VIENNA 2018 TRA TRANSPORT RESEARCH ARENA

A digital era for transport

solutions for society, economy and environment

Ground-Transport Emissions in three different Scenarios until 2040

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Introduction

The aim of the project „Transport and the Environment„ (VEU) is the conduct of an in-depth analysis of thinkable development pathways of the transport system in Germany and assess the effects on air quality and climate.

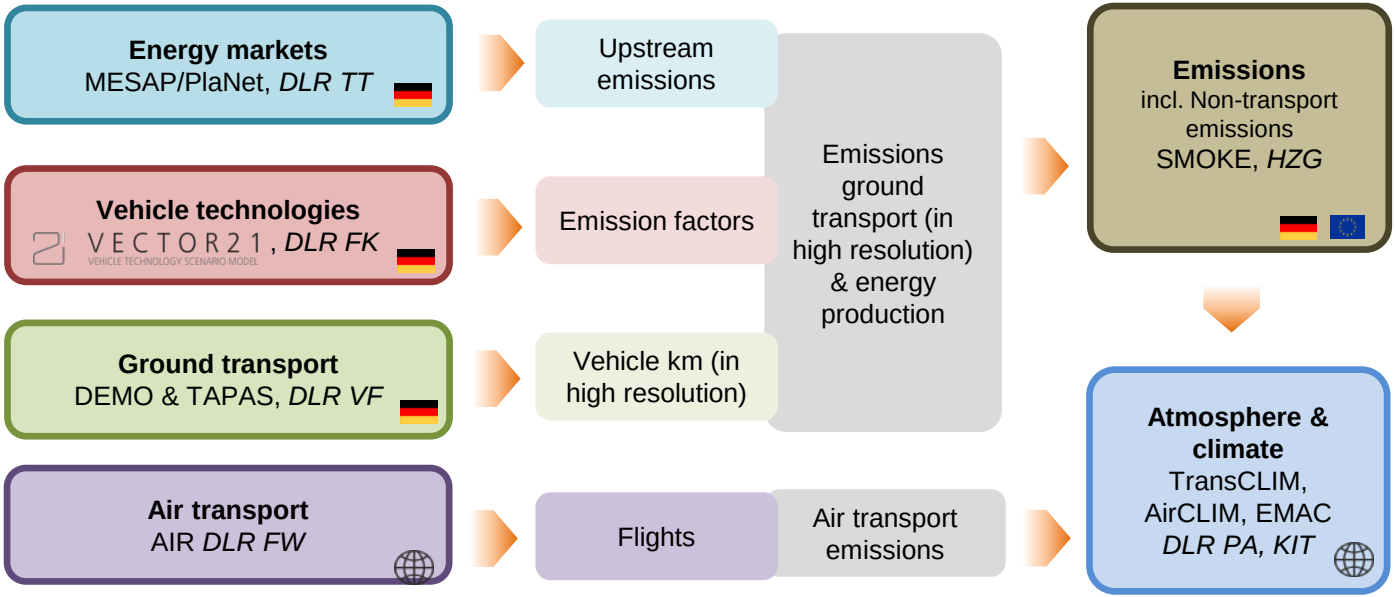
It is based on three consistent and plausible scenarios that were developed bottom-up, assuming reasonable policy decisions and technological developments

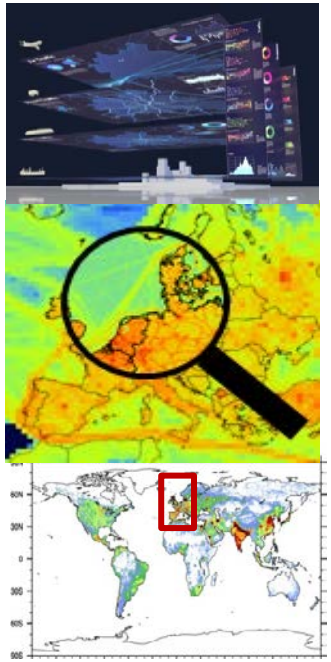
The project is a collaboration of 10 DLR-Institutes together with Karlsruhe Institute of Technology and Helmholtz Zentrum Geesthacht

Content

- Introducing the VEU Model Network and the Scenarios
- Technology Development Cars
- Findings on Transport Demand
- Results for Greenhouse Gas Emissions, NOx and PM
- Outlook to Air Pollution from Transport
- Conclusion

