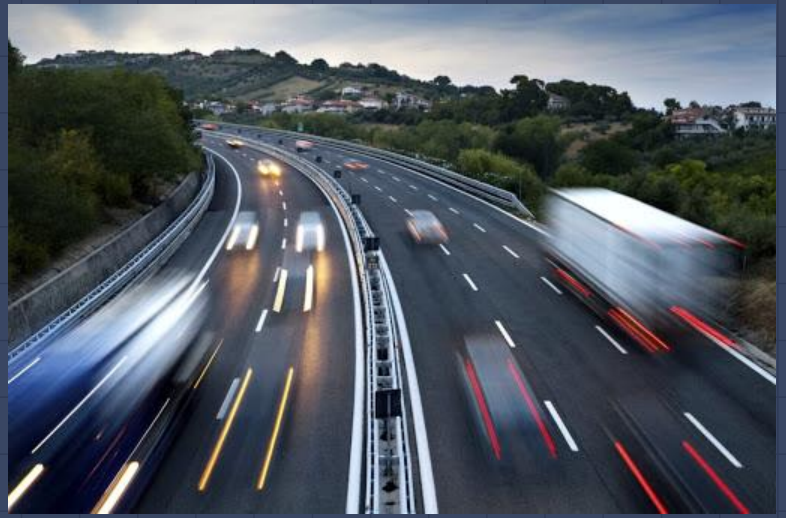
2nd Regional Exchange of Modelling Experts involved in the Development of NECPs

TRANSPORT SECTOR

- High intensive sector
- Increasing future trends
- Lack of statistical data (example pass-km, t-km)
- Modelling new transport technologies



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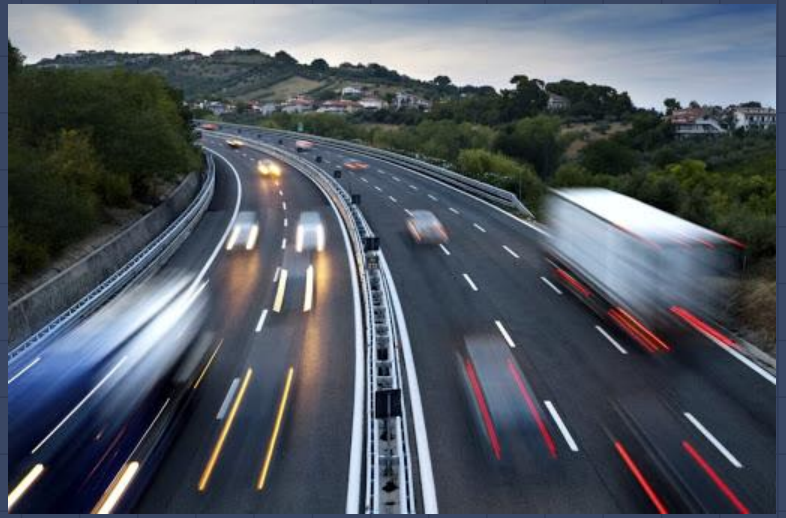

Plug-In-Hybrid Electric Vehicles (PHEV)

- Powered by electrical motors but also equipped with an additional power source (i.e. an internal combustion engine, ICE, or in the future a fuel cell system), either as back-up/range-extender or main power systems.
- PHEVs offer performance and drive range similar to their conventional equivalents, but could provide a 40-55% improvement in fuel economy

https://iea-etsap.org/E-TechDS/PDF/T05_BEV_and_PHEV_final_18Jun10_GS_OK_VENERI_gs.pdf

Plug-In-Hybrid Electric Vehicles (PHEV)

- ability to reduce carbon emissions in the automotive sector
- The CO2 emissions associated with PHEVs are much harder to predict than those of BEVs. This is because the CO2 emissions from PHEVs will also vary according to the proportion of vehicle km that are driven in electric-only mode, and the proportion driven whilst the ICE provides traction power.

Plug-In-Hybrid Electric Vehicles (PHEV)

Proportions will be influenced by the following factors:

- the accessibility of recharging infrastructure
- drive range (30-60 km in electric mode)
- the price of electricity, petrol and diesel
- the user profile and habit (in theory, a PHEV could be driven as a pure EV, tough this is unlikely).

Plug-In-Hybrid Electric Vehicles (PHEV)

But how to build model with PHEVs?

Suggested option:

1. first model the number of vehicles (as an activity level variable)
2. in a lower level activity level branch, model the annual distance driven per vehicle (ann km/veh). Result is the total vehicle-km
3. enter energy intensities as energy/veh-km (e.g. liters/veh-km) or (kWh/veh-kmdriven on gasoline)

Plug-In-Hybrid Electric Vehicles (PHEV)

The possible solution to model plug-ins is to specify two separate technology branches in LEAP: one for distant driven on electricity and one for distance driven on conventional (example: gasoline).

Suggestion is 50/50 split for gasoline kms vs electric km *source: International Energy Agency*

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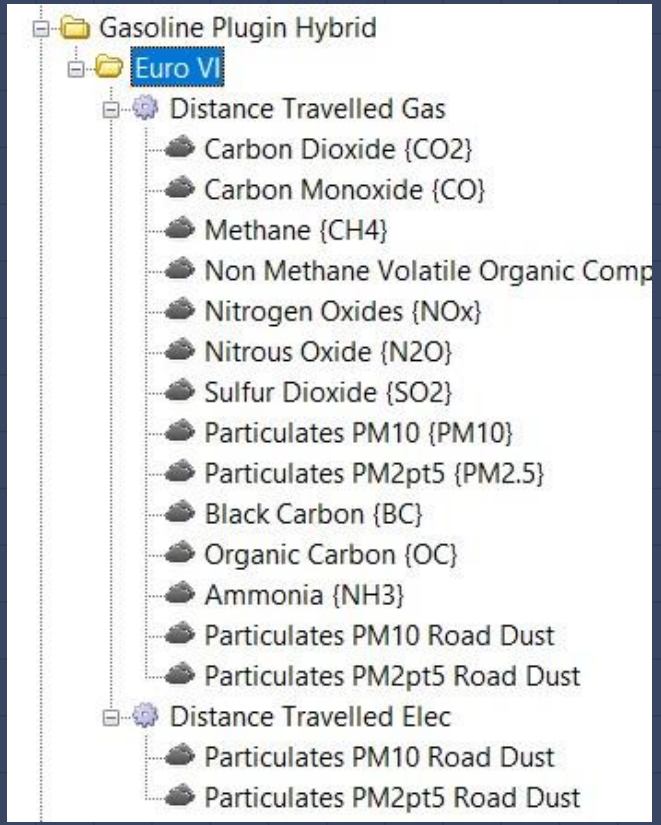
Proposed PHEV model structure



Plug-In-Hybrid Electric Vehicles (PHEV)

But I suspect this may change over time as batteries get bigger and charging becomes more convenient. The good thing about this approach is that you can specify separate emission factors for gasoline vs electric driving (combustion emissions only relevant for gasoline, but PM2.5 and PM10 relevant for both).