



**Advanced Model Development and Validation for the
Improved Analysis of Costs and Impacts of Mitigation Policies**



The research leading to these results has received funding from the European Union's Seventh Framework Programme [FP7/2007-2013] under grant agreement n° 308329

Low-carbon pathways for the transportation sector

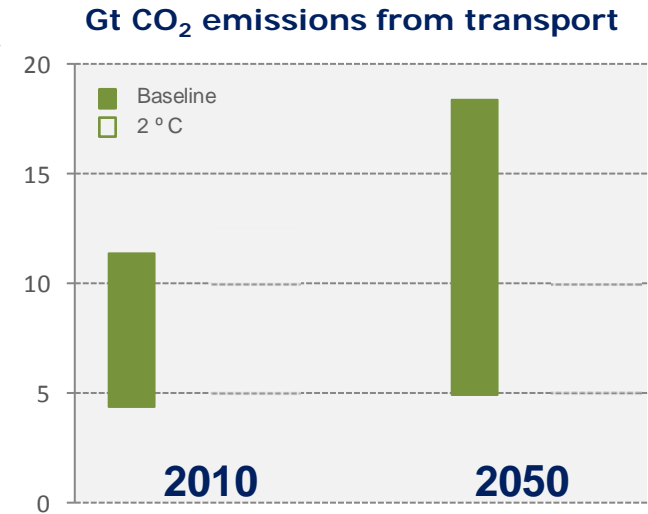
Brussels, 24 October 2016

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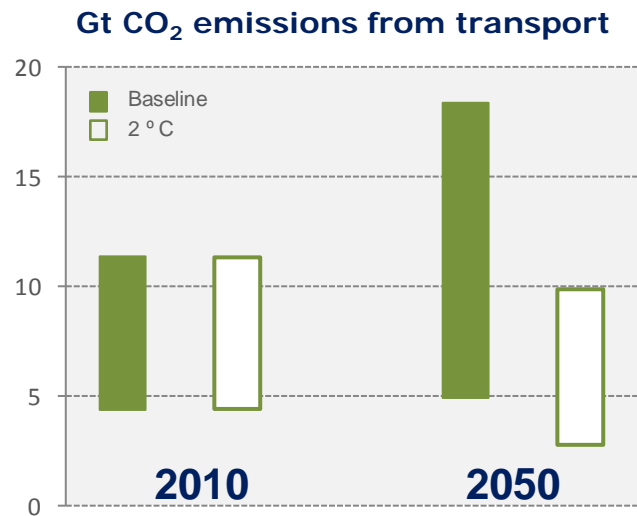
The transport sector

- Transport energy consumption has **rapidly increased** in the last decades, consuming 105 EJ worldwide in 2012
- The transport sector continues to be mainly **dependent on oil (93%)**
- In 2012 77 % of the total transport energy consumption in OECD countries is consumed by **passenger cars**
- Difficult to mitigate emissions in the transport sector
 - Mitigating transport emissions co-benefits:
 - **Air quality, Health, Living environment**

