

A speedy transition: a participatory integrated scenario assessment of attaining a netzero energy system in Austria by 2040

Johannes Schmidt – Klimatag - 4.4.2024



NET ZERO 2040

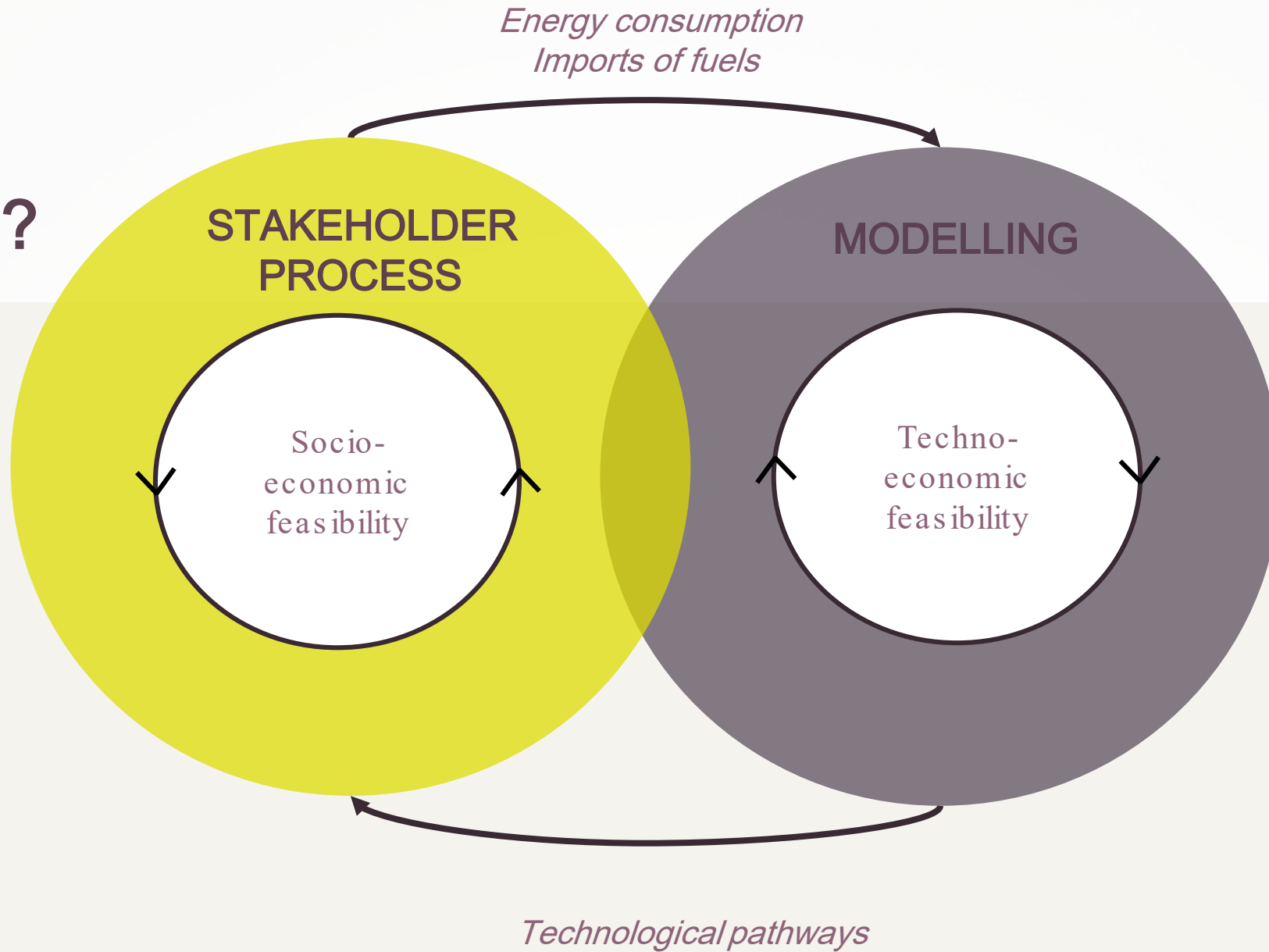




Why scenarios ?

- Austrian goal of achieving net-zero GHG emissions by 2040
- As of 2021: no public, transparent scenarios attaining net-zero for Austria available, Austrian Assessment Report 2 shows a striking lack of comparable scenarios for decarbonization in Austria
- As of 2024: UBA Transitions + a wave of new scenarios, **including netzero2040**

