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ET LE DÉVELOPPEMENT

*The impacts of long term CO₂ objectives on
short term transportation trends
in the European Union*

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Outline

1. EU transportation trends and policy responses
2. Model description (in broad strokes!)
3. 2 Macroeconomic & energy scenarios
4. Road transportation in the 2 scenarios

European road transportation trends

- Sustained growth in demand
 - 1995-2004: +19% pkm passenger cars, overall mobility 35 km *per capita* per day (x2 since 1970)
 - 1995-2004: +35% tkm road freight
- Increased modal dominance: road accounts for
 - 85% pkm, 44% tkm
 - 67% of final oil consumption
- Consequences
 - 85% of transport CO₂ (itself 28% of total emissions, 21% of total GHG +23% since 1990)
 - increasing economic costs and environmental damages

European policy responses: Transportation White Paper (2001)

- Follow on from 1992 White Paper
- Recognition that transport impacts beyond the movement of goods and people (externalities) – sustainability debate
- 2001 Paper key objectives:
 - Maintain high mobility to people and business
 - Environment, energy supply, minimum labour standards
 - Innovate in support of first two aims allowing for increased sustainability and efficiency
 - In addition, connect internationally
- 60 EU level specific measures covering 13 areas
- 2010 is the time horizon but a mid term review (2006) has extended some forecasts to 2020
- Specific long term objectives are beyond the scope of WP

European policy responses: Sustainable Development Strategy (2001)

- Transport should meet society's economic, social and environmental needs whilst minimising negative transport externalities
 - Decouple economic growth & transport demand
 - Sustainable energy use, reduce GHG and local emissions
 - Mode shares back to 1998 by 2010
- Objectives are outlined and these have been incorporated into EU policymaking since
 - 2 degree cap on temp increases over century over pre-industrial levels – translated into 60-80% reduction (2050)
 - CO₂: overall and g/km with differentiated targets by type
 - Local emissions: generalisation of EURO V, EURO VI
 - modal shares: back to 1998 by 2010
 - biofuels: 2010, 2015, 2020 targets as shares

Are these short-term objectives
implied by
the overarching long-term CO₂ target?

What are the implications of the overarching target
on road transportation?

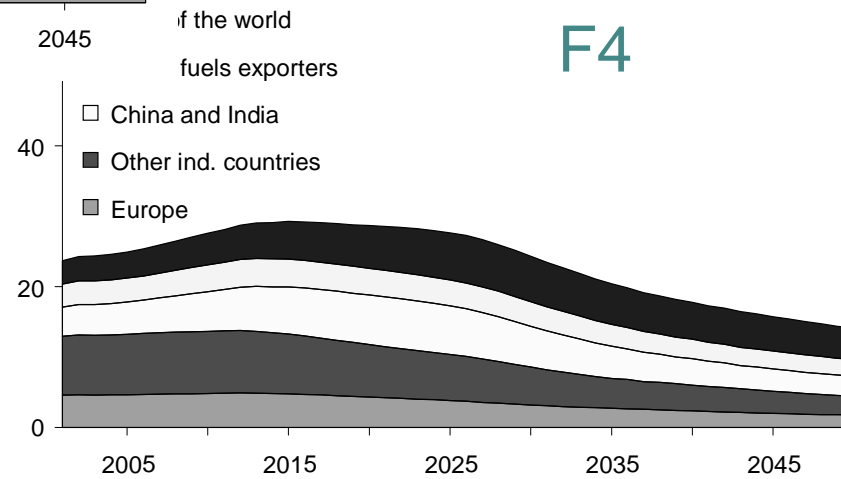
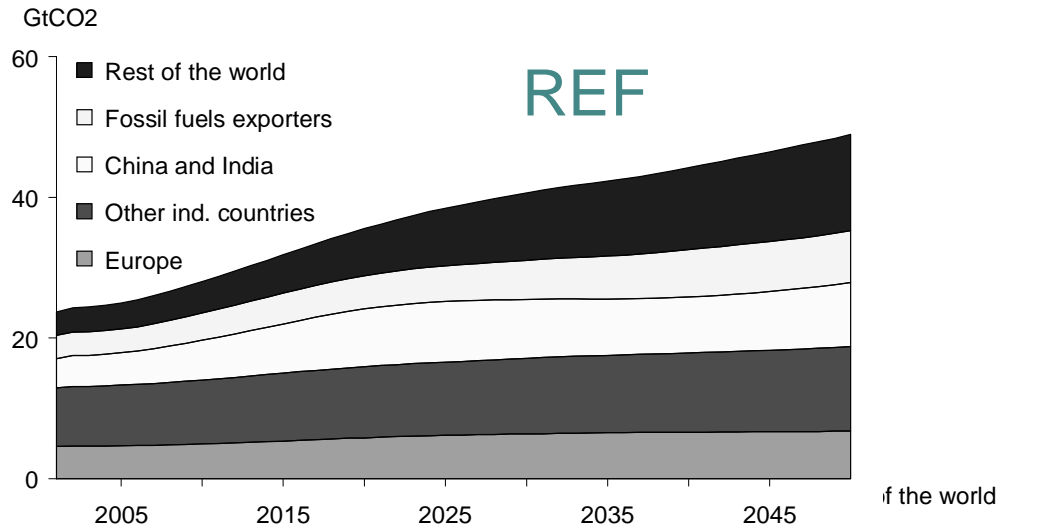
Modelling framework

