International Transport Forum

Reducing Transport Greenhouse Gas Emissions: How Much, How Fast and at What Cost?

Mr. Jack Short, Secretary General, International Transport Forum

International Symposium on Climate Change and Transport Strategy, Tokyo, 14 December 2007

The International Transport Forum

- A global platform for transport, logistics, mobility
- A meeting place for the transport sector at the highest level
- A forum run by governments, open to business, research and civil society
- 51 Countries

- 1st Forum in May 2008 in Leipzig: “Transport and Energy: The Challenge of Climate Change”

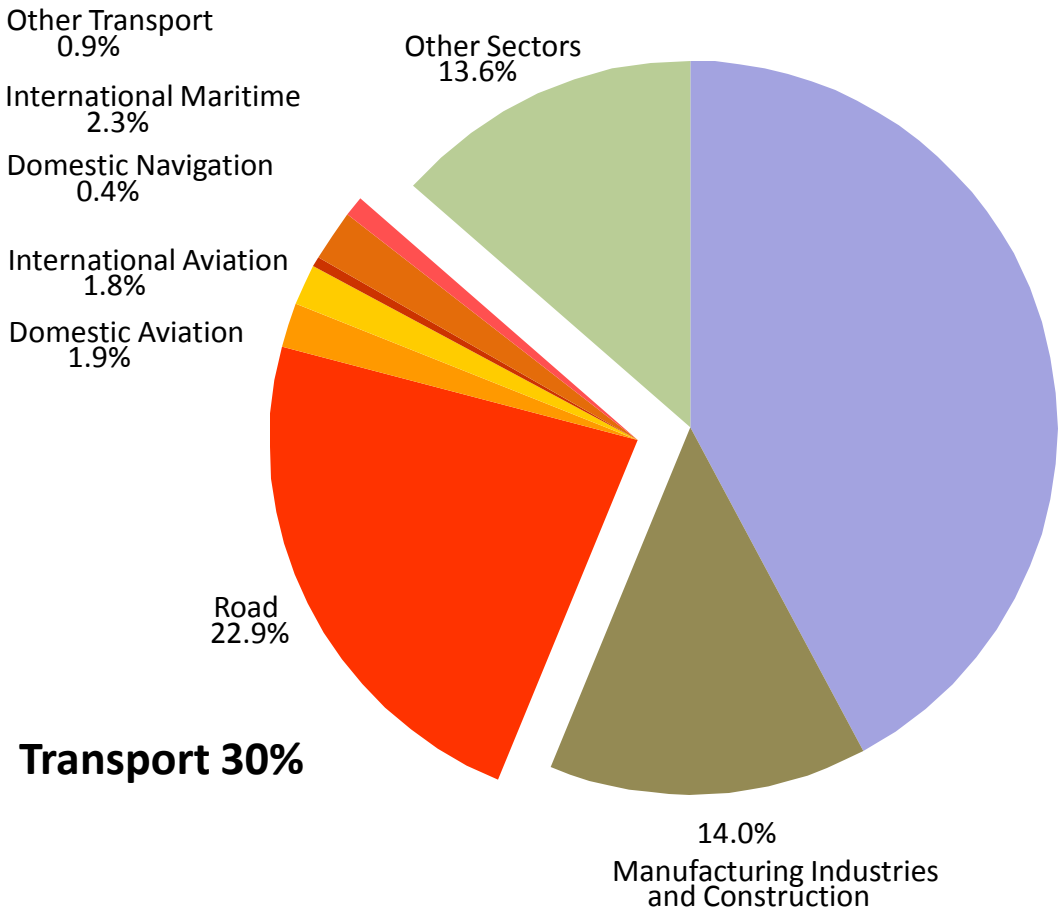
Outline

- "Mind the Gap": Trends in the Transport Sector
- Which Policies at What Cost?
- Transport Policy Implications and Priorities

Transport's Share of CO2 emissions from fuel combustion

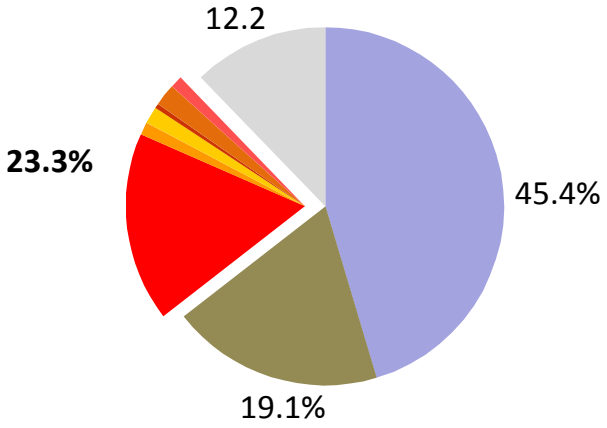
(2005 IEA data, *including* international aviation and maritime)

OECD



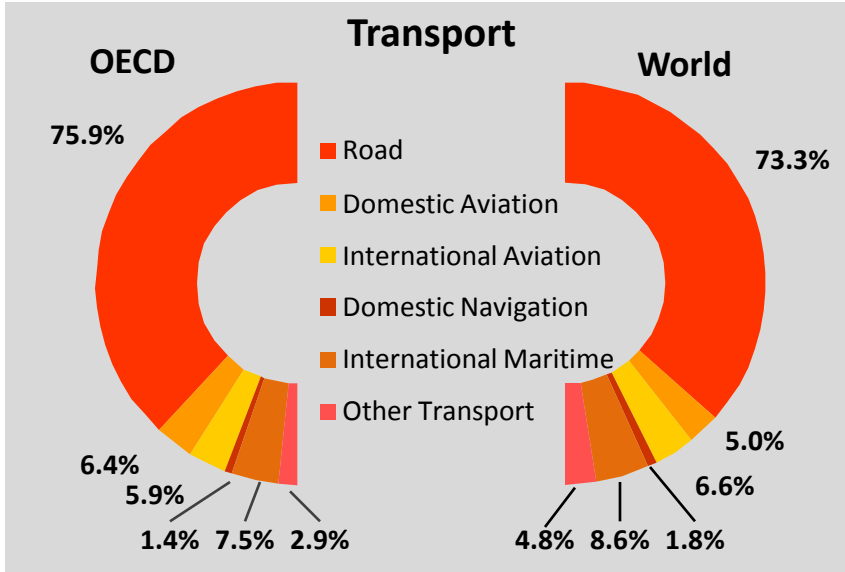
Transport 30%

World



Energy
42.1%

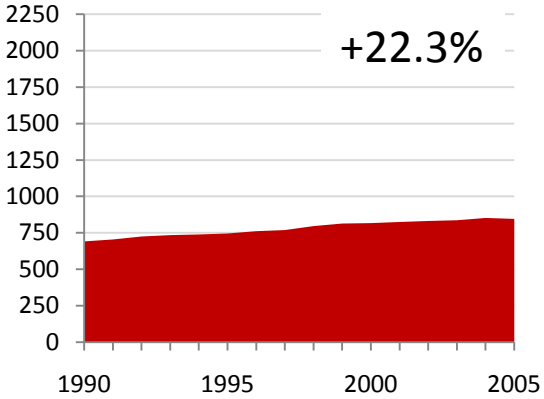
Transport



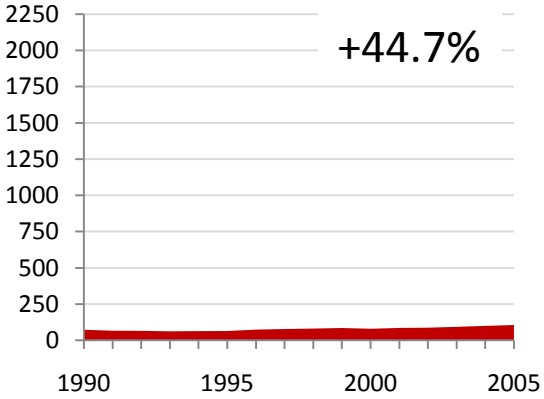
Transport Sector CO2 Emissions by Region: 1990-2005

(excluding international aviation and shipping)

