

1. EU transportation trends and policy responses

2. Model description

3. 2 Macroeconomic & energy scenarios

4. Road transportation in the 2 scenarios for 2020 and 2050

European Road Transportation Trends

- Sustained growth in demand
  - Overall mobility:
    - 35km per capita per day (x2 since 1970)
  - Increased modal domiance1995-2004:
    - Passenger cars: +19% pkm (85% of pkm)
    - Road freight: +35% tkm (44% of pkm)
  - Consequences: Increased economic costs and environmental damage
    - 67% of final oil consumption in EU
    - 85% of transport CO_2 (28% total emissions, +23% since 1990

European Policy Response 1: Transportation White Paper (2001/6)

- Expands 1992 paper, introduces sustainability
- Key objectives (2010/20):
  - High mobility
  - Environment, energy etc.
  - Innovate in support of first two aims
- 60 EU-level specific measures in 13 areas
- Longer term beyond the scope of WP
- 2008 update: Greening transport (20-40 yrs)

European Policy Response 1: EUSDS (2001/6)

- Transport to meet society's economic, social and environmental needs
  - Decouple growth and transport demand
  - Sustainable energy use, reduce GHG and local emissions
  - Mode share back to 1998
- Objectives for EU policymaking:
  - 2$_o$C cap, 60-80% reduction by 2050
  - CO2: overall and g/km (130/10g CO2/km)
  - Local emissions – EURO V/VI
  - Mode shares back to 1998
  - Biofuel (2010: 5.75%; 2020: 10%, targets as shares)

Policy Update 2008/9

- Renewable Energy Directive Proposals (1/2008):
  - National targets for share of RE by 2020; 20% for EU
  - Transport: 10% of final consumption of energy
    - But: 35% GHG emissions reductions
    - Not from land with high biodiversity/carbon stock
    - EU raw materials must meet tough min. standards
  - Parliament: 2015: 5%; 2020: 10%
    - In reality, targets are 4% and 6%

Are these short-term objectives implied by the overarching CO_2 targets?

What are the implications of these overarching targets on road transportation?

Modelling Framework

- IMACLIM-R
  - Recursive hybrid CGE model
  - A world economy of 12 regions and 12 sectors
  - Transportation as 3 distinct sectors + a specific household model trade-off (s.t. budget and time constraint)
  - Specifically dedicated to BU integration
- POLES
  - Recursive model of global energy systems
  - 48 regions, ca. 25 final uses, endogenous primary mkts
  - Transportation: vintage car fleets, 2 other agg. Fleets
- Soft-linking through iterative convergence

Two Scenarios: REF and OCC (450ppm)

- REF (no carbon constraint):
  - Main drivers: labour productivity and demographics
  - Decoupling of growth and CO_2 emissions
    - Non-renewables increase significantly
    - Sustained growth, less energy-intensive
    - EU CO_2: 2020/50 +19%/+13% over 1990
- Overarching Carbon Constraint (OCC):
  - Global carbon profile (450ppm stabilisation), WRE after 2010 (massive emission reductions)
  - EU CO_2: 2020/50 -22%/-65% below 1990
  - ROW follows to lesser extent
  - Generalised carbon tax