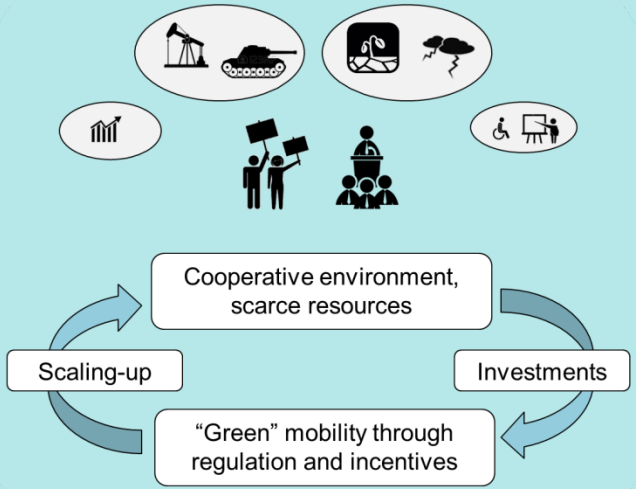
The Project Model Network:
„Transport and the Environment“ (VEU)



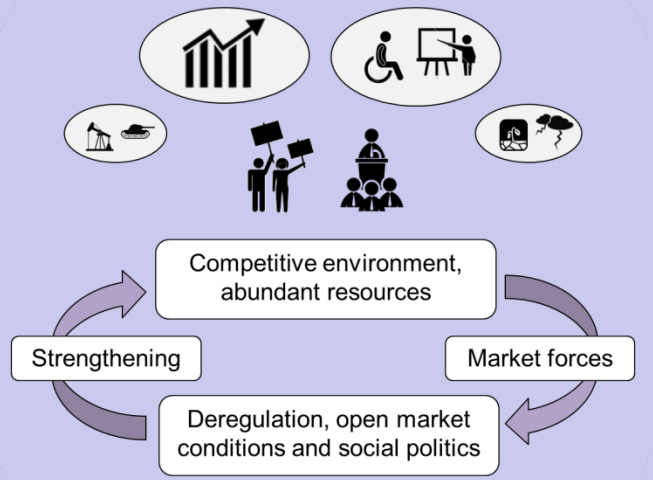


VEU–Scenarios: two thinkable futures
‘Regulated Shift‘ and ‘Free Play‘ 2010 - 2040

Regulated Shift



Free Play



VEU–Scenarios: two thinkable futures
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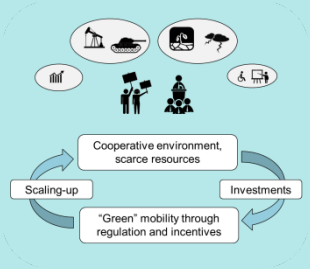
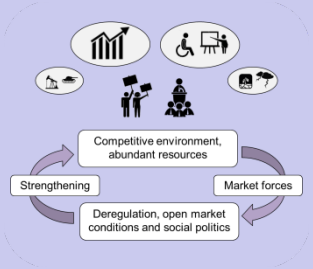
Regulated Shift *examples*				**Free Play** *examples*
- 4.4%		**Population**		- 4.4%
+ 1.14% per year		**GDP until 2040**		+ 1.14% per year
$125 per barrel		**Crude Oil Price**		$125 per barrel
80 % renewable		**Electricity Sources**		40 % renewable
More, cheaper & faster		**Public Transport**		Decay & metropolitan focus
Fewer cars & diesel-ban in cities		**Private Cars**		Gasoline and diesel stay dominant
Doubles for fossil fuels		**Tax on Fuels**		Expanded to renewables
45 g/km		**EU CO_2 Fleet-Targets**		95 g/km

VEU–Scenarios: two thinkable futures
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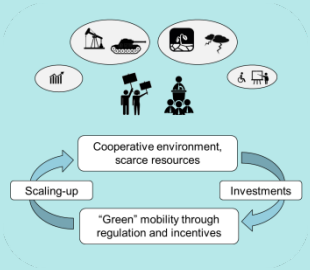
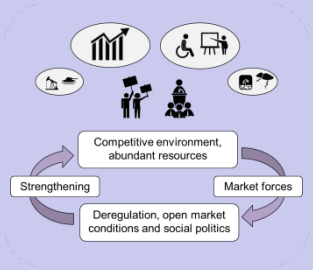
Regulated Shift *examples*





