AUSTRIA'S SCENARIOS FOR A SUSTAINABLE ENERGY SUPPLY - ONE OF SEVERAL KEY CHALLENGES

GÜNTHER LICHTBLAU - A3PS CONFERENCE 2024

PERSPEKTIVEN FÜR UMWELT & GESELLSCHAFT umweltbundesamt

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- Case for action
  - Climate
  - Resources
  - Biodiversity
- Energy demand
- Energy scenarios/Energy aspects in the transport sector
- Challenges
- Conclusions

CASE FOR ACTION

As a society, we are currently facing three major challenges

- Global heating - the climate crisis
- Overuse - the resource crisis
- Species loss - the biodiversity crisis

WHERE DO WE STAND AND WHAT ARE THE OBJECTIVES

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Facts:

- Global warming should be limited to 1.5°C to avoid catastrophic consequences (Paris Agreement)
- **80 per cent likelihood** that the world will see the annual average global temperature temporarily exceed 1.5°C above pre-industrial levels for at least one of the next five years (WMO)
- August 2024: 1.51°C
- Catastrophic Consequences: nature, social and economic

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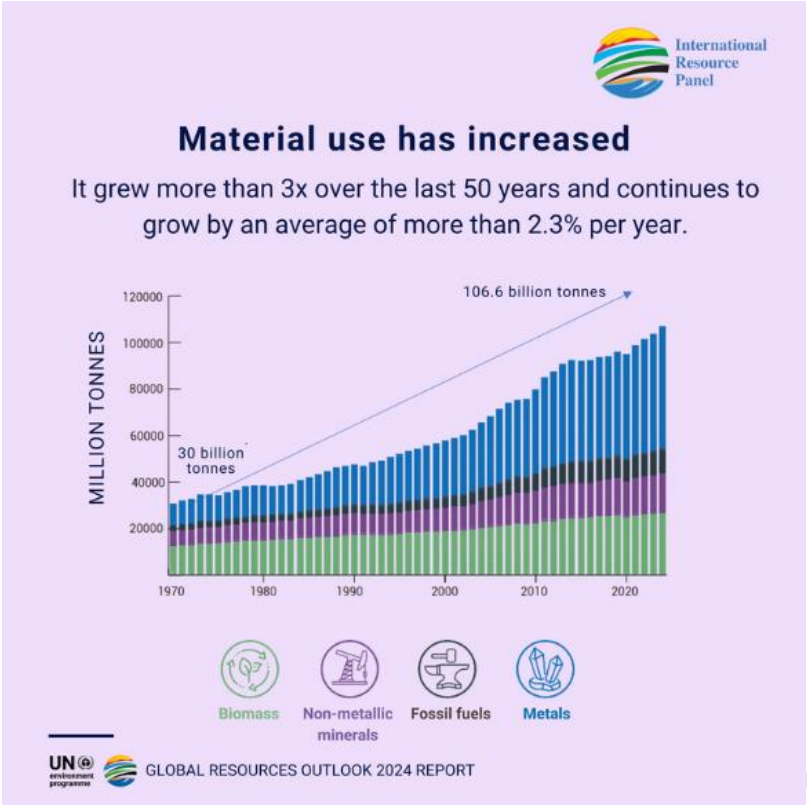