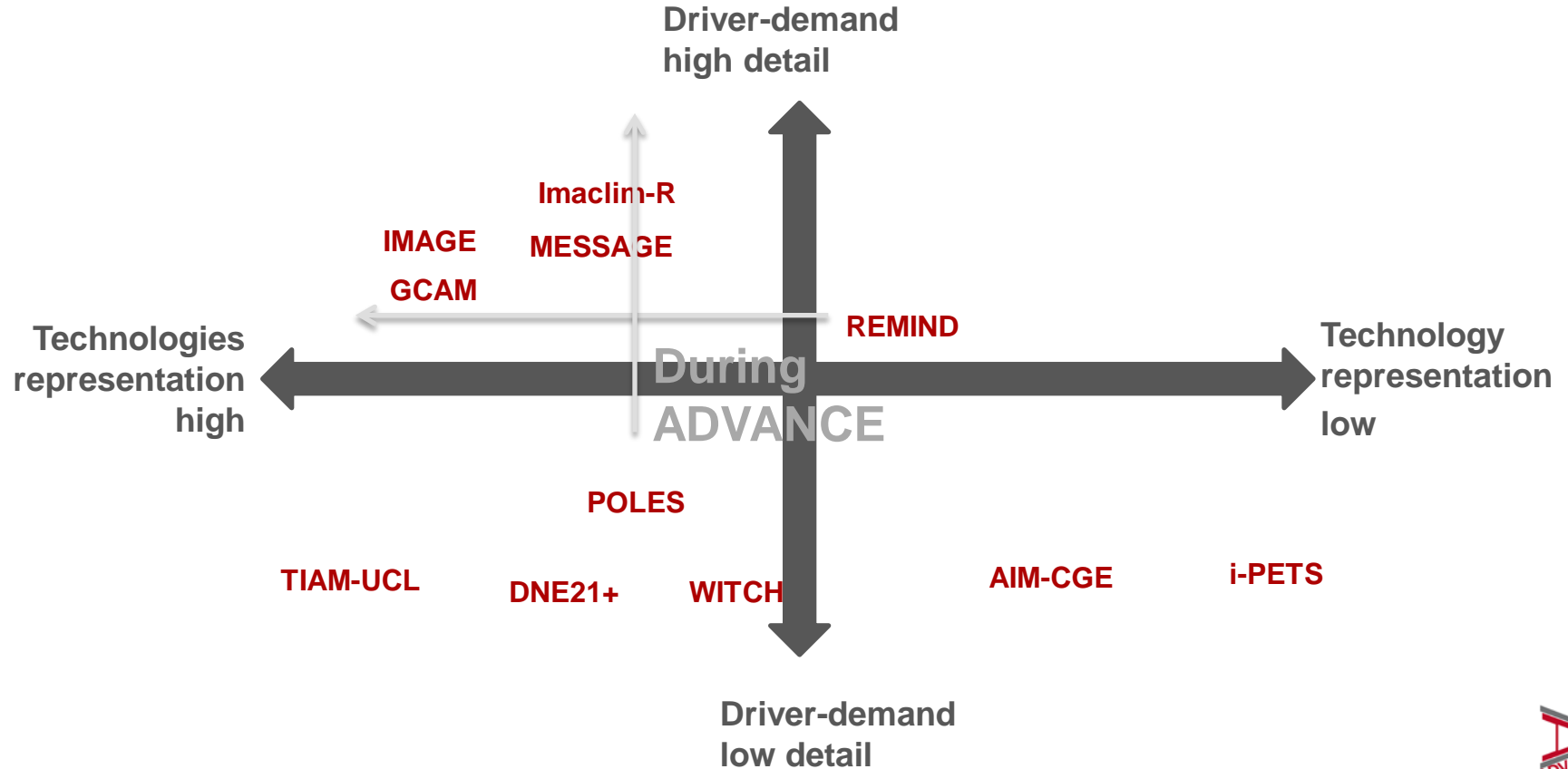


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The calculation tools



GHG reduction measures

- Service demand



- Mode shift



- Energy efficiency



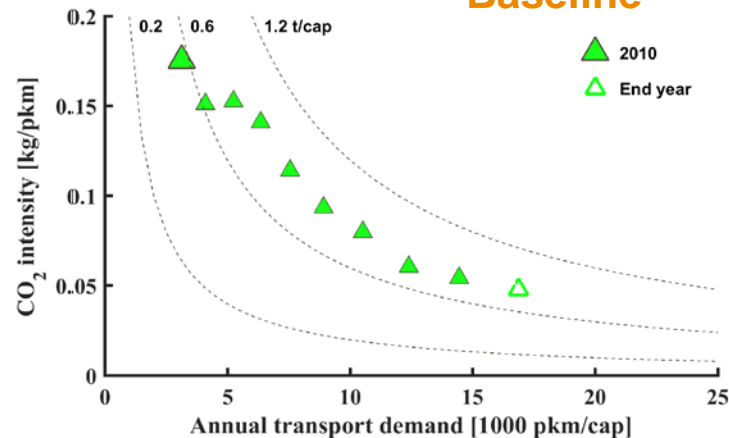
- Electrification



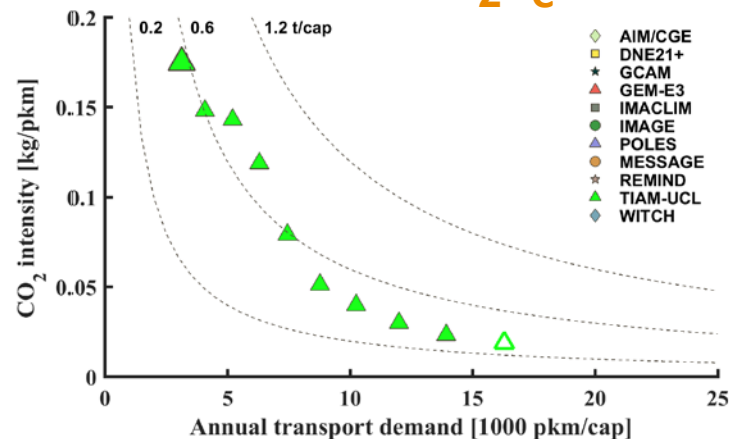
- Fuel content



Baseline



2 °C



GHG reduction measures

- Service demand



- Mode shift

