TECHNISCHE UNIVERSITÄT WIEN

Energy Economics Group

Modelling Energy Policies in Passenger Car Transport – A Case Study of Austria

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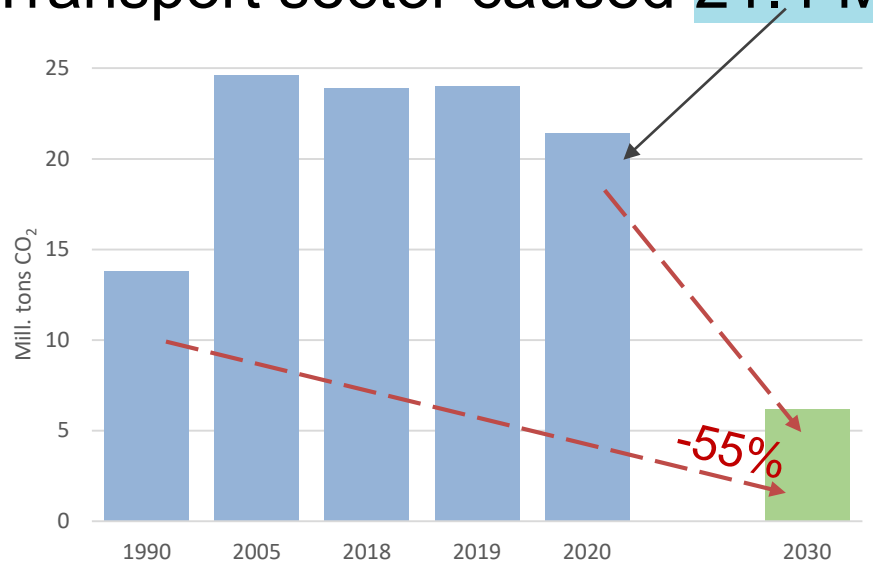
Agenda

- Introduction
- Core objective
- Energy policies in transport
- State of the art
- Methodology
- Results
- Conclusions

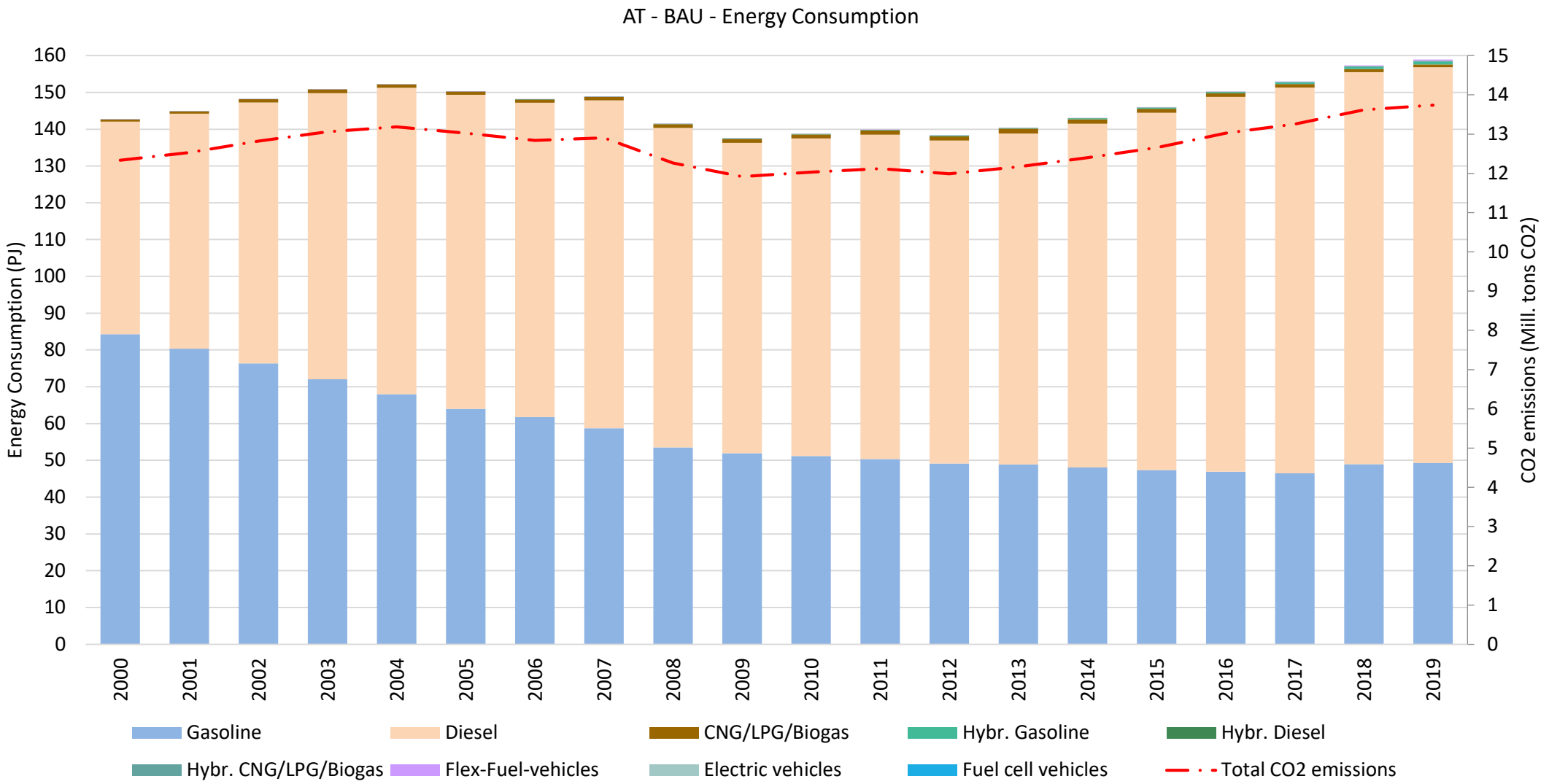
Introduction

- EU target → reduction of CO_2 emissions by at least 55% compared to 1990 levels until 2030
- Transport sector caused 21.4 Million tons CO_2 in Austria in 2020



- Road Transportation contributed 72% of CO_2 emissions within transport sector

Introduction



Core objectives of the entire study

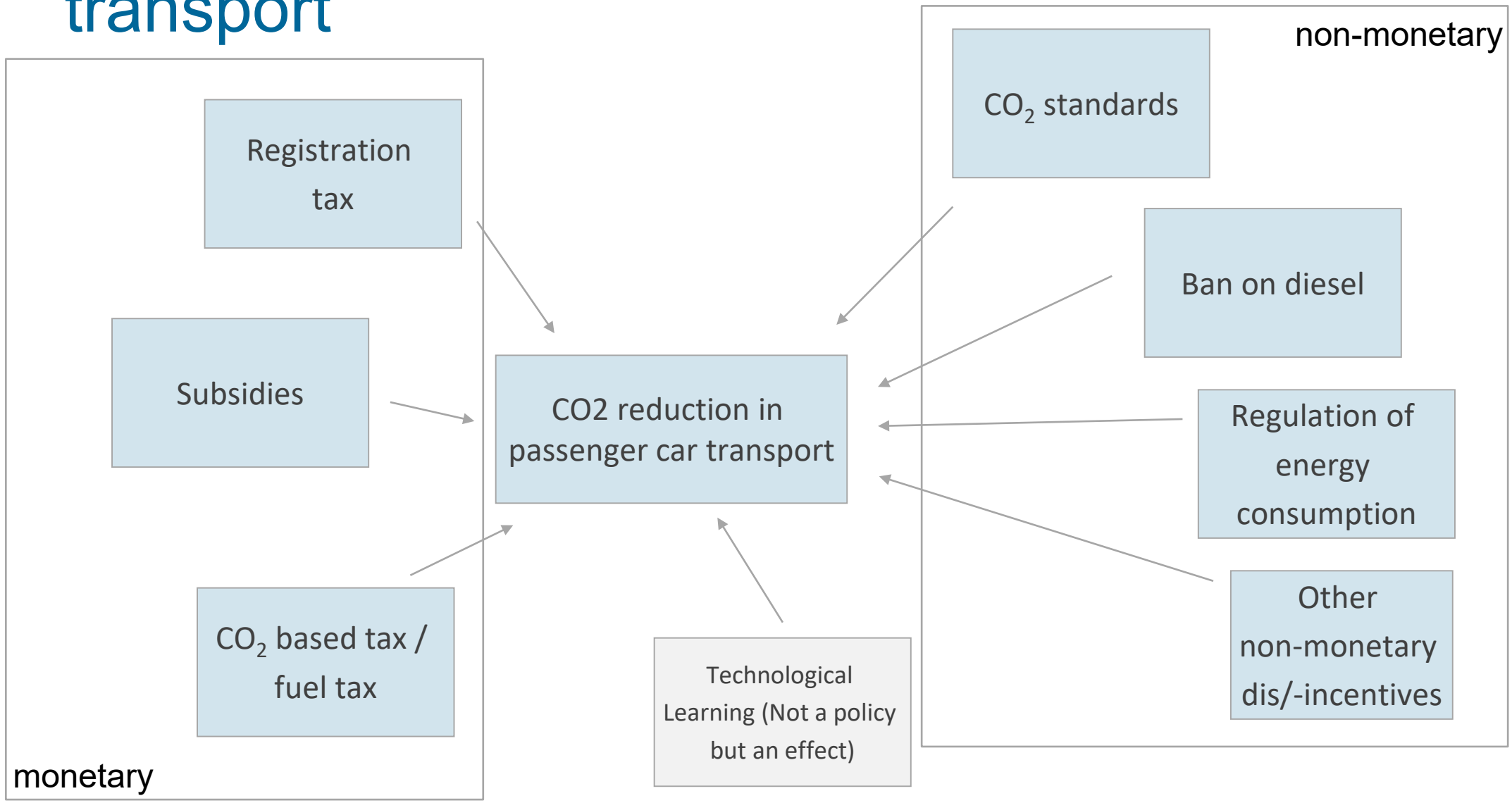
1. **Derivation of policy strategies** to reduce CO2 emissions in passenger car transport
2. **Analysis of the current state of the art** regarding studies of the modelling of policies in passenger car transport
3. **Modelling of BAU- (Business As Usual) and Policy Scenarios** from 2000 until 2050 for all EU-countries

