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

Mr. Philippe Crist, Joint Research Centre of the International Transport Forum and the Organisation for Economic Co-operation and Development

UNEP – Geneva, February 11, 2008

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

Outline

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

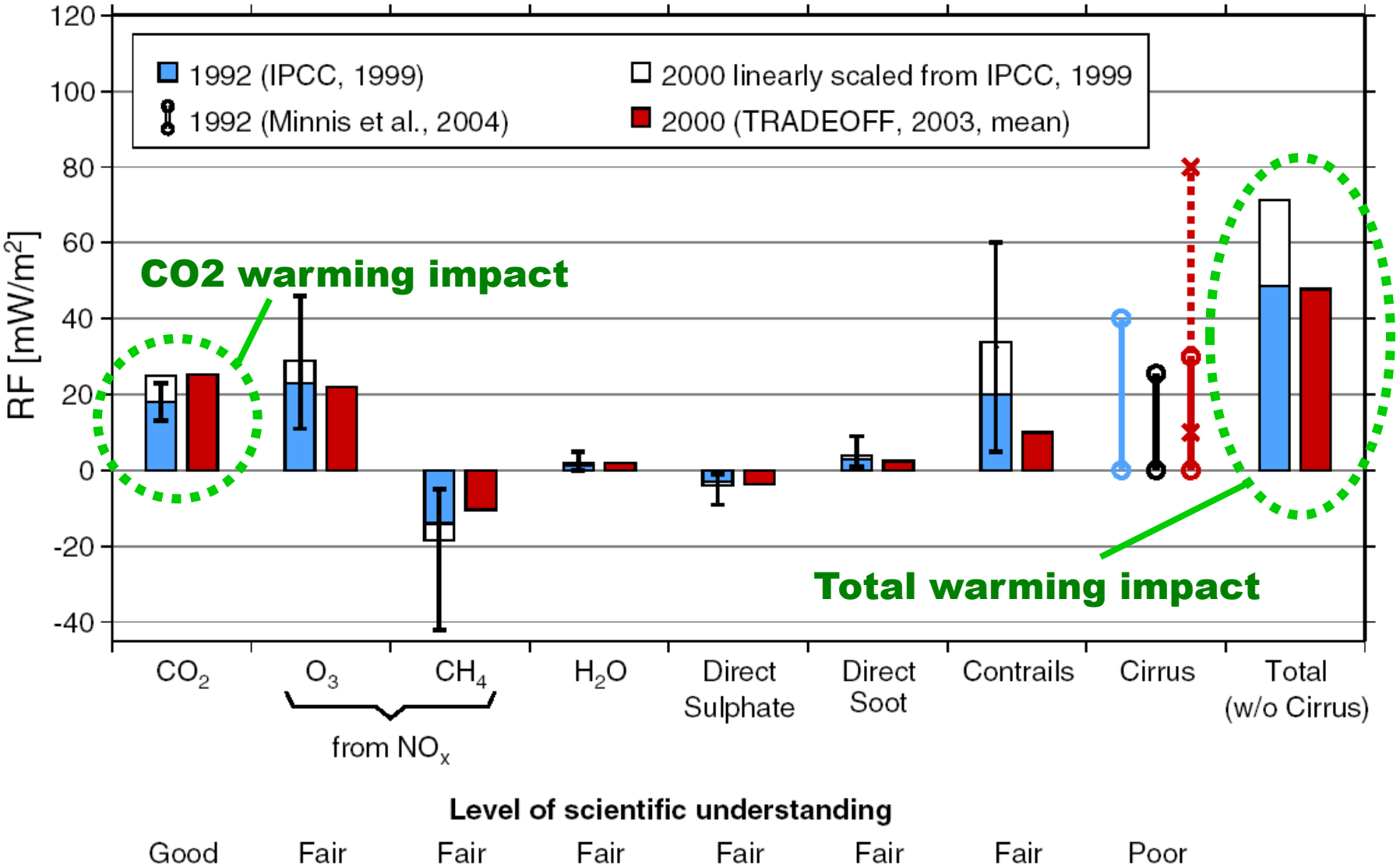
Linking Emissions to Damages

1. **Emissions**
   Kyoto Gases: Carbon Dioxide, Methane, Nitrous Oxide, H-gases… but also NOx, SOx, Black soot, Water vapour, other atmospheric-reactive compounds and effects (contrails)
2. **Atmospheric Concentrations:**
   Depends on interaction with other emissions, strength of sinks (extraction from the atmosphere), persistence in atmosphere
3. **Radiative Forcing**
   Actual impact on atmospheric temperatures, not constant factor (depends on atmospheric concentrations), can be pos., neg. or both depending on point of emission/concentration
4. **Climate Change**
   Changes in: average atmospheric temperatures, amount and pattern of precipitation, wind strength and patterns, soil moisture, frequency and strength of extreme weather, sea level.
5. **Impacts of Climate Change**
   Agricult. and Forestry (yields and spatial shifts), ecosystems (spatial shifts, loss of key ecosystems and species), energy prod. and cons., water distribution, social effects, etc.…
6. **Damages/Benefits**
   Welfare losses, welfare gains (monetary units – e.g. GDP), other welfare metrics (HDI,GPI, etc)