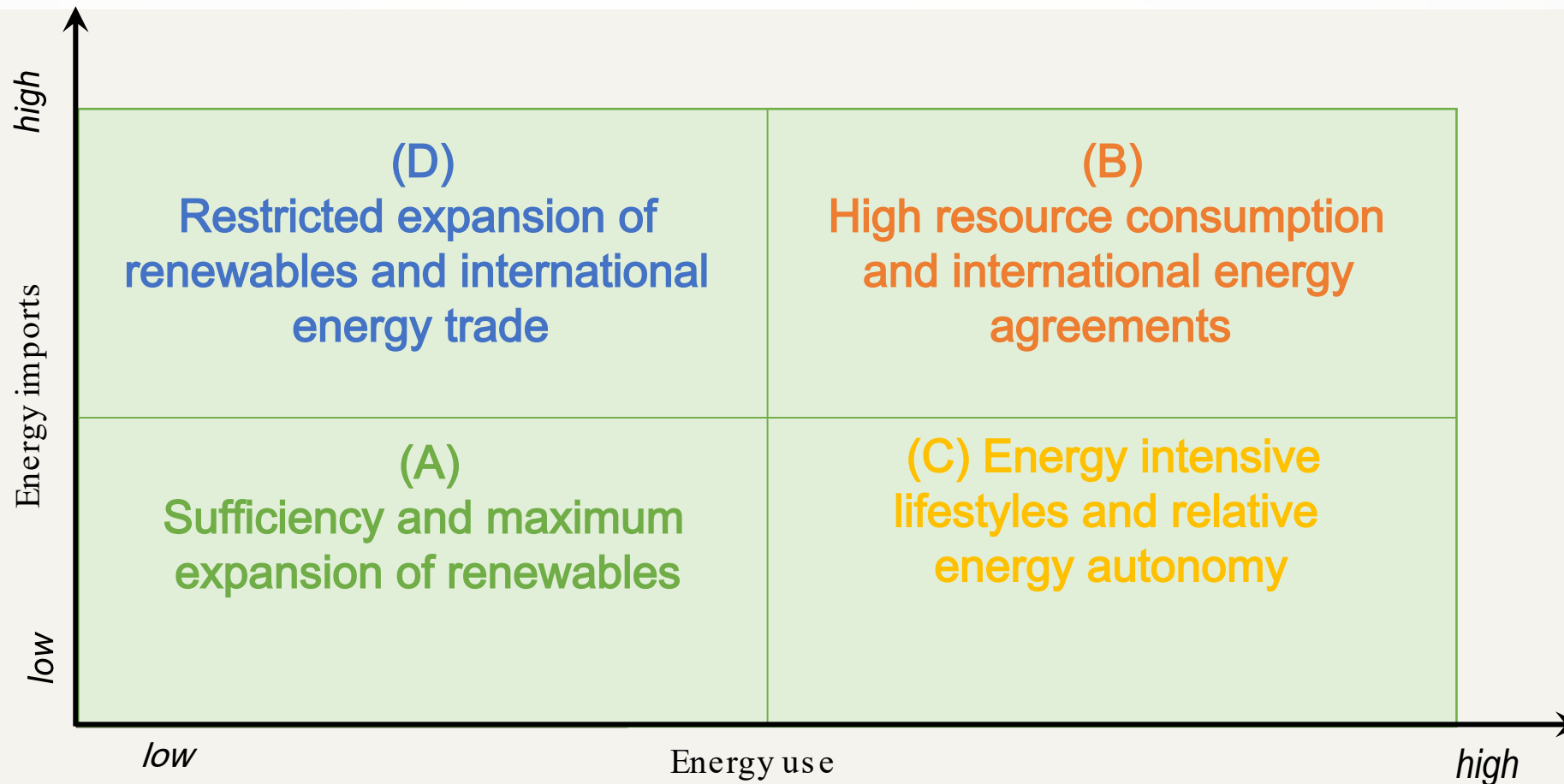
How ?



What is a NetZero2040 Scenario?

- Qualitative Scenario-Narrative
- Quantitative Model Scenario
- Integrated by
 - Quantitative Online-Survey
 - Consistency checks

4 scenarios



Quantification of input parameters

- Online survey with stakeholders
- Requirements on development of parameters in high/low scenarios
- Car use, modal split, housing area, industrial energy demand