Core objectives of this presentation

Presentation of …

1. energy policies in the transport sector
2. the methods of approach
3. the results from BAU- and Policy-Scenarios from 2000 until 2050 for Austria
4. first conclusions and preliminary recommendations regarding policy strategies

Policies with an affect on passenger car transport



State of the art

Alter-Motive Project from the EEG (2008-2011)

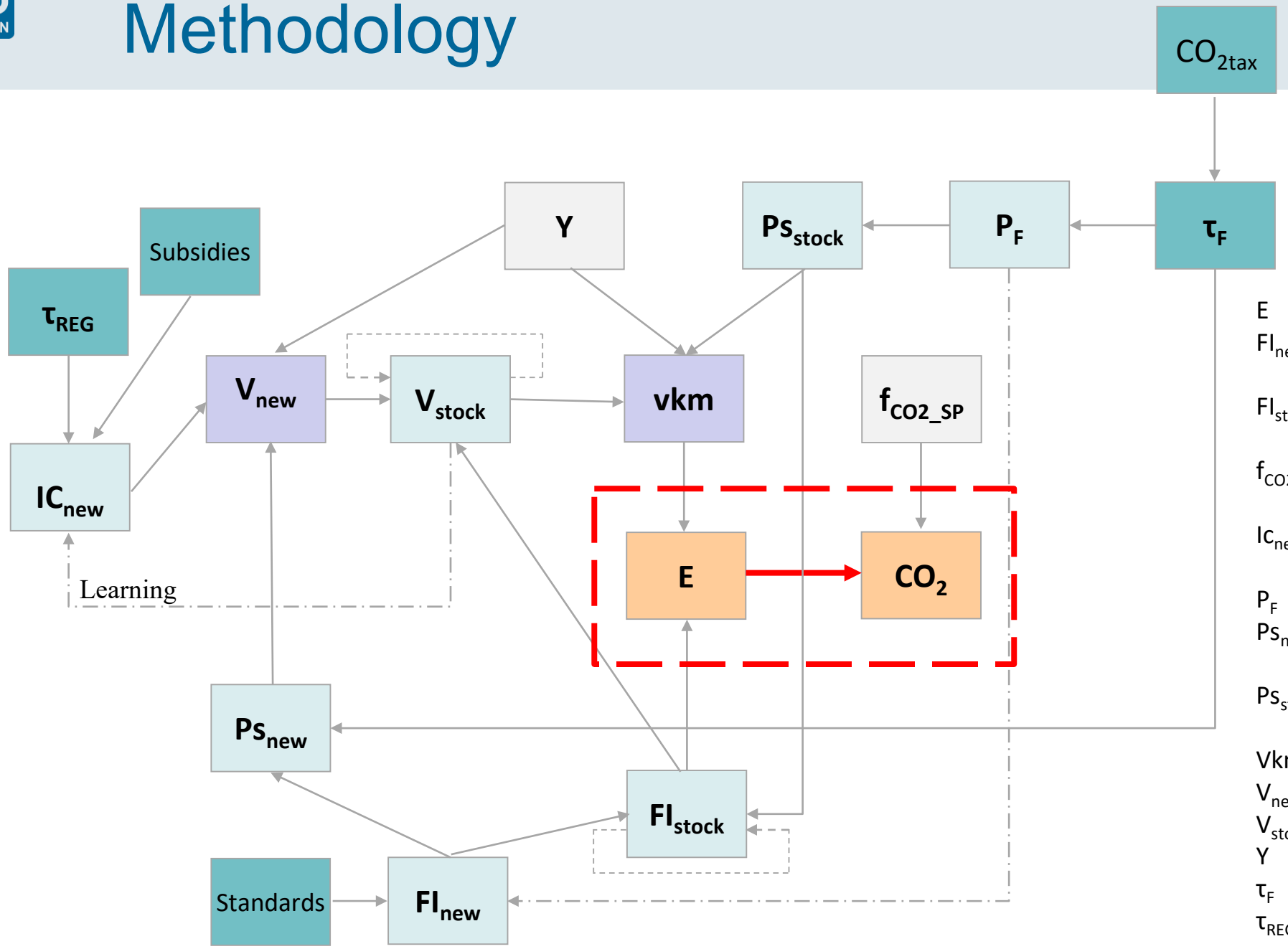
Data is from

- ODYSSEE MURE (2016-2018)
- TransLoC (2018-2022)
- Statistic Austria

Peer-reviewed paper:

- Linking energy and transport models to support policy making (Gerboni et al., 2017)
- A system dynamics model for CO2 emission mitigation policy design in road transport sector (Barisa et al., 2018)
- How do transport policies contribute to a low carbon city? An integrated assessment using an urban computable general equilibrium model (Zhang et al., 2018)