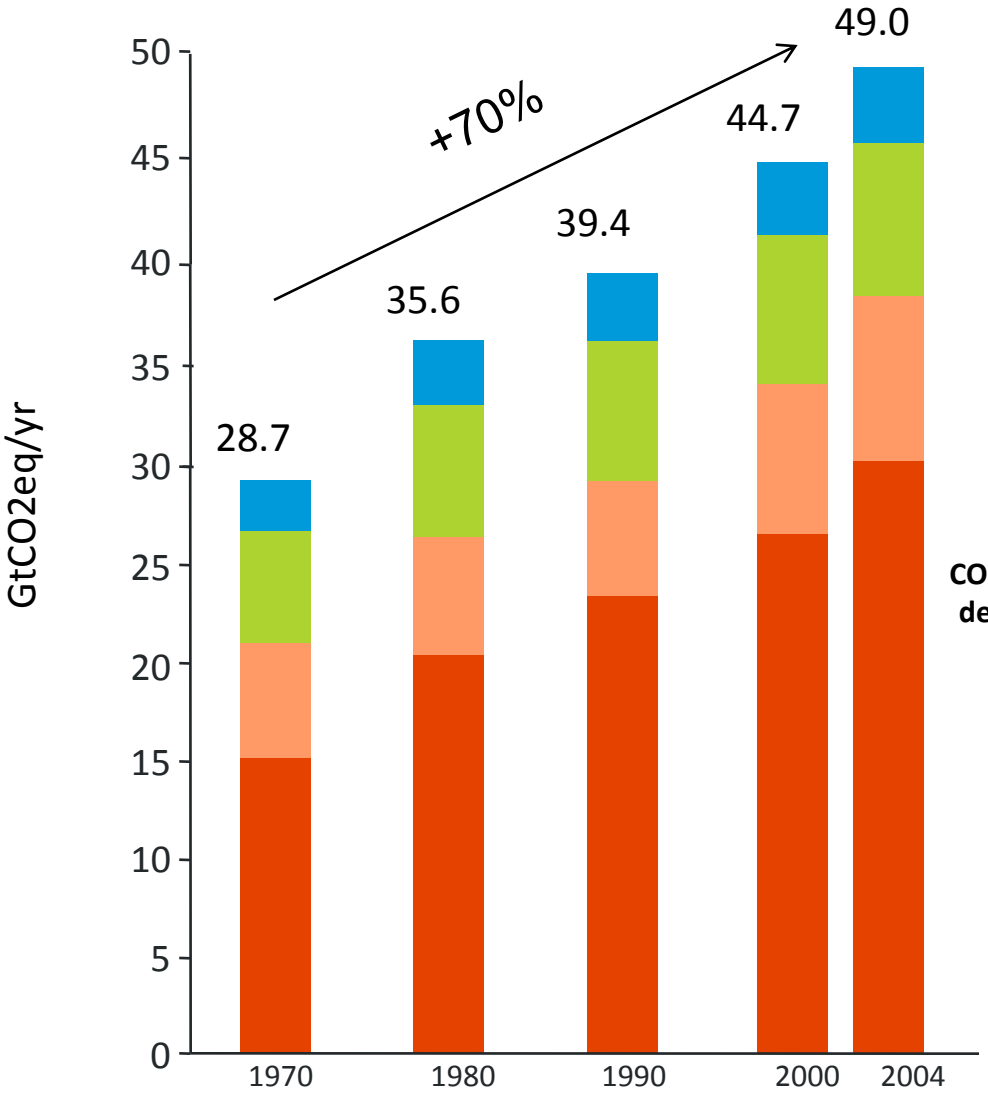
International Transport Forum

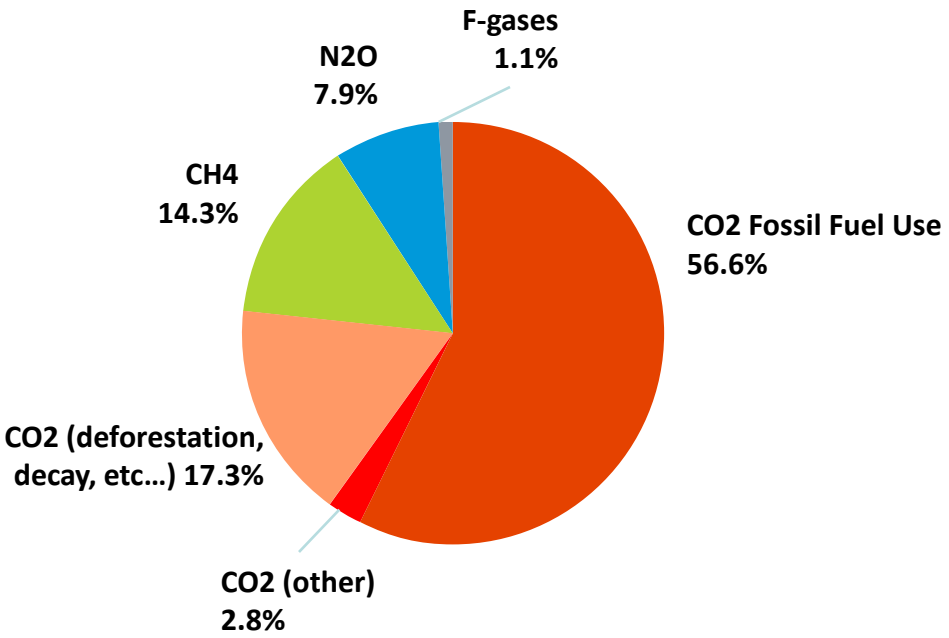
Source: Fuglestevdt et al, 2005

CO2 vs. Total Radiative Forcing from Aviation



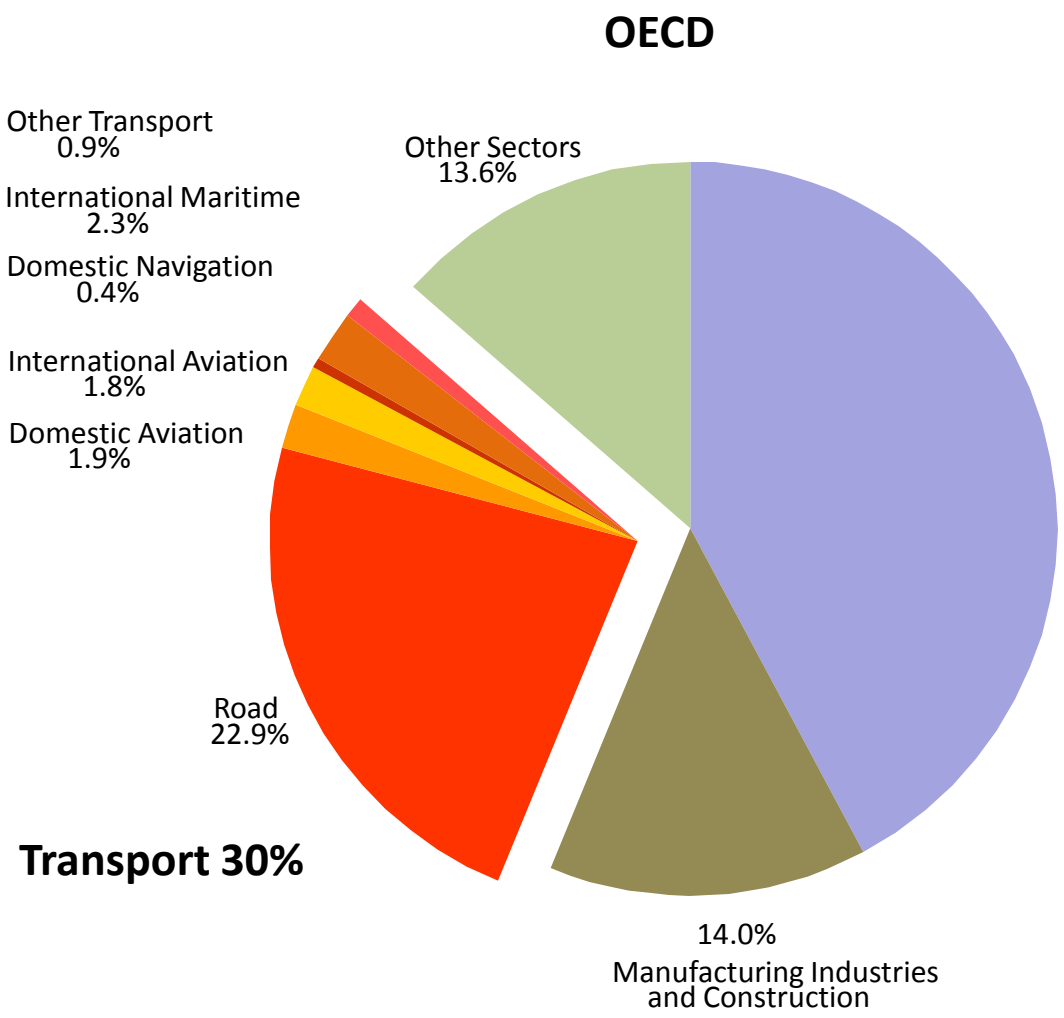
Global Anthropogenic GHG Emissions 1970-2004

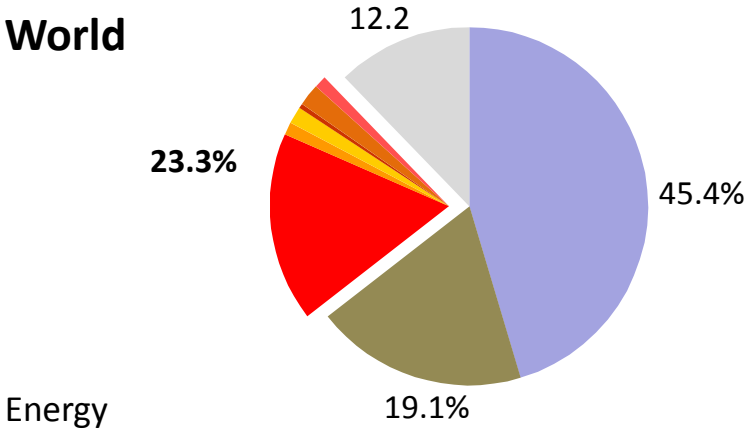


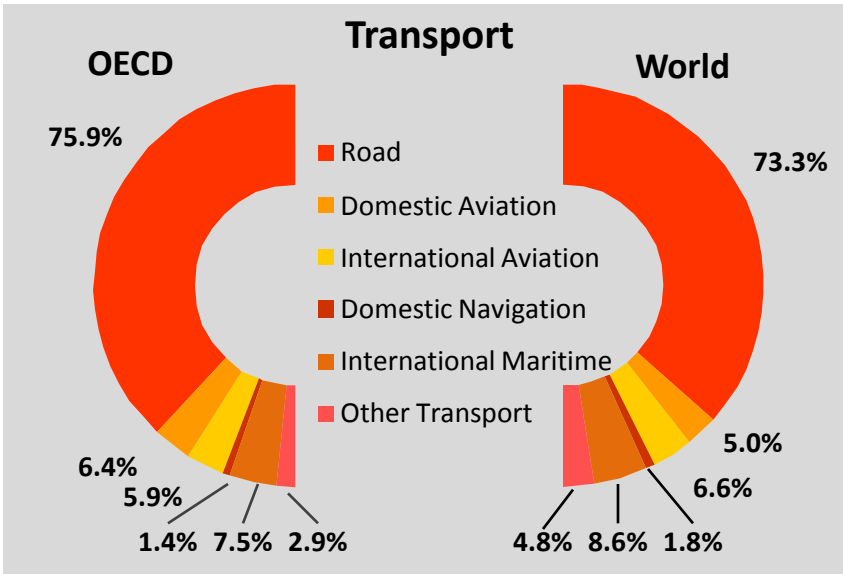


Transport's Share of CO2 emissions from fuel combustion

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



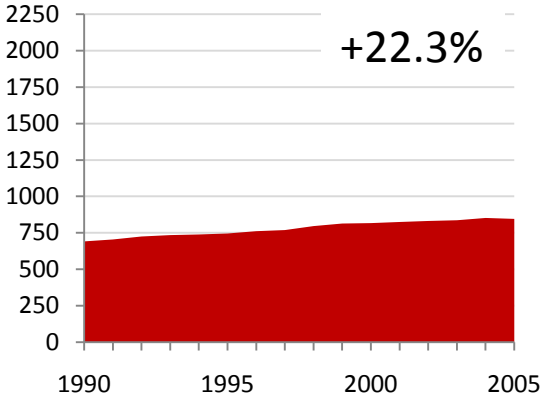




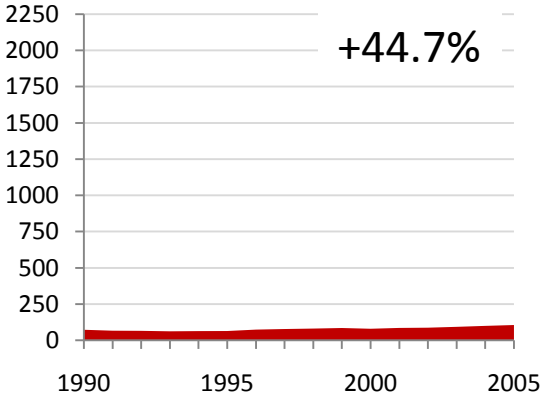
Transport Sector CO2 Emissions by Region: 1990-2005