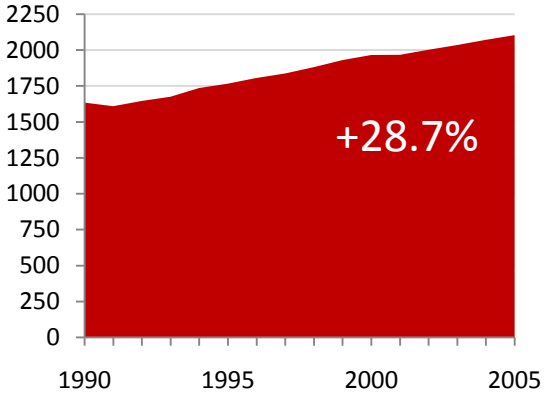
EU-15



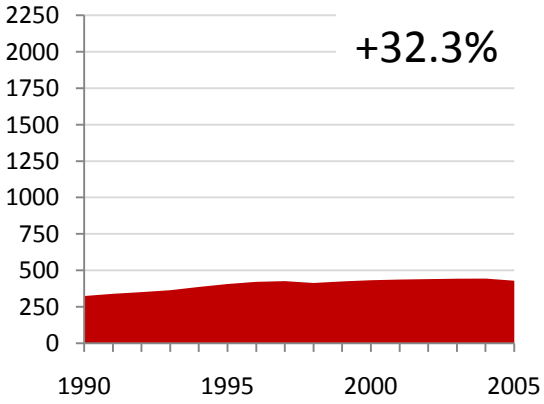
New EU (EU27-EU15)