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]
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Vkm	vehicle km driven [km]
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Y	income
τ_F	tax on fuel
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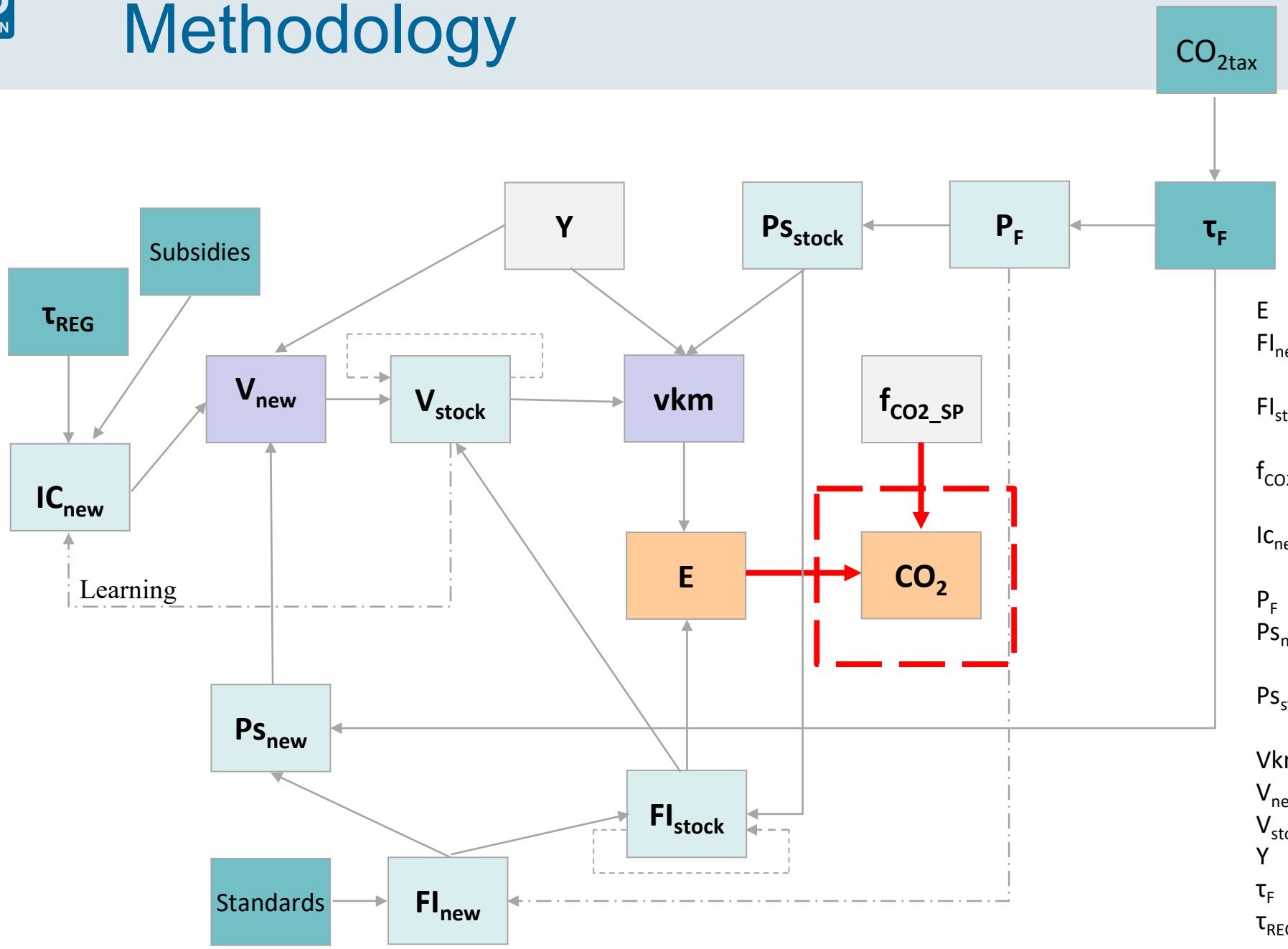

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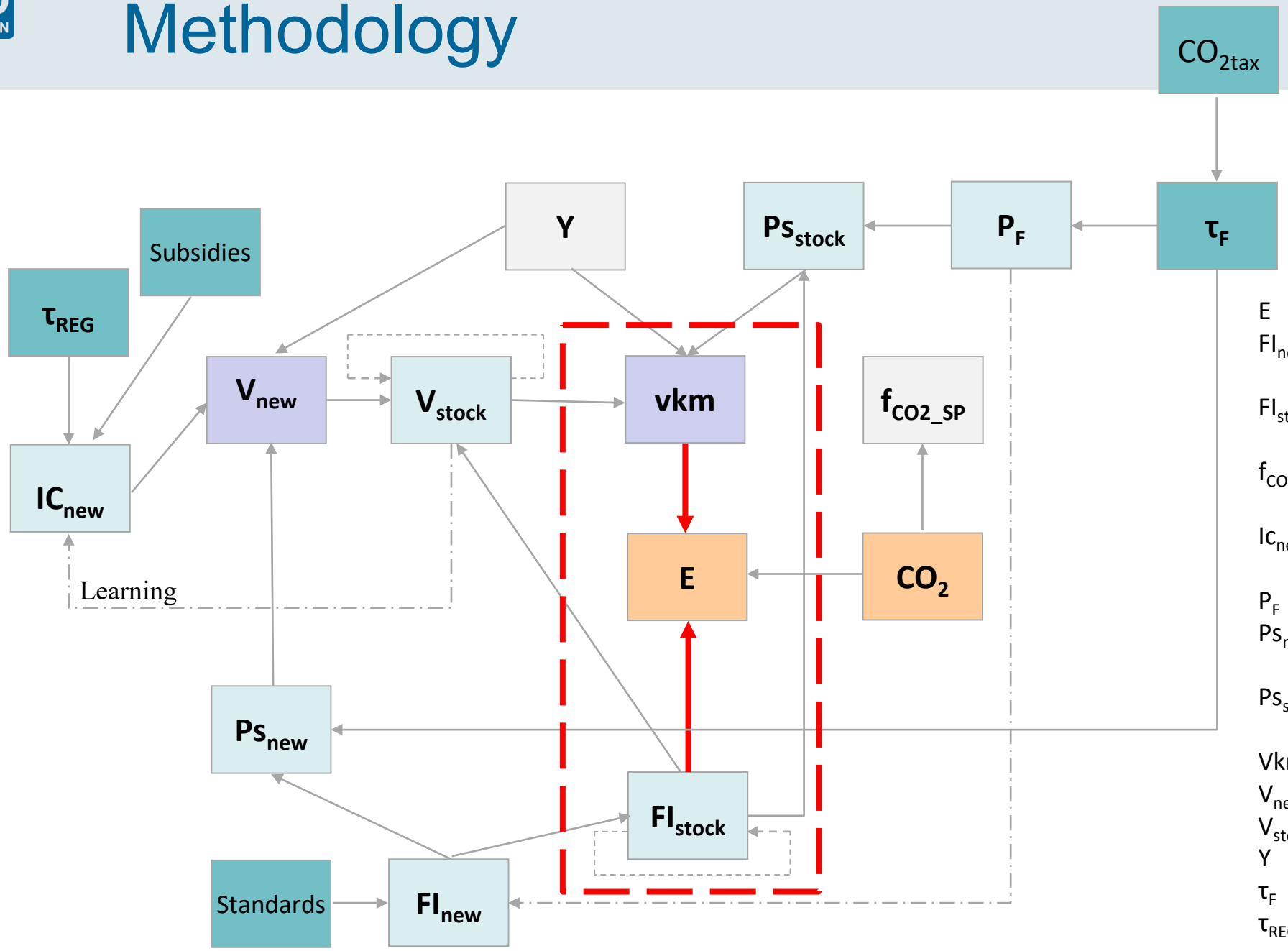

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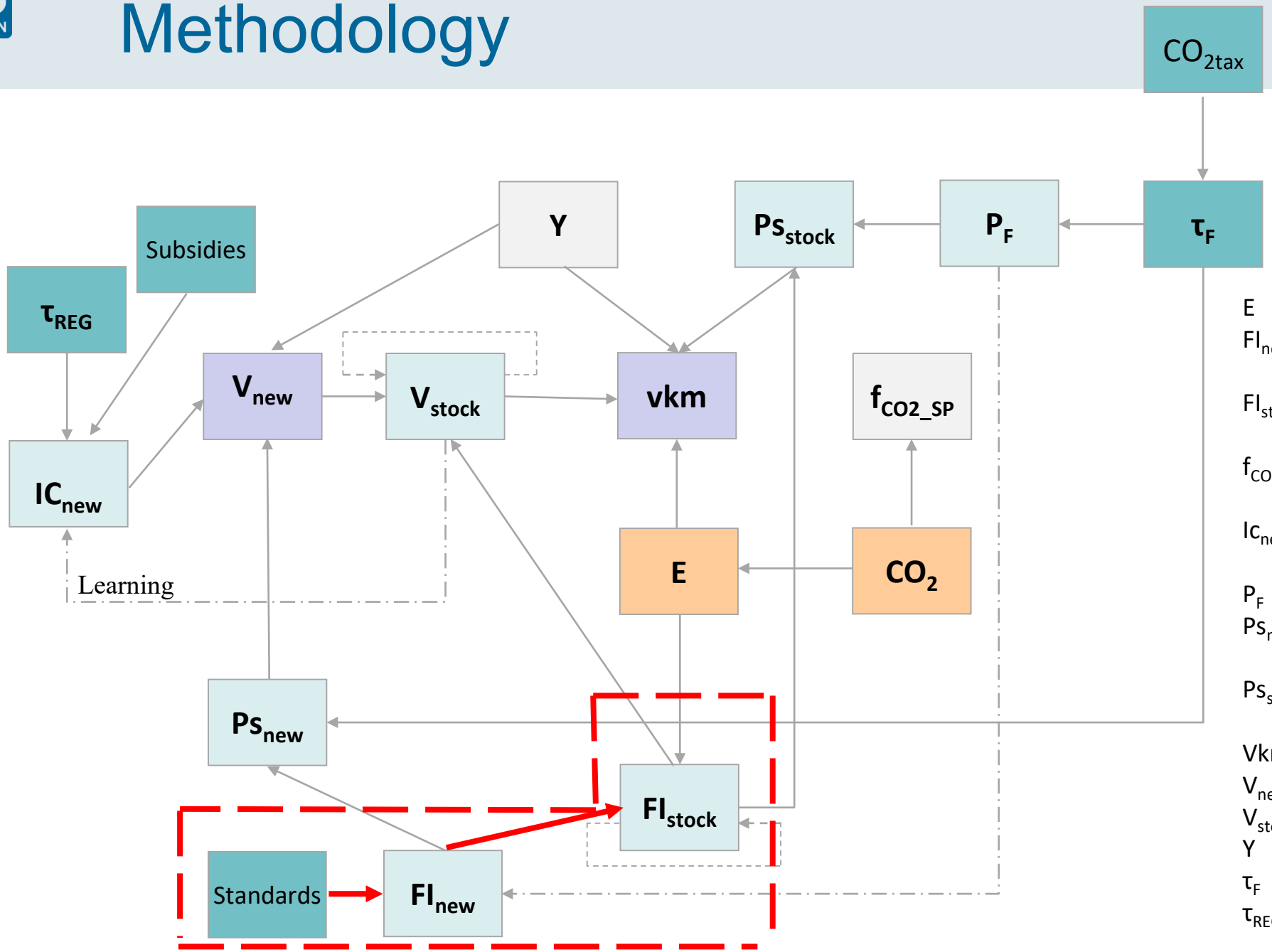

