TECHNISCHE UNIVERSITÄT WIEN

Energy Economics Group

On the Future of Passenger Mobility and its GHG Emissions in Vienna: Scenarios for Different Types of Policies

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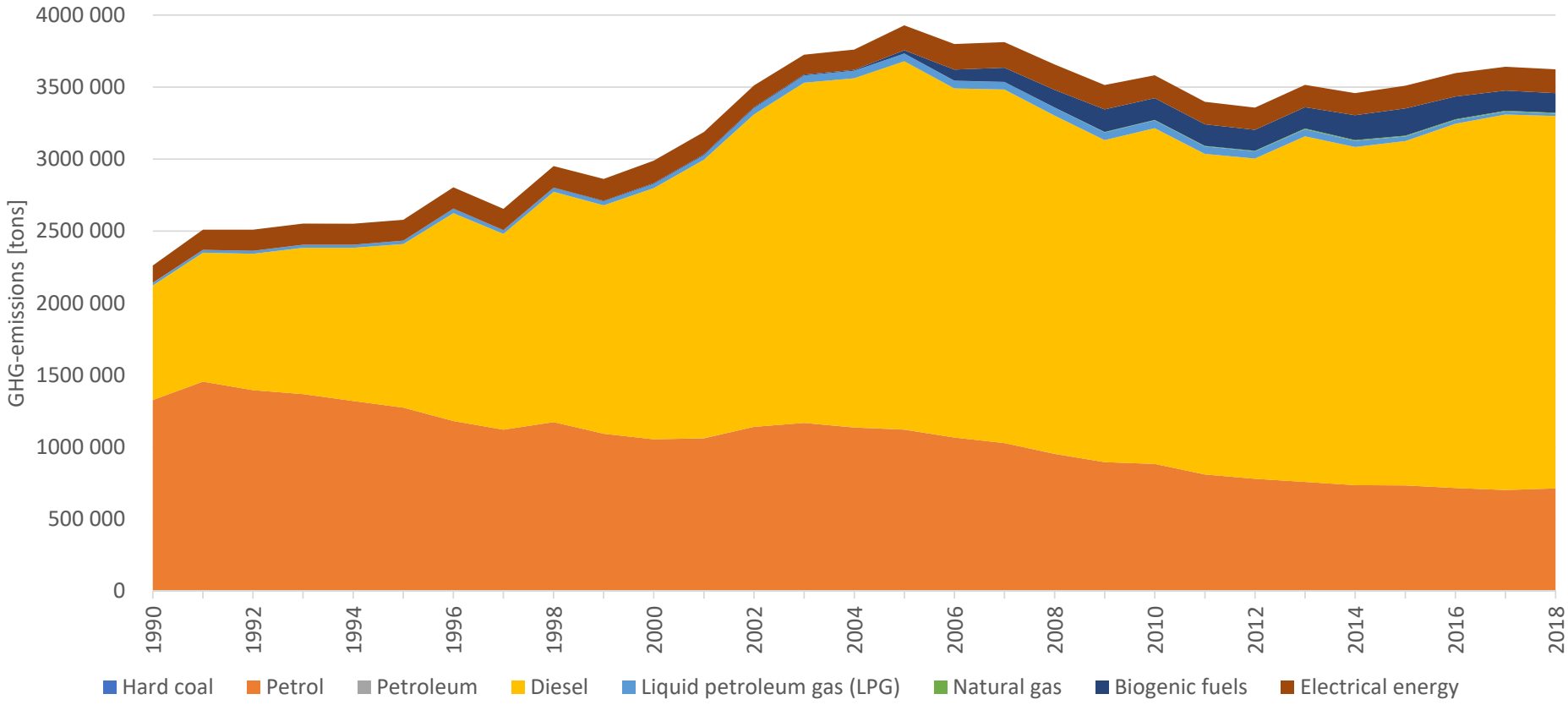
Agenda

- Mobility in Vienna
- Core objective
- State of the art
- Methods of approach
- Assumptions for the scenarios and results
- Conclusions

Mobility in Vienna

- Urban areas host about 50% of global population and generate 70% of GHG emissions
- Vienna -> reduction of GHG emissions until 2050 by 80% compared to emissions in 1990 (Smart City Wien Framework Strategy)
- **Transport sector (43%),** energy generation (20%), buildings (17%)
- **Road Transportation** contributed **72%** of CO_2 emissions within transport sector
- Still fossil fueled, largely car-oriented