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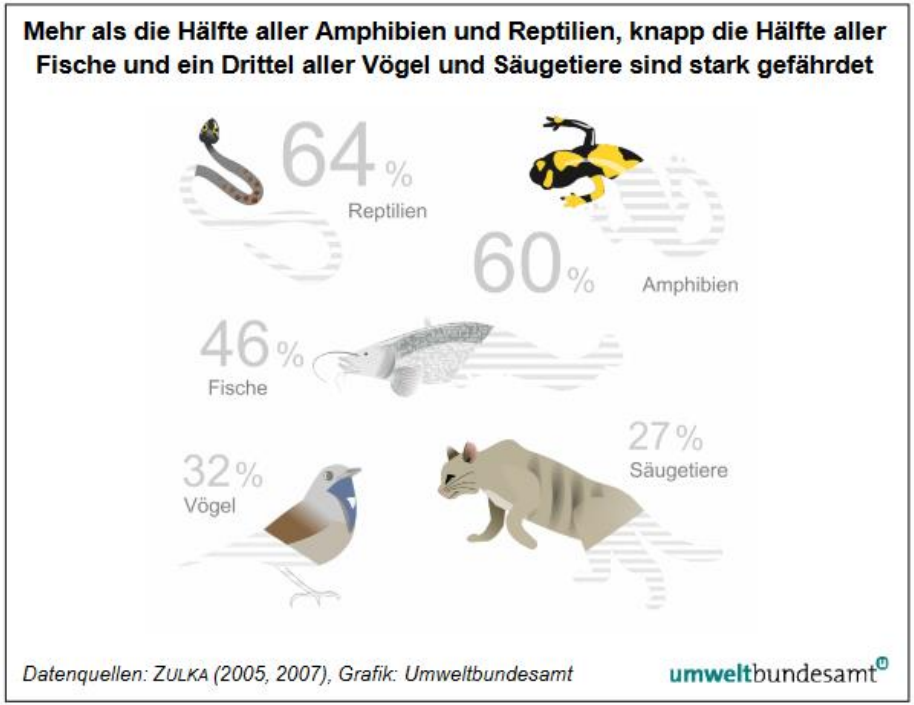
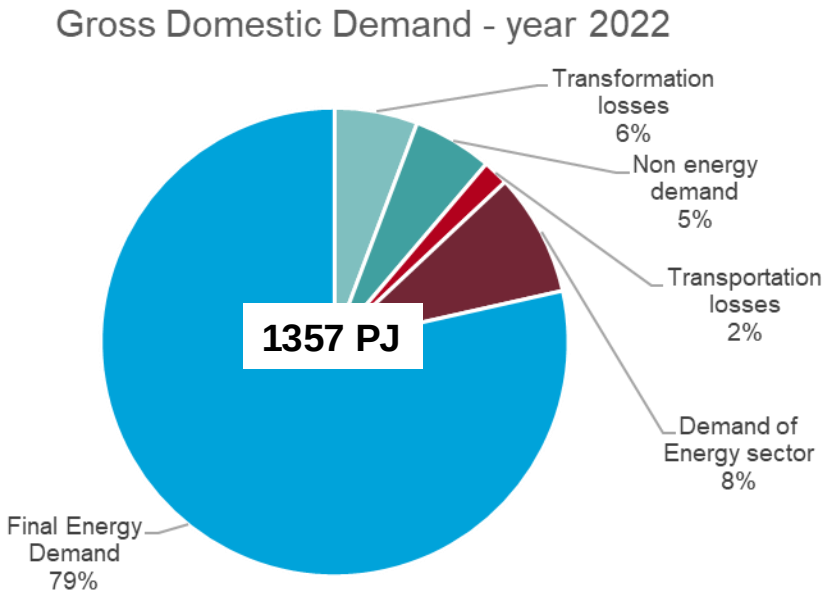
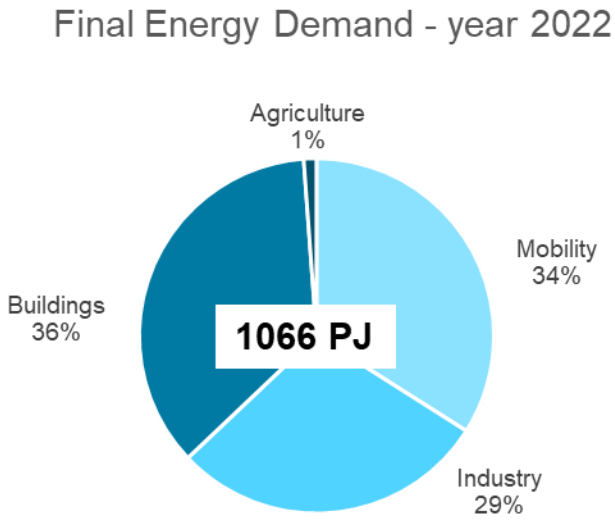
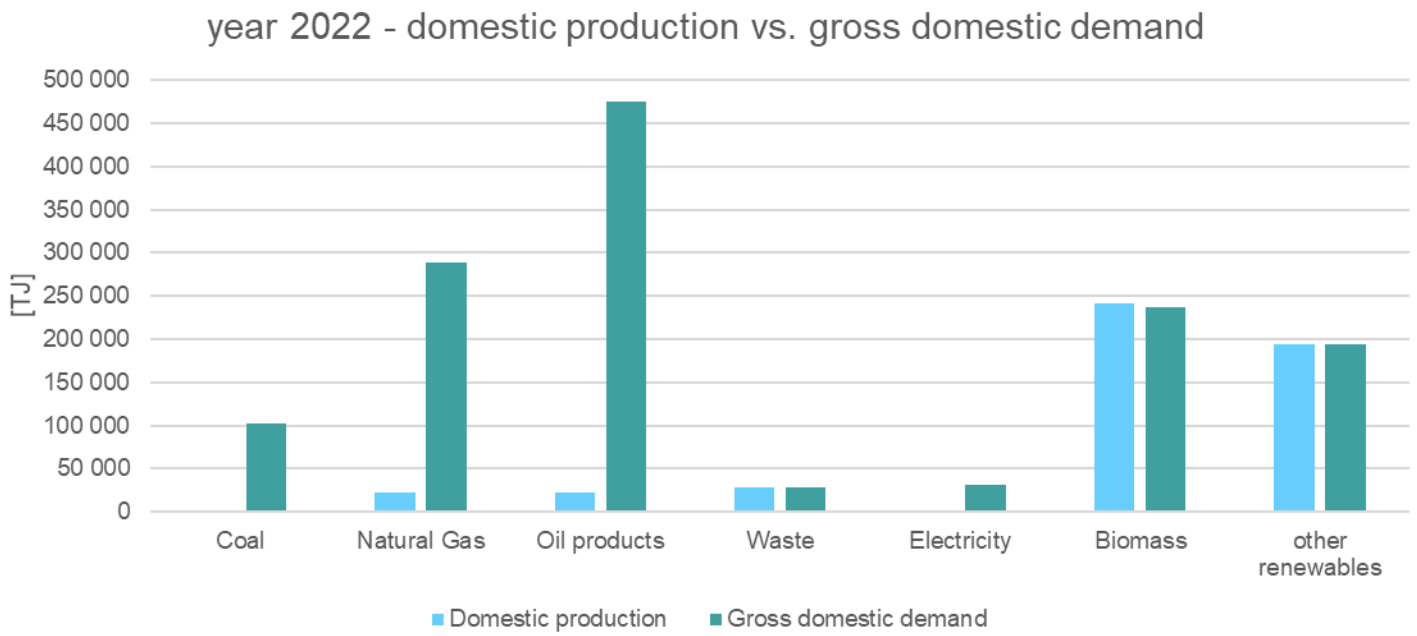


