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National Capacity Building Workshop on Measurement of Inland Transport CO_2 Emissions and Assessment Tool (ForFITS)

23-24 September 2013, Bangkok, Thailand

Evaluating CO_2 emissions in inland transport and climate change mitigation

ForFITS

A monitoring and assessment tool "For Future Inland Transport Systems"

General overview

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ForFITS: model requirements

Key requirements

Allow the estimation/assessment of emissions in transport
Allow the evaluation of transport policies for CO_2 emission mitigation

} Convert information on transport activity into fuel consumption and CO_2 emission estimates considering the influence of the demographic and socio-economic context, including policy inputs

Be developed as a software tool
Be freely available for users (e.g. national and local governments, general public)
Be developed between 2011 and 2013

Sectoral model (focused on inland transport only): we do not expect it to target the evaluation of overall effects on the economic growth

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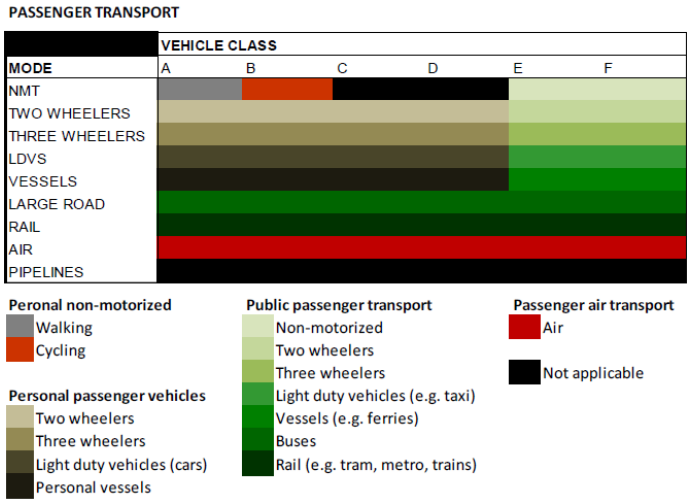
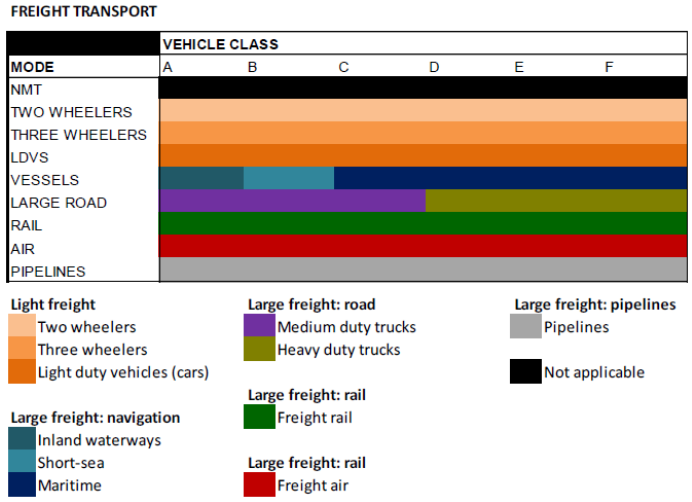
ForFITS model: coverage

- Passenger and freight transport services
- Two different areas (e.g. to define the transport systems: urban, non-urban, non-spec.)
- Nine transport modes: non-motorized transport, two wheelers, three wheelers, light road vehicles, medium and heavy road vehicles, rail, navigation (inland, short-sea and deep-sea/martime), air and pipelines
- Different vehicle subsets within each mode (organized in six vehicle classes – A to F) (figures)





- 31 powertrain technologies (e.g. internal combustion engines, hydraulic hybrids, electric hybrids, plug-ins, fuel cell, electric)
- 10 fuel blends, some of which are associated with specific modes and/or powertrains

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ForFITS model: demand generation

Transport demand (pkm, tkm), vehicle activity (vkm) and vehicle stock are largely determined by:

- Relationships linking GDP and population with transport activity
  - GDP per capita with vehicle ownership and pkm
  - Economic output (GDP) with tonnes lifted
- Effects of changes in the cost of driving and moving goods
  - Elasticities of pkm, tkm, average travel and average loads
- Structural changes in the transport system
  - Passenger transport system (mainly with respect to the role of public transport, to assess policies related with modal shift)
  - Freight transport system (and related economic structure, and especially the impacts this has on modal choice)
- To some extent, behavioral aspects (environmental culture) are also taken into account for passenger transport
  - Elasticities on key passenger transport parameters

ForFITS model: demand generation

Passenger transport

(1/3)

