

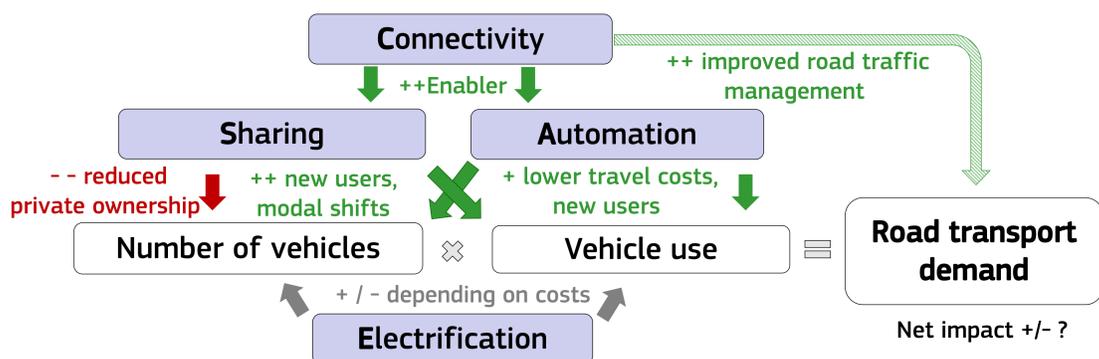
Macroeconomic Impacts of Connected Autonomous Electric Vehicles

ABSTRACT

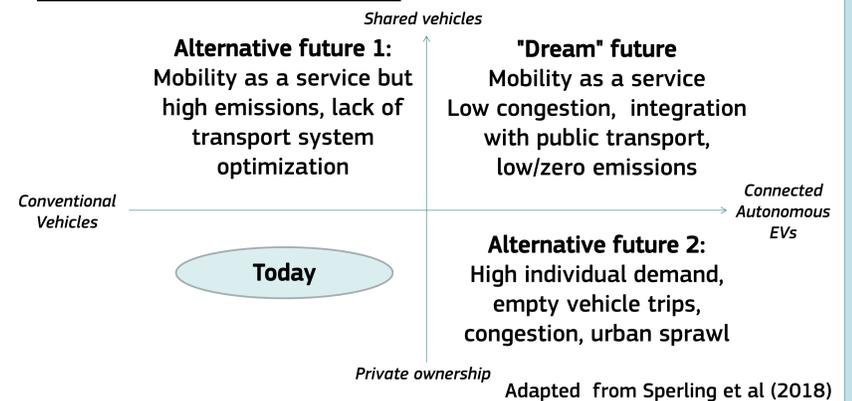
This study explores the potential macroeconomic and environmental impacts of various future mobility scenarios encompassing the deployment of Automation, Connectivity, Electrification and Shared Mobility technologies in road transport, using a global energy and environment focused Computable General Equilibrium Model (the JRC-GEM-E3).

1. Automation, Connectivity, Electrification and Sharing - Future Mobility Revolution?

What may be the implications of ACES on road transport demand?



What could the future look like?



2. What are the potential economic implications?

Vehicle manufacturing

- Type of vehicles produced and supply-chains? Labour intensity?
- Number of vehicles produced/sold and where?

Private transport

- Private ownership (stock implications)?
- Maintenance requirements, fuel consumption, fuel switching?
- Vehicle use and modal shifts (transport services)?

Freight transport

- Fuel efficiency, fuel switching, labour intensity?
- Modal shifts?