AUSTRIAS ENERGY DEMAND IN THE YEAR 2022





ENERGY SUPPLY IN THE YEAR 2022

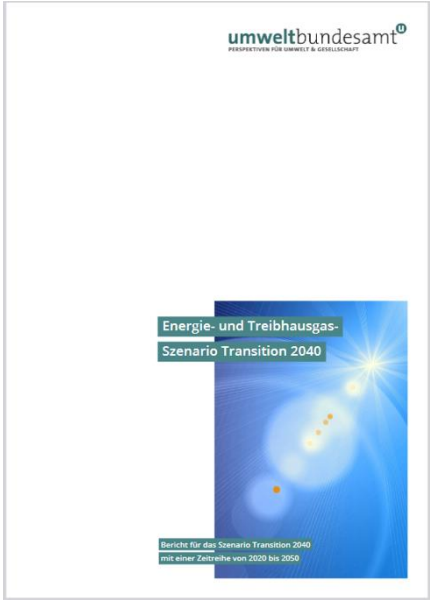


„Electricity“ only shows net imports;
„other renewables“ sums hydro, wind, PV, geothermal, solar and ambient heat

CONSEQUENCES FOR THE THE ENERGY SUPPLY SYSTEM

- Use of fossil fuels is not compatible with the climate protection
- Need to phase out of fossil fuels as soon as possible
- Increase the (domestic) production of renewables
- Key questions:
  - Do we have enough sustainable renewable energy sources?
  - Is such a development compatible with resource demand ans biodiversity protection?