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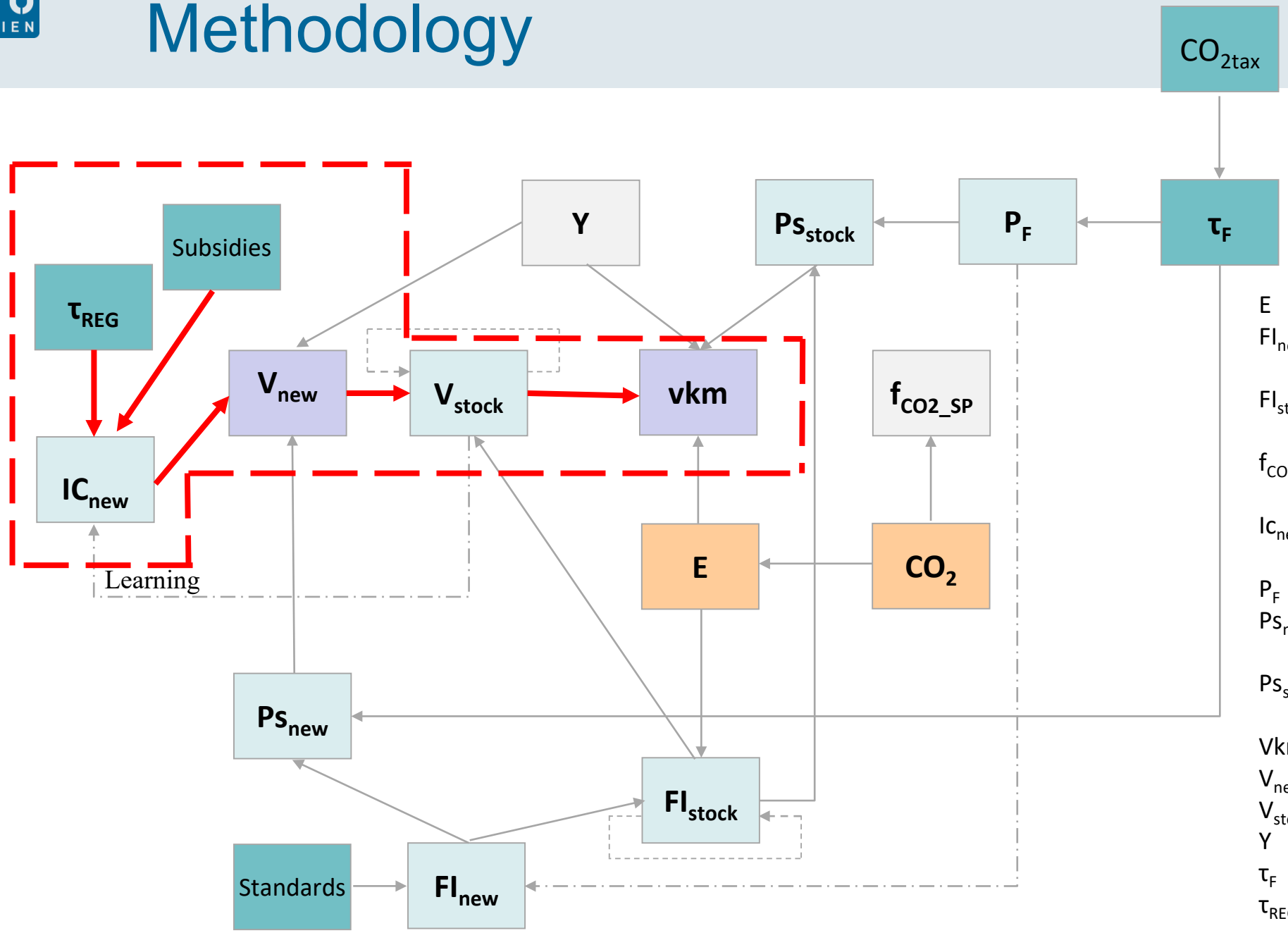

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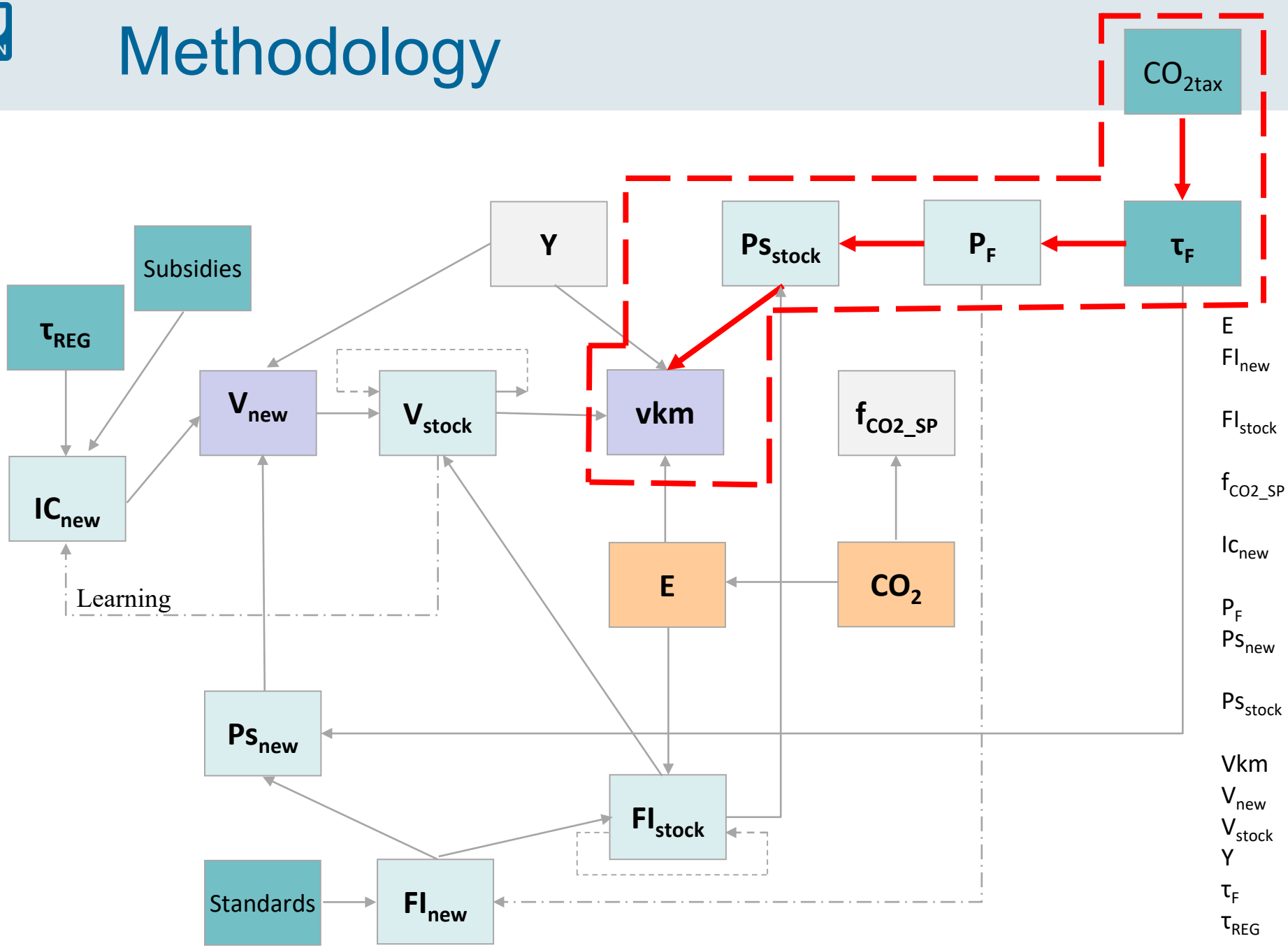