- Imports of energy carriers

Models

TIMES

- Complete Austrian energy balance
- Low temporal resolution
- No neighbouring countries (but imports possible)

MEDEA

- Power, District heat, and hydrogen production in high temporal resolution, including trade with Germany

Limitations

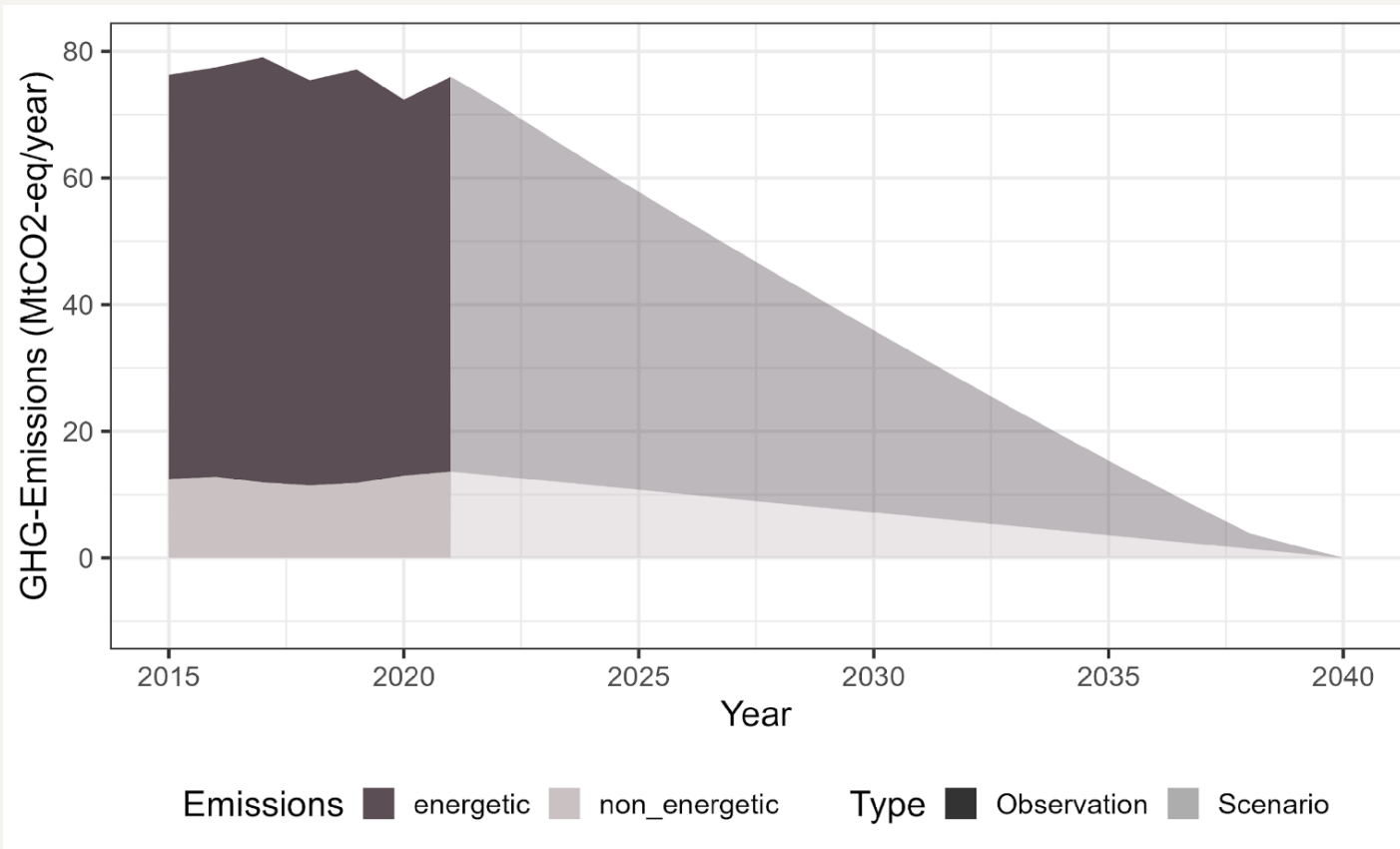
- No grid
- Without complete integration of neighbouring countries