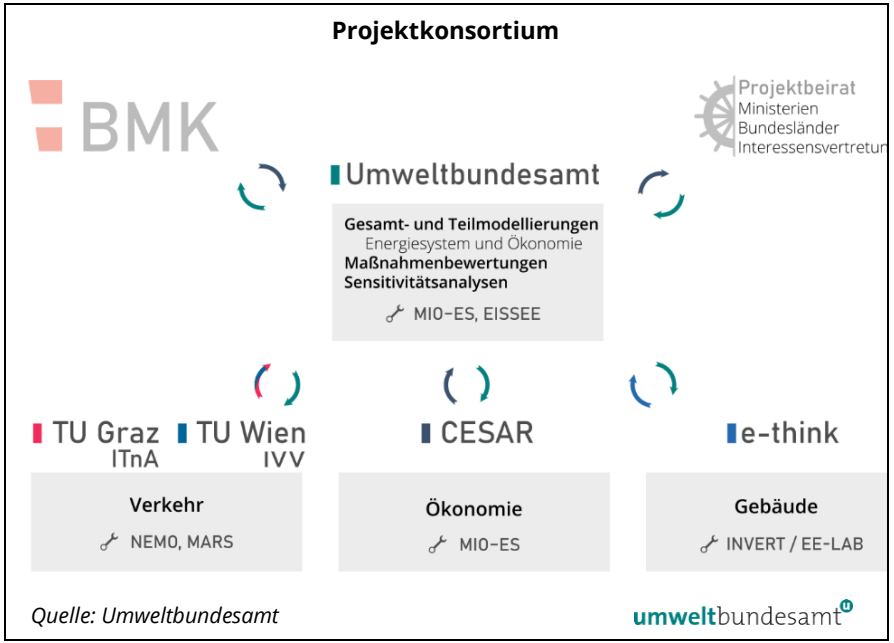
→ Energy and climate scenarios



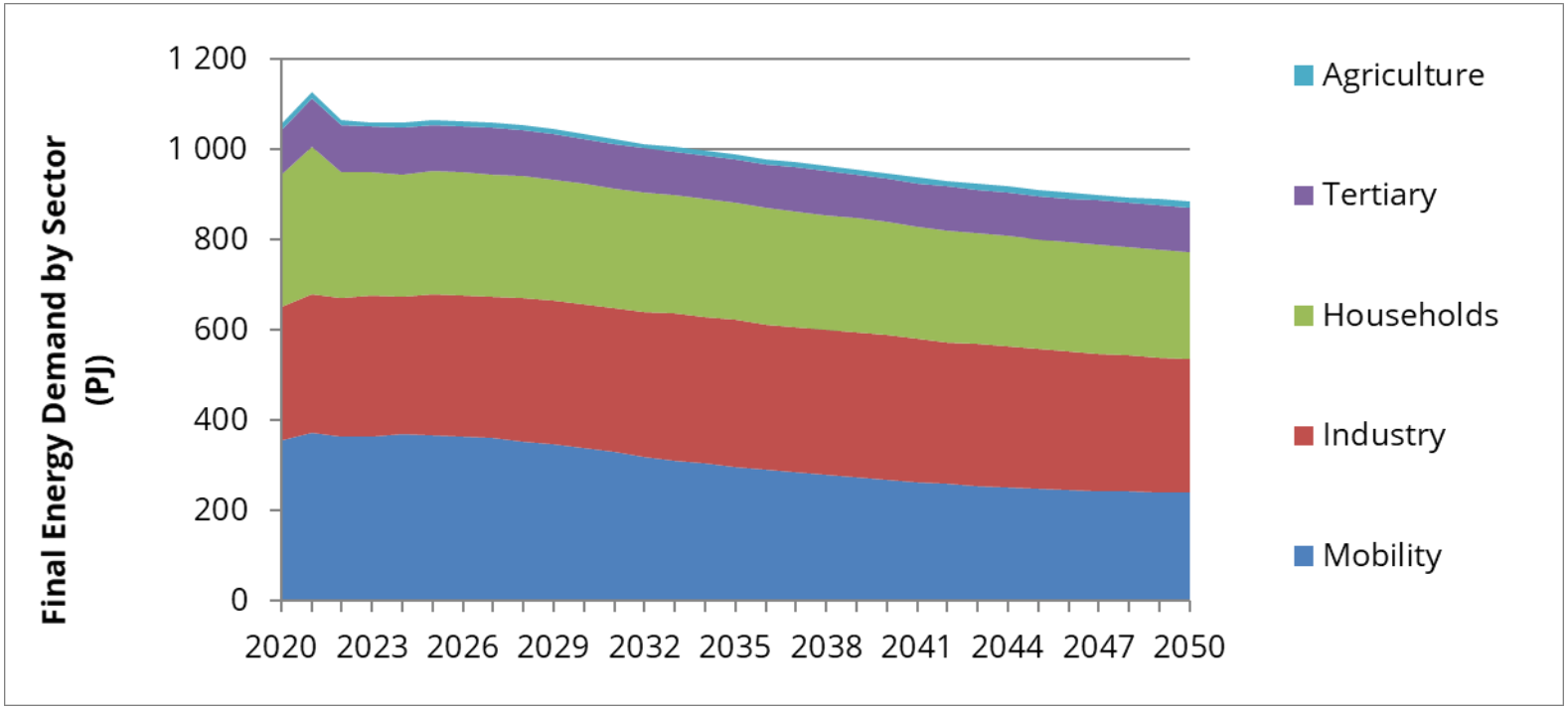
CONSEQUENCES FOR THE THE ENERGY SUPPLY SYSTEM