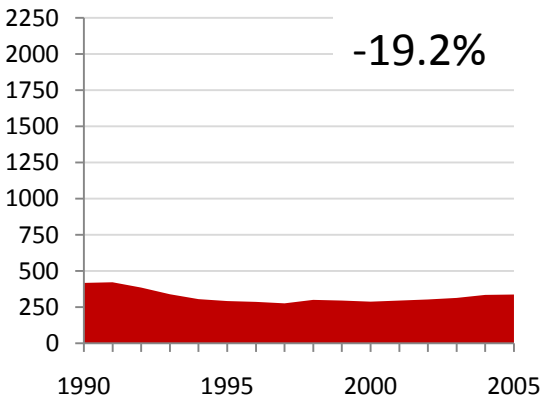
North America



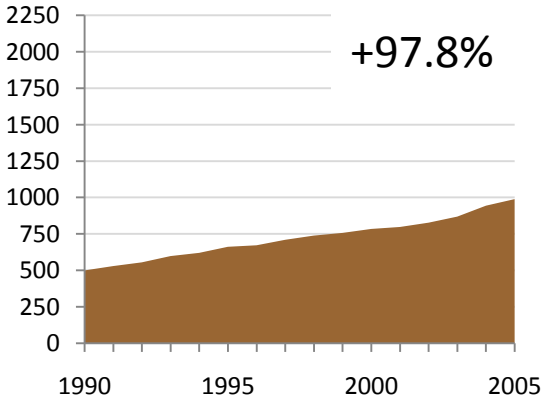
OECD Asia



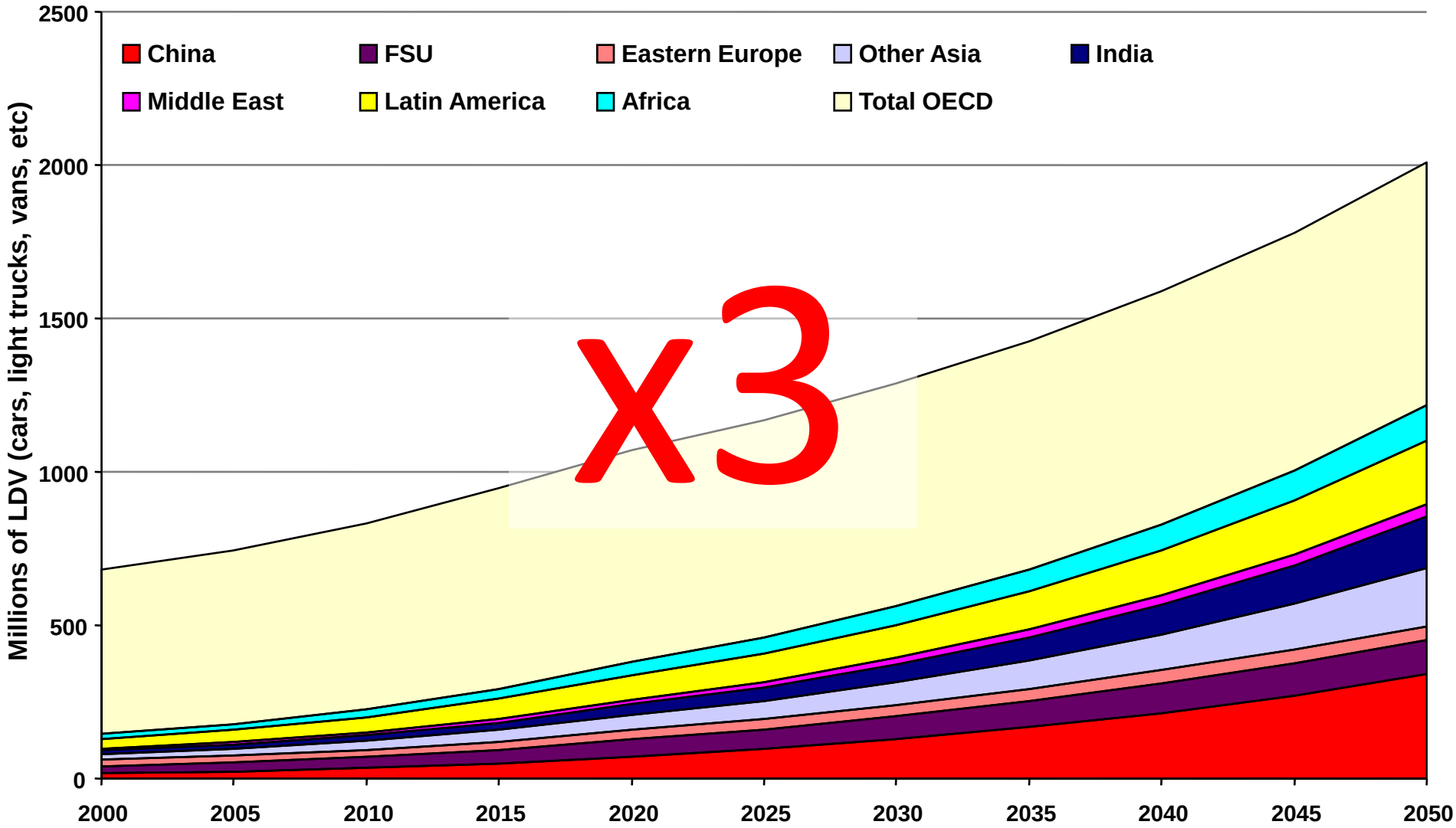
Other ITF



Top 10 non ITF



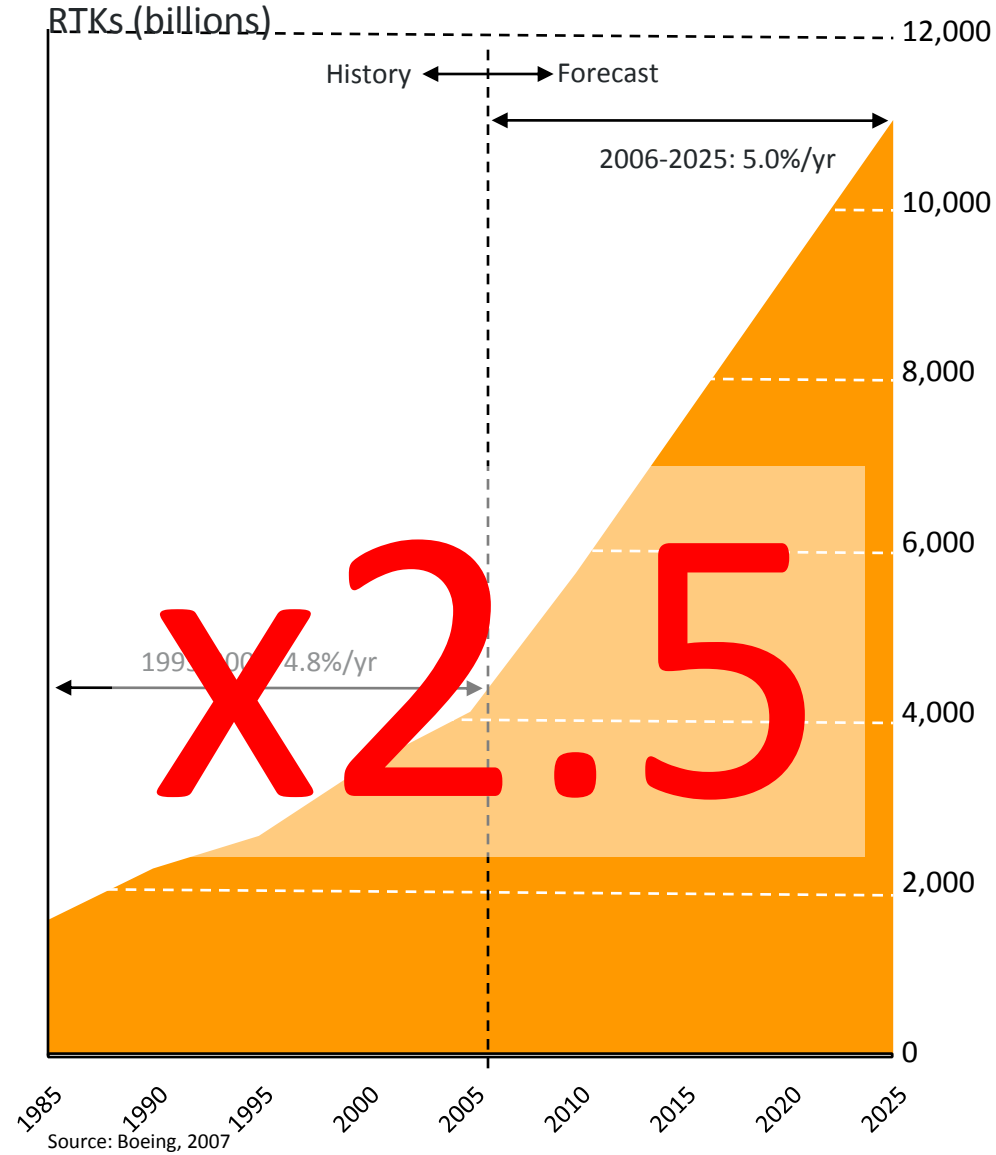
World Motorization: WBCSD Projections



Source: IEA

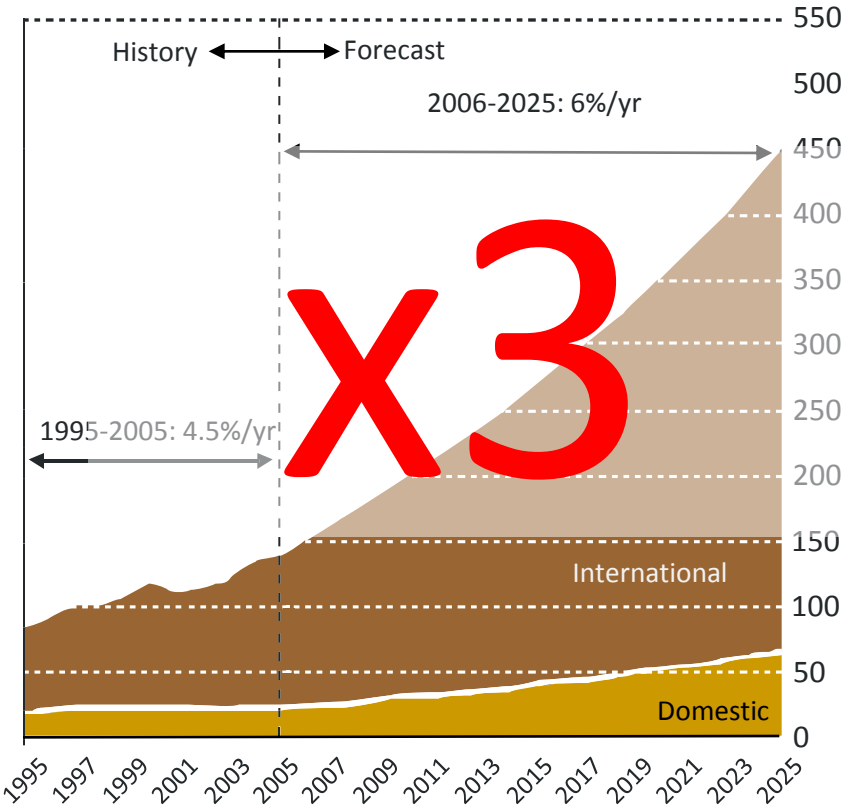
Future trends

Air Passenger Traffic Development



Source: Boeing, 2007

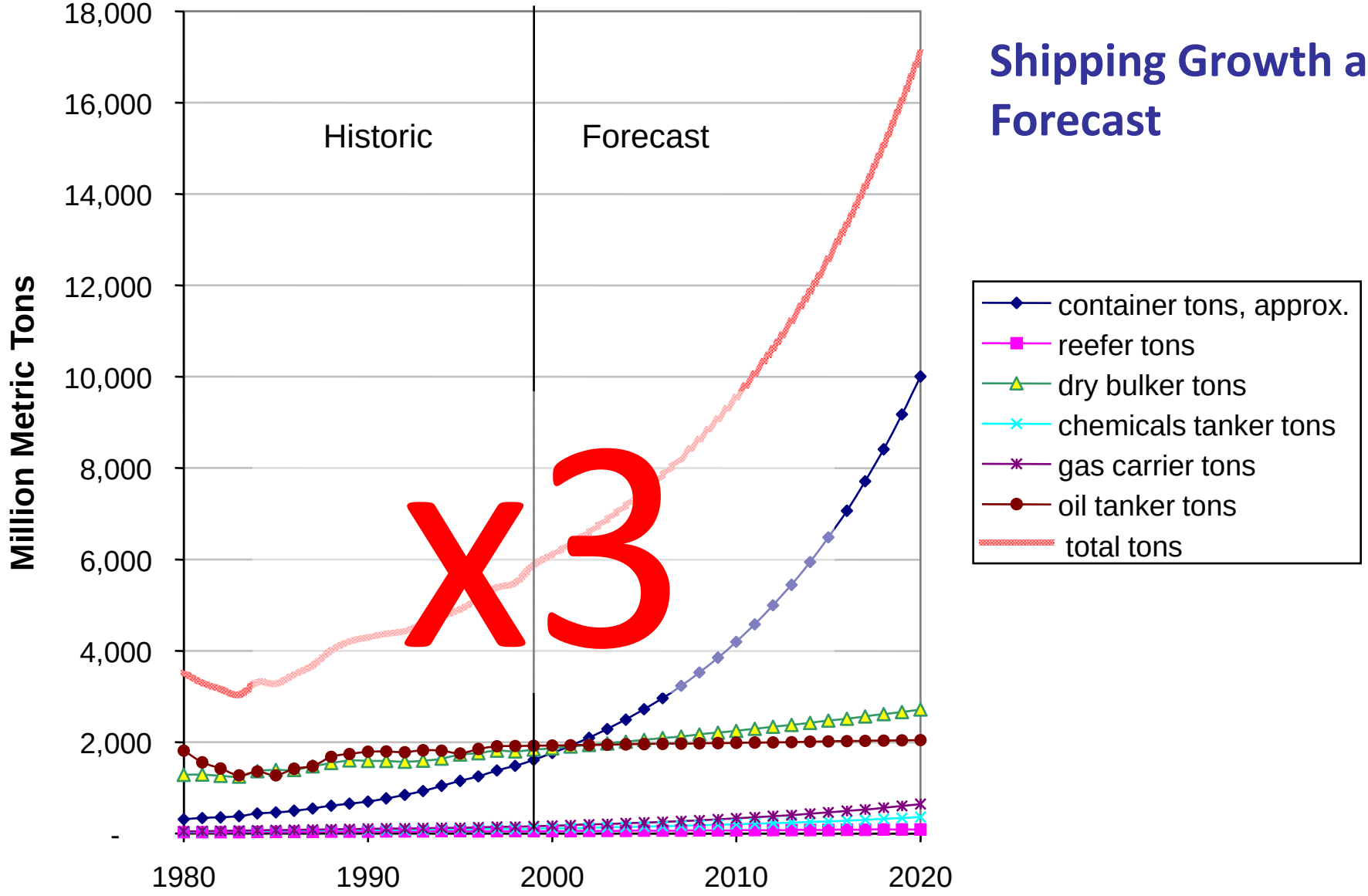
Air Cargo Traffic Development



Source: Airbus, 2007

Future trends

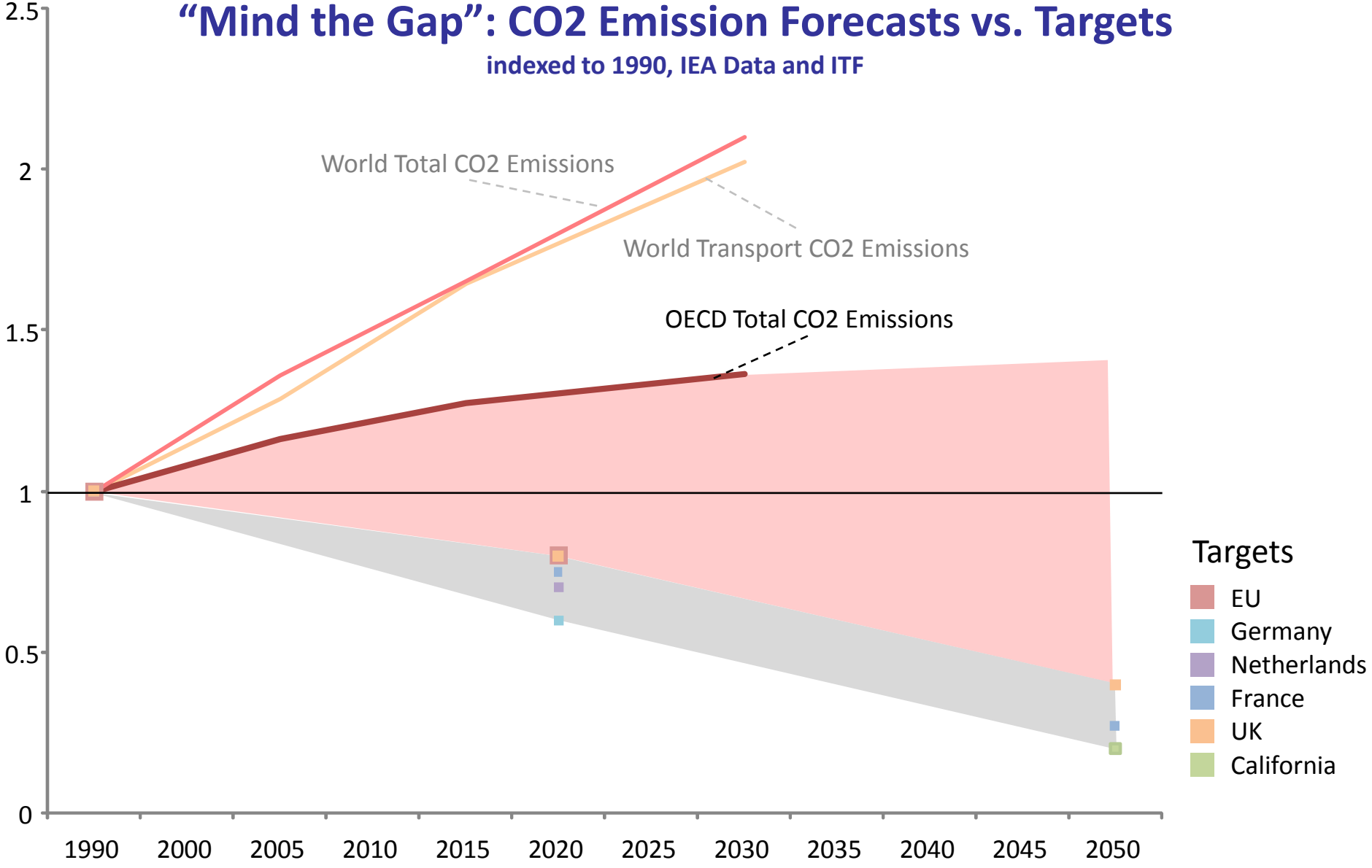
Shipping Growth and Forecast



source: Corbett, 2007

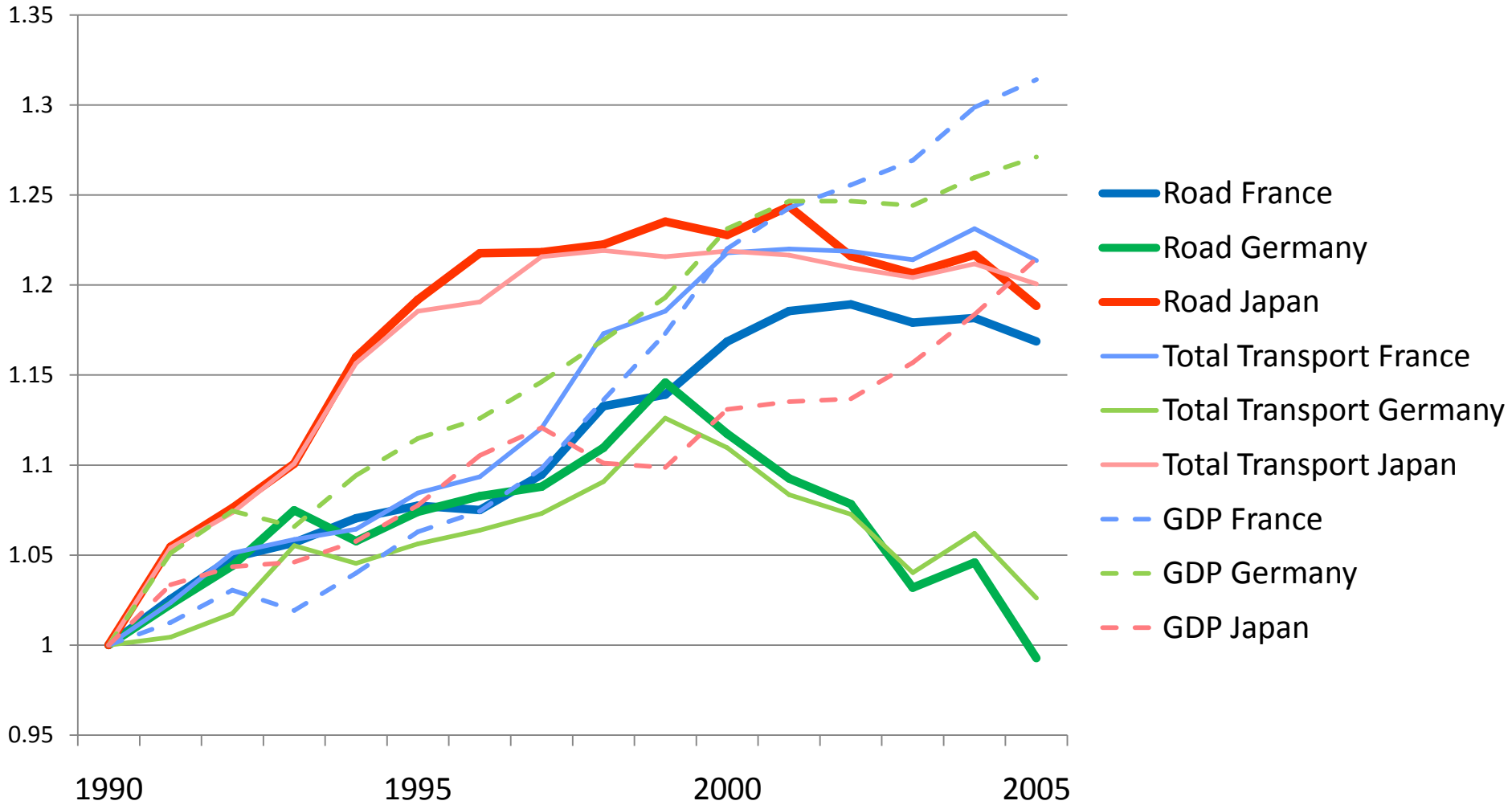
"Mind the Gap": CO2 Emission Forecasts vs. Targets

indexed to 1990, IEA Data and ITF



Decrease in Transport CO2 Emissions: 2002-2005

Indexed to 1990, IEA data, France, Germany and Japan



Outline

"Mind the Gap": Trends in the Transport Sector

Which Policies at What Cost?

- Our review of Transport GHG Policies
- Decision framework: Cost Effectiveness
- Evidence of Transport GHG Marginal Abatement Costs
- Focus on Fuel Efficiency and Biofuels

Transport Policy Implications and Priorities

What is being done?

Analysis of over 400 policies identified

		% of policies
Demand	Urban planning to discourage sprawl; Road pricing; Logistics optimisation.	**4%**
Fuel efficiency -Technical - On-road	Tax differentiation to promote EFVs;	**31%**
	Vehicle efficiency regulations – CAFE, Top-Runner;	
	Driver training; Car pooling;	**16%**
	Logistics management, route planning / guidance.	
Carbon intensity	Biofuel targets and tax incentives; Hydrogen fuel cell R&D; Incentives for CNG buses.	**24%**
Modal split	Targeted subsidies for public transport.	**28%**

What is being done?