Robust: technology transition for transport emission mitigation can reduce emissions drastically

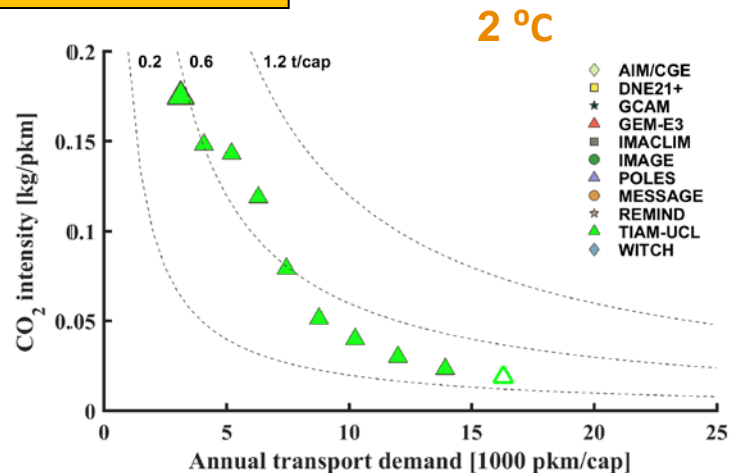
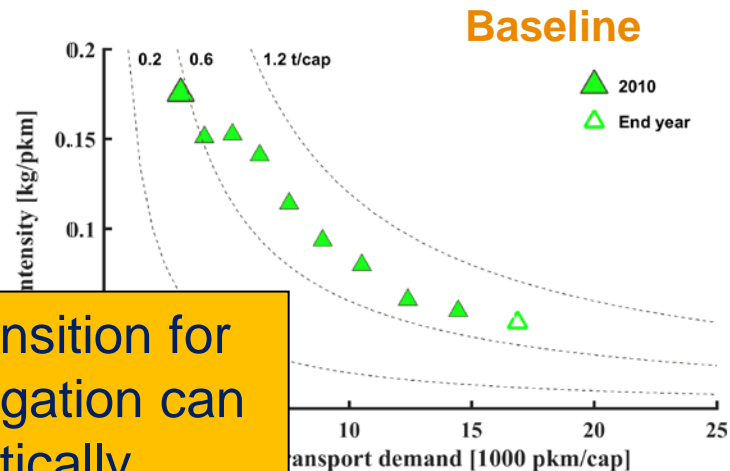
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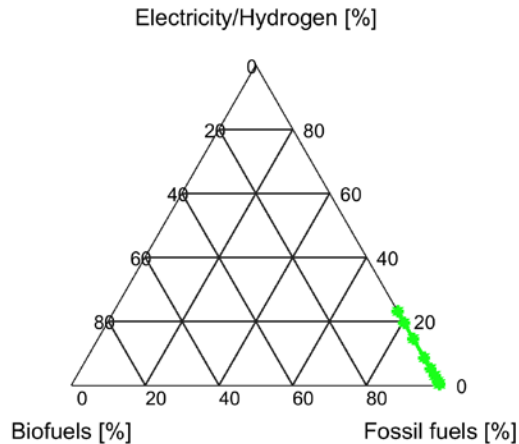
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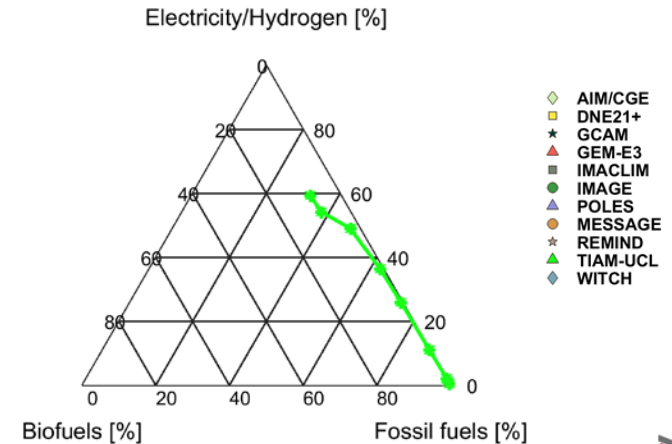
Passenger transport: technology transition