Energy and climate scenarios

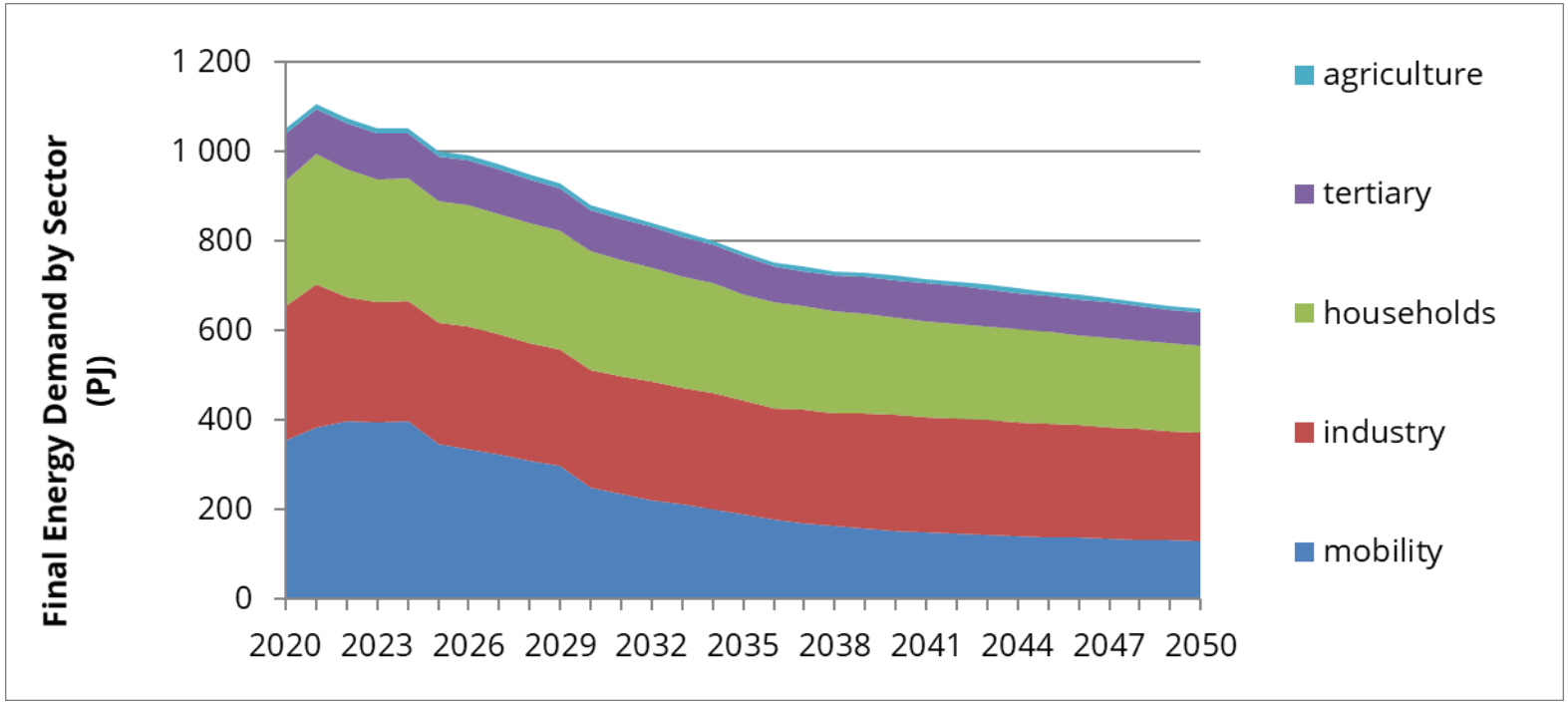
- Scenarios for future energy use in all sectors (sector energy/emission models)
- Linking with an overall economic model for mapping systemic effects and social and economic implications
- Beside a baseline two scenarios are created: “WAM” (with additional Measures) and “Transition”