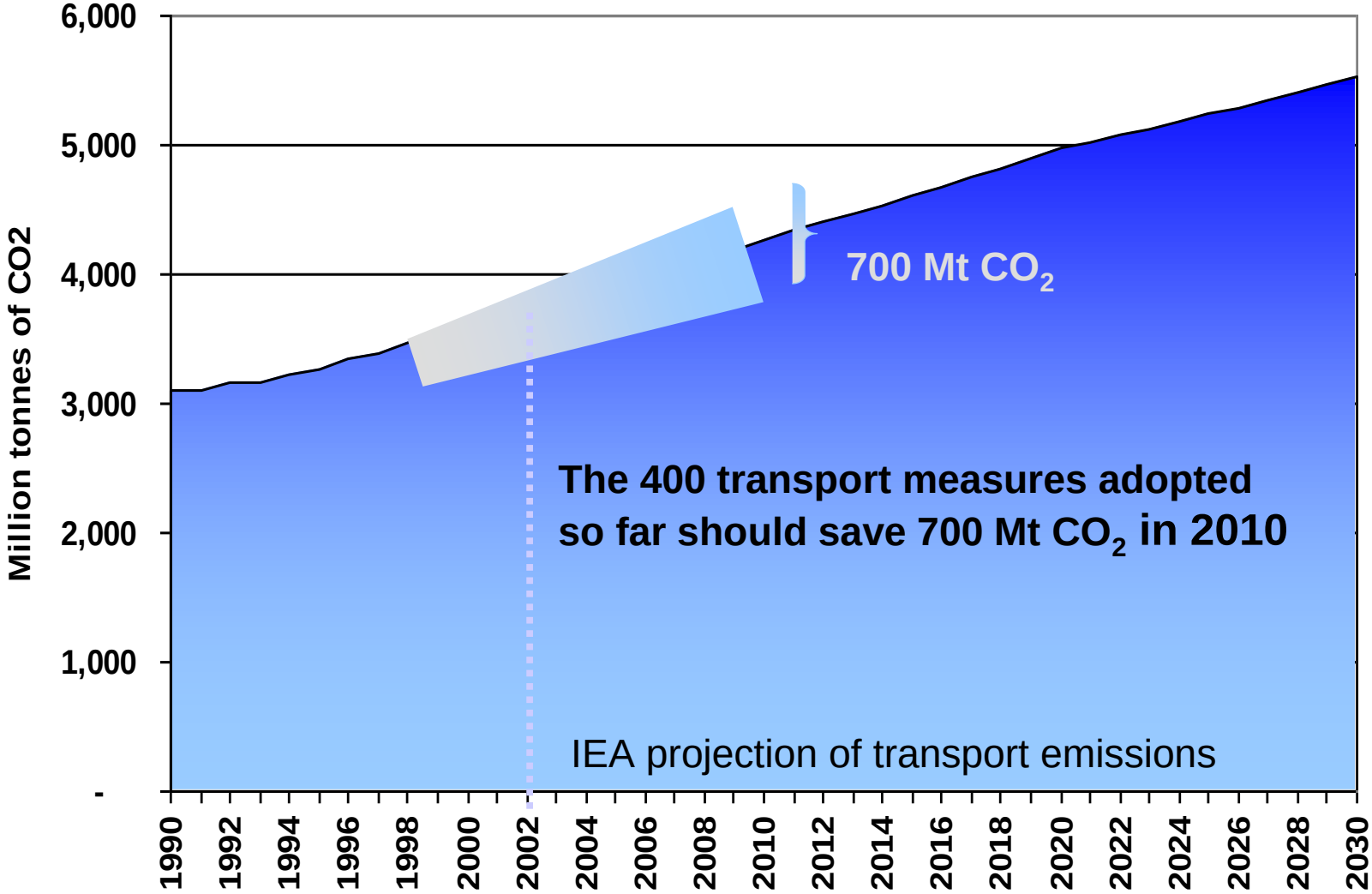
Analysis of policies identified

Top Policy Combinations	Ave % impact *	No. of ITF Countries
Fuel tax policy	*7.1*	6
Vehicle fuel efficiency/voluntary agreement	*4.6*	EU + 3
Vehicle efficiency tax incentives	*4.3*	17
On road eff. education / training	*2.8*	11
Biofuels regulation	*2.6*	3
Fuel efficiency information	*2.2*	11
Road pricing	*2.1*	3

* CO_2 abated by national measure / total domestic transport CO_2 emissions

What is being done?

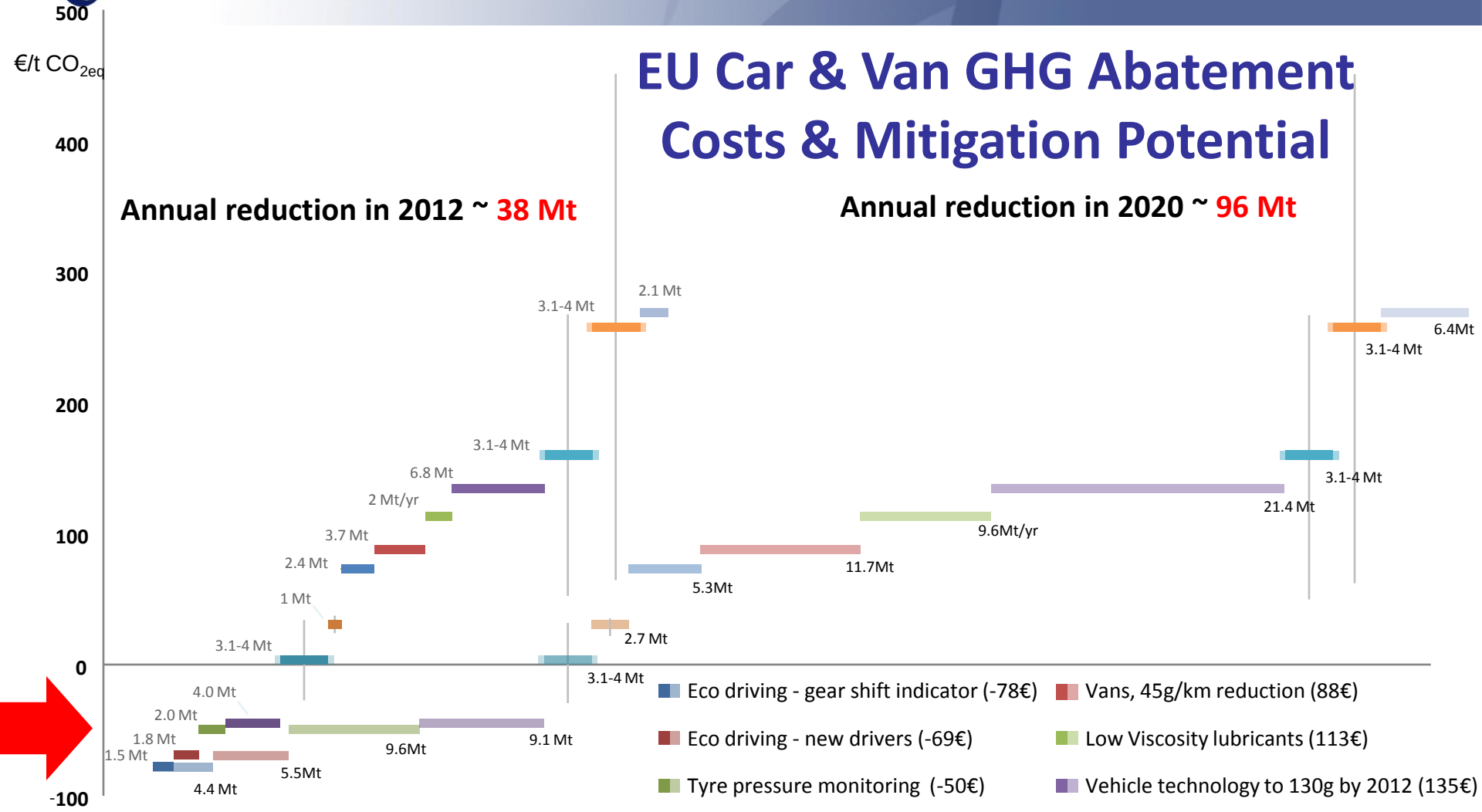
ITF Transport Sector Emissions: Potential Impact of Current Policies



Cost-effectiveness matters

- Cost-effectiveness fundamental determinant of which abatement policies to adopt
- 2nd best argument – transport should mitigate more because limited de-localisation effects
- Transport reported to have high marginal abatement costs, evidence that this is not so much the case
  - *More rigourous abatement cost analysis needed*
- High cost measures have attracted political support: Hydrogen, Biofuels, Modal shift, Hybrids
- Despite low effectiveness or robust quantification of GHG reduction
- Effective measures have weak political support