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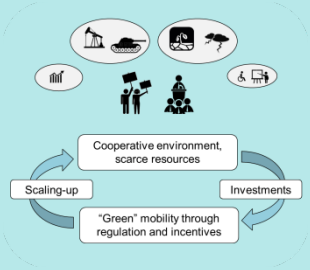
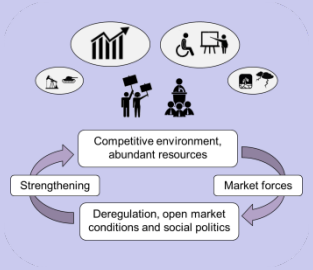
Regulated Shift *examples*			**Free Play** *examples*
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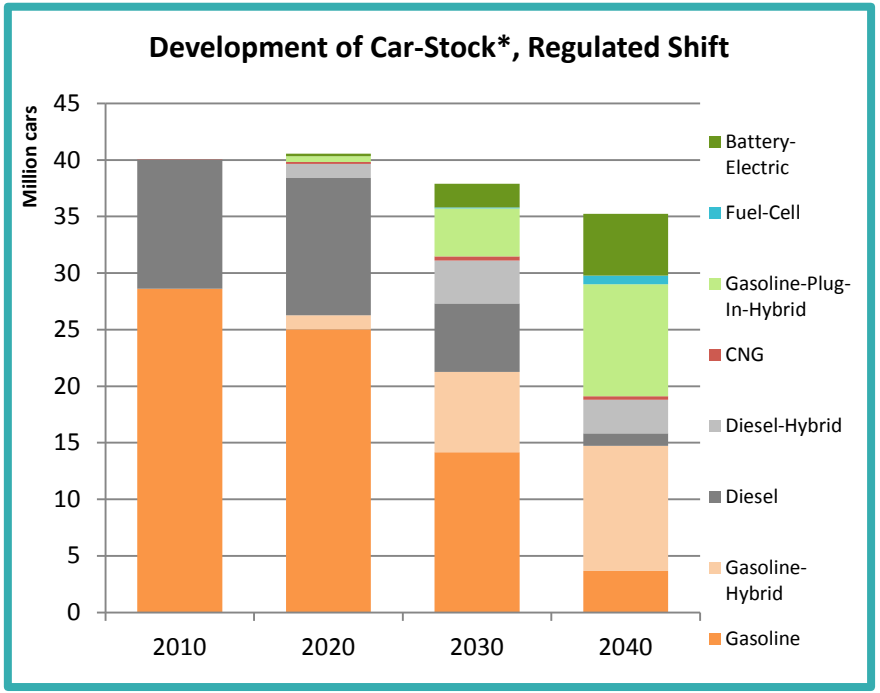
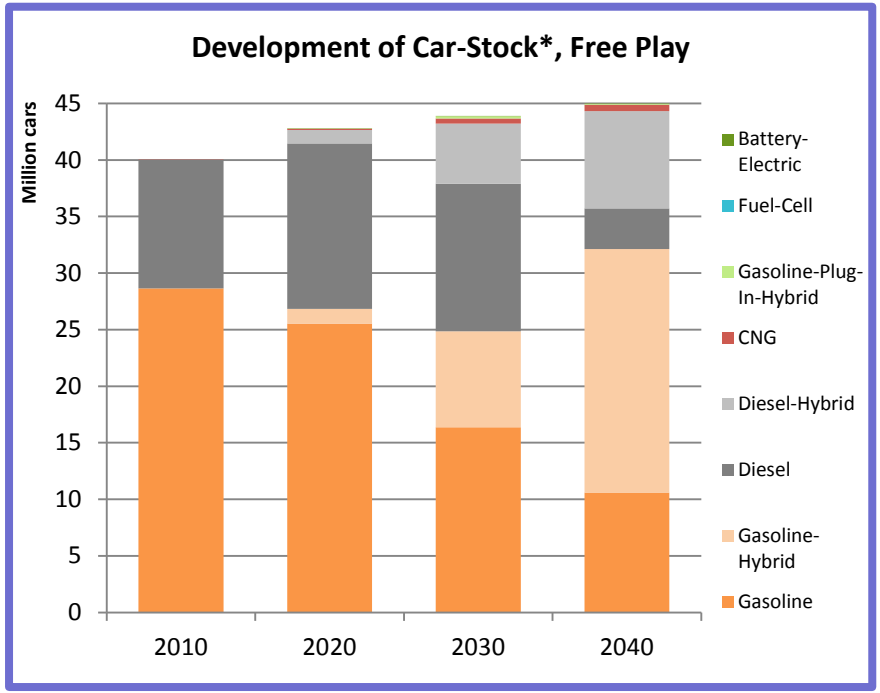
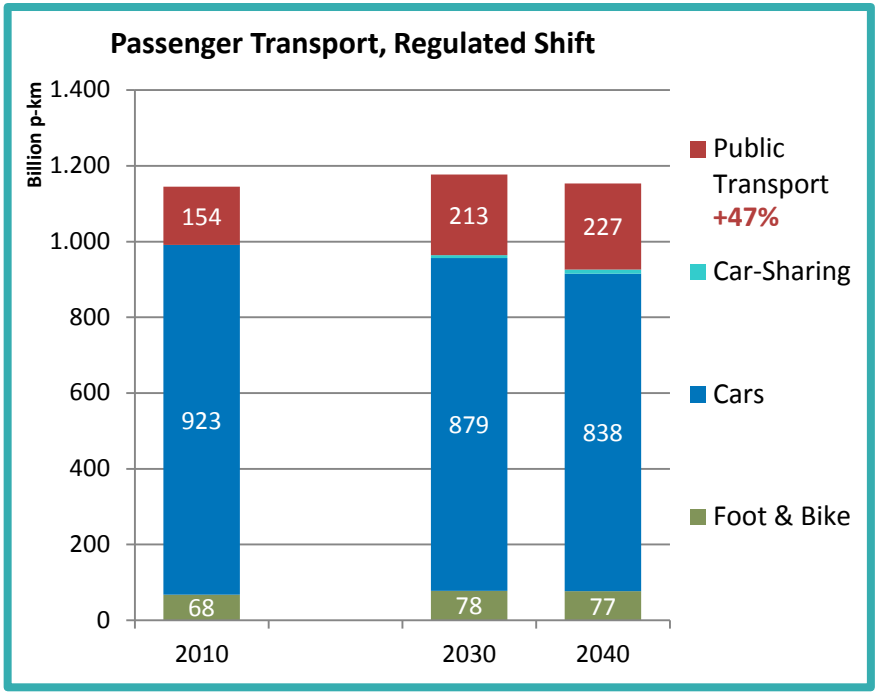
Technology Development: declining number of cars and electrification in ‘Regulated Shift’