Mobility in Vienna



Core objective

Core objective:

- Analysis of scenarios for future development of energy use and resulting GHG emissions in transport in Vienna up to 2030
- Consideration of flow energy, flow emissions and embedded emissions of car/vehicle production
- Derivation of three scenarios (1) BAU-Scenario, (2) Public Transport Scenario, (3) BEV Scenario
  - conventional electricity mix, electricity from RES

Methods of approach:

- Excel model to estimate energy and CO2 flows and embodied energy and embodied CO2 and calculate corresponding emissions from manufacturing

State of the art

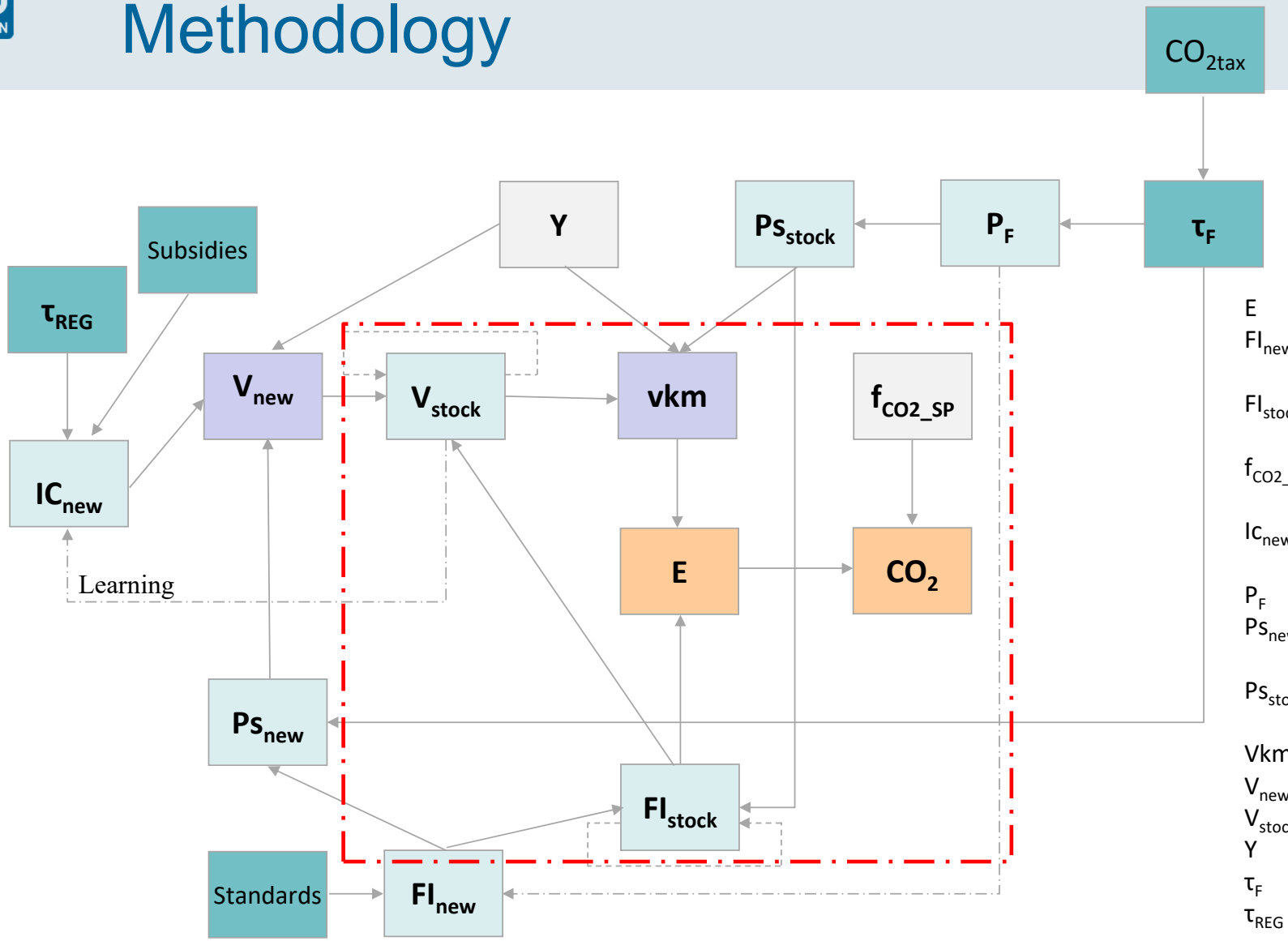
Data is from

- Alter-Motive Project from the EEG (2008-2011)
- ODYSSEE MURE (2016-2018)
- TransLoC (2018-2022)
- Statistic Austria

