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

THE PEP Workshop
Improvement of Sustainable Urban Mobility for Better Health and Environment
Move to improve!
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1. Allows the estimation/assessment of emissions in transport

2. Allows the evaluation of transport policies for CO2 emission mitigation

Converts information on transport activity into fuel consumption and CO2 emission estimates considering the influence of the demographic and socio-economic context, including policy inputs!
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/maritime), 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
ForFITS may be used to evaluate policy impacts and to consider the effect of certain assumptions/scenarios.

Examples:
- Socio-economic growth scenarios (e.g. strong vs. weak GDP and/or population growth),
- Fuel cost scenarios (e.g. high vs. low oil price),
- Fuel taxation policy, including carbon taxes (need for proper characterization),
- Road pricing policies (caution needed when it is applied to portions of the network),
- Assumptions/scenarios on the evolution of the cost and performance of vehicle technologies,
- Differentiated vehicle taxation (e.g. based on the vehicle technology),
- Assumptions/scenarios related to structural changes of the transport systems
  - Passenger: modal shift policies, e.g. towards public transport from private vehicles
  - Freight: modal shifts, e.g. due structural changes in the economy (such as relevance of imports & exports) and in the logistic system (such as local vs. long-distance sourcing).

In the case of assumptions/scenarios, the coupling with policies has to be worked out by the user aside from the model.
Even if ForFITS has the capacity to adapt to different levels of data availability, the model does require a substantial amount of data, for:

- the characterization of the transport system in the base year (historical inputs)
- the definition of the context in which the transport system should evolve (projections)

Information on the initial and final times, the characterization of the areas, and the selection of the modelling approach for the powertrain choice (exogenous or endogenous), are also firm needs.

**Minimum data requirements** (other inputs are defined by default data and can be modified)

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### Historical inputs

- **GDP, population**
- **Vehicle stock**: number of vehicles by powertrain, average travel and loads, average fuel consumption
- **New vehicle registrations**: same detail used for stocks needed for the base year, 5 and 10 years earlier (data in between are taken into account with linear interpolations)

### Projections

- **GDP and population**
- **Fuel prices (cost and taxation)**
- **Vehicle shares between two and three wheelers**
- **Pkm shares for different public transport modes** (e.g. due to the construction of urban rail)
- **Modal shares of light road freight vehicles**
- **Evolution of the network extension for pipelines**
- **With endogenous powertrain selection (optional)**, discount rate and powertrain shares
The implementation of ForFITS in the City of KAUNAS!
Current situation with forecasts!
Passenger vehicle CO\(_2\) emissions by mode of transport

Freight vehicle CO\(_2\) emissions by mode of transport
The case of Kaunask

Overall CO₂ emissions

Million kg

2012 2016 2020 2024 2028

Freight

Passenger

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Scenarios Analysis!
## The case of Kaunas

### Transport Policies

<table>
<thead>
<tr>
<th>Scenarios</th>
<th>non-motorized transport systems</th>
<th>development of bicycle paths</th>
<th>Postcards &amp; Leaflets</th>
<th>bicycle marathon</th>
<th>environmentally friendly public transport</th>
<th>joint project with CHAMP</th>
<th>campaign / rallies</th>
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**THE PEP** Transport, Health and Environment Pan-European Programme  
**UNECE - Transport Division**
Overall CO2 emissions from passenger transport under different scenarios

7.6 per cent reduction by 2030 from shifting transport
5.8 per cent reduction from culture shift
4.4 per cent reduction from oil up
7.3 per cent reduction from 1.5% GDP growth
4.6 per cent increase with high fertility
19.9 per cent decrease with all scenarios together
The case of Kaunas

Percentage change in CO₂ emissions from 2012-2030 for Buses and Passenger LDVs under different scenarios

Change in CO2 emissions from 2012-2030 for Buses and Passenger LDVs under different scenario
Overall CO₂ emissions from freight transport under different scenarios

13.4 per cent reduction from oil up in 2030
34.1 per cent reduction from GDP growth of 1.5%
0.9 per cent reduction from high fertility scenario
43.4 per cent reduction with all scenarios
Percentage Change in Passenger vehicle vkm, all scenarios vs baseline

Percentage Change in Passenger vehicle pkm, all scenarios
Percentage Change in Freight vehicle vkm, all scenarios vs baseline scenario

Percentage Change in Freight vehicle tkm, all scenarios vs baseline scenario
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Percentage Change in Passenger vehicle vkm, culture shift scenario vs baseline scenario

Percentage Change in Passenger vehicle vkm, transport shift scenario vs baseline scenario
Percentage Change in Passenger vehicle pkm, culture shift scenario vs baseline scenario

Passenger Vehicle pkm, transport shift scenario
Percentage Change in Passenger vehicle fuel cost, all scenarios vs baseline scenario

Percentage Change in Passenger vehicle fuel cost, transport shift scenario vs baseline scenario
Thank you!