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

2 contrasted scenarios

- Reference scenario (REF)
 - Central assumptions re. labour productivity increases
 - Benchmark carbon policies (up to €30 per ton CO₂ in 2050)
 - NB: sustained European growth
- Factor 4 scenario (F4)
 - Carbon profile close to WRE after 2010 = massive reductions in CO₂ emissions
 - Through scaling up benchmark carbon prices: up to €911 (!!!) in IC, €228 in DC (misprinted in paper)
 - ...and extensions of POLES' databases

F4 vs REF: emissions

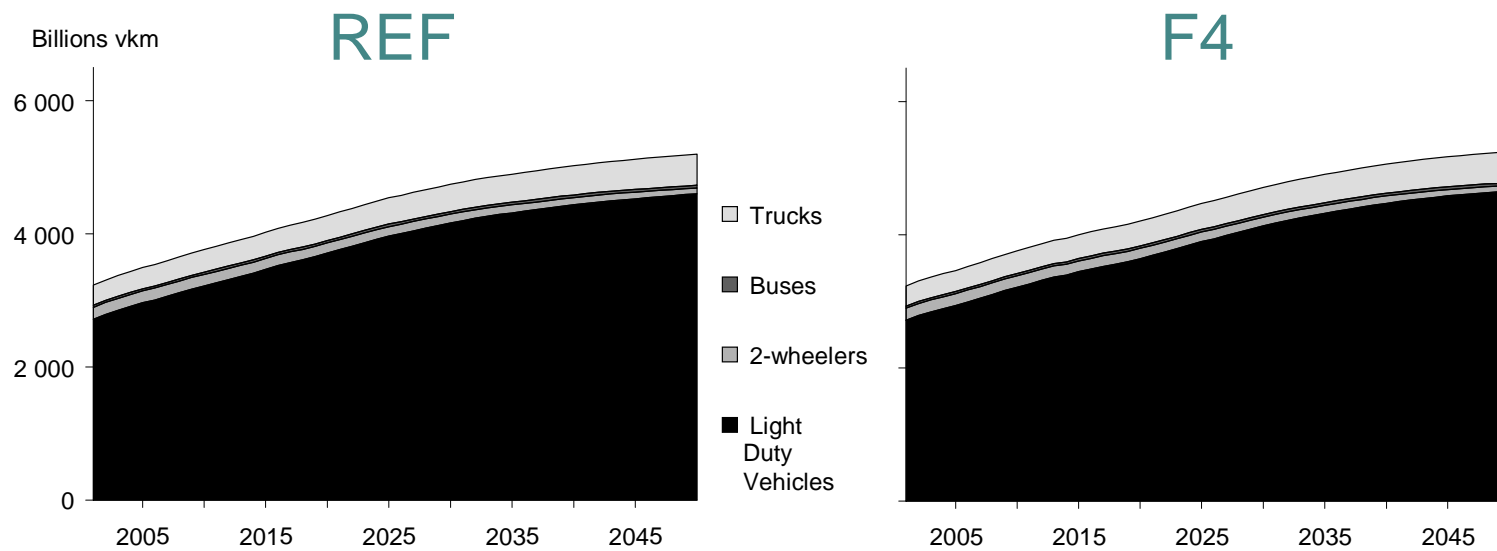


F4 vs REF: real economic growth

REF	2001-15	2016-30	2030-50	2001-50
Europe	2.1%	2.1%	1.4%	1.8%
Other industrialised countries	2.1%	1.8%	1.8%	1.9%
China and India	5.3%	2.3%	1.7%	2.8%
Fossil fuels exporters	4.4%	3.2%	2.3%	3.1%
Rest of the world	4.2%	3.7%	2.0%	3.1%