Peer-reviewed paper:

- Electric Mobility in Cities: The Case of Vienna (2021, Ajanovic et al.)
- How policy measures succeeded to promote electric mobility – Worldwide review and outlook (2018, Rietmann et al.)
- Policy Instruments to Promote Electro-Mobility in the EU28: A Comprehensive Review (2018, Cansino et al.)
- Future local passenger transport system scenarios and implications for policy and practice (2020, Enoch et al.)

Methodology

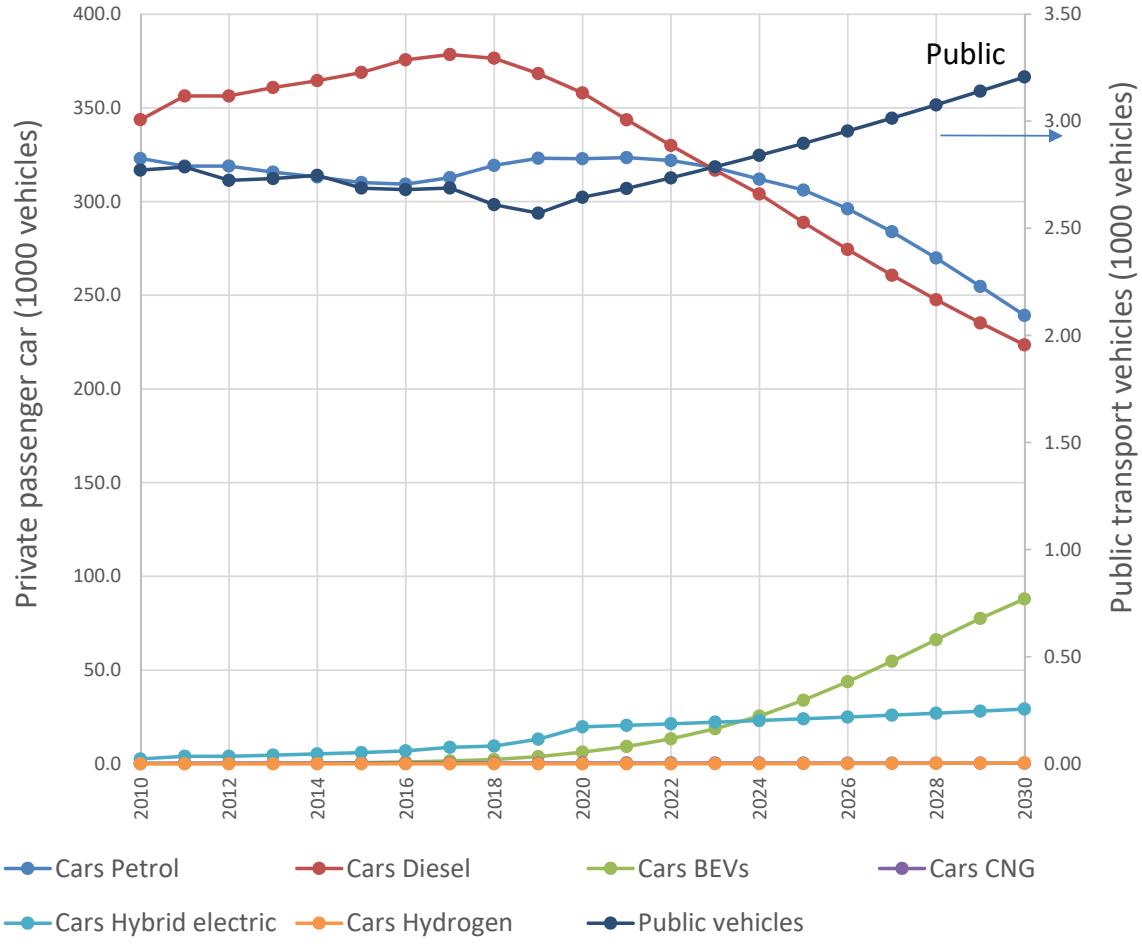


E	energy consumption
FI_{new}	fuel intensity [litre/100 km] new registered vehicles
FI_{stock}	fuel intensity [litre/100 km] vehicle stock