Core results

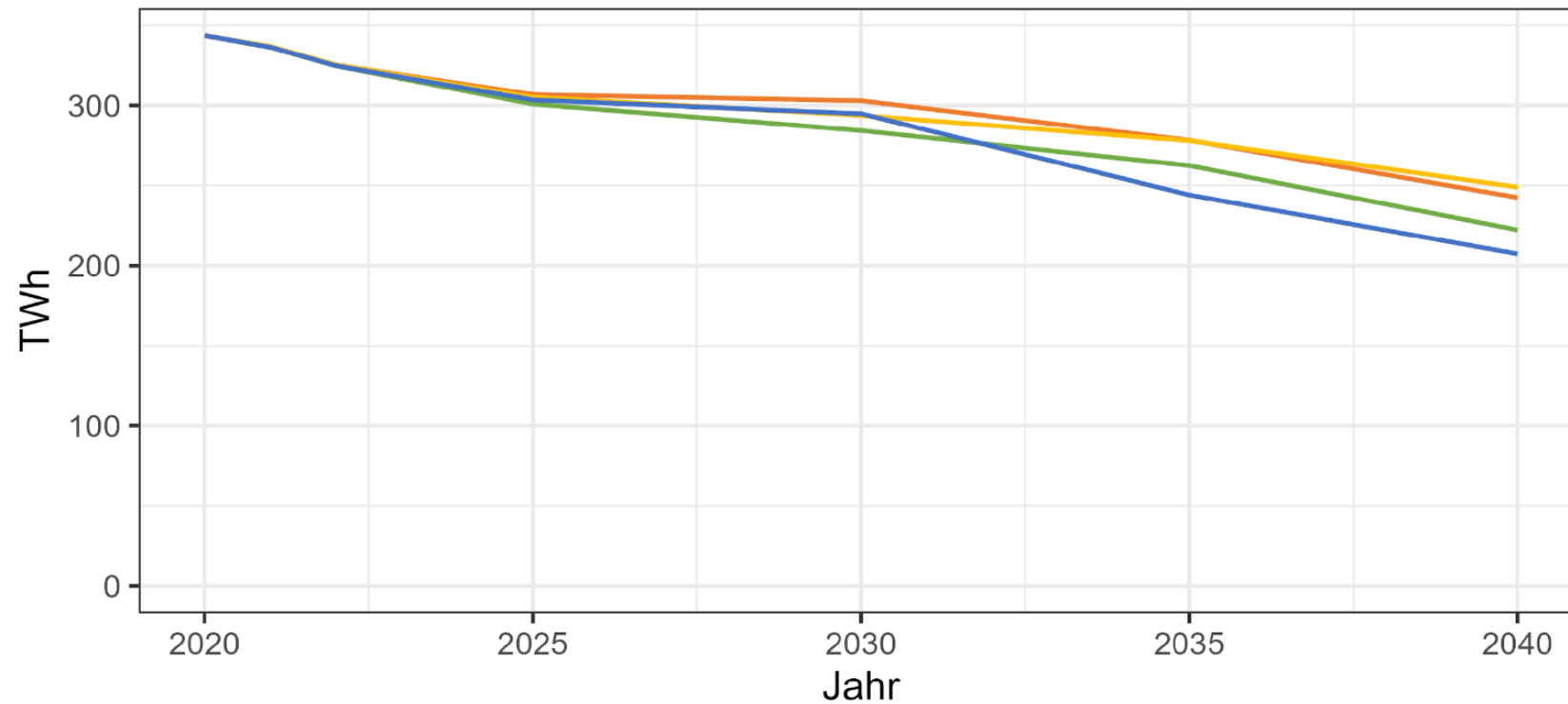


The emission pathway in Netzero2040



Energy use declines

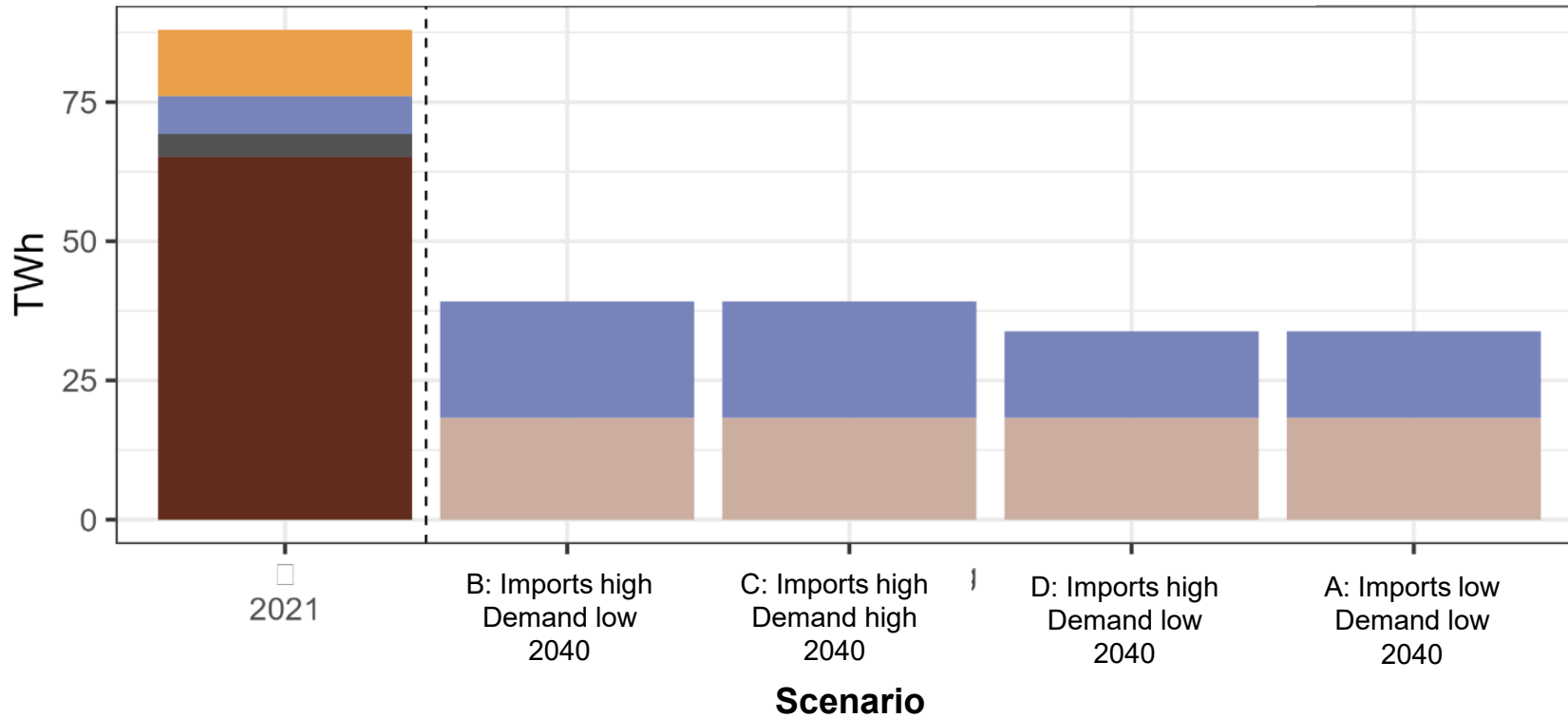
Gross domestic consumption



Scenario A Imports low | Demand low
Scenario B Imports high | Demand high
Scenario C Imports low | Demand high
Scenario D Imports high | Demand low