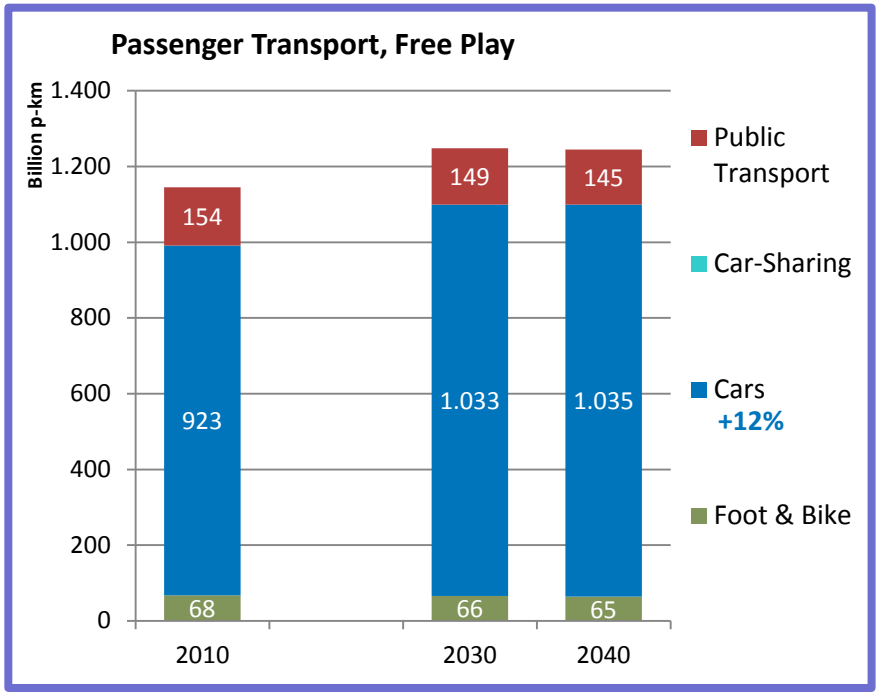




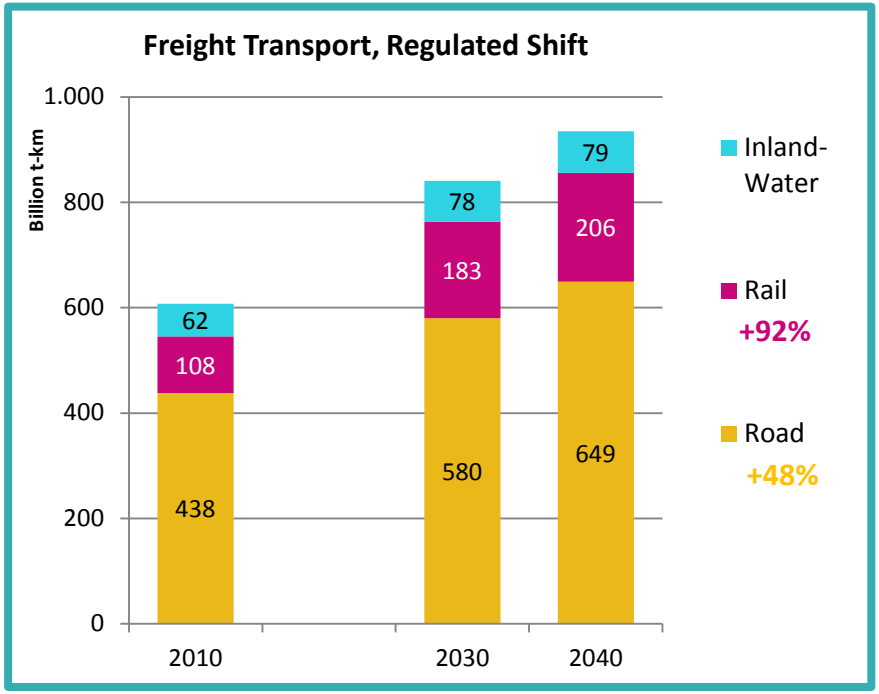
* Without Camper and „other vehicles“ (KBA)

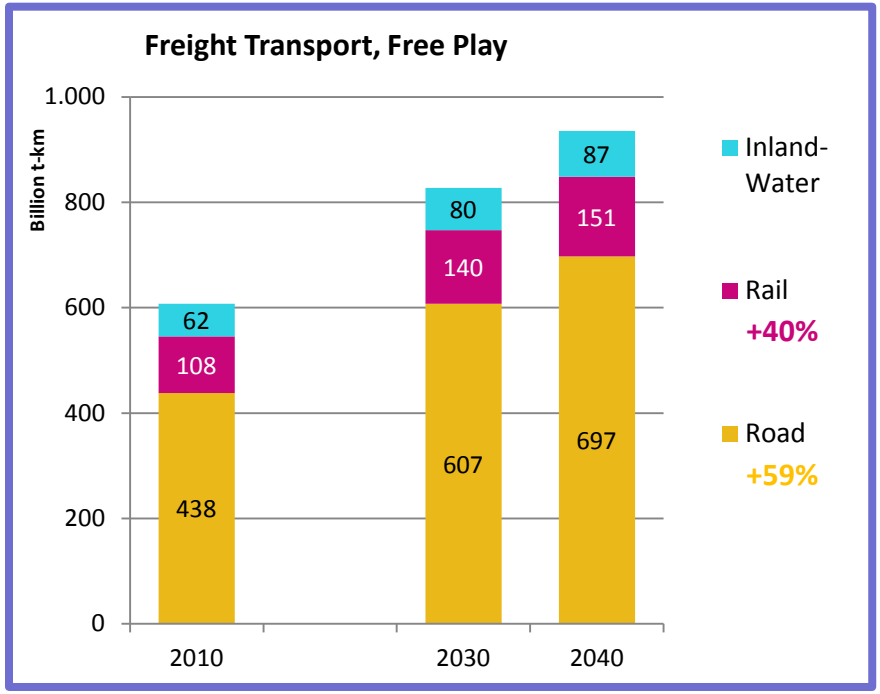
Passenger transport Demand: modal-shift to rail in ‘Regulated Shift’, increasing otherwise