(excluding international aviation and shipping)

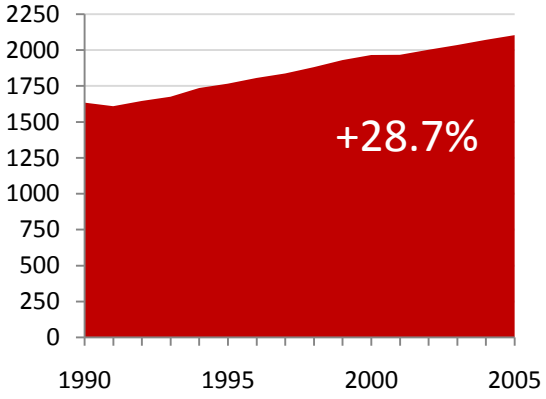
EU-15



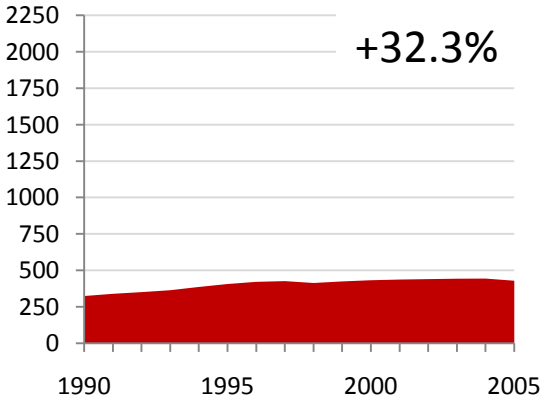
New EU (EU27-EU15)