f_{CO2_SP}	specific CO2 emissions per litre fuel
Ic_{new}	investment costs [€/car] new registered vehicles
P_F	fuel price [€/litre]
Ps_{new}	service price [€/km] new vehicles
Ps_{stock}	service price [€/km] vehicle stock
Vkm	vehicle km driven [km]
V_{new}	vehicles new registered
V_{stock}	vehicle stock
Y	income
τ_F	tax on fuel
τ_{REG}	registration tax

Business as Usual Scenario

Scenario Assumptions:

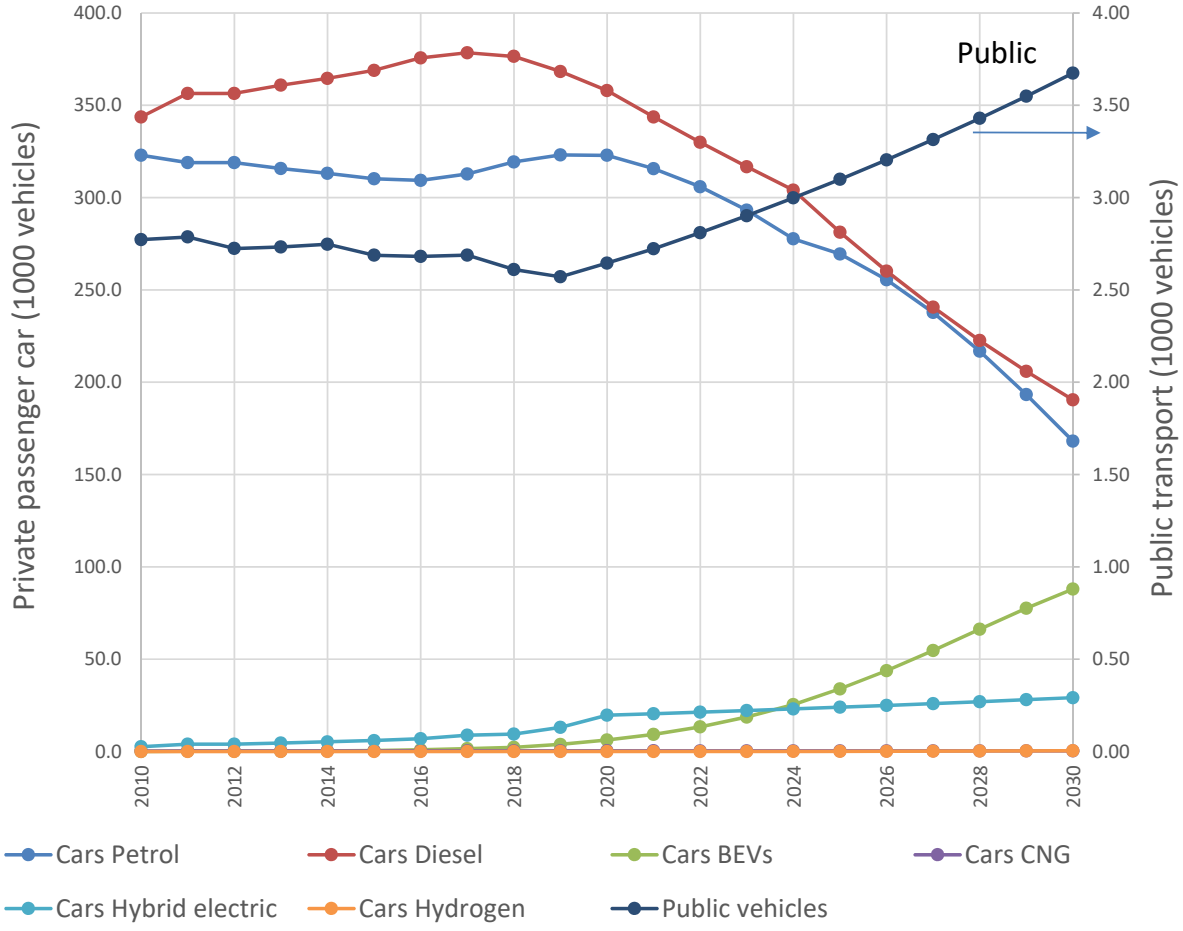
- Average growth rate PT of 2.6%/year in recent years to 2.6%/year up to 2030
- Average growth rate alternative-fueled cars of 3%/year up to 2030
- Private diesel use -> reduction of 4%/year