Electrification main driver of decline in energy use

Final energy use mobility

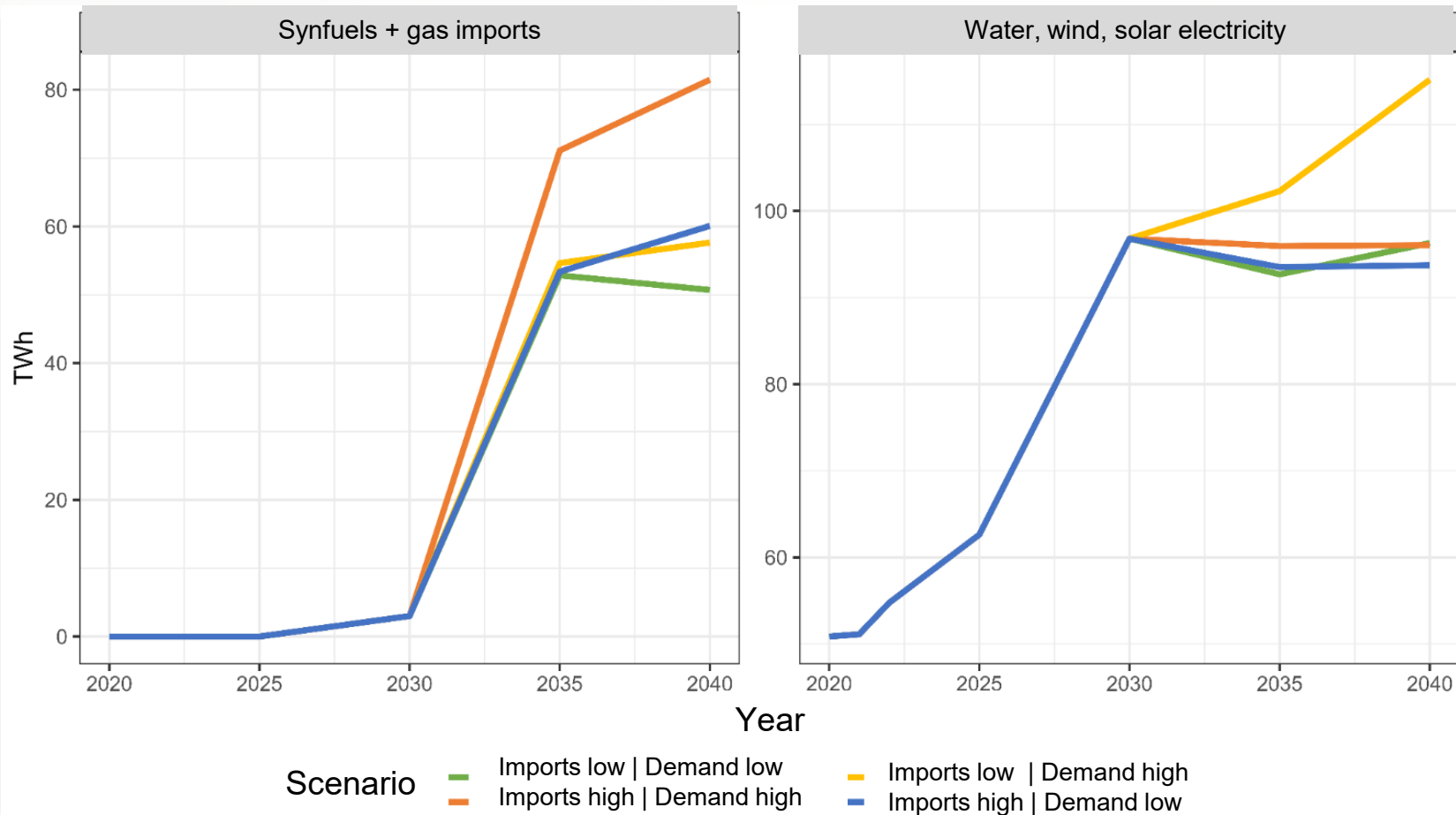


Final energy transport

- Fossil Methane
- Biofuels
- Fossil fuels
- Electricity
- Synthetic fuels

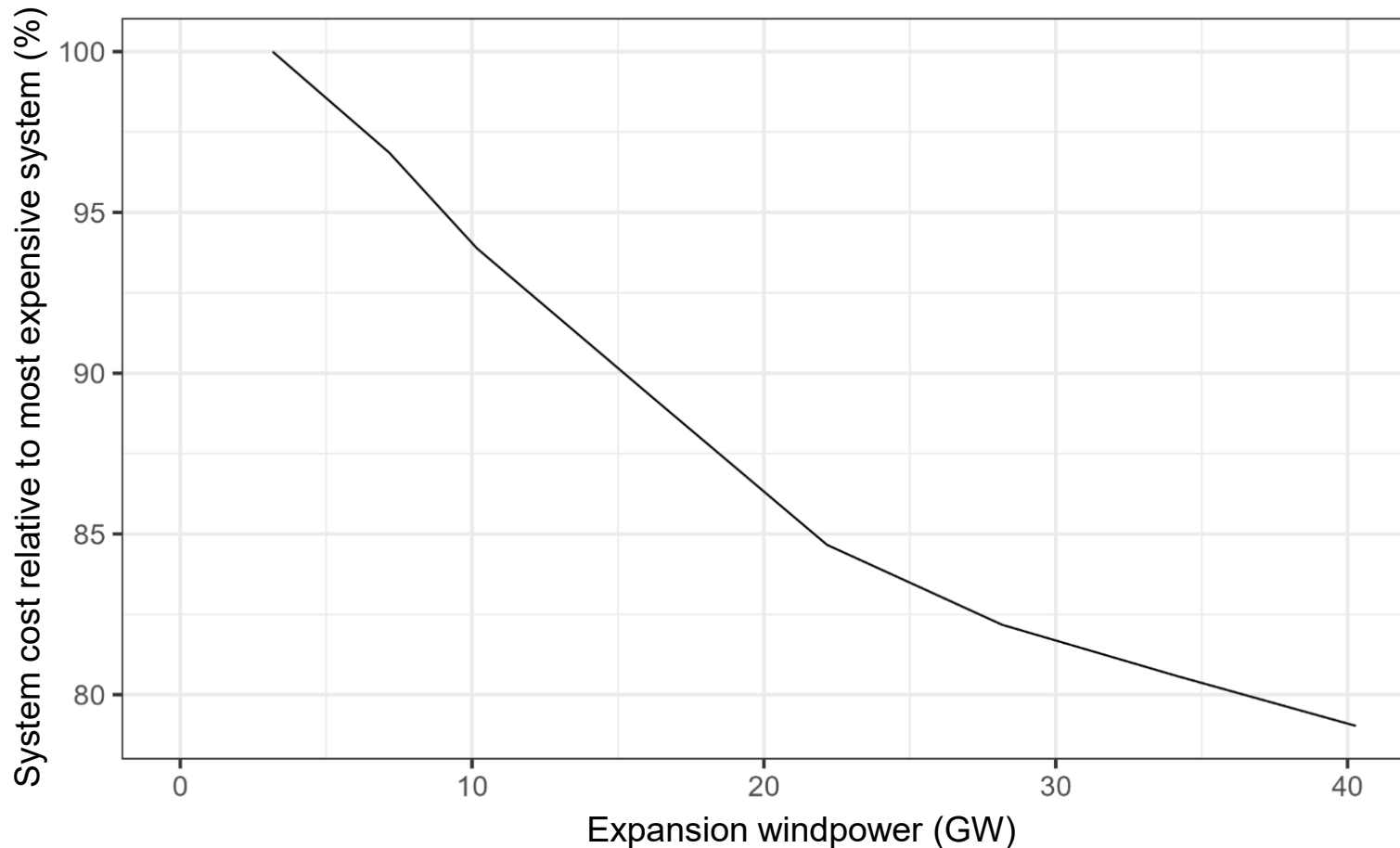
After 2030: Imports of synthetic gas fuels