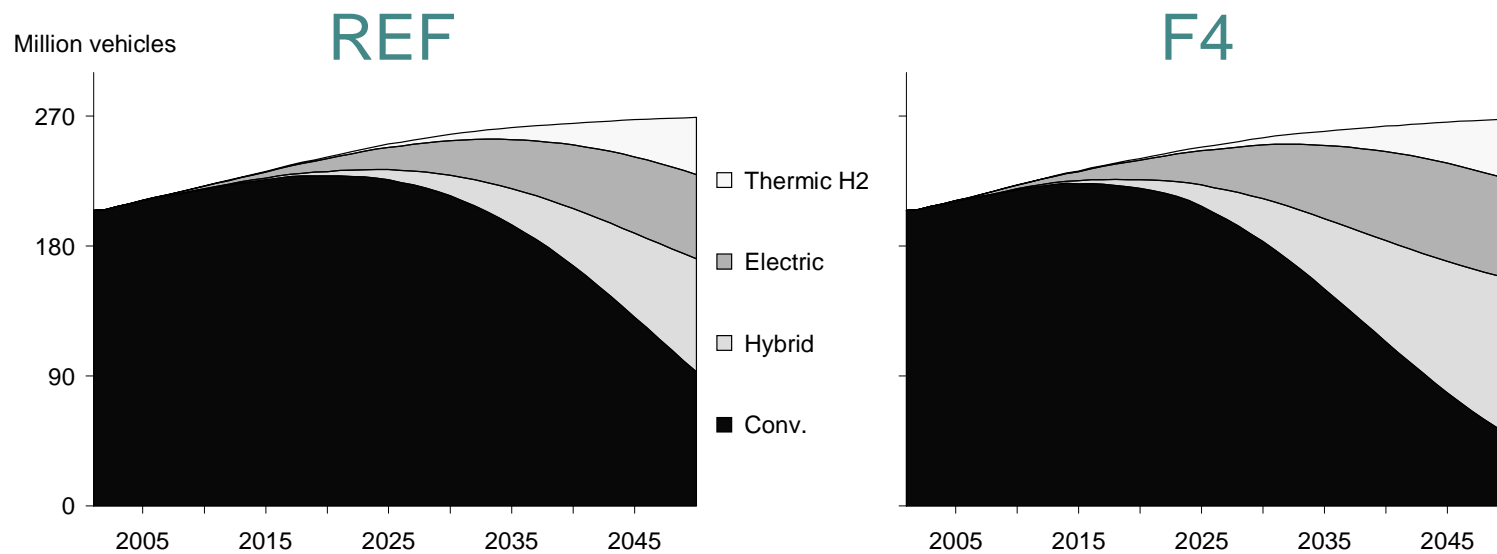
F4	2001-15	2016-30	2030-50	2001-50
Europe	1.6%	1.2%	1.4%	1.4%
Other industrialised countries	2.1%	1.5%	1.9%	1.8%
China and India	5.0%	2.3%	2.3%	3.0%
Fossil fuels exporters	4.2%	2.4%	1.8%	2.6%
Rest of the world	4.1%	3.4%	2.4%	3.1%

Total on-road mobility



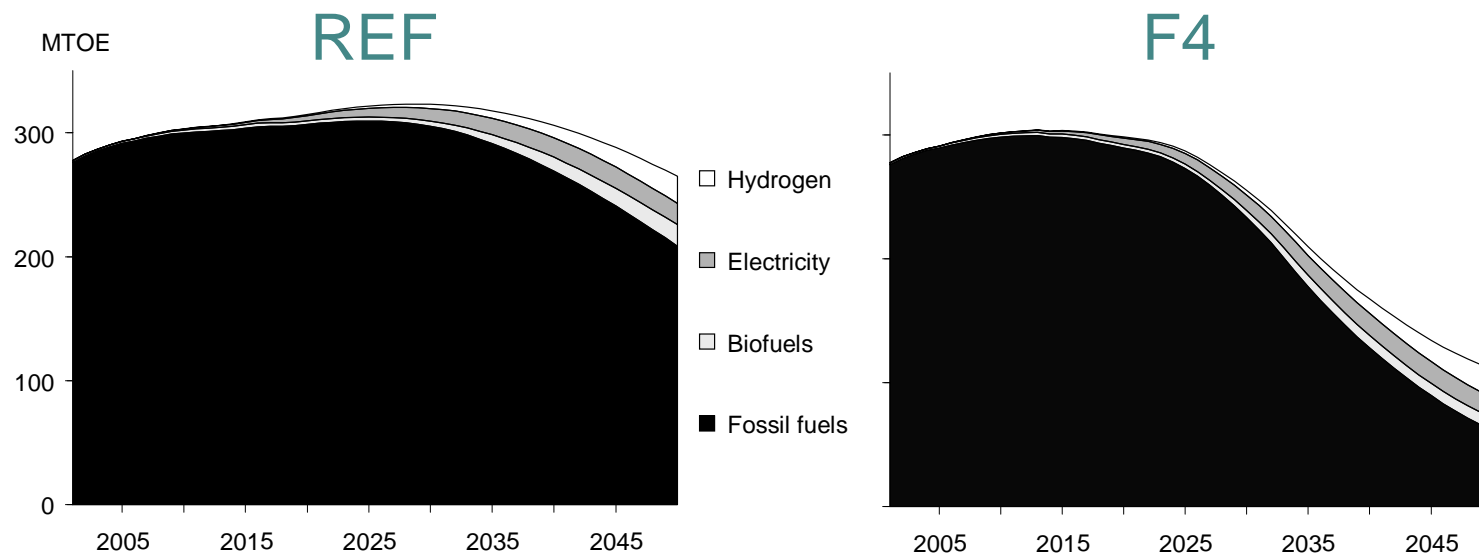
Virtually no impact on mobility!