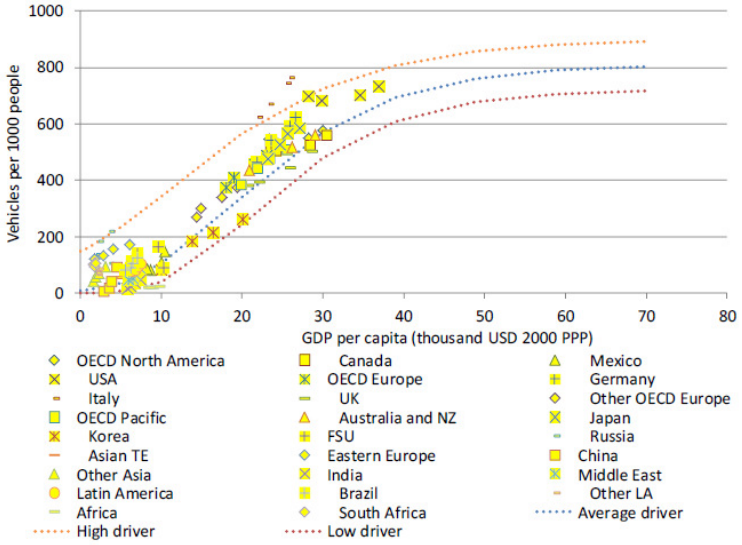
Motorized personal vehicles

- Vehicle stock primarily a function of GDP per capita (figure)
- Annual vehicle travel (km/year) affected by changes in the cost of driving (through direct and cross elasticities)
- Vehicle load affected by changes of vehicle ownership (lower ownership associated with higher average loads)

Shifts to/from personal from/to public transport are considered as structural changes having an effect on:

- the vehicle stock (vehicle ownership is lower in areas with high shares of public transport)
- the average travel per vehicle (the average travel of personal vehicles is lower in areas with high shares of public transport)

Motorized personal vehicles ownership



Sources: elaboration of national and international databases, building on the information referenced in UNECE, 2012

Vehicle ownership is also assumed to be influenced by environmental culture (behavioural aspect)

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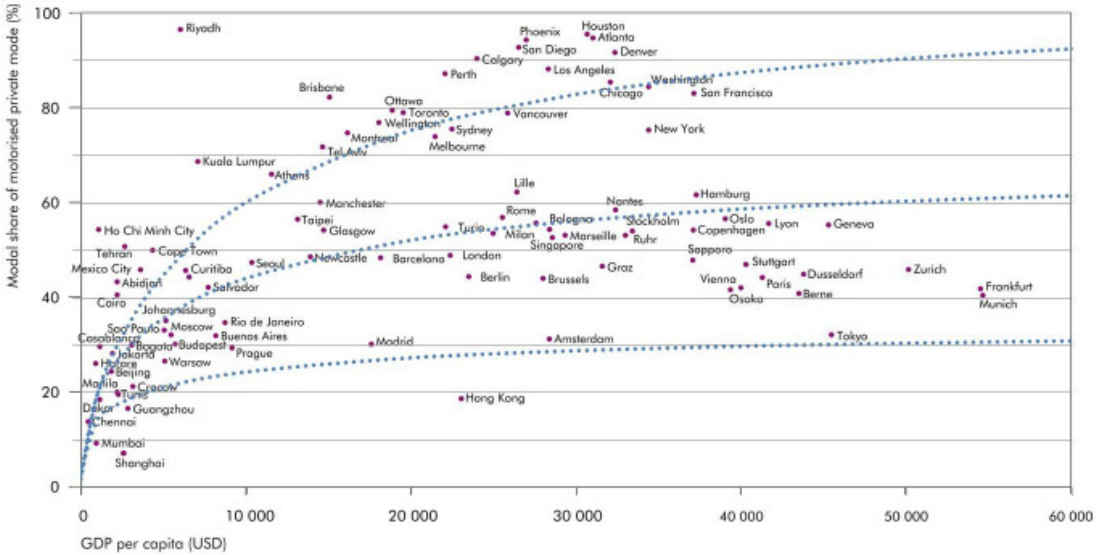
ForFITS model: demand generation

Passenger transport

Public transport (except air)

- Pkm share on public transport modes (in total personal and public transport, excluding air) primarily a function of GDP per capita (figure), also assumed to be influenced by environmental culture (behavioural aspect)
- Pkm affected by changes in the cost of driving (direct & cross elasticities)
- Pkm influenced by modal shifts to/from personal from/to public transport
- Vkm from pkm and annual travel
- Vehicle stock from vkm and loads