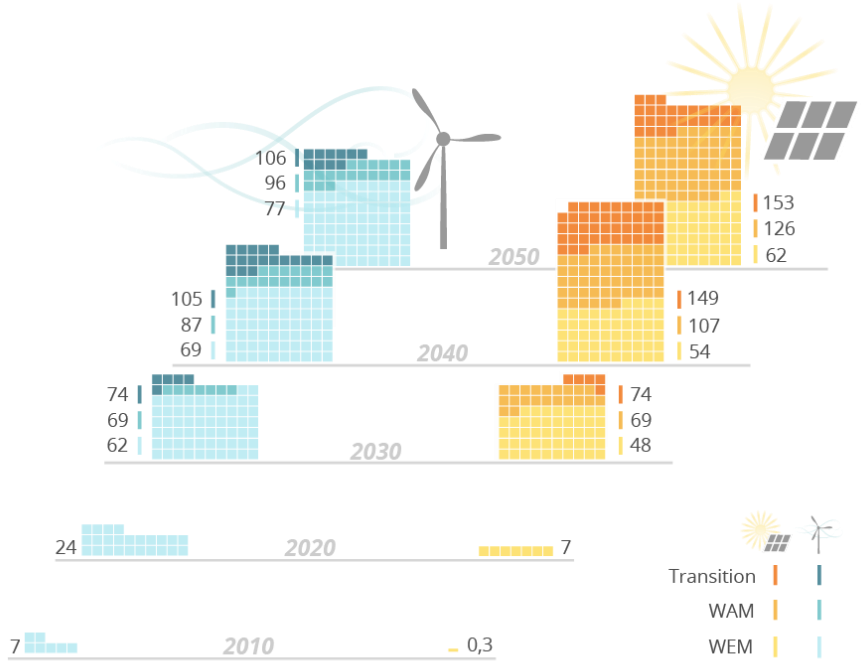
FINAL ENERGY DEMAND – SCENARIO WAM NECP 2024



FINAL ENERGY DEMAND – SCENARIO TRANSITION 2023



POWER GENERATION WIND POWER/PV 2010 – 2050 [PJ]