- Radical technology change is required for 2 degree target.
- How fast and to what extent this technological transition can occur varies across models.

Baseline

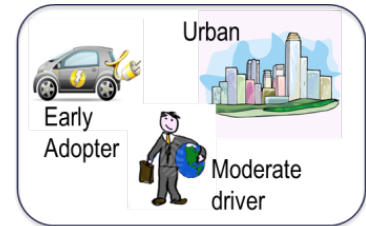


2 °C



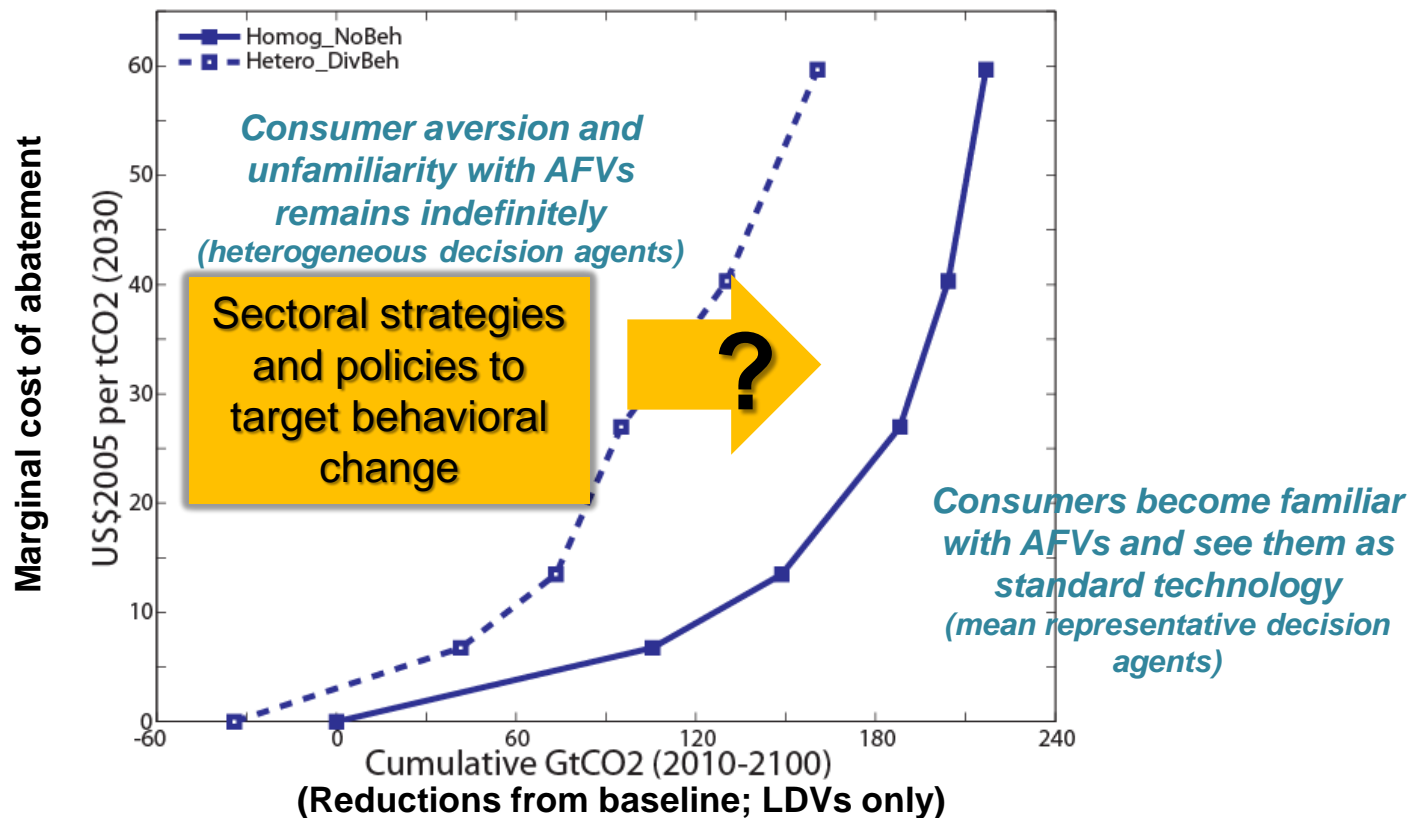
Behavior is also crucial for vehicle choice