EU Car & Van GHG Abatement Costs & Mitigation Potential



Source: TNO, IEEP, LATS

Core Vehicle Technology

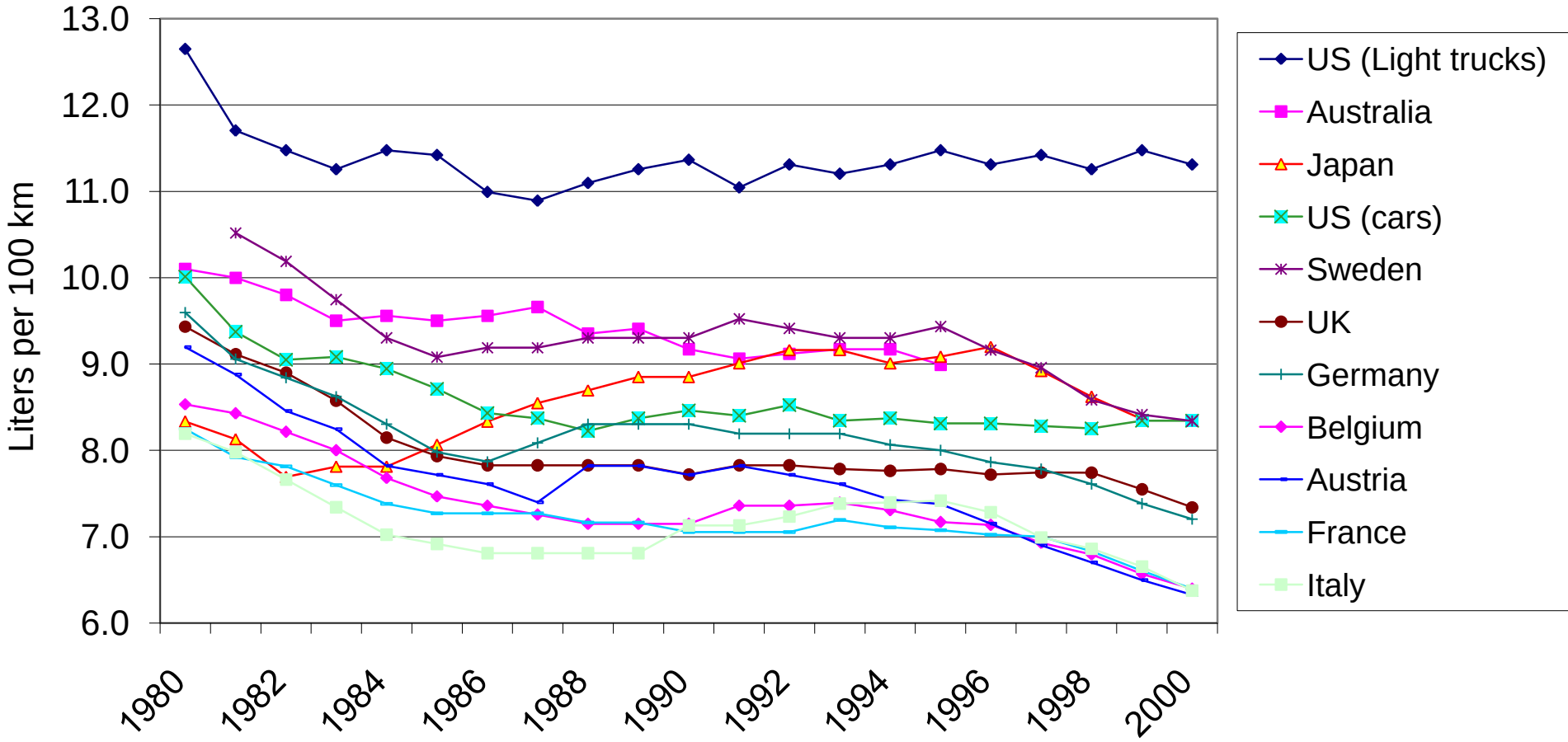
Technology	Δ efficiency	Cost/vehicle £
Direct injection & lean burn	10 - 13%	200 - 400
Variable valve actuation	5 - 7%	175 - 250
Engine downsizing with turbocharging	10 - 15%	150 - 300
Dual clutch transmission	4 - 5%	400 - 600
Stop-start	3 - 4%	100 - 200
Stop-start with regenerative braking	7%	350 - 450
Electric motor assist	7%	1000
Reduced friction components	3-5%	negligible
Lightweighting	10%	250 - 500
Low rolling resistance tyres	2 - 4%	50 - 100
Aerodynamics	2 - 4%	negligible

Source: King 2007 based on IEA, IEEP, CARB, Ricardo.