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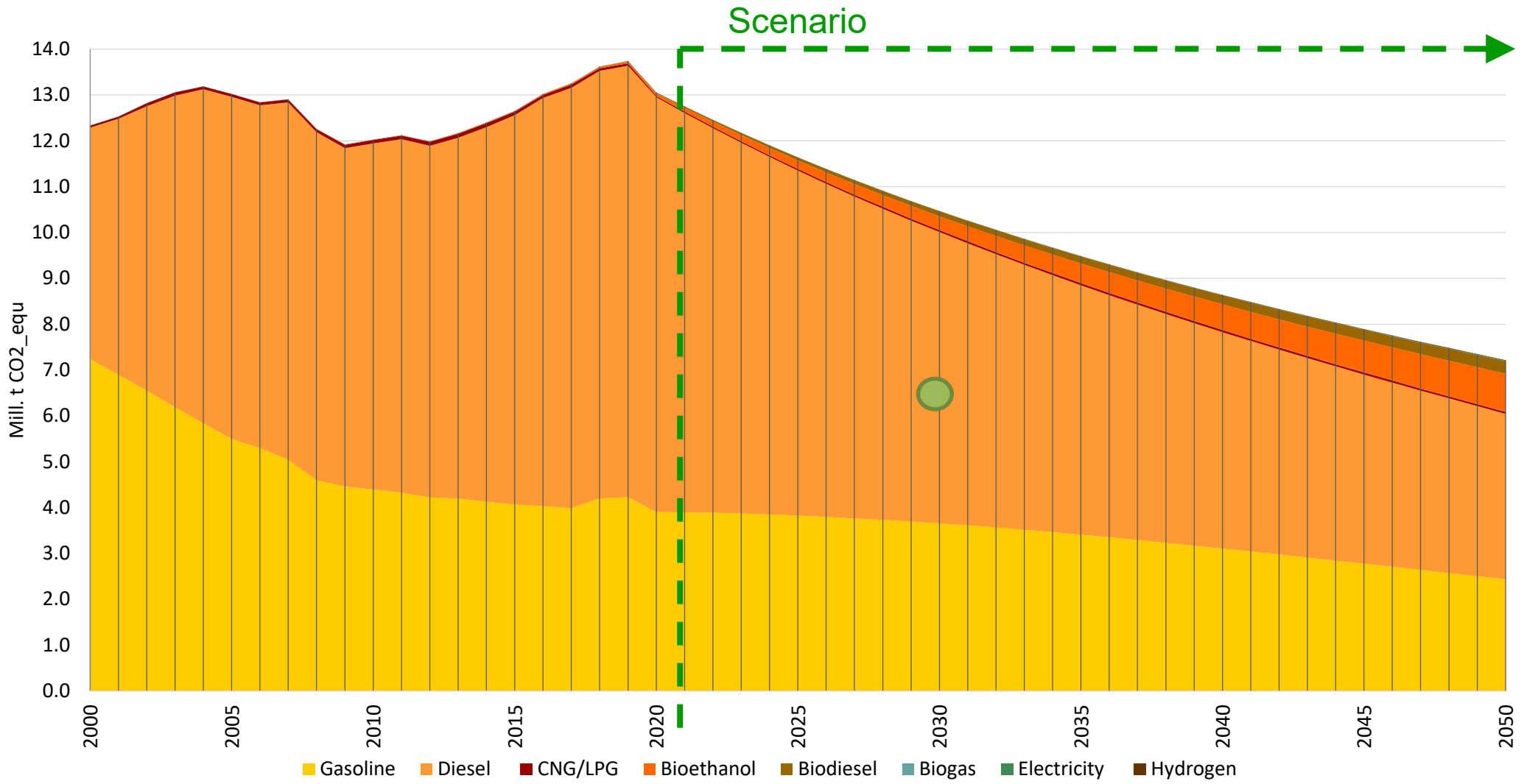
Methodology

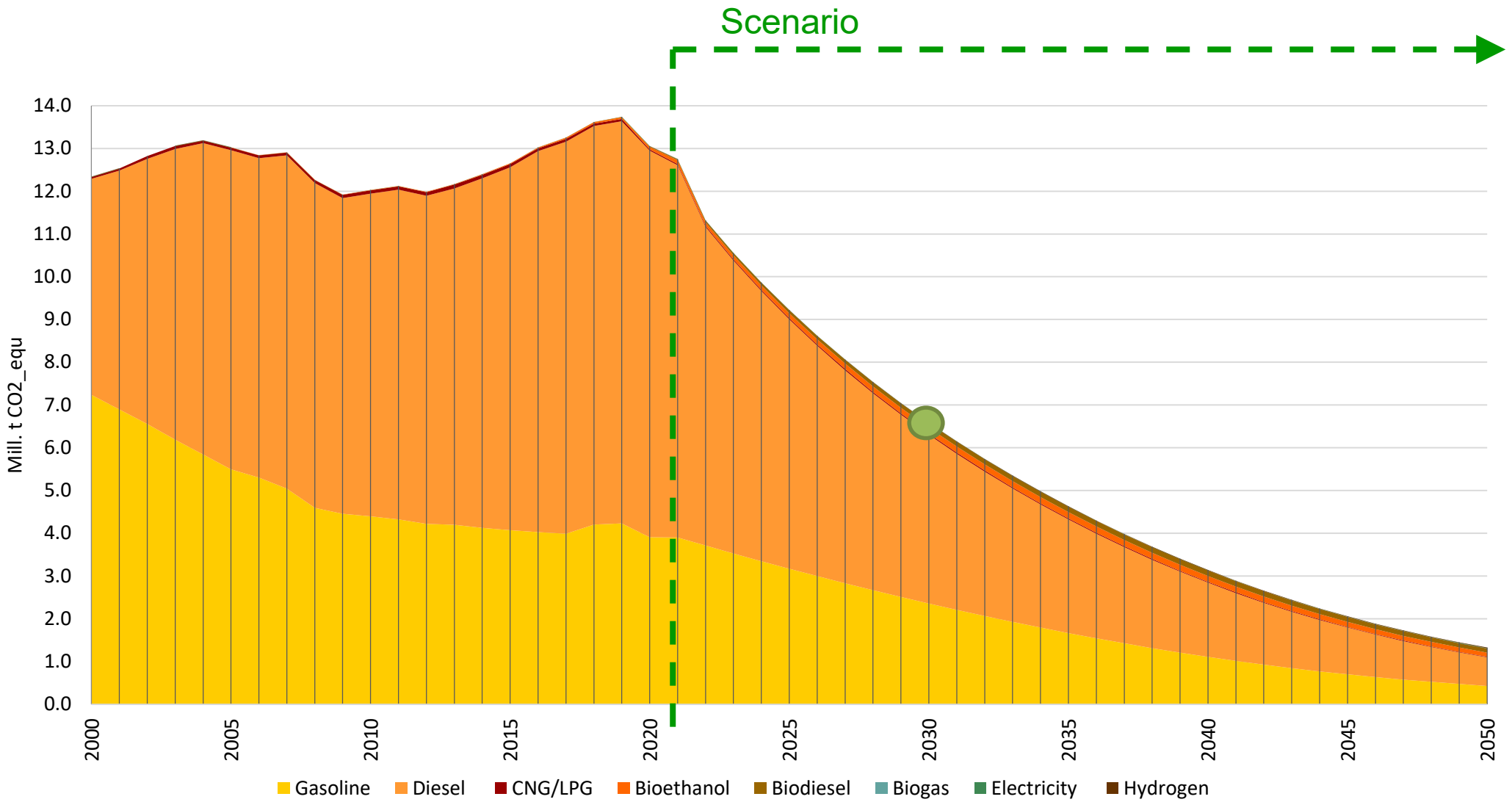
	BAU – Scenario 2000 - 2050	Policy – Scenario 2000 - 2050
CO_2 tax	- Fuel tax: 0.703[EUR/kgCO2/year] in 2020	0.254[EUR/kgCO2/year] Fuel tax increase: 0.05[EUR/kgCO2/year]
Registration tax	-4%/year	+20%/year (petrol, diesel, CNG/LPG, flex fuel) + 10%/year (hybrid)
Subsidy increase	only since 2017, every 3 years + 5% on BEVs, FCV and hybrids (exempted diesel-hybrids)	+15%/year (BEV, FCV) +5%/year (hybrids (exempted diesel-hybrid)) No increase necessary from 2025