Modal share of personal vehicles in total personal and public transport



Source: elaboration of UITP, quoted by IEA, 2008

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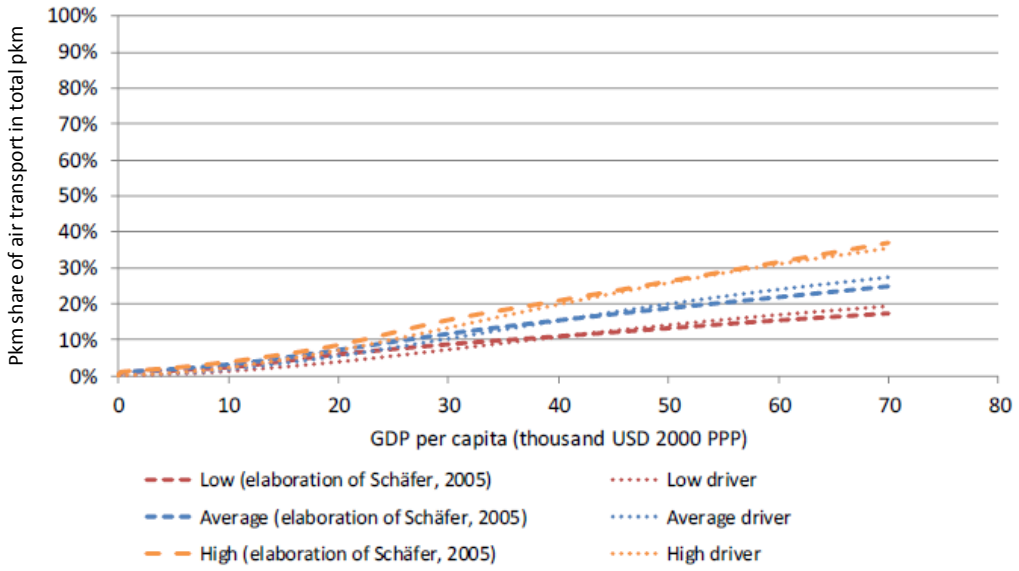
ForFITS model: demand generation

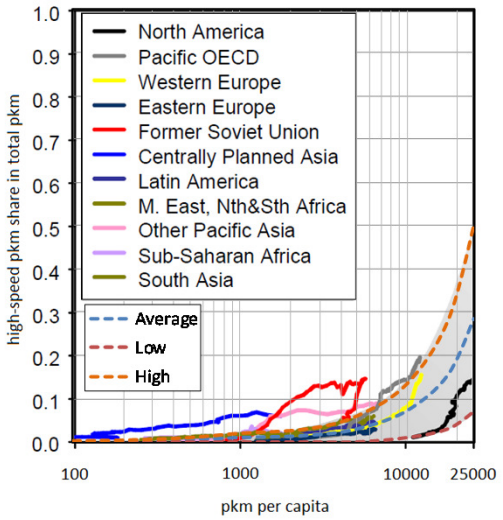
Passenger transport

Air transport

- Pkm share of air transport (in total pkm) pimarily a function of GDP per capita (figure), also assumed to be influenced by environmental culture (behavioural aspect)
- Pkm affected by changes in the cost of driving (direct & cross elasticities)
- Vkm from pkm and annual travel
- Vehicle stock from vkm and loads

Modal share of air transport in total transport





Source: elaboration of Schäfer, 2005

model: demand generation

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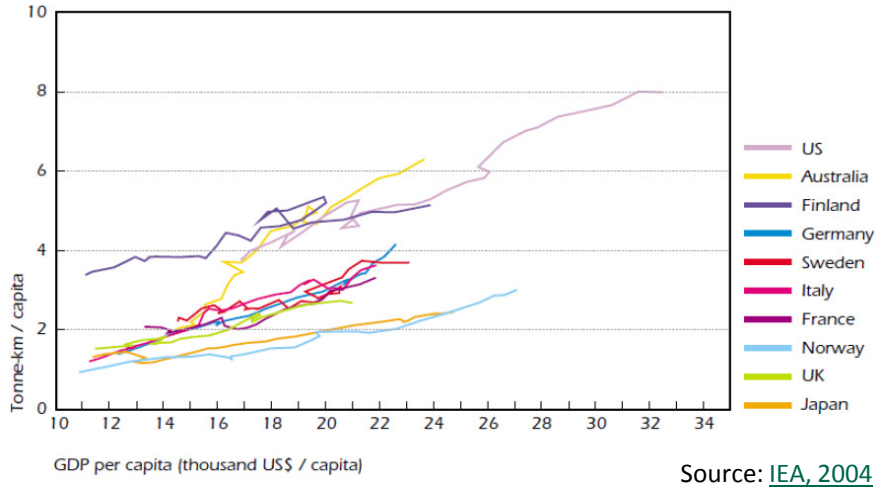
Freight transport activity and GDP



Source: IEA, 2004

portional to GDP (figure)
es lifted (also proportional
onstant by distance class)

ject to structural changes,

the economy (e.g. free
exports)
oods (e.g. changes in sourcing and/or destination of exports)
ted (e.g. change of importance of the manufacturing industry with vs.
n and trade)
s (e.g. changes due to the construction of new network links)

ect to the influence of the cost of moving goods (through elasticities)
vel
oads