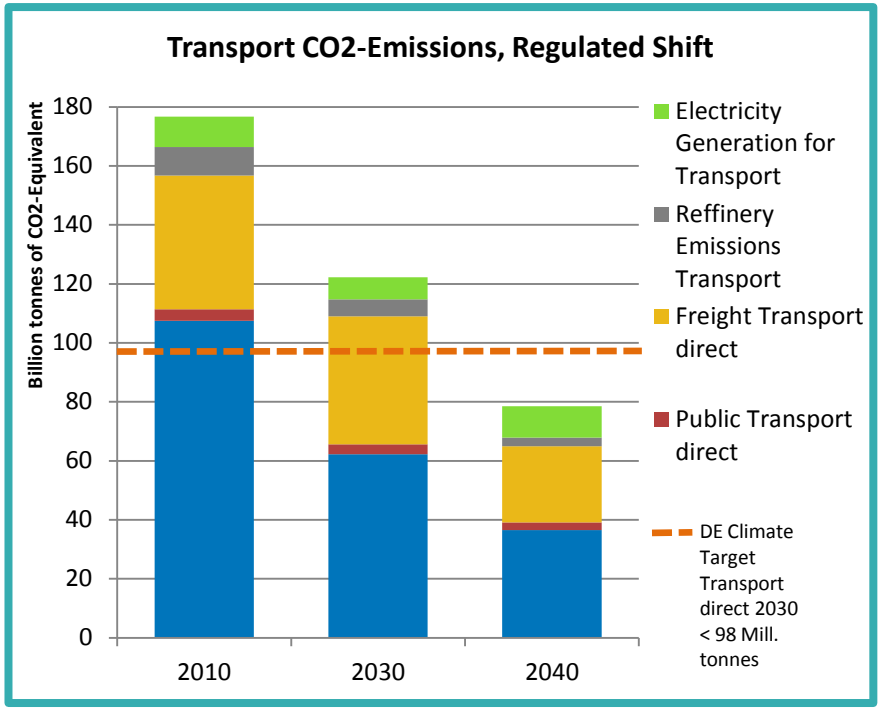
Freight transport Demand: generally increasing; modal-shift to rail in ‘Regulated Shift’