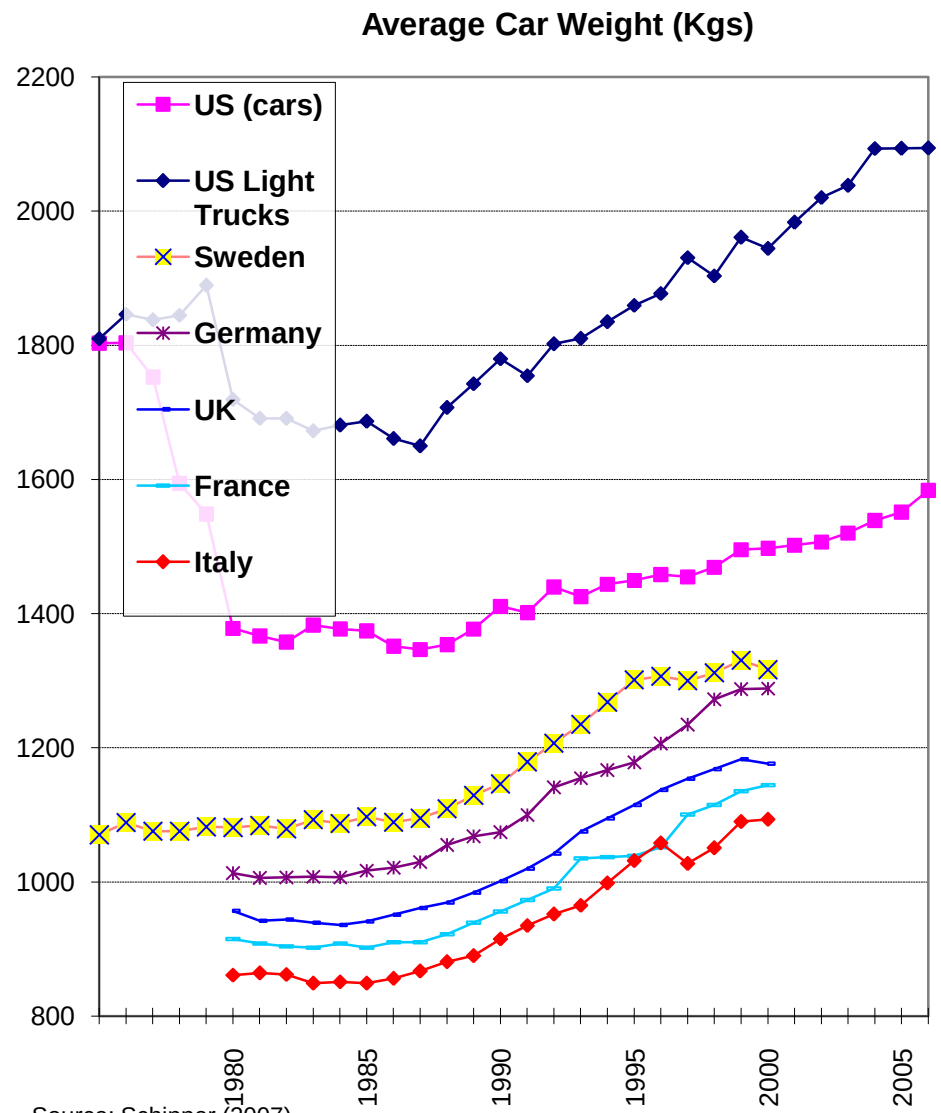
Fuel Efficiency: Potential

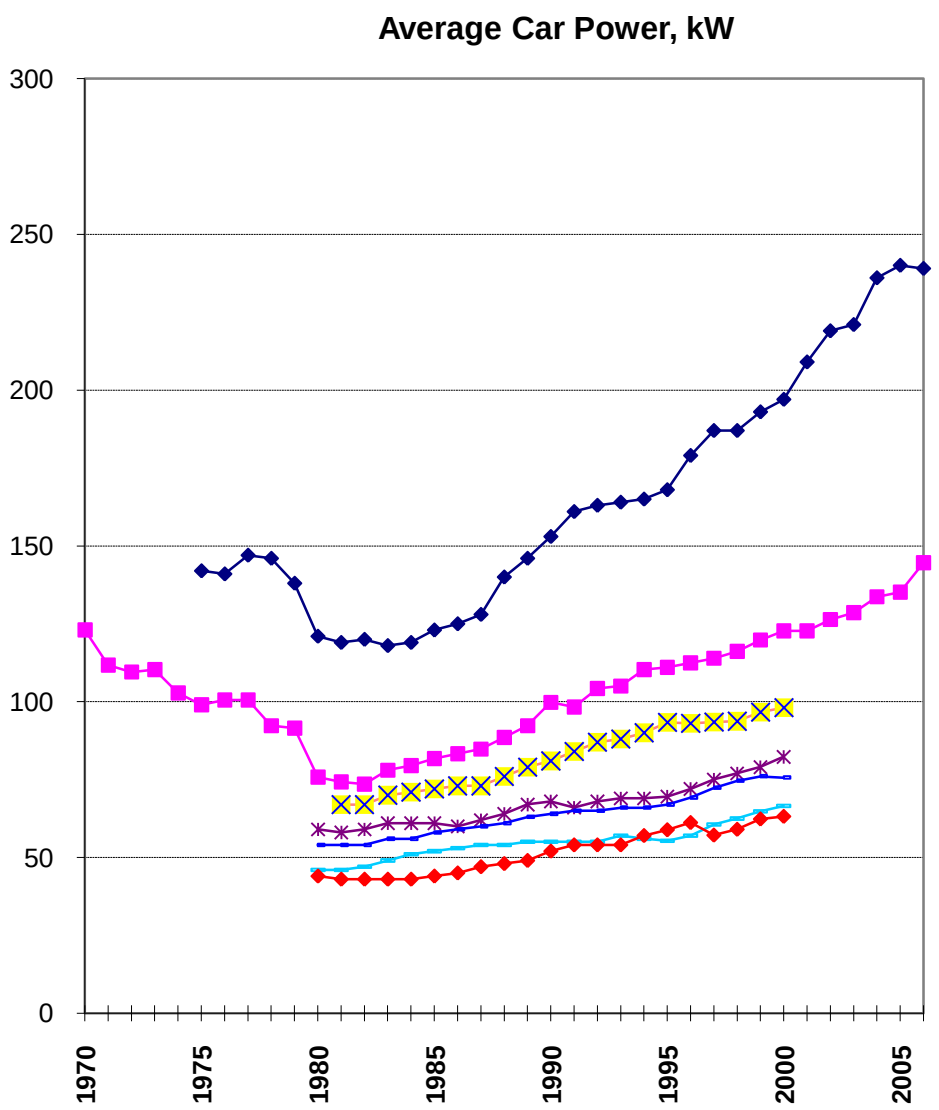
- Tyres, cruise control, air con effective, lubricants: combined these could save up 5-10% of fuel.
- Diesels: lower potential for improvement
- Reducing vehicle weight important: evidence indicates this can be done without compromising safety
- More ambitious measures might deliver up to a factor 2 improvement by 2035 – but this will be challenging and a crucial question remains: how will people use their fuel savings?

Evolution of New Car Fuel Economy



Evolution of New Car Weight and Power





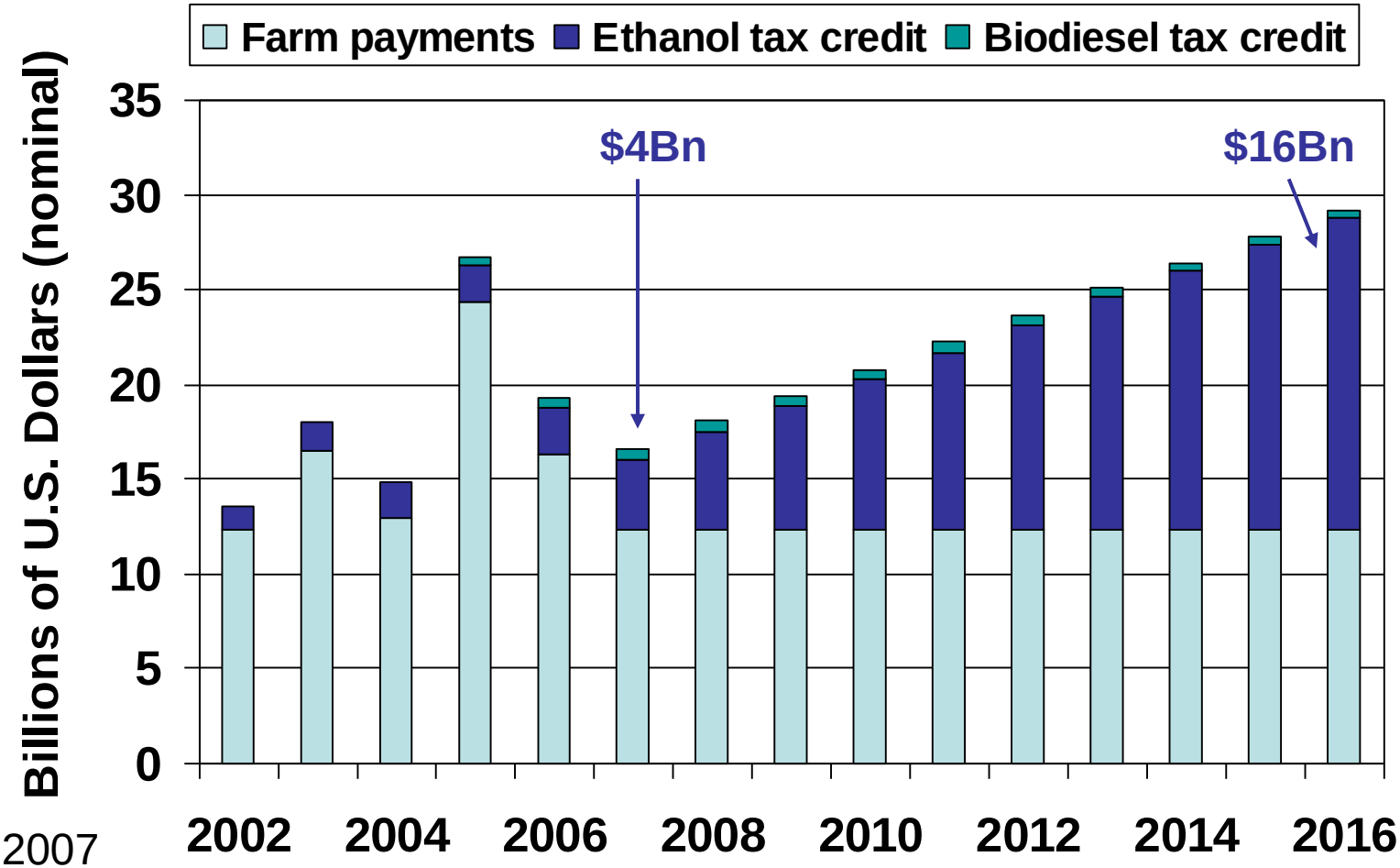
Source: Schipper (2007)

High cost GHG mitigation: Biofuel subsidies

Average performance	Euros/tCO_{2eq}	USD
US corn-ethanol	390	520
EU sugar-beet ethanol	450—620	610—840
EU rapeseed biodiesel	750—990	1 000—1 340

Sources: Koplow 2007; Kutas *et al.*, 2007.