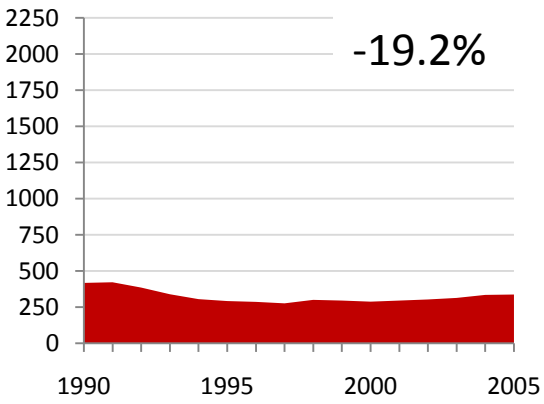
North America



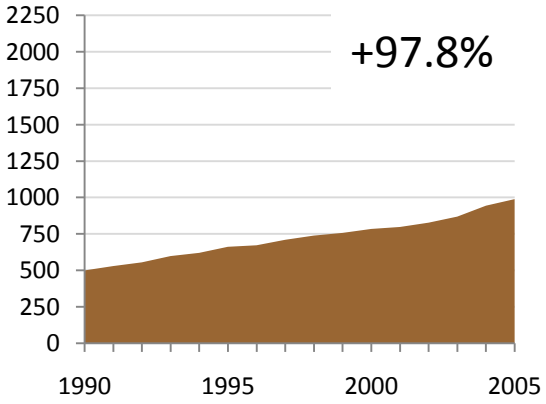
OECD Asia



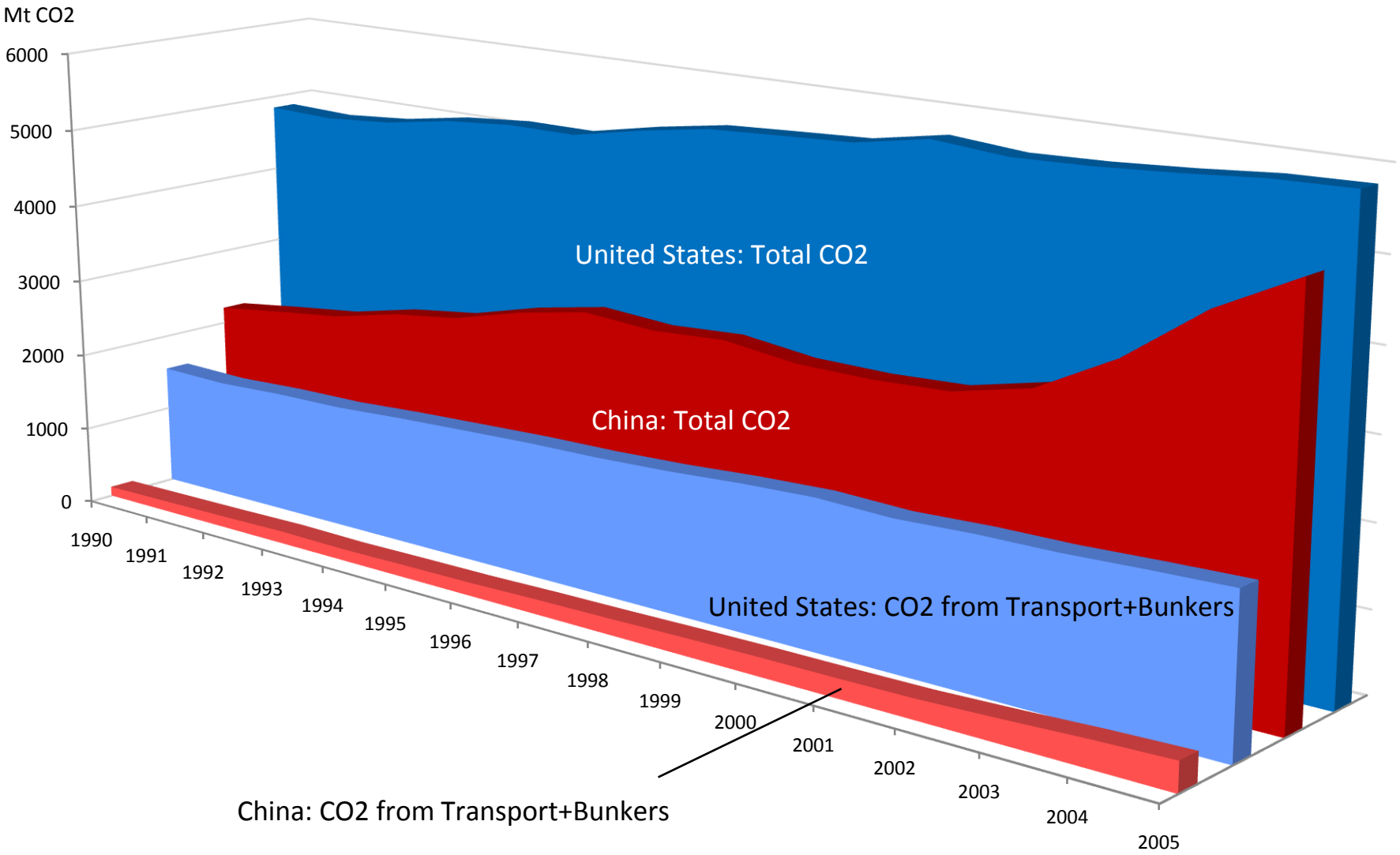
Other ITF



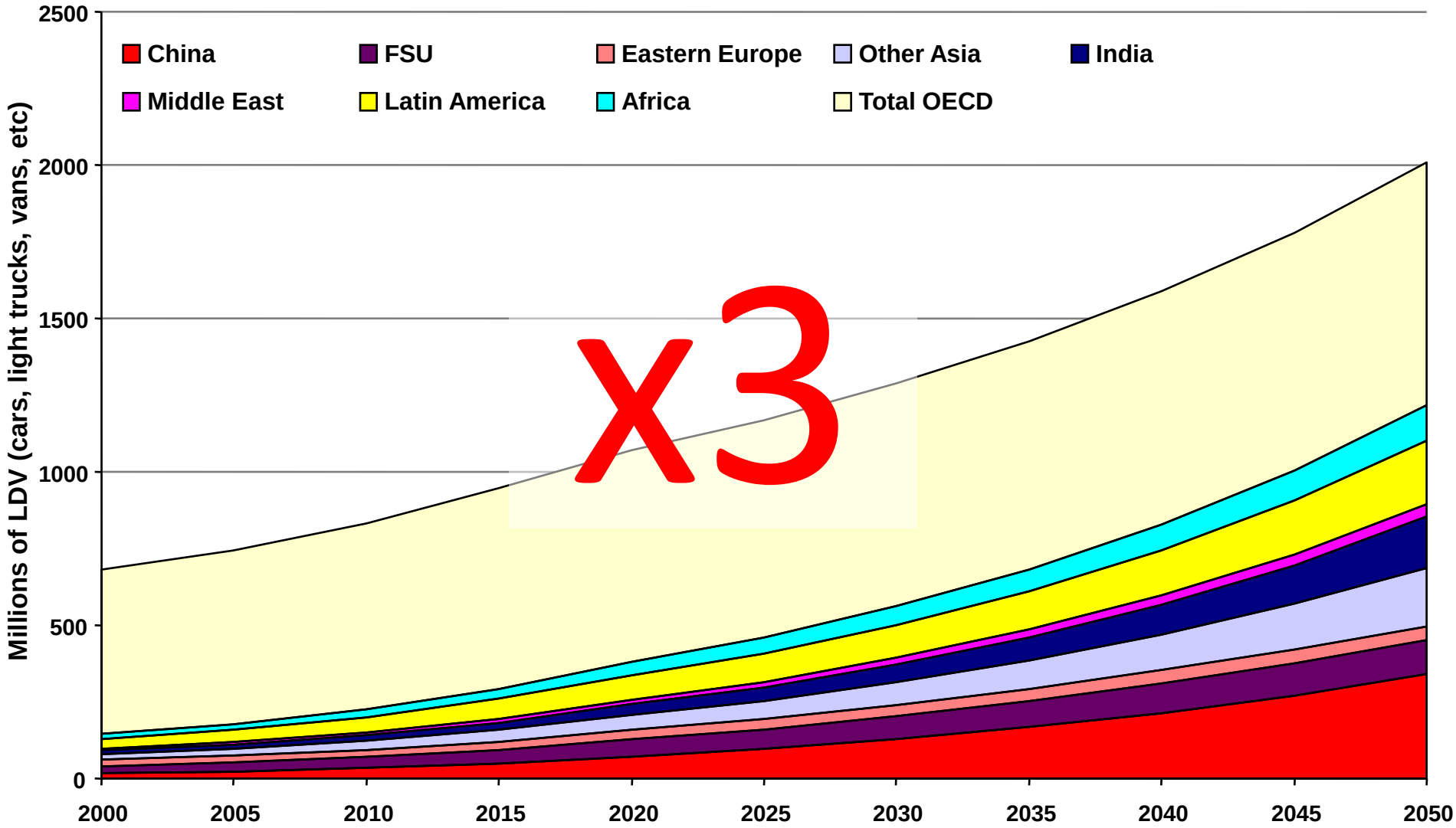
Top 10 non ITF



CO2 Emissions: Comparing China and USA 1990-2005



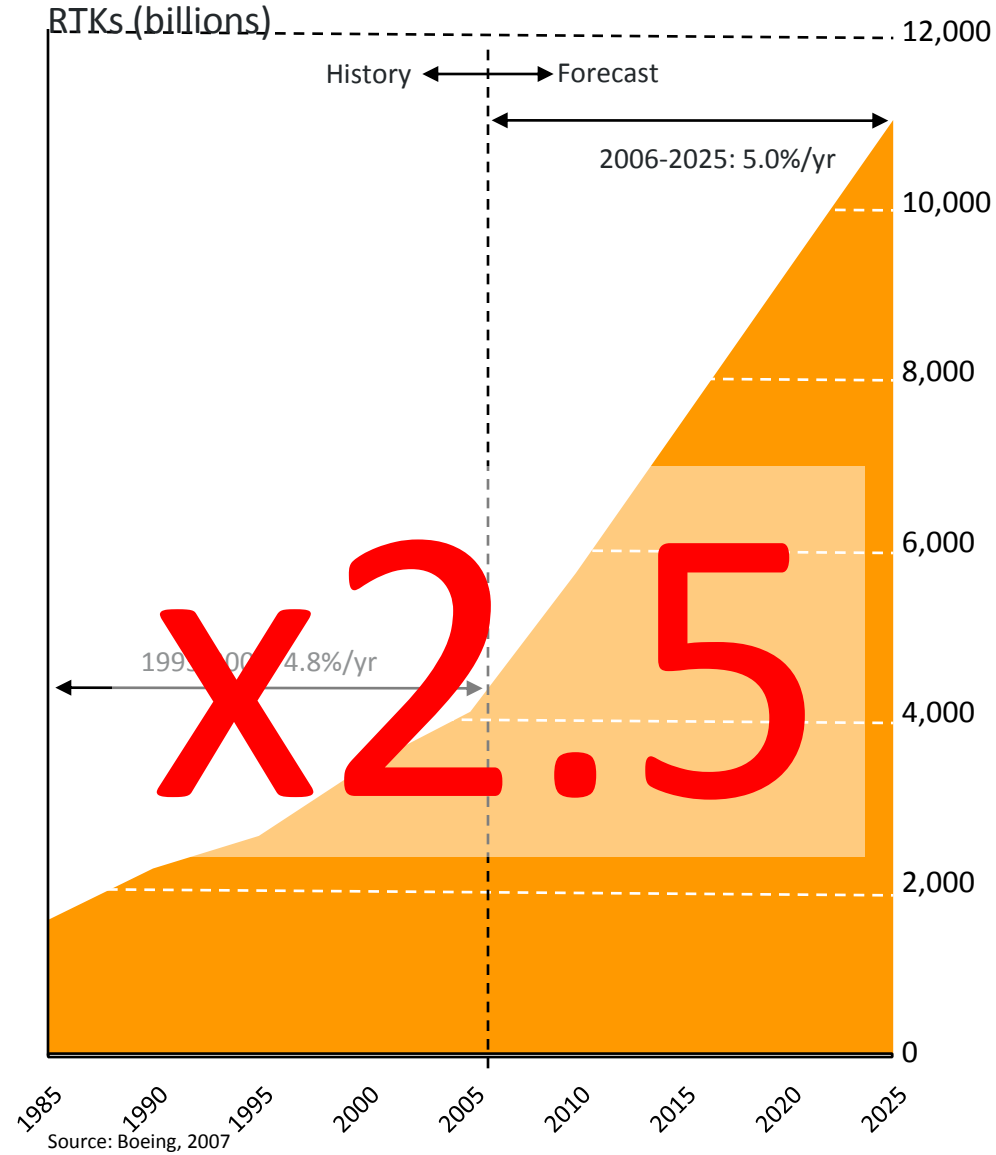