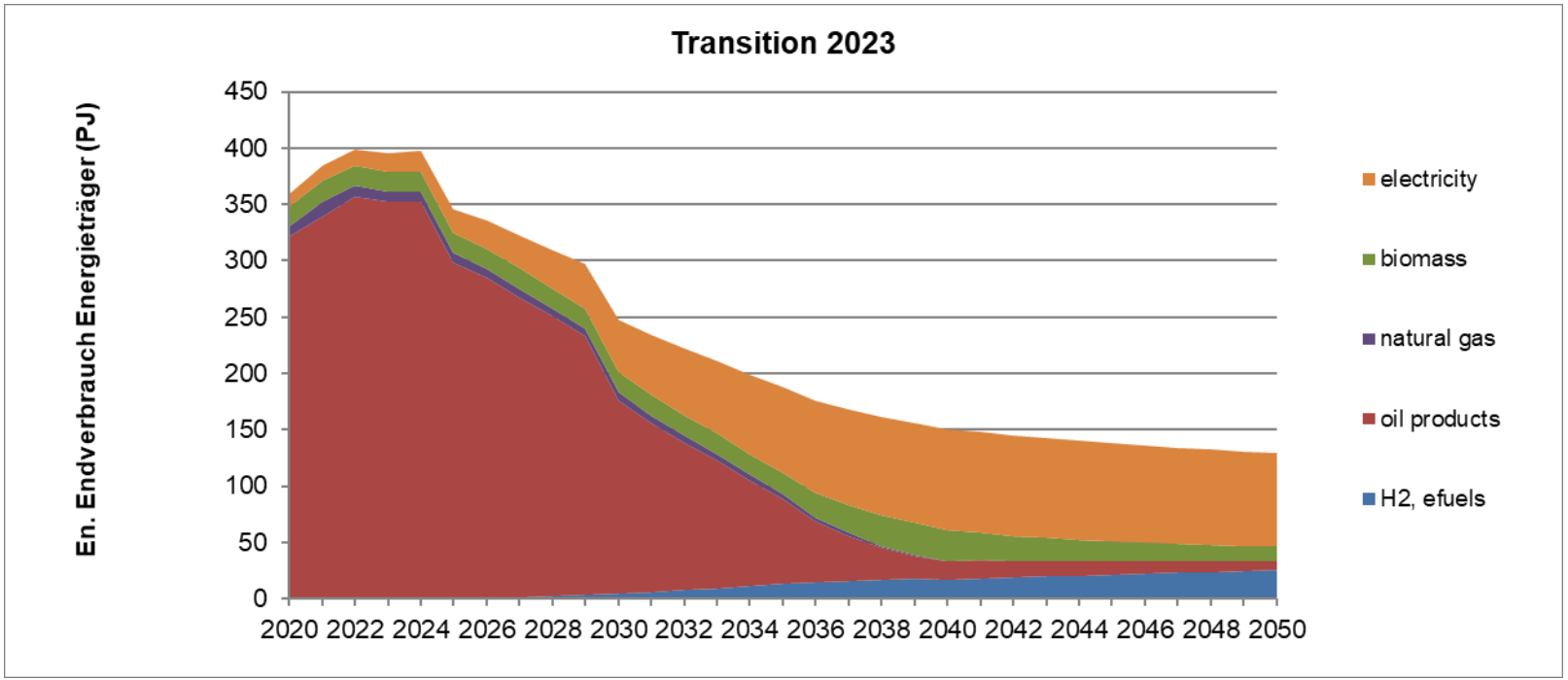


NET IMPORTS – TRANSITION

- transition scenario shows a significant reduction in total energy consumption of around 40%
- The prerequisite is the use of the most efficient technologies available in all sectors
- Positive side effects: reduction of dependencies, greater security of supply, higher domestic value creation, less pollution...

gross domestic demand (PJ)	2020	2030	2040	2050
coal	103	76	0	0
oil products	464	260	62	50
natural gas	312	136	0	0
electricity	8	-25	-6	-47
H2, e-fuels	0	6	72	77