Public Transport Scenario

Scenario Assumptions:

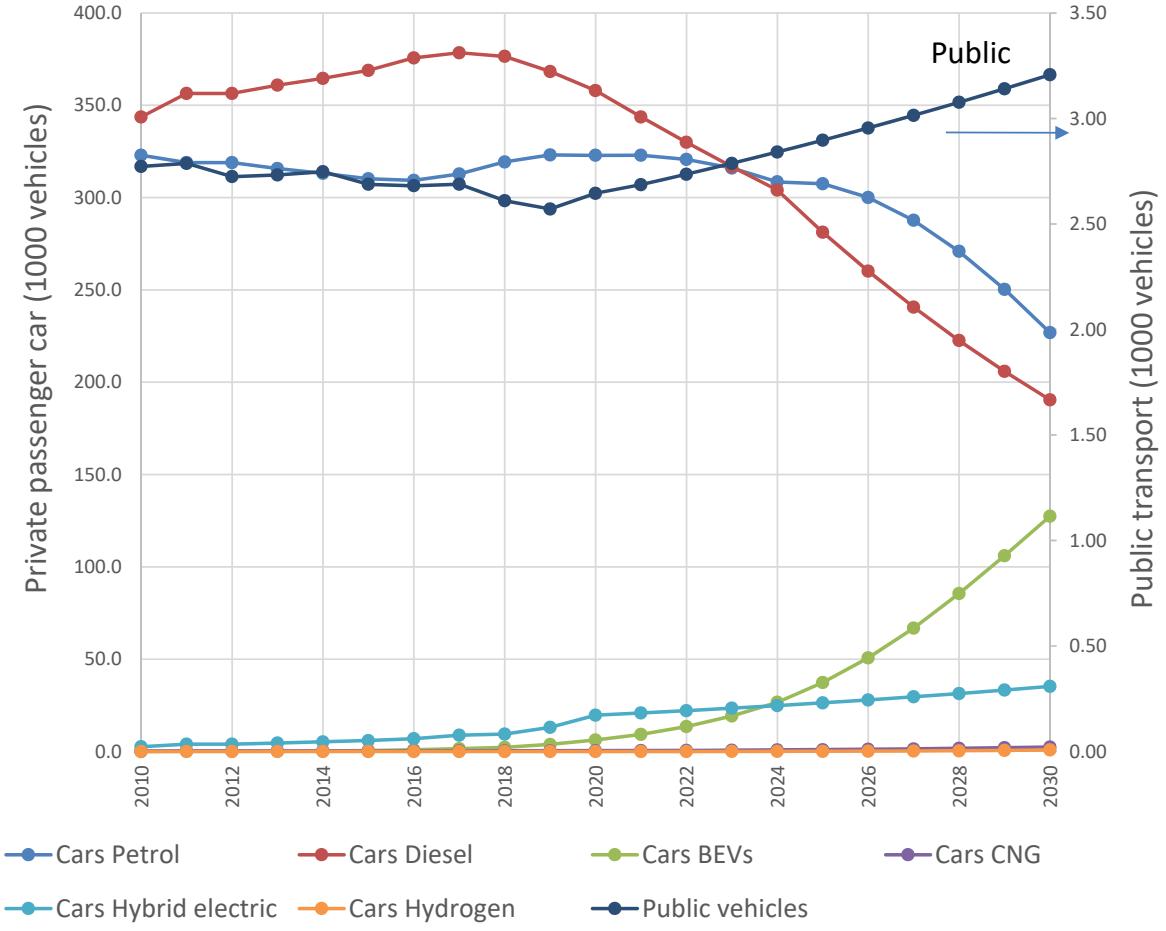
- Average growth rate PT of 2.6%/year in recent years to 4%/year up to 2030
- average growth rate alternative-fueled cars of 3%/year up to 2030
- Private diesel use -> reduction of 4%/year