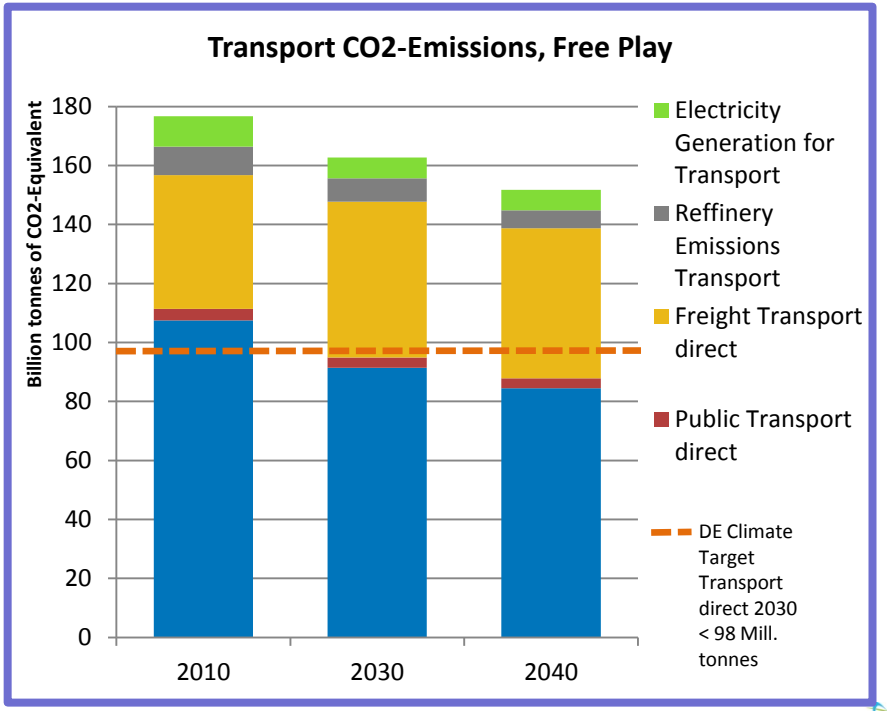




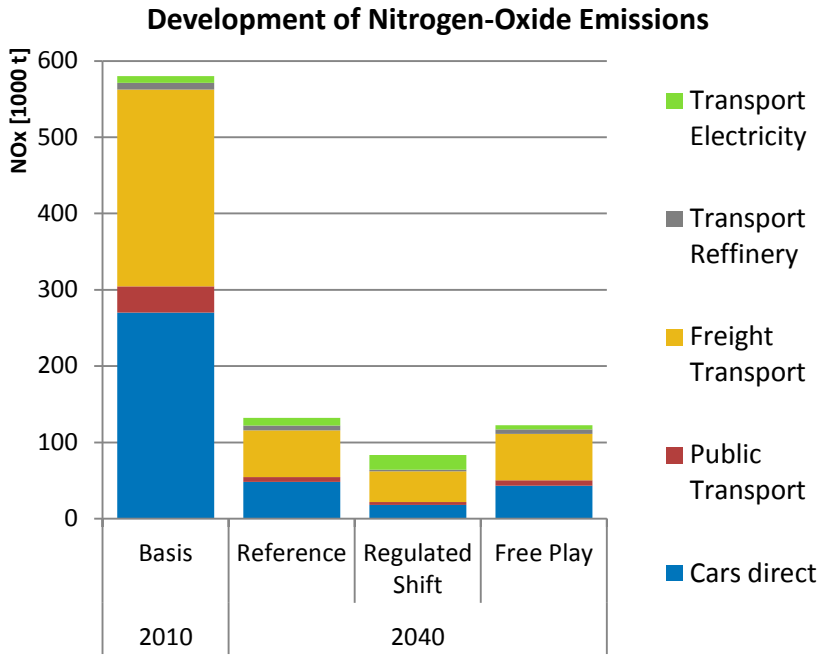
Will German Climate-Targets be met?

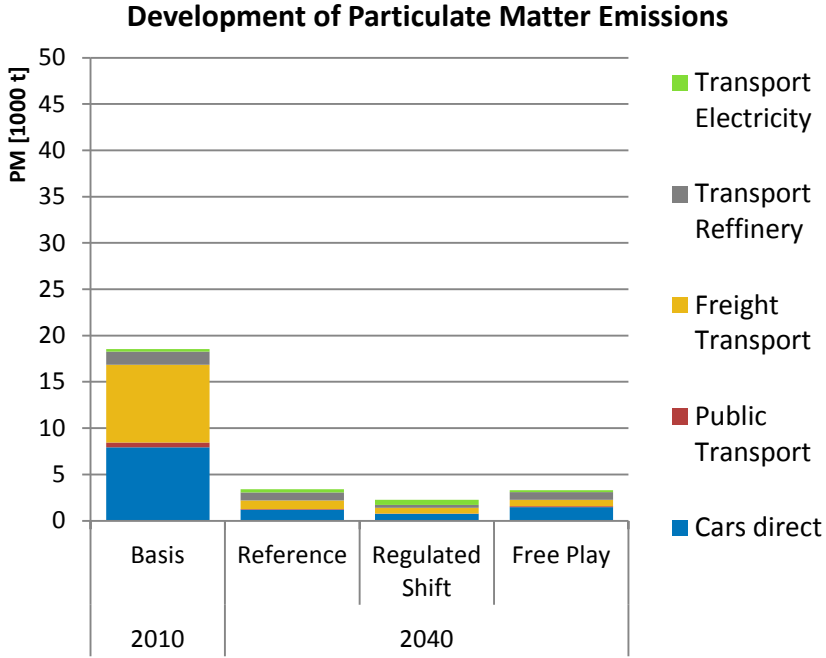
Not in 2030; in 2040 only in ‘Regulated Shift’



