ITF
Transport Outlook
2015
International Freight Model
Objectives

- Assess the international freight flows and related CO2 emissions into the future under:
  - Different international trade configurations
  - Available transport infrastructure (2010)
Modelling approach

- International Trade (world regions)*
  - Regional breakdown (centroids)
  - GDP, population

- Mode choice and weight conversion
  - Route assignment

- International trade volumes
  - Between 294 world regions
  - Scenarios for trade liberalisation

* Source: OECD Economics Directorate
Global freight will more than quadruple by 2050
(by a factor of 4.3)

(Increasing) capacity constraints can hamper economic growth

Strong growth of CO₂ emission (+290%) undermines climate change goals

An unprecedented challenge

Overall results show...
Global freight volumes and CO₂ emissions by corridor (Baseline Scenario)

- **North Atlantic route**: +344% to +263%
- **North Pacific route**: +269% to +194%
- **South Pacific route**: +280% to +195%
- **Intra-North America**: +316% to +225%
- **Intra-South America**: +400% to +309%
- **Intra- Europe**: +715% to +689%
- **Intra-Asia**: +403% to +332%
- **Intra- Africa**: +406% to +315%
- **Indian Ocean route**: +258% to +142%
- **South Atlantic route**: +216% to +174%

**Notations**:
- **Freight volume** in billion tonne-km
- **CO₂ Emissions** in million tonnes
Variation to global freight volumes and CO2 emissions by corridor to Baseline Scenario (Multilateral Scenario)

- Intra-North America:
  - Freight volume: +9%
  - CO2 Emissions: +10%

- North Atlantic route:
  - Freight volume: +8%
  - CO2 Emissions: +9%

- Mediterranean and Caspian Sea:
  - Freight volume: +7%
  - CO2 Emissions: +7%

- Intra-Asia:
  - Freight volume: +11%
  - CO2 Emissions: +11%

- North Pacific route:
  - Freight volume: +9%
  - CO2 Emissions: +9%

- Intra-Africa:
  - Freight volume: +13%
  - CO2 Emissions: +15%

- Indian Ocean route:
  - Freight volume: +24%
  - CO2 Emissions: +28%

- South Pacific route:
  - Freight volume: +8%
  - CO2 Emissions: +10%

- South Atlantic route:
  - Freight volume: +18%
  - CO2 Emissions: +19%

- Oceania:
  - Freight volume: +5%
  - CO2 Emissions: +5%
The increase in movements in some ports may be more than 10 times greater.
Composition of good at ports may also change

Weight composition of freight movements at Chinese ports

2010
- Chemicals: 7.44%
- Coal: 5.67%
- Crude oil: 3.41%
- Electronics: 2.30%
- Food products: 4.40%
- Gas: 17.10%
- Iron and Steel: 7.95%
- Livestock: 6.24%
- Fabricated Metal Products: 6.96%
- Fishing: 0.37%
- Other manufacturing: 1.05%
- Non-Ferrous Metals: 0.39%
- Non-metallic minerals: 0.76%
- Other mining: 6.59%
- Paper, pulp and print: 6.55%
- Petroleum & coke: 0.55%
- Rice and crops: 8.30%
- Textiles: 0.61%
- Transport equipment: 0.39%

2050
- Chemicals: 8.15%
- Coal: 6.72%
- Crude oil: 2.04%
- Electronics: 2.97%
- Food products: 4.72%
- Gas: 17.25%
- Iron and Steel: 10.99%
- Livestock: 16.25%
- Fabricated Metal Products: 3.32%
- Fishing: 1.71%
- Other manufacturing: 1.17%
- Non-Ferrous Metals: 0.65%
- Non-metallic minerals: 8.15%
- Other mining: 3.59%
- Paper, pulp and print: 4.96%
- Petroleum & coke: 3.26%
- Rice and crops: 6.55%
- Textiles: 2.30%
- Transport equipment: 0.76%
Domestic share of global freight

10% of international trade takes place within domestic borders
Domestic share of trade-related CO₂ emissions

- 10% of international trade takes place within domestic borders
- 30% of total trade-related CO₂ is emitted here
Domestic freight movements will grow

- The largest increases in domestic freight movements will take place in Africa and Asia.
Policy implications

**Improve capacity management**

Many freight facilities are underutilised. Sometimes even when they seem saturated (poor operational efficiency).

**Invest in missing links**

More alternative and multi-modal connections increase efficiency.

**Prepare for mega-ships**

Adapt infrastructure to more and bigger vessels – including port-hinterland links.

**Increase vehicle utilisation**

Improve load factors and reduce idle times across supply chains.