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

1. “Mind the Gap”: GHG Trends in the Transport Sector
2. Which Policies at What Cost?
3. Transport Policy Implications and Priorities
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)

Atmospheric Concentrations:
Depends on interaction with other emissions, strength of sinks (extraction from the atmosphere), persistence in atmosphere

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

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.

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....

Damages/Benefits
Welfare losses, welfare gains (monetary units – e.g. GDP), other welfare metrics (HDI,GPI, etc)

Source: Fuglestevdt et al, 2005
CO2 vs. Total Radiative Forcing from Aviation

CO2 warming impact

Total warming impact

Level of scientific understanding

Good  Fair  Fair  Fair  Fair  Fair  Fair  Fair  Fair  Poor

- **CO2 Fossil Fuel Use**: 56.6%
- **CO2 (other)**: 2.8%
- **CO2 (deforestation, decay, etc...)**: 17.3%
- **CH4**: 14.3%
- **N2O**: 7.9%
- **F-gases**: 1.1%

Emissions increased by +70% from 1970 to 2004.
Transport's Share of CO2 emissions from fuel combustion
(2005 IEA data, including international aviation and maritime)

OECD
- Road: 22.9%
- Domestic Aviation: 1.9%
- International Aviation: 1.8%
- Domestic Navigation: 0.4%
- Other Transport: 0.9%
- Manufacturing Industries and Construction: 14.0%
- Other Sectors: 13.6%

World
- Road: 23.3%
- Domestic Aviation: 5.9%
- International Aviation: 6.4%
- Domestic Navigation: 1.4%
- Other Transport: 6.6%
- Other Sectors: 13.6%
- Manufacturing Industries and Construction: 14.0%

Present
- Road: 75.9%
- Domestic Aviation: 5.0%
- International Aviation: 4.8%
- Domestic Navigation: 8.6%
- Other Transport: 1.8%
- Other Sectors: 73.3%
- Manufacturing Industries and Construction: 23.3%
Transport Sector CO2 Emissions by Region: 1990-2005
(excluding international aviation and shipping)

EU-15: +22.3%
New EU (EU27-EU15): +44.7%
North America: +28.7%
OECD Asia: +32.3%
Other ITF: -19.2%
Top 10 non ITF: +97.8%
CO2 Emissions: Comparing China and USA 1990-2005

United States: Total CO2

China: Total CO2

United States: CO2 from Transport+Bunkers

China: CO2 from Transport+Bunkers
World Motorization: WBCSD Projections

Source: IEA
**Future trends**

**Air Passenger Traffic Development**
- **History**
  - 1995-2005: 4.8%/yr
- **Forecast**
  - 2006-2025: 5.0%/yr

**Air Cargo Traffic Development**
- **History**
  - 1995-2005: 4.5%/yr
- **Forecast**
  - 2006-2025: 6%/yr

Source: Boeing, 2007

Source: Airbus, 2007
Future trends

Shipping Growth and Forecast

source: Corbett, 2007
Top CO2 Emitting Countries/Sectors in 2005
(Mt CO₂, CO₂ emissions from fuel combustion, IEA, IMO, INTERTANKO)

International Maritime

International Aviation

IMO-INTERTANKO estimate

Mt CO2

United States
China (w/ Hong Kong)
Russia
Japan
India
Germany
Canada
World marine bunkers
United Kingdom
Italy
Korea
World aviation bunkers
Islamic Republic of Iran
Mexico
France
Australia
Spain
Indonesia
South Africa
Brazil
Saudi Arabia
Ukraine
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

Targets
- EU
- Germany
- Netherlands
- France
- UK
- California

World Total CO2 Emissions
OECD Total CO2 Emissions
World Transport CO2 Emissions
Decrease in Transport CO2 Emissions: 2002-2005
Indexed to 1990, IEA data, France, Germany and Japan

New Developments
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
The 400 transport measures adopted so far should save 700 Mt CO₂ in 2010.
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 rigorous 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

Annual reduction in 2012 ~ **38 Mt**

Annual reduction in 2020 ~ **96 Mt**

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 CO₂) when lower cost alternatives available.

• Must account for soil released CO₂ 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
UK Modeled CO2 Emission Reductions by Sector
Scenario Showing Least Cost Route to 60% Reduction by 2050

Source: Markal-Macro model
Freight Modal Shift and Logistics: -8.4mt
Eco-driving, Clean Veh.
Biofuels: -8.2mt
Traffic Flow: -5.1mt
Public Transport and ITS: -2.8mt

“Business as Usual” w/ Fuel efficiency
“Business as Usual” w/out Fuel efficiency
Gov’t. Transport Target

source: MLIT, 2007

Transport CO2 Reduction Strategy 2002-2010, Japan
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
Thank You
For more information:
www.internationaltransportforum.org
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