- Vehicle choices are influenced by BOTH **financial** AND **non-financial** considerations.
- **Financial attributes:** Pretty well understood and nearly always included in energy-economy / systems models.
- **Non-financial attributes:** Less well understood. Models often use a stylized approach.
- Consumer preferences for these financial and non-financial attributes are **very heterogeneous**.

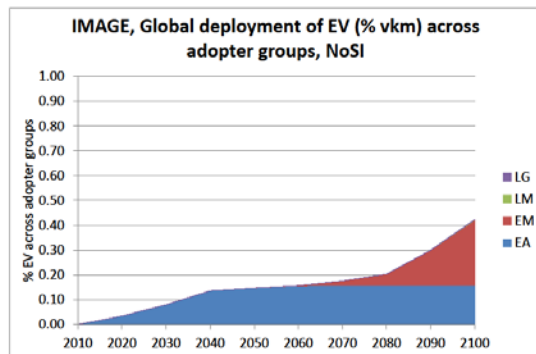


Considering diverse consumer transport preferences in IAMs

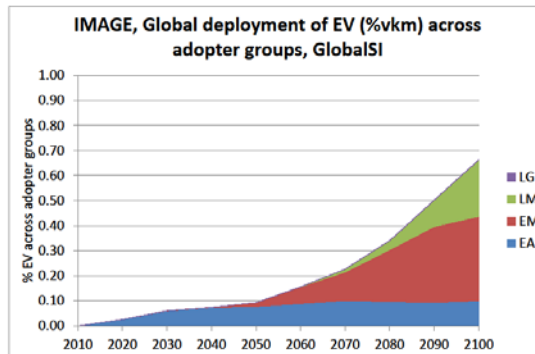
Results shown are from the MESSAGE model (IIASA)



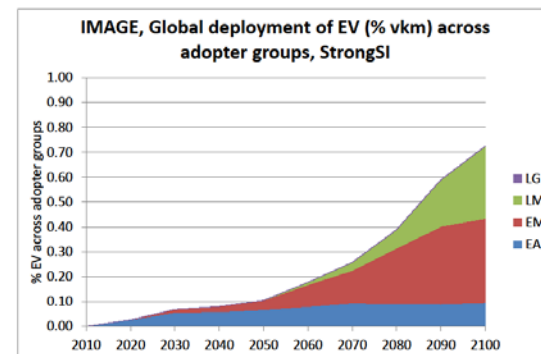
Modelling heterogeneous, interdependent adopter groups offers ways to analyse sectoral policy



Baseline: No social influence (homogenous consumers)



Global social influence: heterogeneous interdependent adopter groups



Strong global social influence: relationship between adopter groups strengthened

Examples of sectoral policies include priority parking, high occupancy vehicle lanes, and dedicated refueling infrastructure, all of which may stimulate social influence effects for EVs.

Policy to support technology change

- IAMs show that radical decarbonization of passenger transport can occur through technological innovations:
 - Efficiency, **electrification** and fuel switching
 - However depends on **techno-economic development** as well **consumer behavior**
 - **Sectoral strategies** and **policies** explicitly targeting consumer attitudes toward alternative fuel vehicles are necessary
- ...But also policy directed to **mode shift** or **activity** reduction could complement radical technology change required



Thanks!

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