US biofuel tax subsidies to grow and grow



GSI 2007

Designing support for Biofuels

- Volumetric targets inappropriate

  Likely to favour worst performing, lowest cost production

- Transport fuel carbon content targets better
- Certification for biofuels production
- Fuel carbon taxes, including for biofuels, would be more cost-effective than subsidies or targets

Outline

- "Mind the Gap": Trends in the Transport Sector
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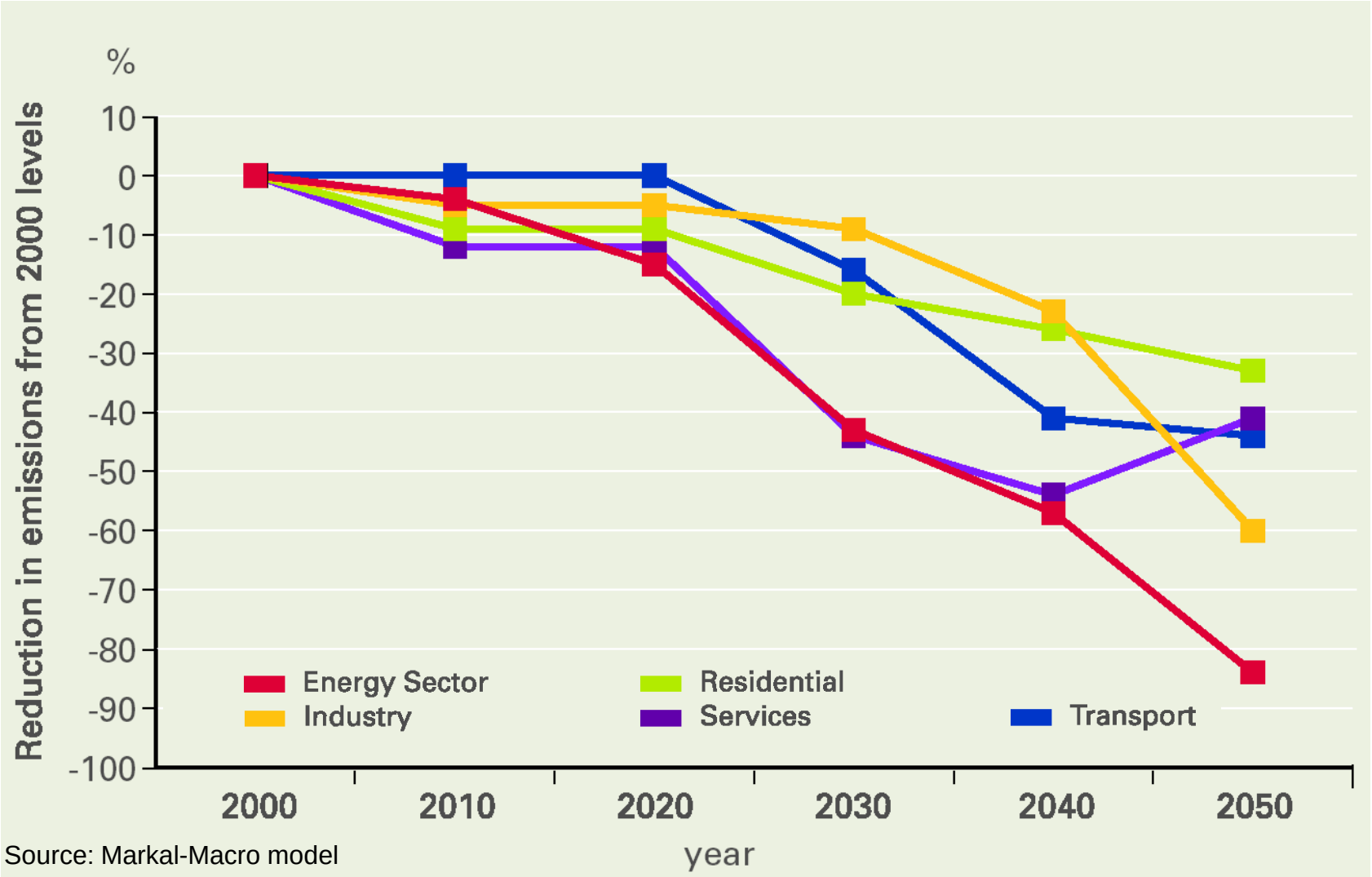
Policy package (1/2)

- Integrated packages of measures needed
  - Vehicles, fuels, demand management, modal shift : fiscal and regulatory
  - mix depends on context
- Pricing important: London and Stockholm = -20%CO2, German MAUT?
- Public Transport, Integrated Land Use Planning, Strategic Infrastructure Investment all can have large co-benefits… and can deliver other benefits even if climate impact difficult to quantify.
- … but they deliver GHG reductions on different time scales

Long-term: UK

UK Modeled CO2 Emission Reductions by Sector

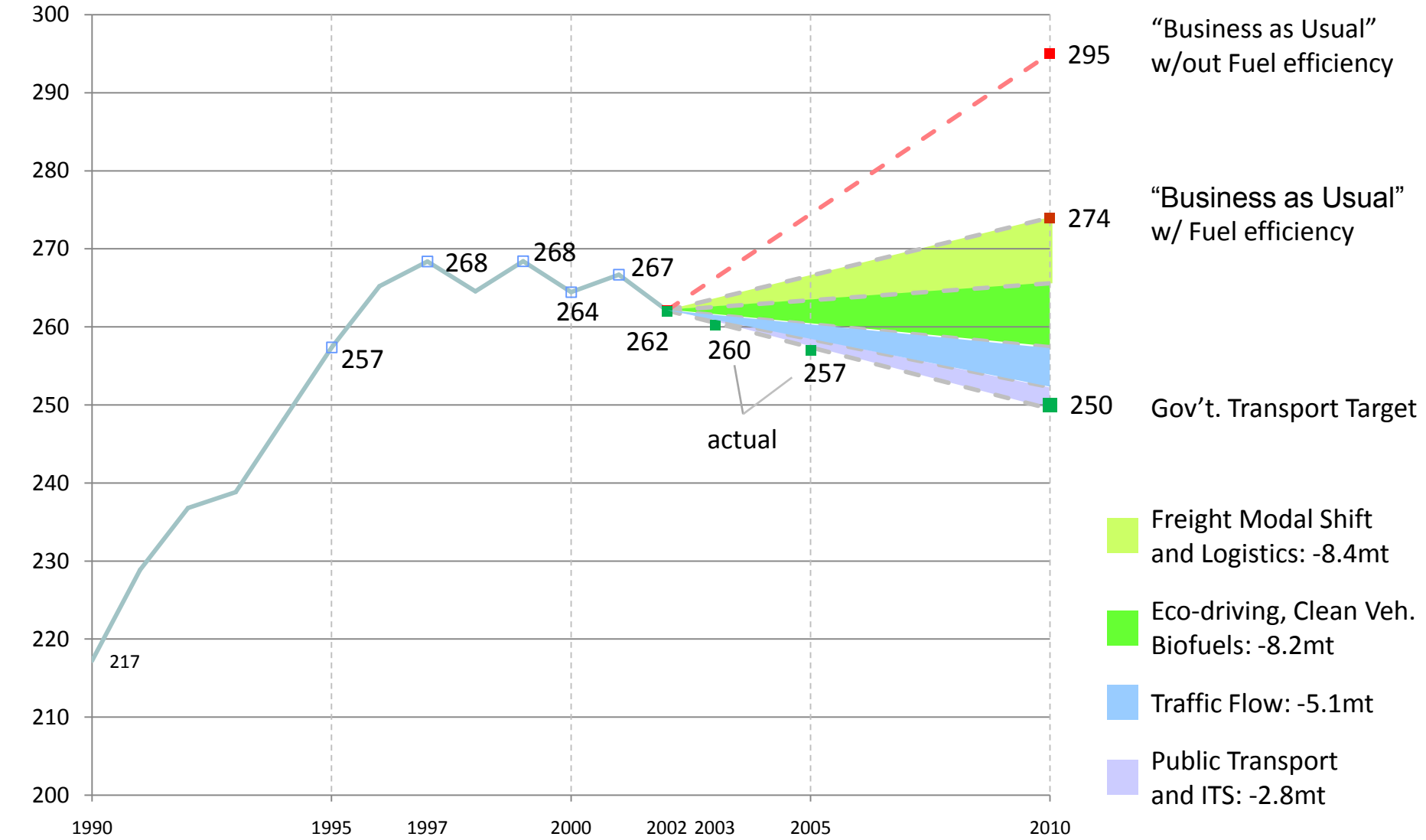
Scenario Showing Least Cost Route to 60% Reduction by 2050



Source: Markal-Macro model

Short-term: Japan

Transport CO2 Reduction Strategy 2002-2010, Japan



source: MLIT, 2007

Policy package (2/2)

- Vehicle efficiency measures deliver the most quantifiable cuts
- Off-cycle components and eco-driving are most cost-effective
  - Significant, immediate savings – should be core measures
  - Give more attention to efficiency, away from only fuels & modal shift co-benefits approach (currently 1/3 of all national policies reported)

Some Priorities for Road Transport

- Certification of Biofuels, volume targets to become quality targets.
- Differentiate vehicle taxes by CO_2
- New low cost efficiency measures – Identify responsibility for implementation
- Develop off-test vehicle component standards / incentives
- Include CO2 in transport appraisal
- Increase understanding of transport abatement costs
- Ultimately, we need a price on Carbon.

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Thank You

For more information:

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www.cemt.org