CO_2 Emissions in REF and OCC

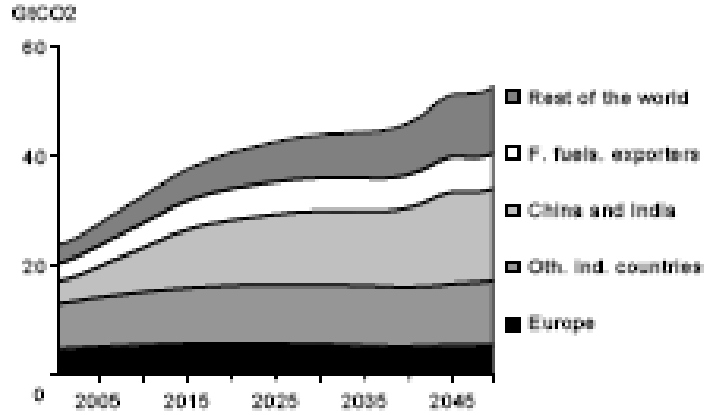

Figure 1. *CO_2 emissions in the REF scenario*

- OCC: economies feel most pain in early years, growth then trends back to REF

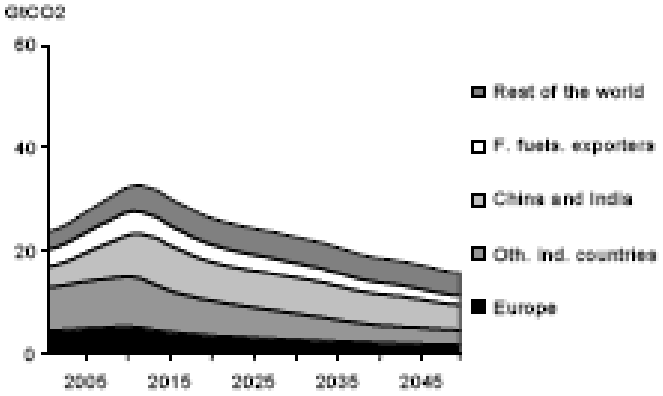

Figure 2. *CO_2 emissions in the OCC scenario*

Road Transportation under 2020/2050 REF and OCC

- Agg. ground passenger mobility resilient to high carbon prices in OCC

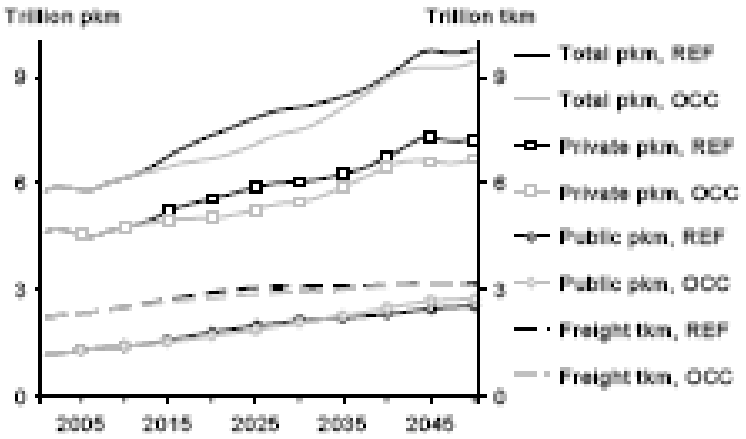

Figure 4. *European motorised ground mobility*

- Limited impact on energy consumption also
  - stabilisation (barely)
  - Fuel mix similar
  - CtL fuels blocked in OCC, replaced by biofuels
- Fleet composition changes:
  - OCC: non-conventional vehicles 25%/44% by 2030/50 (10%/17% in REF)

CO_2 Emissions

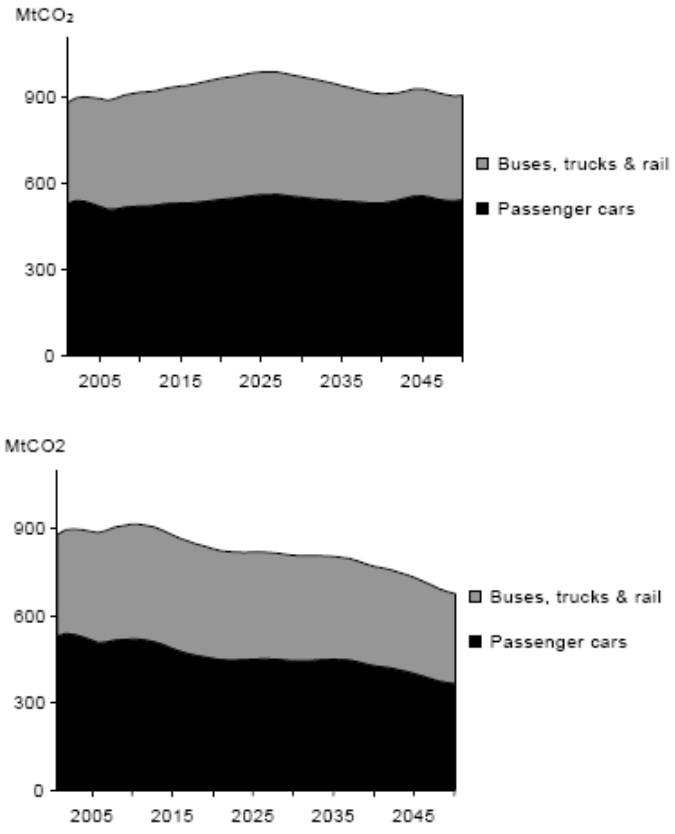

Figure 7. ***Tank-to-wheel CO_2 emissions of ground transportation, REF (upper graph) vs OCC (lower graph) scenario***

- OCC Reductions:
  - 14% of REF (2020)/ 25% of REF (2050)
  - Small compared to overall reductions (34%/69%)
  - Transport as an obstacle

Transport Objectives Under REF and OCC

Target	Year	Objective	REF scenario	OCC scenario
Share of biofuels	2015	5%	1.55%	1.76%
Share of biofuels	2020	10%	2.95%	4.02%
LDV CO_2 emissions, vintage average	2012	120 g/km	134 g/km	127 g/km
LDV CO_2 emissions, vintage average	2020	95 g/km	132 g/km	120 g/km

- Targets missed in OCC and REF
- Biofuel
  - Too early and Carbon price too low to incentivise 2nd gen
  - OCC starts to makes difference for biofuels by 2020
- CO_2 emissions:
  - OCC starts to make difference but still missed

Conclusions

- Stringent medium and long-term CO2 mitigation targets *don't* dominate shorter-run objectives
- Challenge to policymakers:
  - Lock-in in carbon intensive trajectories
  - May undermine 2050 objective of 60-80% reductions
  - More ambitious transport-specific policy agenda