- and



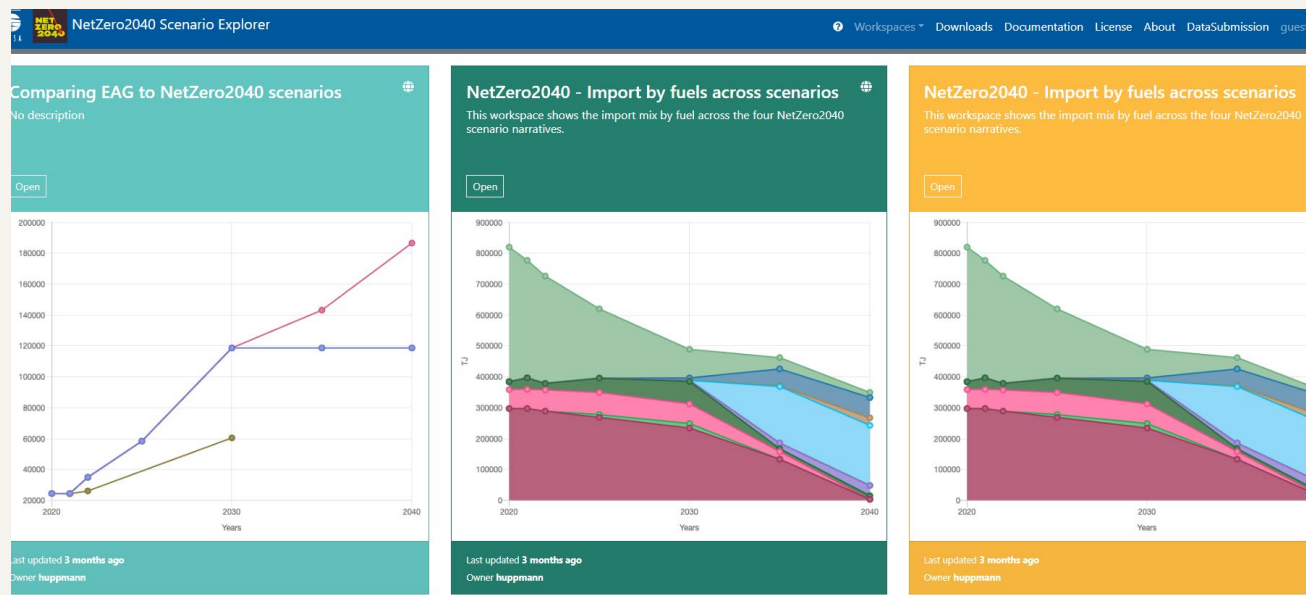
Wind power more cost effective than photovoltaics

But photovoltaics allows reaching climate neutrality too



Availability of scenarios

- Webpage: <https://netzero2040.at/scenarios>
- IIASA Scenario explorer: <https://data.ece.iiasa.ac.at/netzero2040/#/workspaces>



Conclusions

- First openly available, integrated scenarios for attaining netzero by 2040 in the energy sector in Austria
- Scenarios do not diverge strongly until 2030: **electrification & renewables drive decarbonization**
- After 2030, stronger divergence in scenarios: **imports of synthetic fuels vs. domestic production of renewables**
- Strongest competition to imported synthetic fuels comes from **carbon capture & storage** (but not assessed in detail)
- Changes in **industrial energy demand** crucially make energy use diverge between scenarios
- Changes in **private car use** highly relevant during transition, but less important once completely electrified

Thank you!