Technology of the LDV fleet



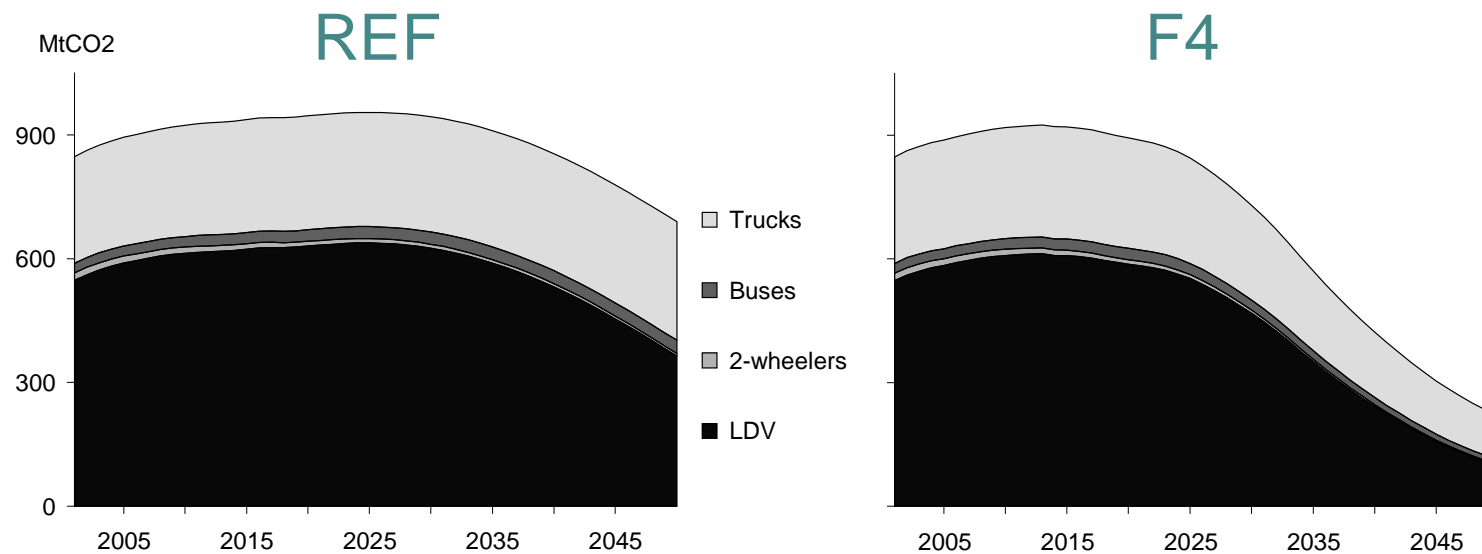
Limited technology impact, beyond 2020 only

Energy consumption



Strong efficiency gains beyond 2015

Tailpipe CO₂ emissions



As per the evolution of fossil fuels consumptions

Are short-term targets met?

Target	Year	Objective	REF scenario		F4 scenario	
			achieved	<i>off by</i>	achieved	<i>off by</i>
Share of biofuels	2010	5.75%	0.82%	86%	0.81%	86%
Share of biofuels	2015	8%	0.92%	88%	0.94%	88%
Share of biofuels	2020	10%	0.98%	90%	1.04%	90%
LDV CO ₂ emissions, vintage average	2012	120 g/km	148	23%	146	21%
LDV CO ₂ emissions, vintage average	2020	95 g/km	136	43%	130	37%

Targets are missed... insensitive to F4 policy

Conclusions

- Extreme 2050 F4 objective implies combination of efficiency gains and technology switching
 - No impact on mobility
 - No break-through of biofuels (modelling deficit?)
 - Short-term targets unaffectedly missed!
 - Main cause: inertia of vehicle fleets (must extract figures)
- ⇒ Specific policy instruments are a necessity...
if these goals are to be reached (but why?)