Battery Electric Vehicle Scenario

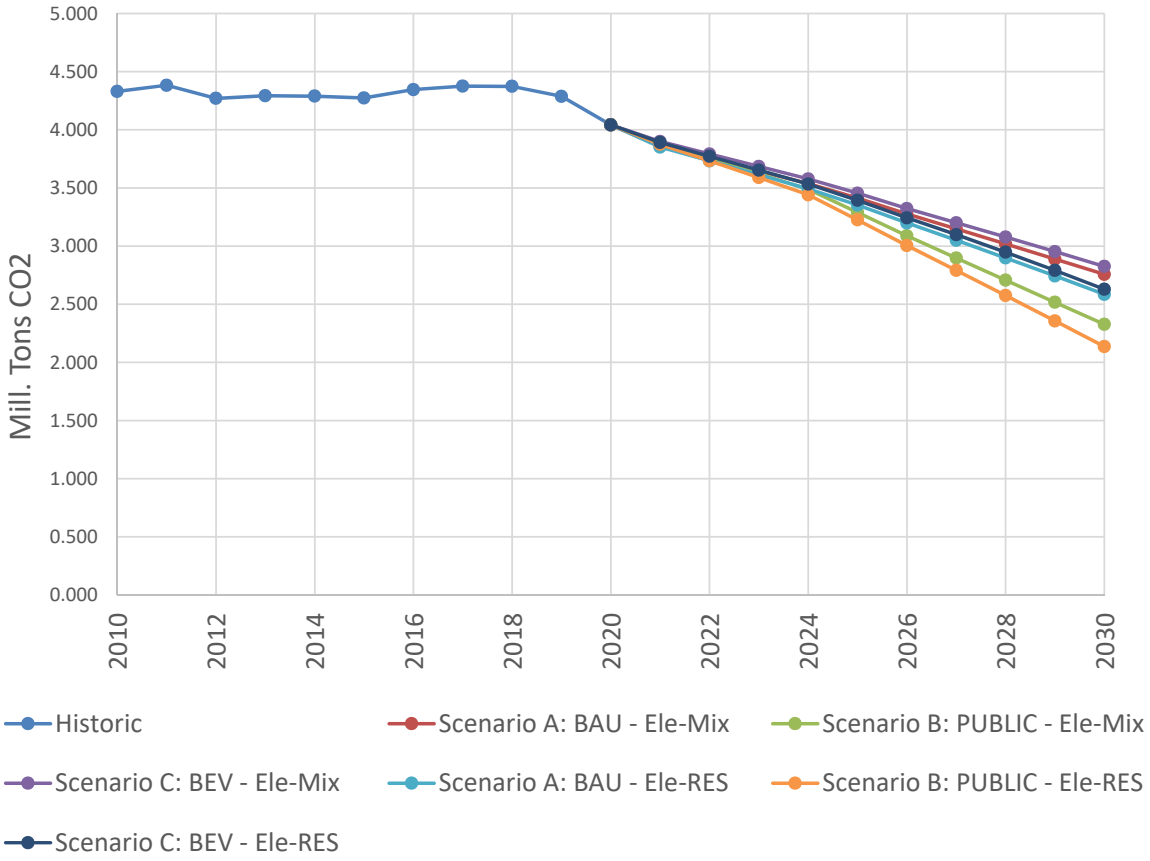
Scenario Assumptions:

- Average growth rate PT of 2.6% in recent years to 2.6% up to 2030
- average growth rate BEV of 3%/year in recent years to 4%/year up to 2030
- Private diesel use -> reduction of 4%/year



Development of CO2 Emissions in Scenarios

- Each scenario with a conventional electricity mix and electricity from RES
- Public scenario with electricity from RES → lowest CO2 emissions



Conclusion

- Political measures -> most significant impact on CO2 emissions in transport (reduction of pkm driven)
- Electrification of transport -> need to increase the electricity generation from RES
- Promotion of public transport
- Public Transport scenario with electricity from RES -> lowest total CO2 emissions (minus of 15% CO2 emissions compared to BAU-scenario)

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