@NetZero2040



www.netzero2040.at

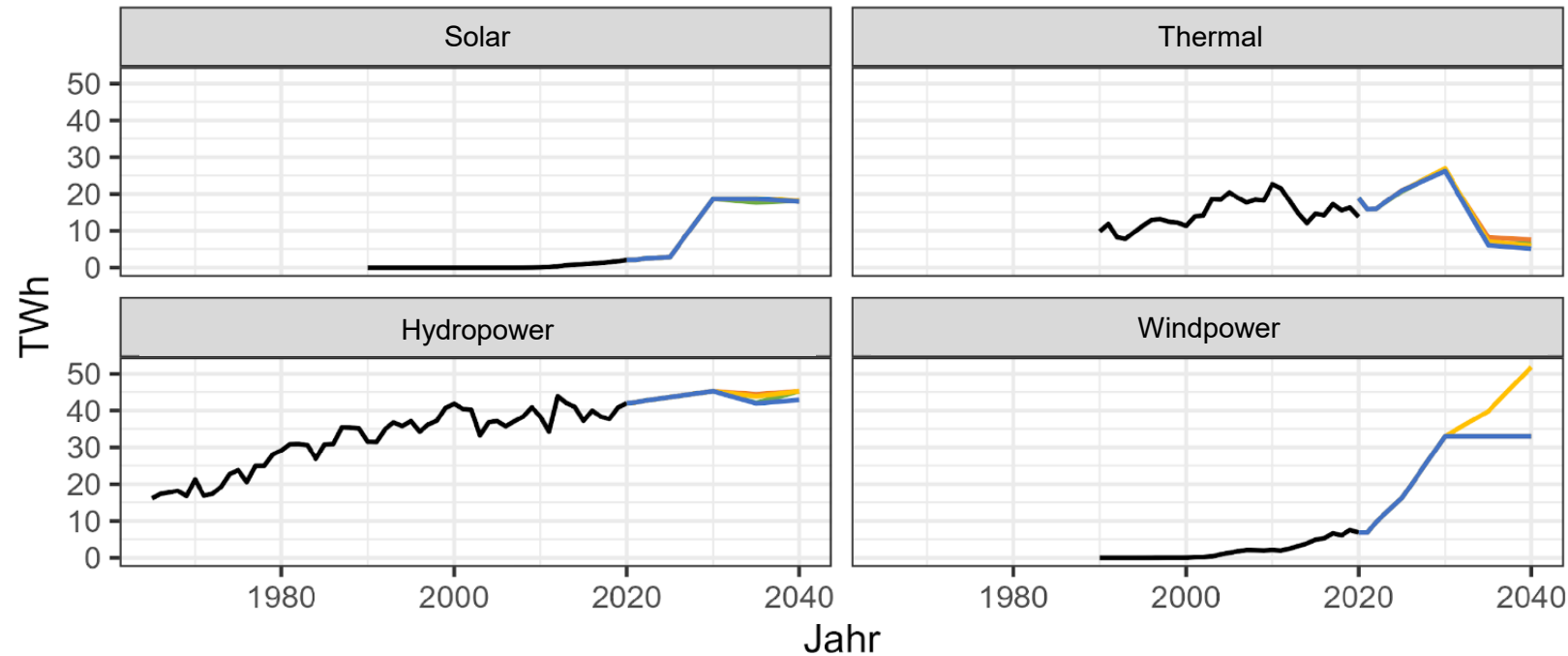
**NET
ZERO
2040**



Until 2030: Massive expansion of renewable energies



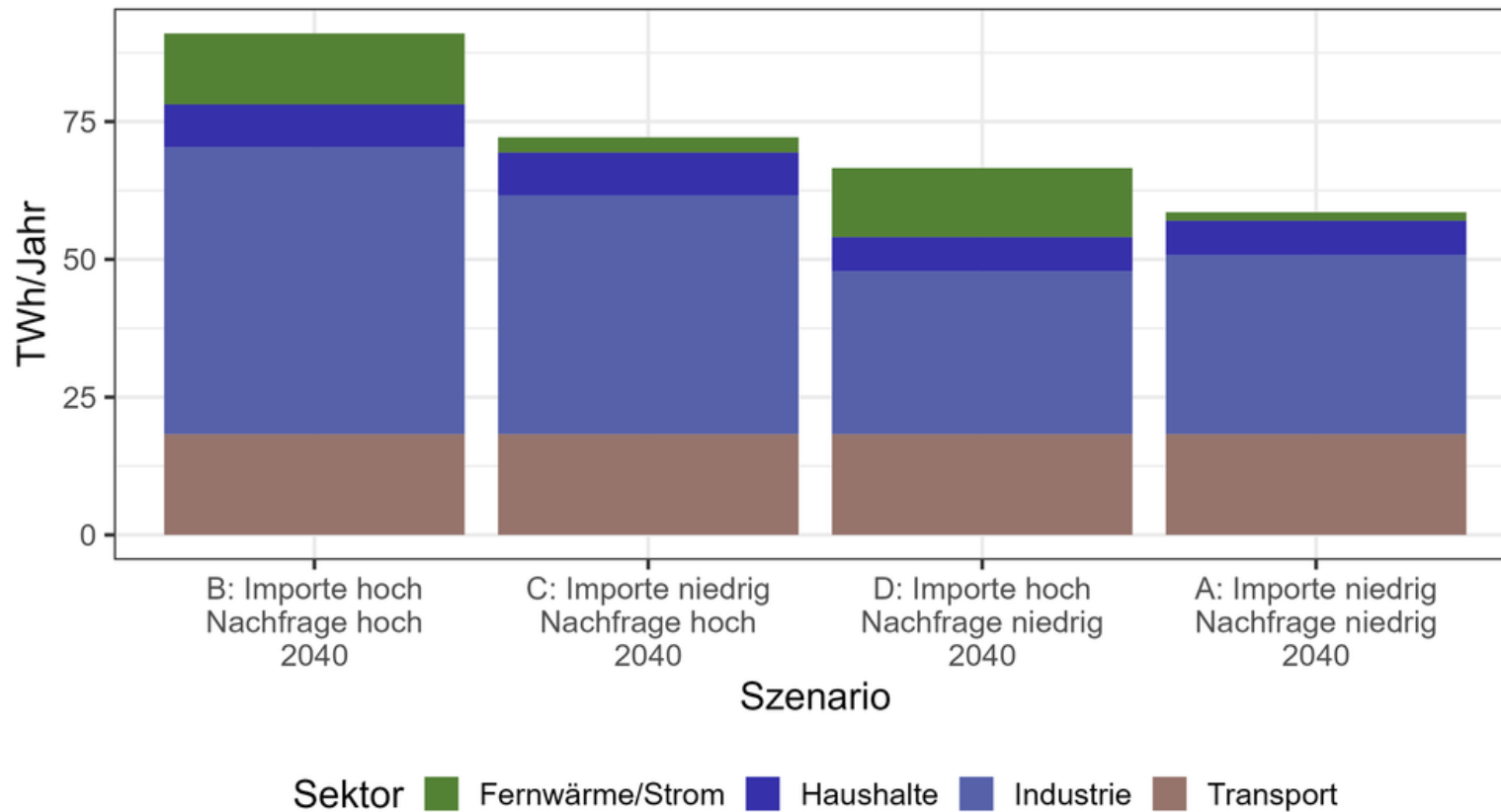
Stromerzeugung



- Scenario
- Past
 - A: Imports low | Demand low
 - B: Imports high | Demand high
 - C: Imports low | Demand high
 - D: Imports high | Demand low

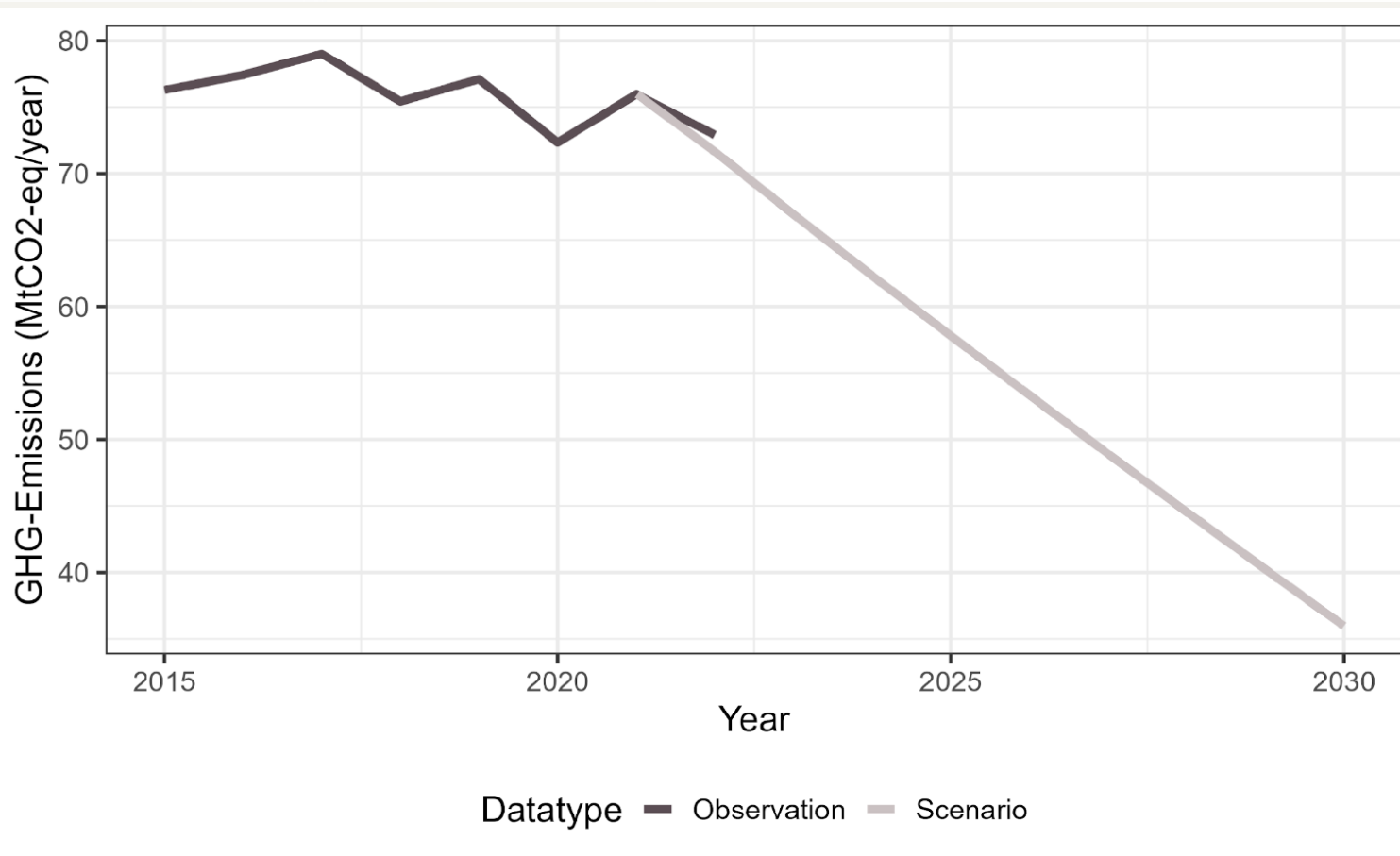
Synfuels

Einsatz synthetischer Kraftstoffe und Gase





Current developments in comparison





Qualitative scenario narrative: example scenario (A)

Scenario title	Key factor 1	Key factor 2
(A) Sufficiency and maximum expansion of renewables	<ul style="list-style-type: none">- State-specific and national energy policy strongly climate-friendly.- Promotion of renewable energy supply and of energy infrastructure, including pipelines and storage facilities	<ul style="list-style-type: none">- sharp rise in environmental and climate awareness among population- → energy-sufficient lifestyles (in particular consumption, mobility and housing behavior)- → high level of social acceptance for the measures required to implement the energy transition.

Online survey: Example Driven distance cars