World Motorization: WBCSD Projections



Source: IEA

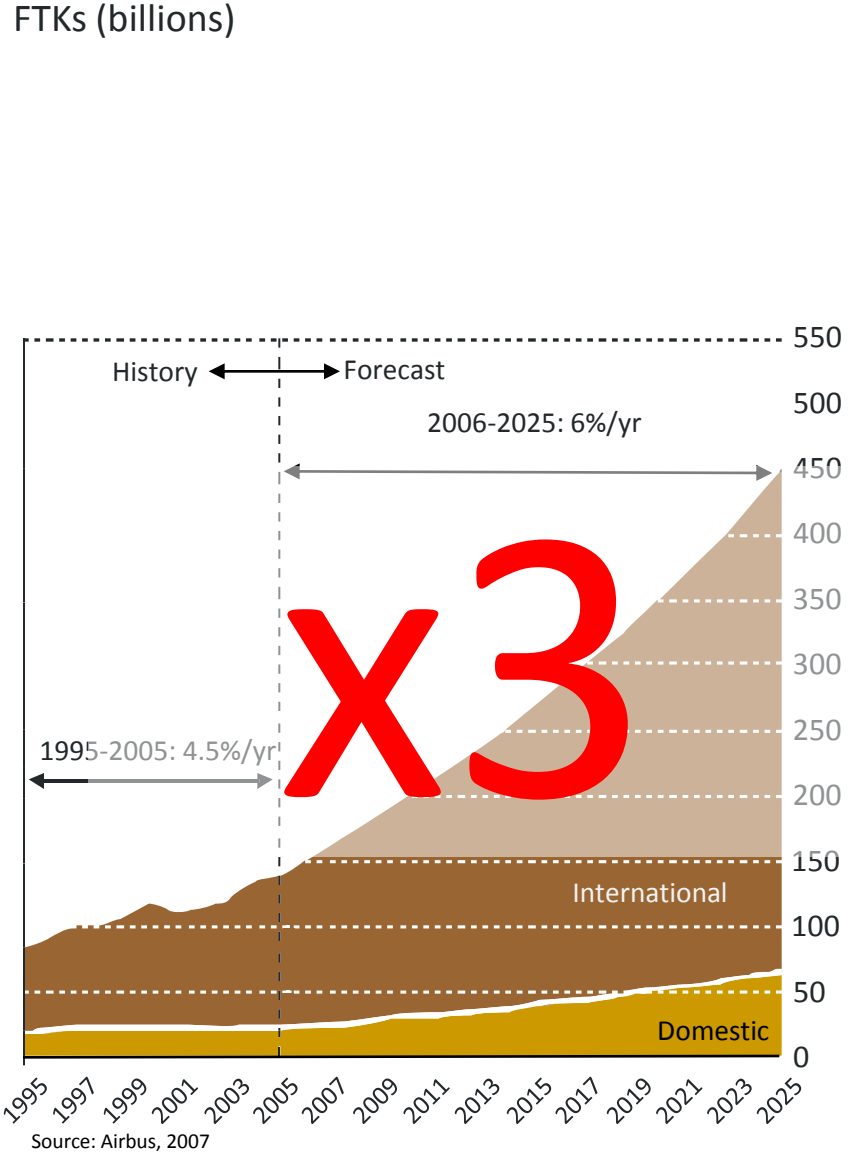
Future trends

Air Passenger Traffic Development



Source: Boeing, 2007

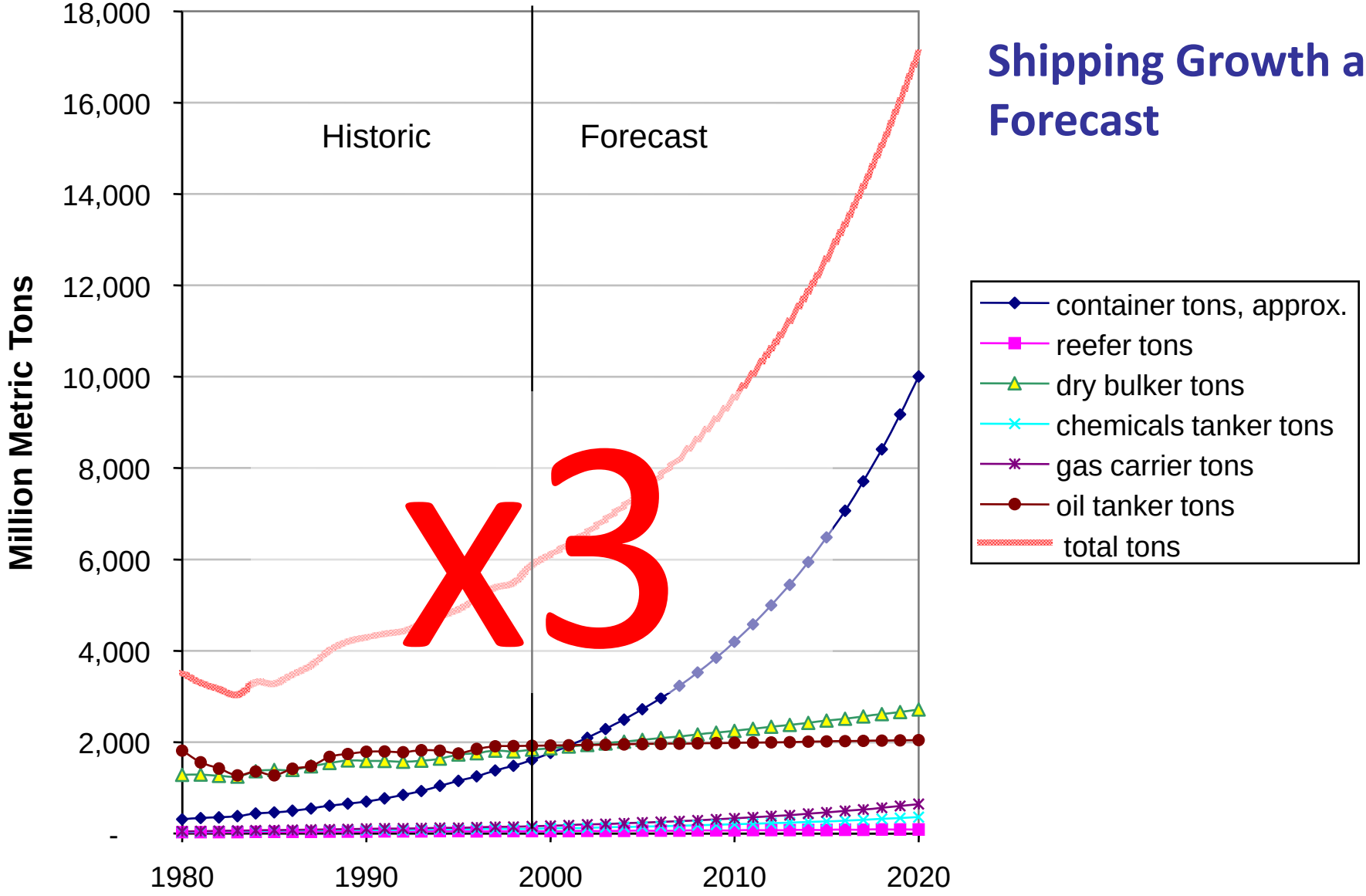
Air Cargo Traffic Development



Source: Airbus, 2007

Future trends

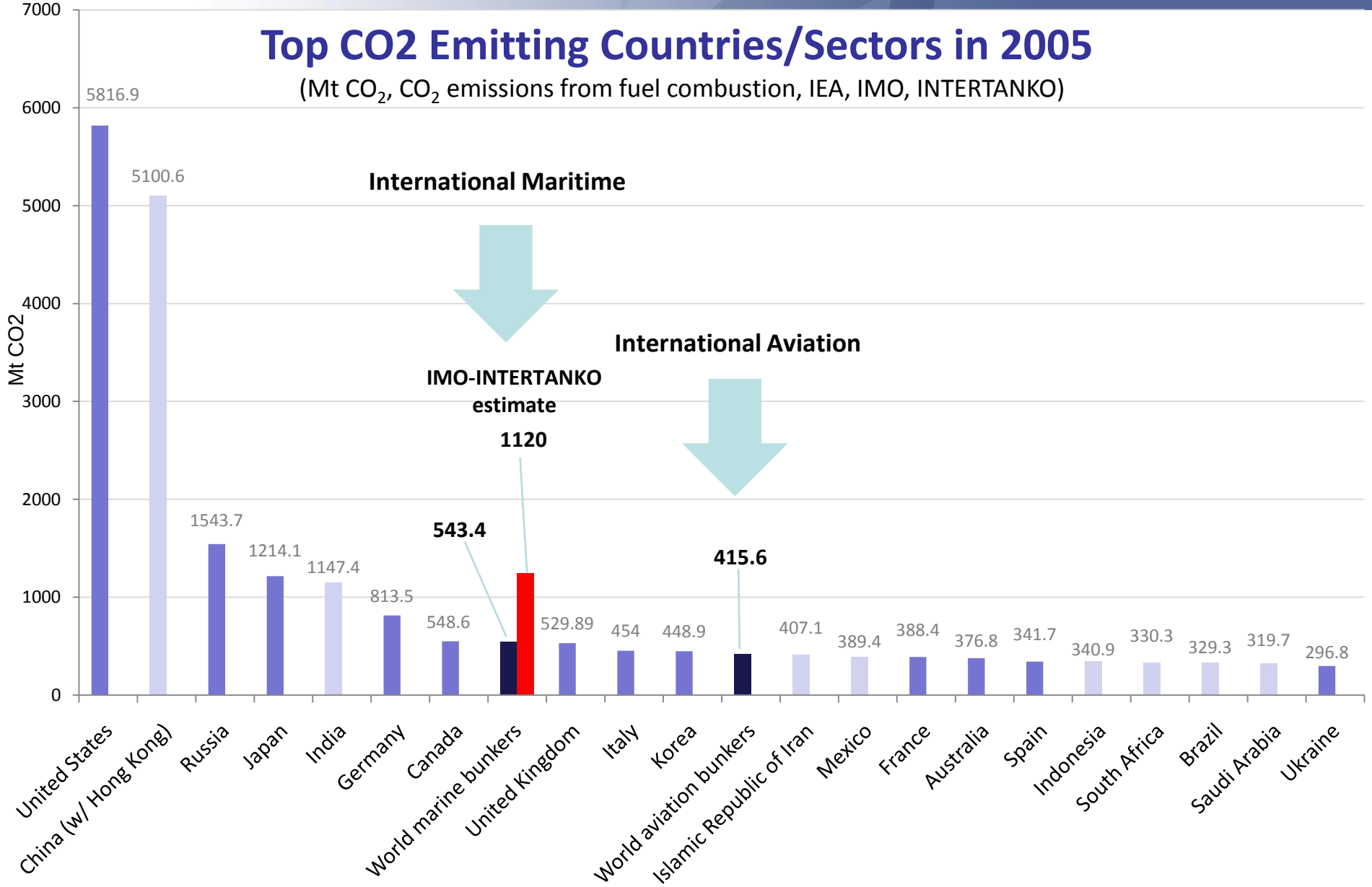