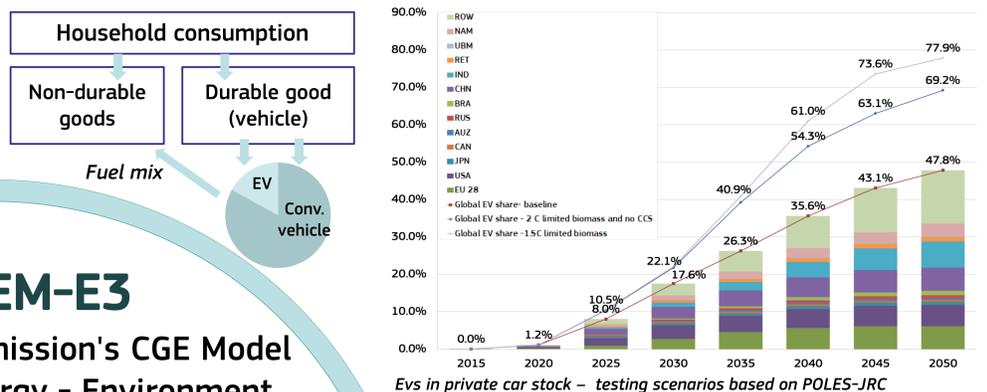
Further questions

- Infrastructure investment, electric system

4. Modelling new vehicles in the JRC-GEM-E3

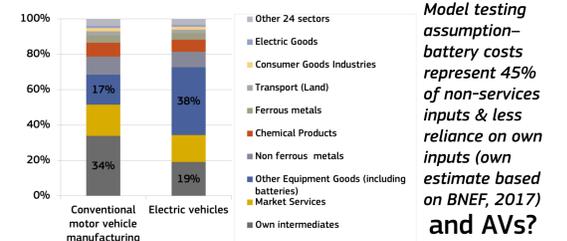
Demand side: Varying deployment levels and speed by technology

- Private cars: adjusting the consumption matrix
- Increasing share of new vehicle type in household consumption of private vehicles



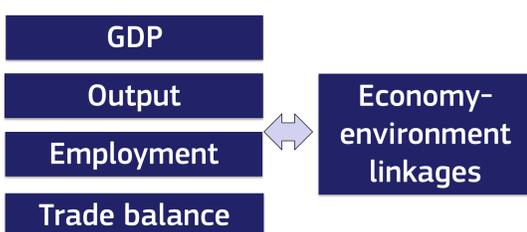
Supply-side: Vehicle manufacturing sectors

- New cost structure: For EVs?



3. How to capture them?

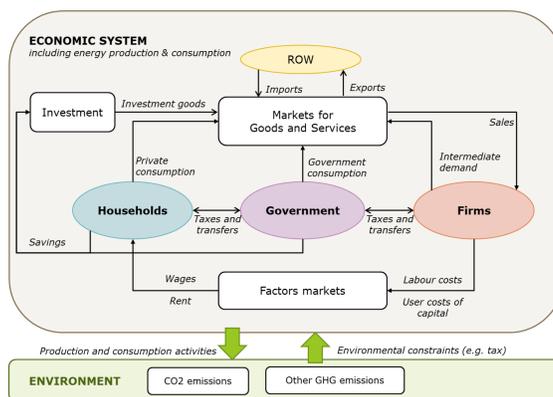
- Need to assess impacts on:



- Supply-chain impacts and international competitiveness are key
- CGE Modelling of alternative deployment scenarios of various vehicle types in a global setting
- Technical input on vehicle manufacturing cost structure
- Inputs from bottom-up energy system models (stock deployment, fuel use)

JRC-GEM-E3

The European Commission's CGE Model for Economy – Energy – Environment



5. Further work

Continue model implementation

- Fuel and labour intensity, maintenance, modal shifts.
- Freight: Modifying the investment matrix?

Scenario modelling

- "What if" scenarios combining various impacts

Convert employment impacts into occupations and skills

- Links to separate tool at NACE-2 level (University of Warwick)

References

- Alonso Raposo M., Grosso, M., Després, J., Fernández Macías, E., Galassi, C., Krasenbrink, A., Krause, J., Levati, L., Mourtzouchou, A., Saveyn, B., Thiel, C. and Ciuffo, B., An analysis of possible socio-economic effects of a Cooperative, Connected and Automated Mobility (CCAM) in Europe. Publications Office of the EU, Luxembourg, 2018
- Sperling, Daniel. Three Revolutions : Steering Automated, Shared, and Electric Vehicles to a Better Future, Island Press, 2018. ProQuest Ebook Central, <https://ebookcentral.proquest.com/lib/europaeu/detail.action?docID=5217684>.
- Bloomberg New Energy Finance, (BNEF). (2017). Why Battery Cost Could Put the Brakes on Electric Car Sales. available at: <https://about.bnef.com/blog/why-battery-cost-could-put-the-brakes-on-electric-car-sales>