All policies start 2021

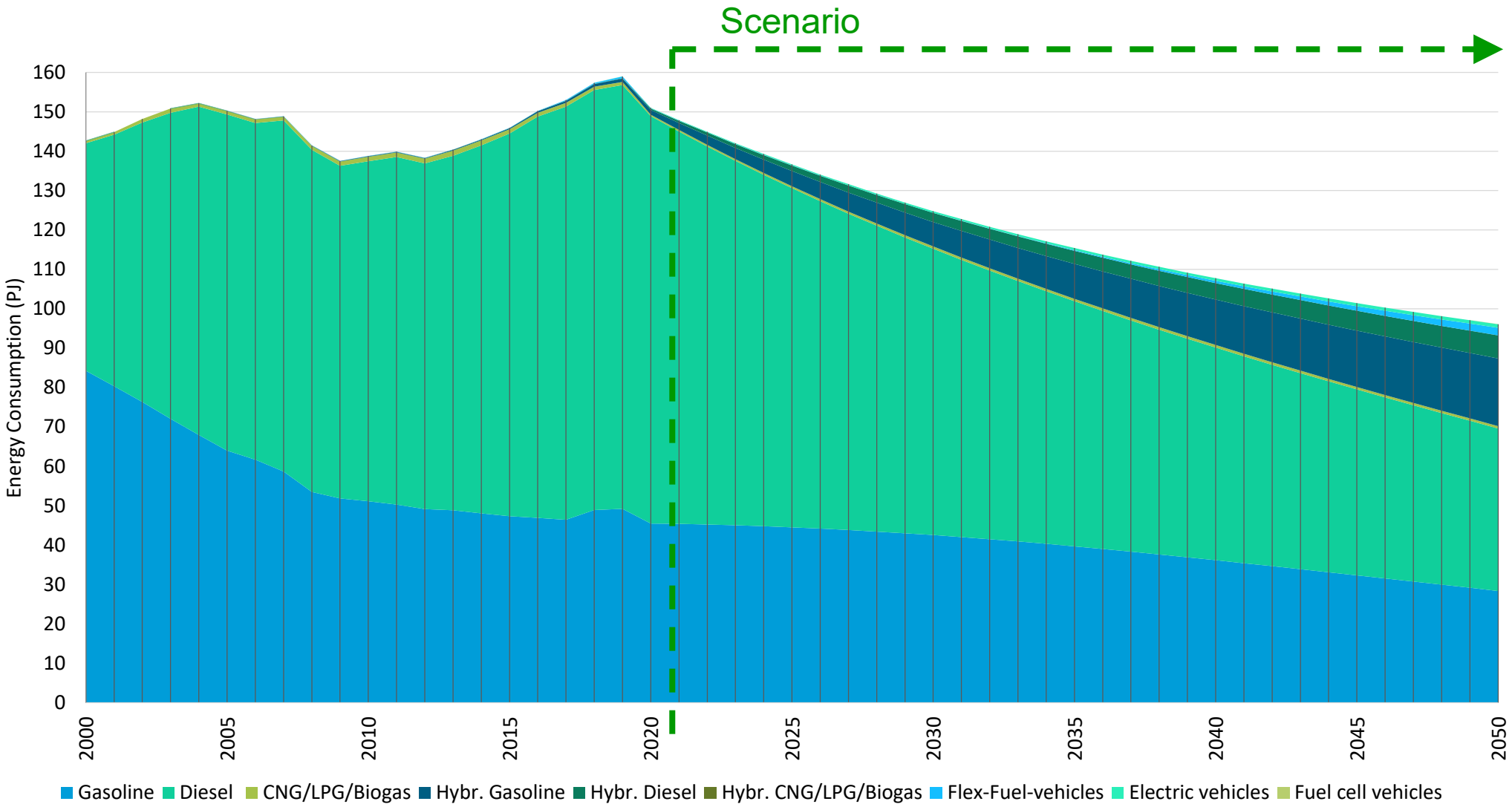
Results: CO_2 Emissions - BAU



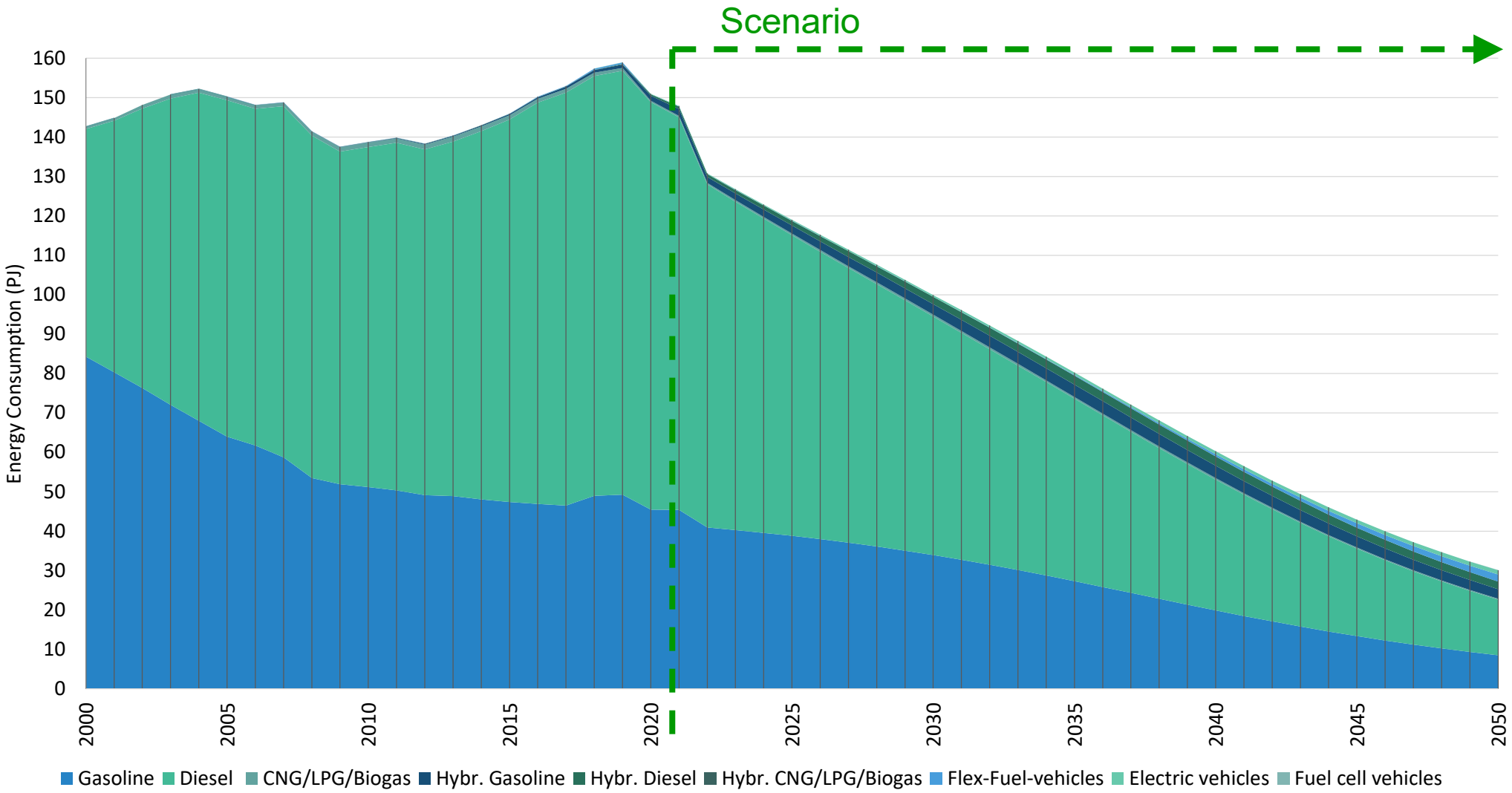
Results: CO_2 Emissions - Policy



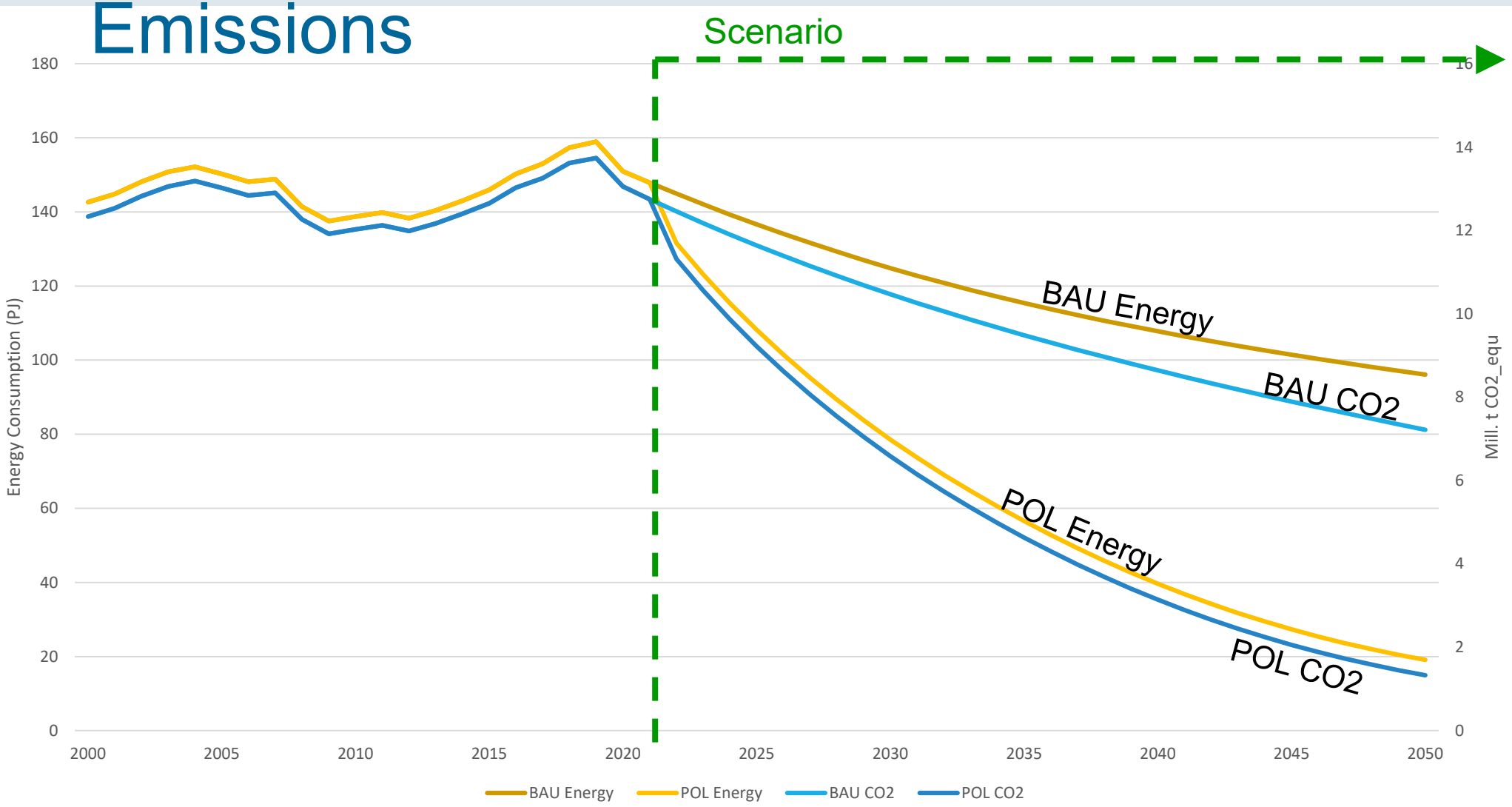
Results: Energy Consumption - BAU



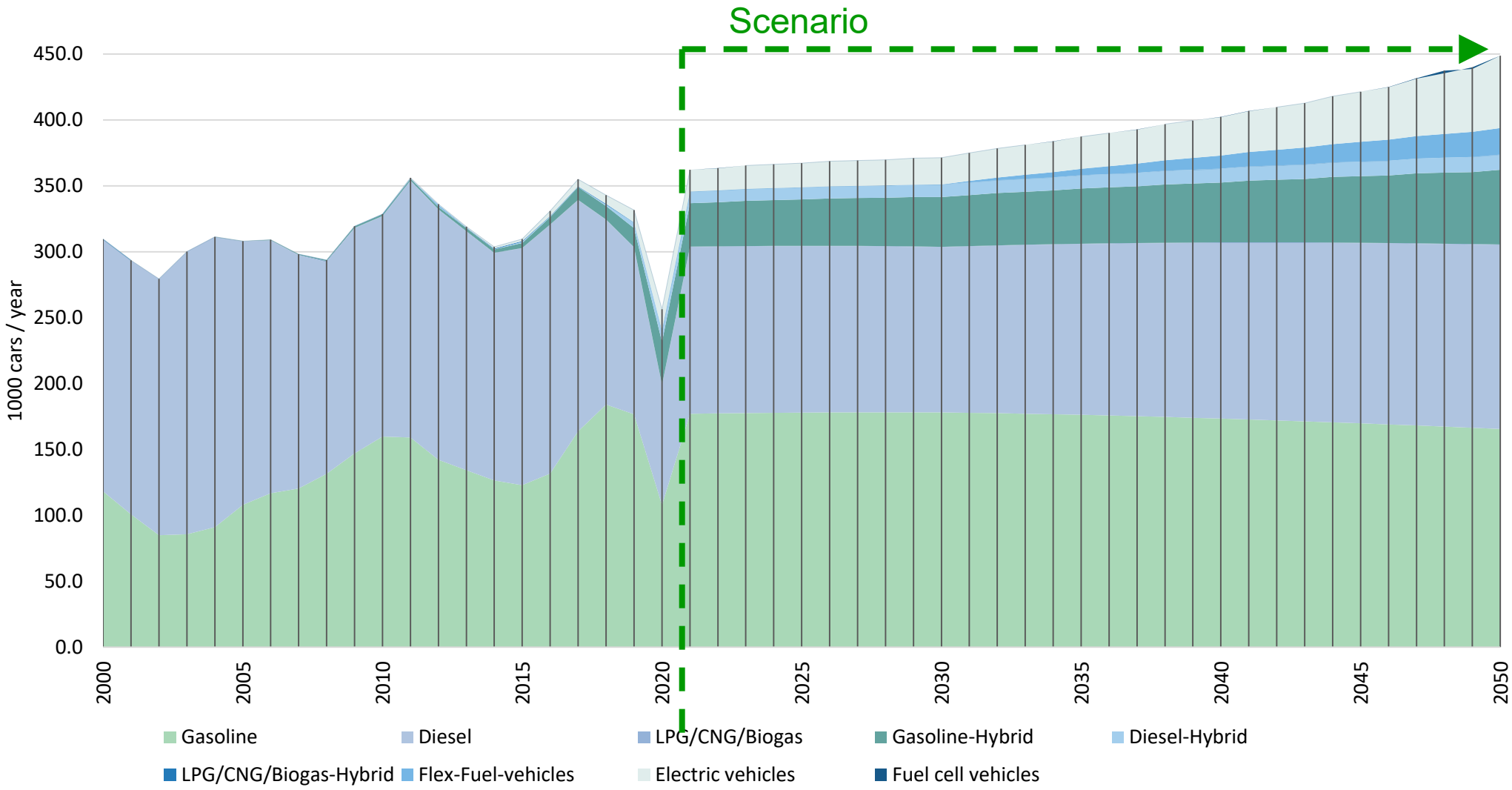
Results: Energy Consumption - Policy



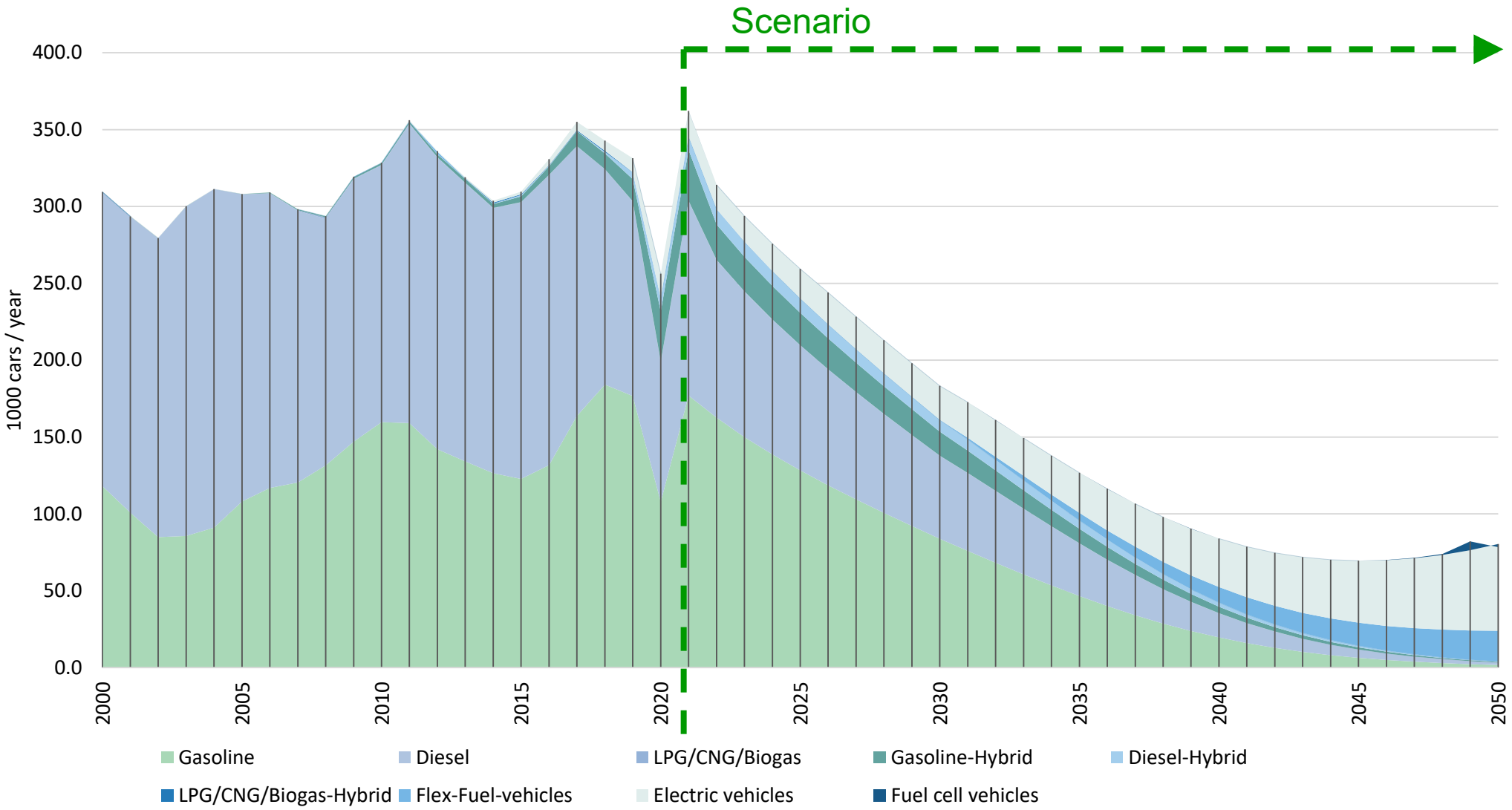