Shipping Growth and Forecast



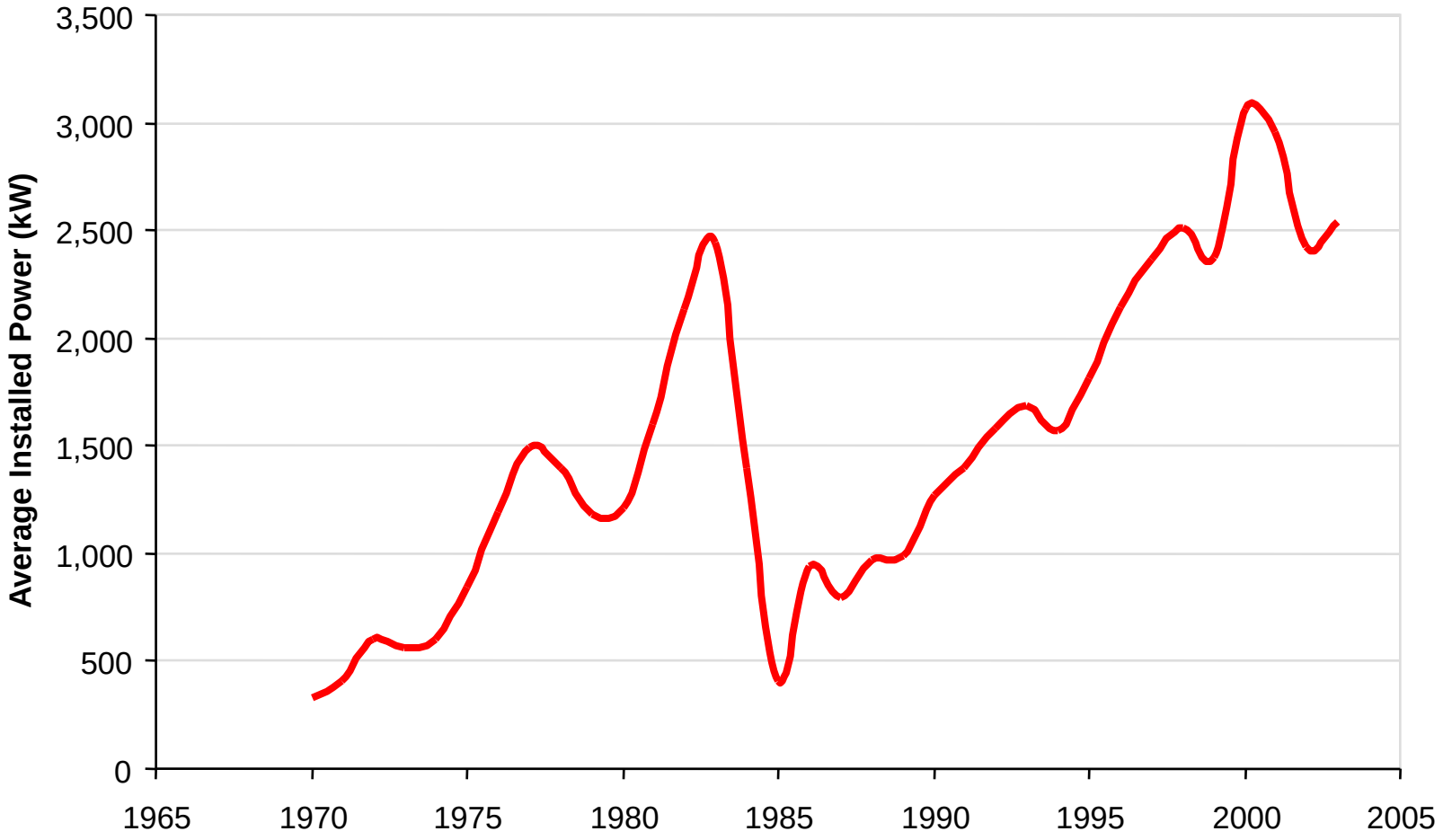
source: Corbett, 2007

Top CO2 Emitting Countries/Sectors in 2005

(Mt CO_2, CO_2 emissions from fuel combustion, IEA, IMO, INTERTANKO)



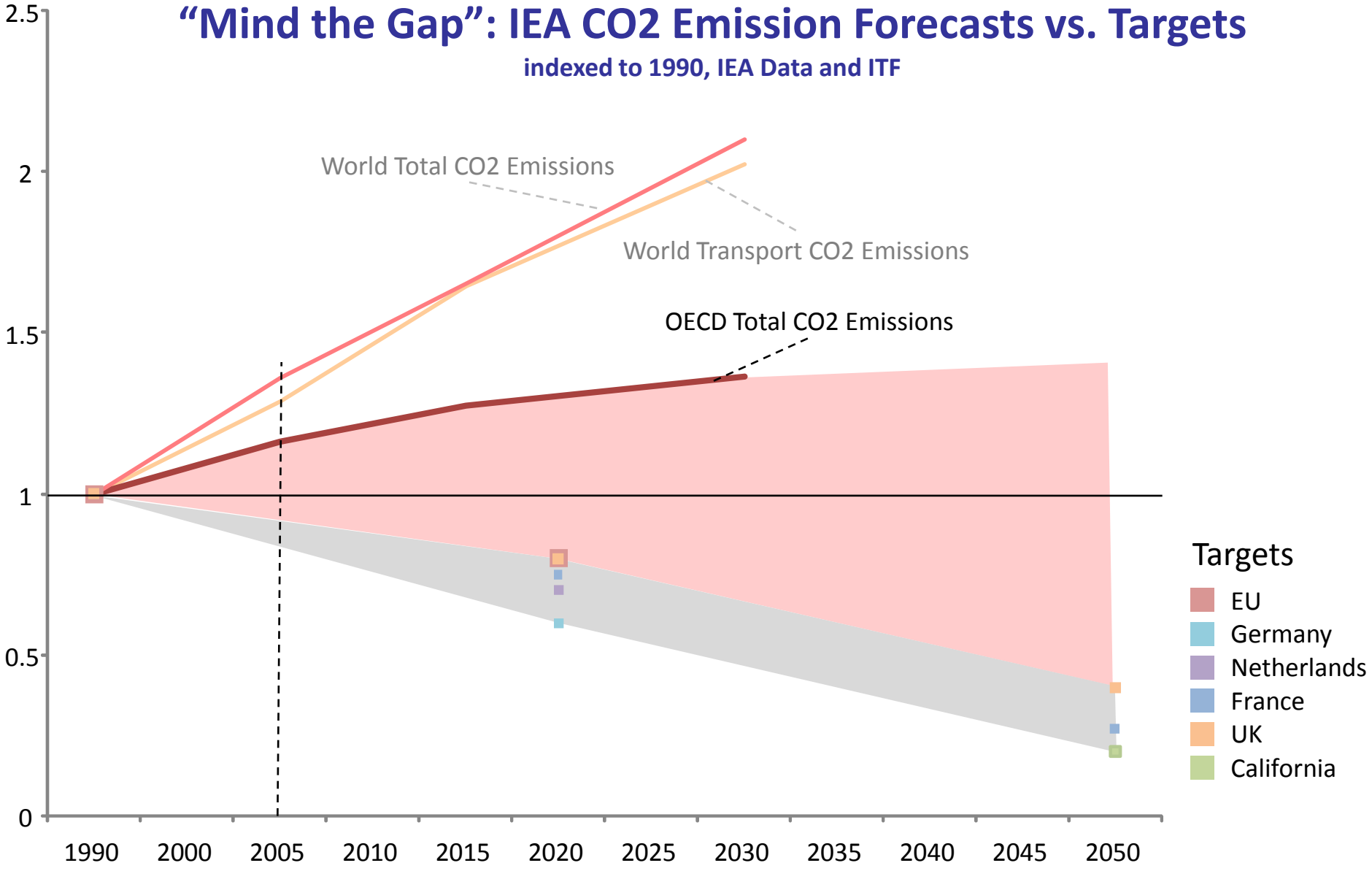
Shipboard power trends implicate growth in energy demand