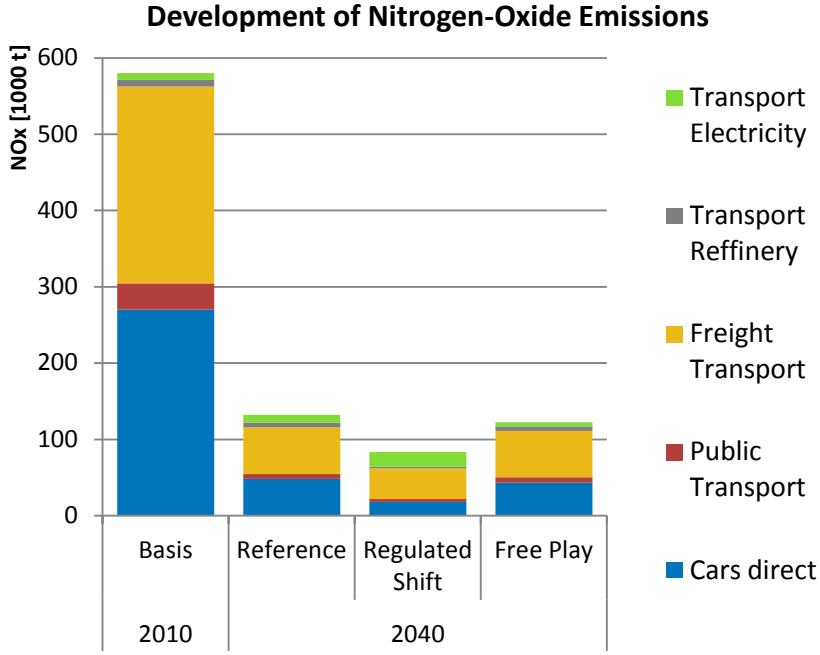


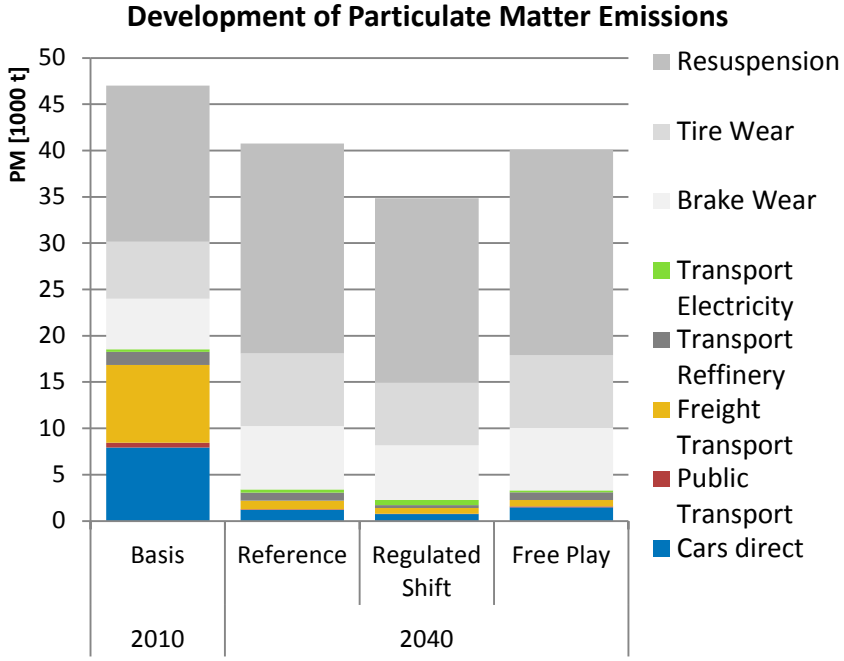
And Air Pollution? significant reductions even with conventional technologies





And Air Pollution? Non-combustion PM will dominate emission from transport





Conclusion

- The VEU model network is a comprehensive analytical tool
- The „thinkable futures“ bear a large risk of failing climate protection targets in transport
- Climate protection requires a combination of modal-shift and technology changes, including the end of coal-based electricity
- De-carbonisation of transport demands further research
- Air quality research will need to investigate in seasonal variations and non-combustion emissions

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Paper: Seum, S.; Bieser, J.; Ehrenberger, S.; Kugler, U.: „German and European Ground-Transport Emissions in three different Scenarios until 2040“. TRA Proceedings