Results: Energy Consumption and CO_2 Emissions



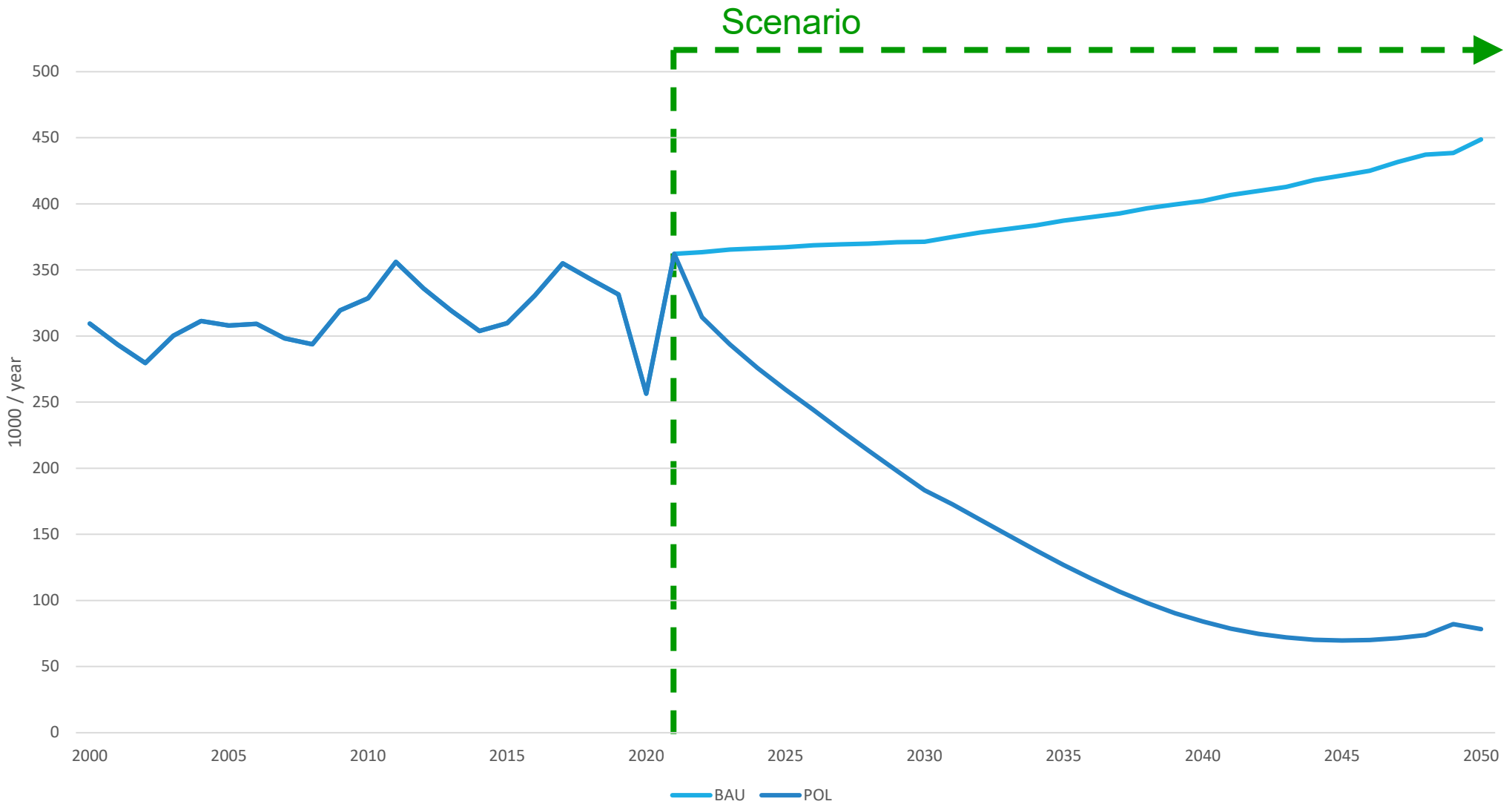
Results: New Registered Cars - BAU



Results: New Registered Cars - Policy



Results: new registered cars



Conclusion

- No “one size fits all” strategy
- Need to force a broad customizable portfolio of policies
- Drastic steps are necessary to improve energy efficiency and reduce energy consumption
- Introduction of incentives and disincentives which cannot be measured with our tool

Further research:

- Analysis of historical developments in other EU-Countries
- Identification of Best Practice Cases
- Exchange of ideas with experts

References

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