source: Corbett, 2007

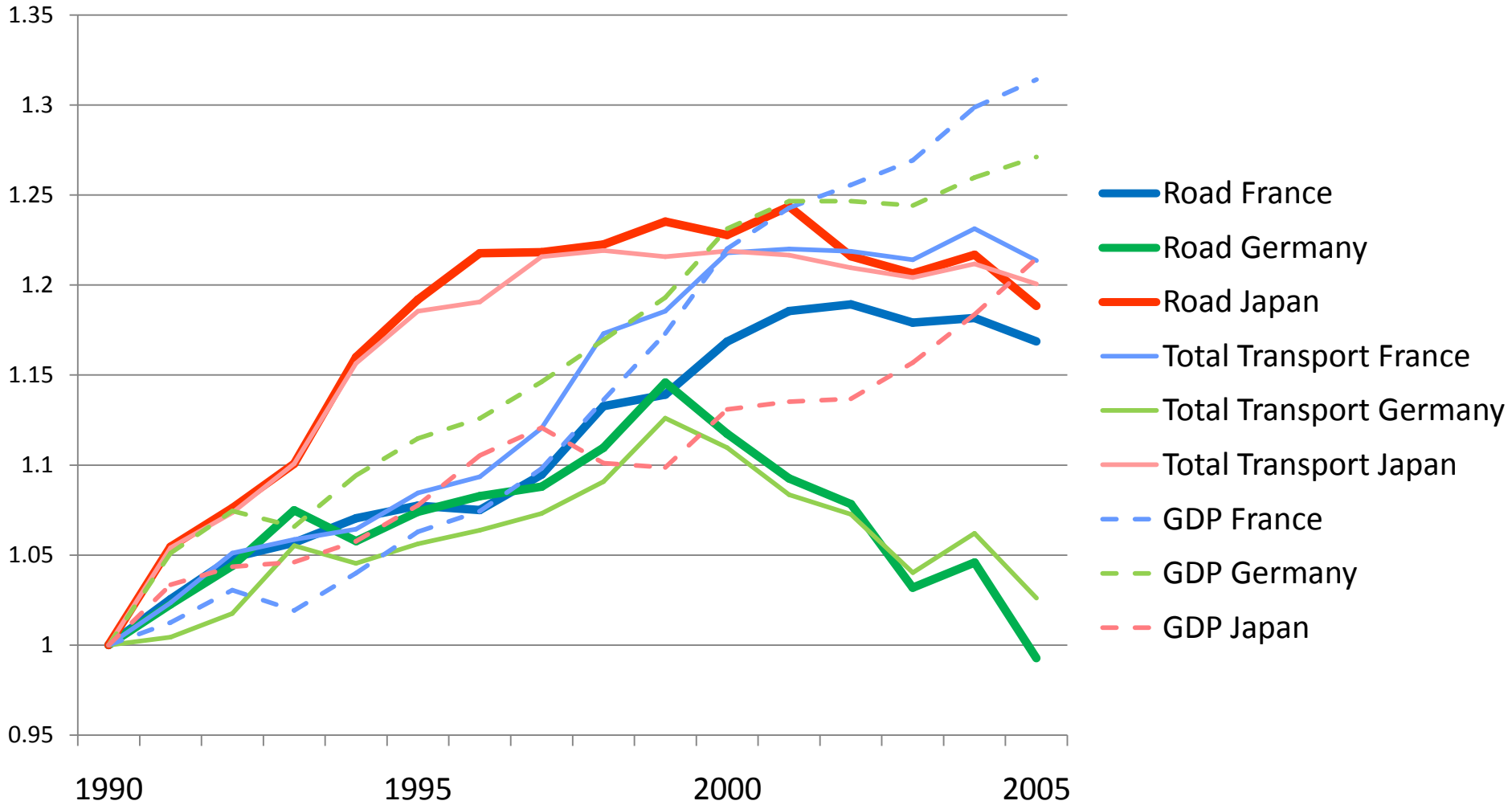
"Mind the Gap": IEA CO2 Emission Forecasts vs. Targets

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

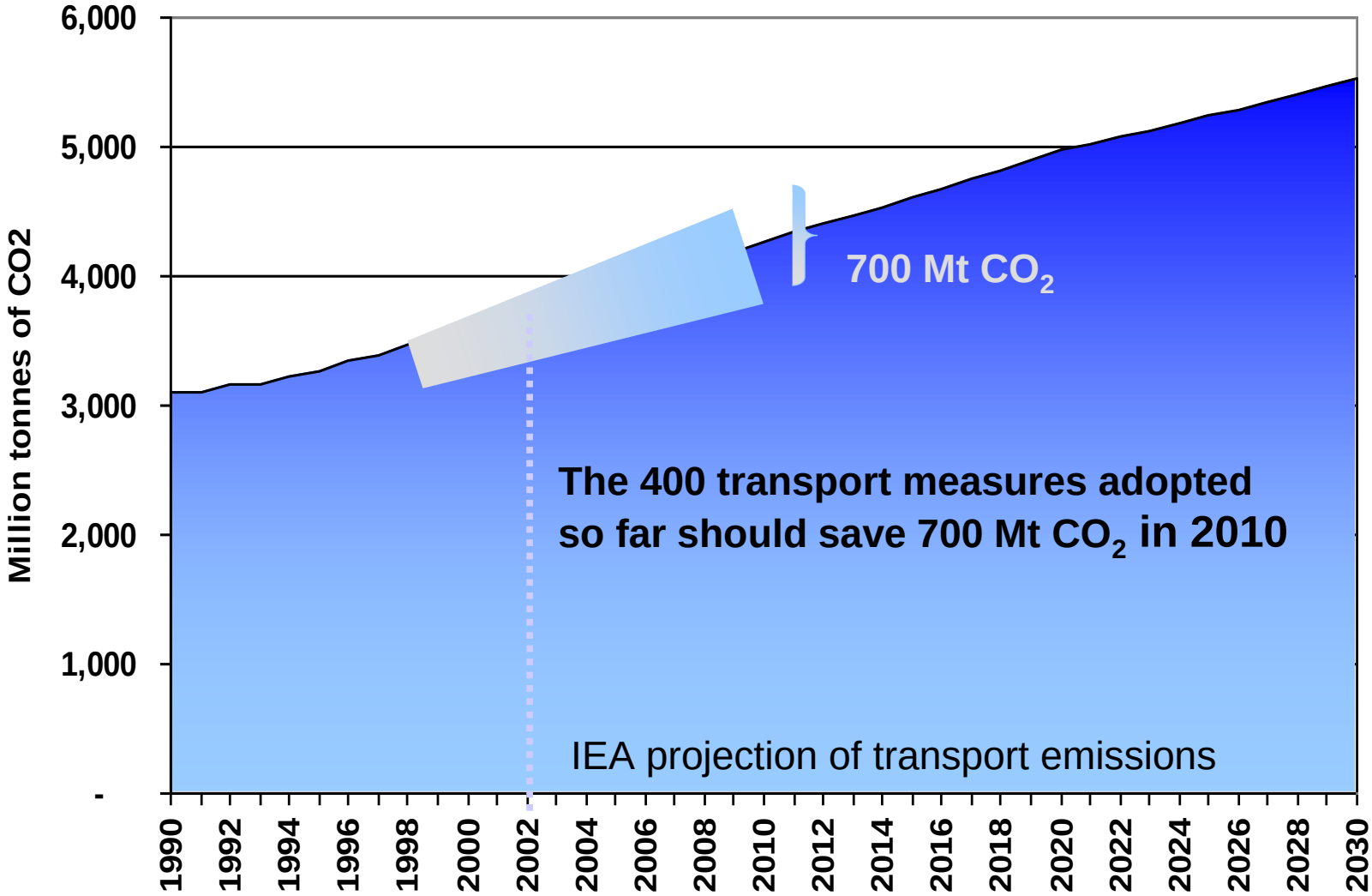
Which Policies at What Cost?

- 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?

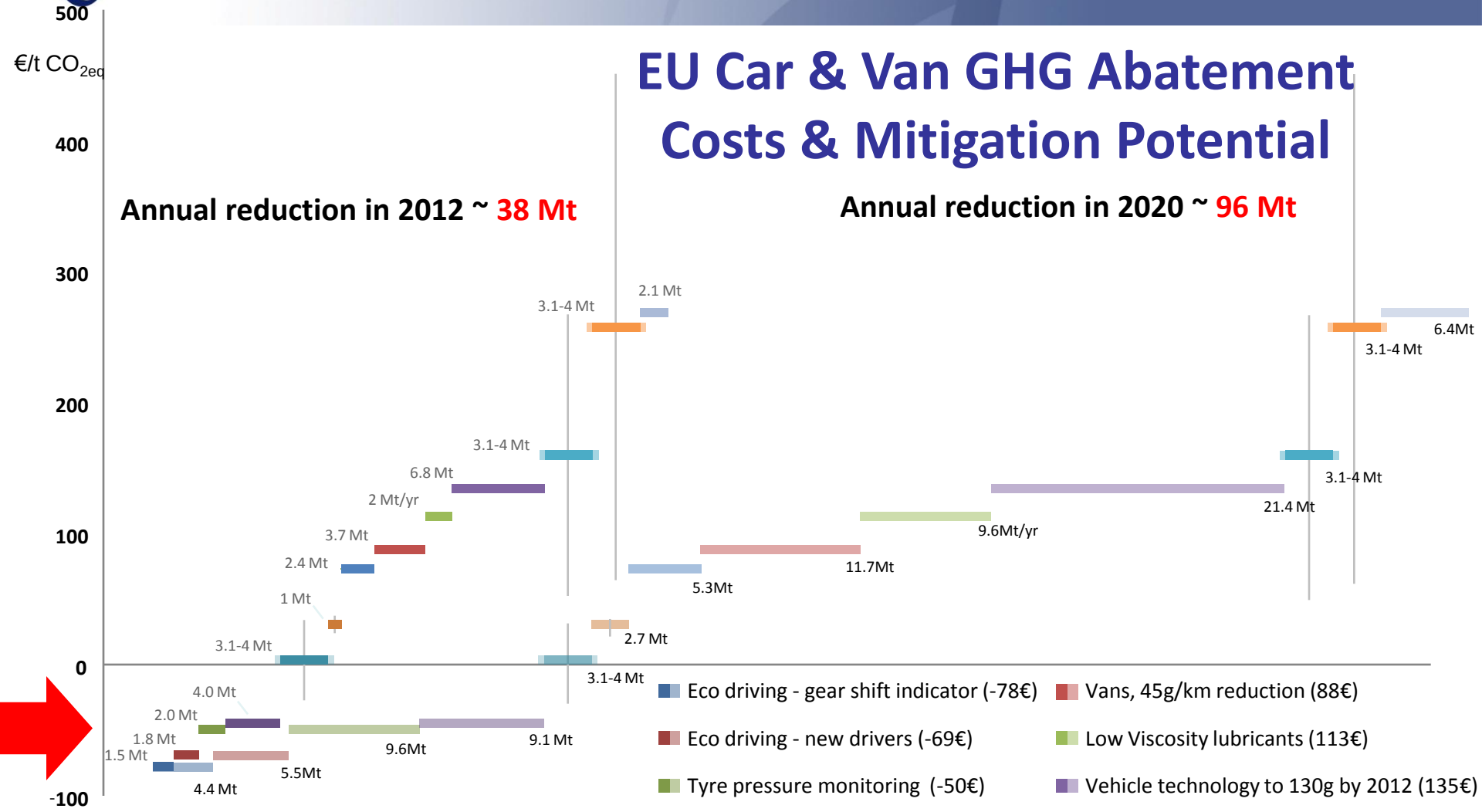
ITF Transport Sector Emissions: Potential Impact of Current Policies



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

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?

Designing support for Biofuels

- Should not subsidise high CO2 abatement ($520-1340/ton CO_2) when lower cost alternatives available.
- Must account for soil released CO_2 and Nitrogen
- 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
- Which Policies at What Cost?
- Transport Policy Implications and Priorities

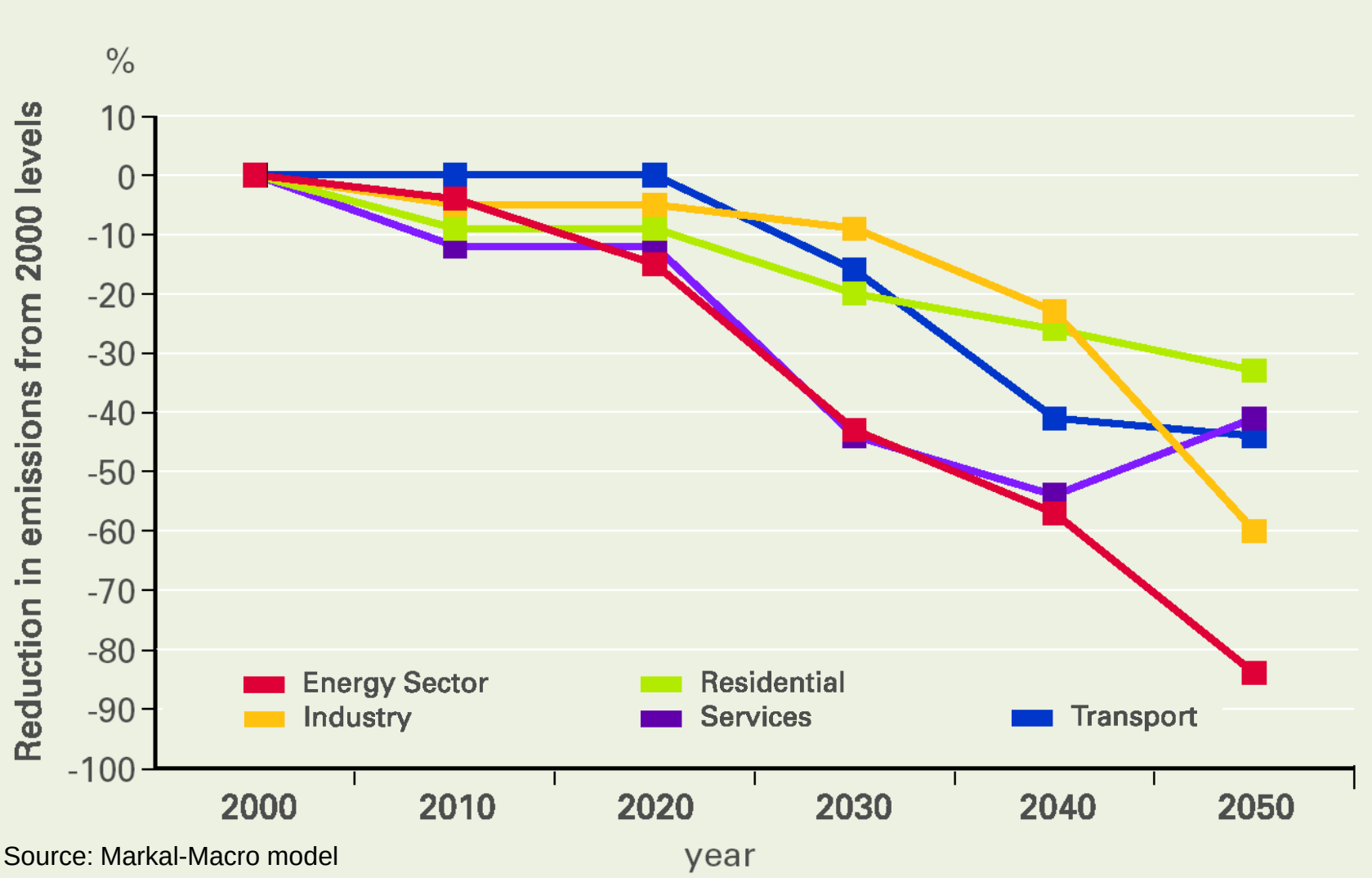
Policy package (1/2)

- 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 heavy goods vehicle charge.
- 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 sectors deliver GHG reductions on different time scales

Long-term: UK

UK Modeled CO2 Emission Reductions by Sector

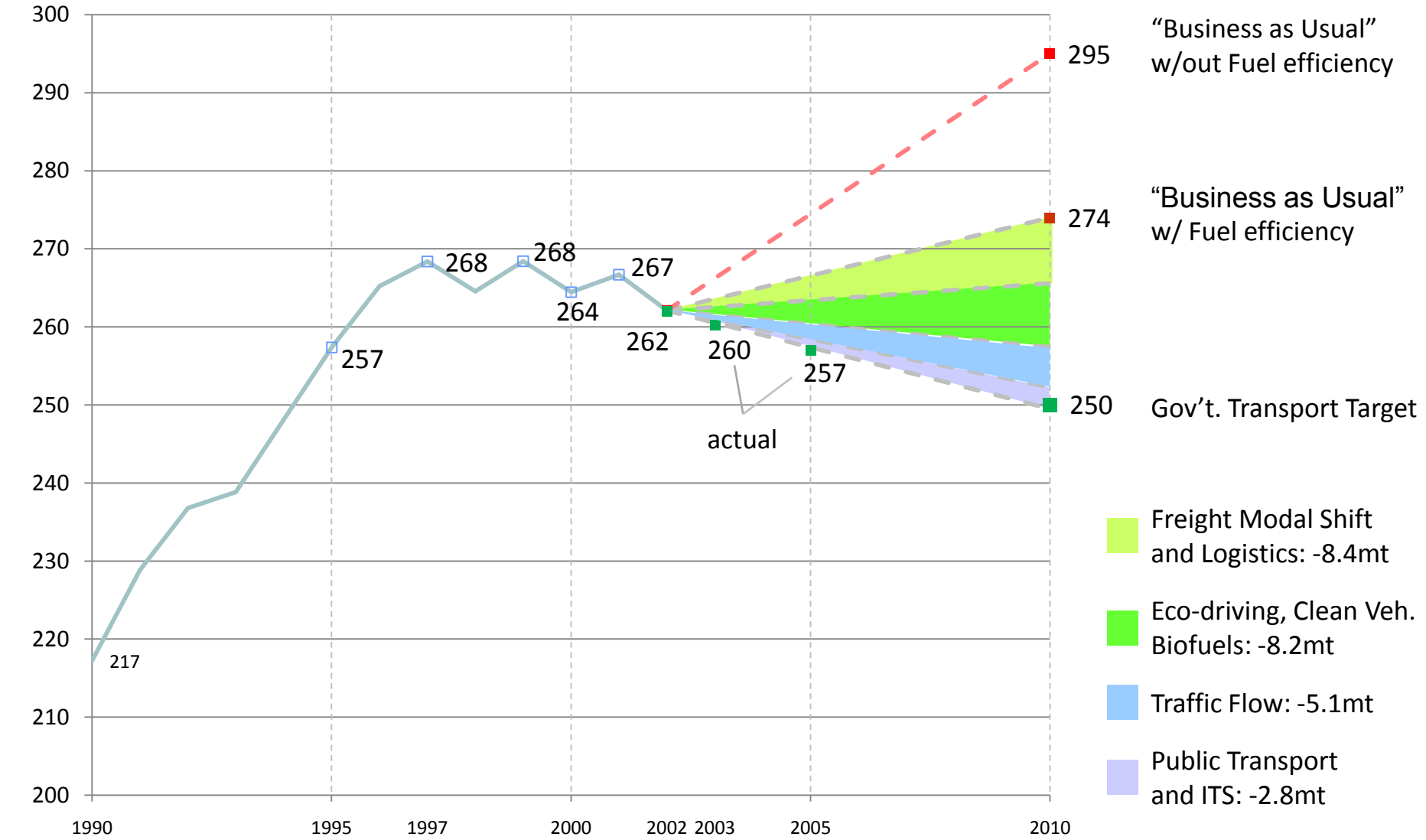
Scenario Showing Least Cost Route to 60% Reduction by 2050



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.

Some priorities for maritime/aviation

International Transport Forum

Thank You

For more information:

www.internationaltransportforum.org
www.cemt.org