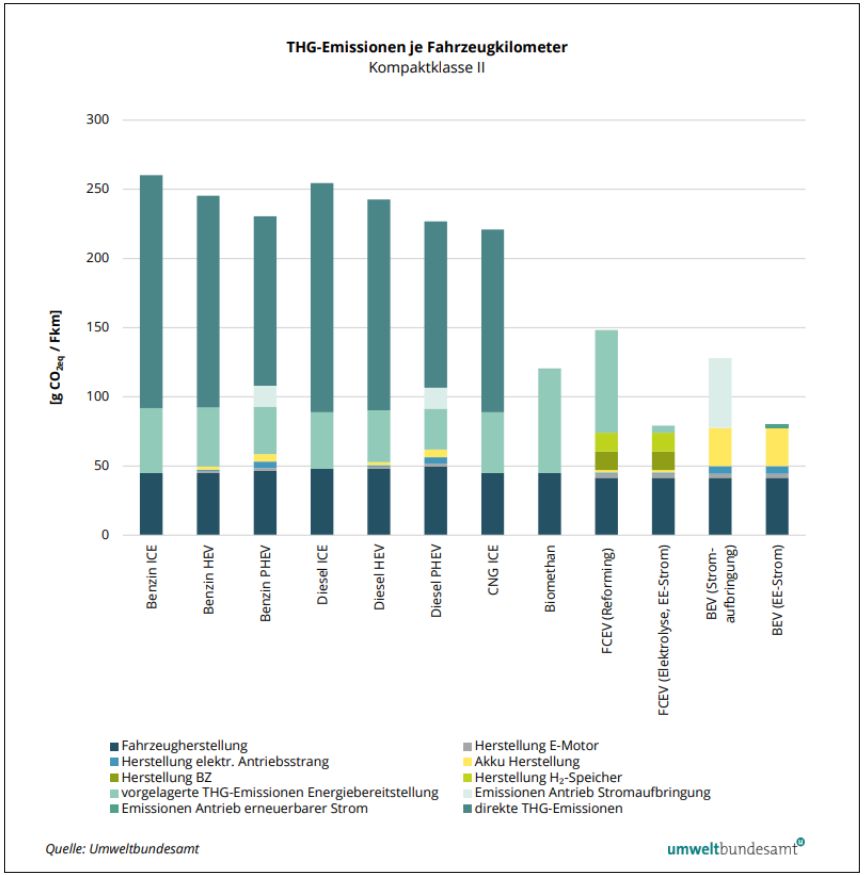
ROAD TRANSPORT SECTOR - SCENARIO TRANSITION



LCA PROPULSION SYSTEMS – GHG EMISSIONS

- Lowest GHG Emissions: electric drive trains – efficiency
- Additional reduction by 40 – 50% using electricity from renewable
- FCEV and BEV show similar values

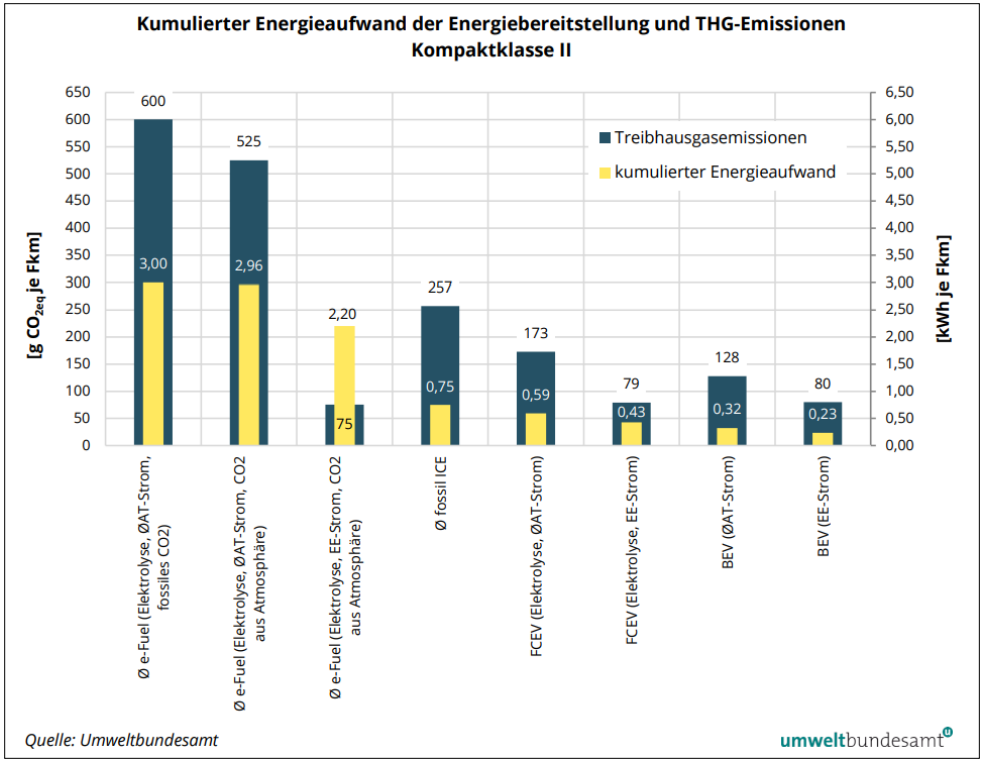
→ dominant propulsion systems for the Transition scenario



LCA PROPULSION SYSTEMS – CUMULATIVE ENERGY INPUT

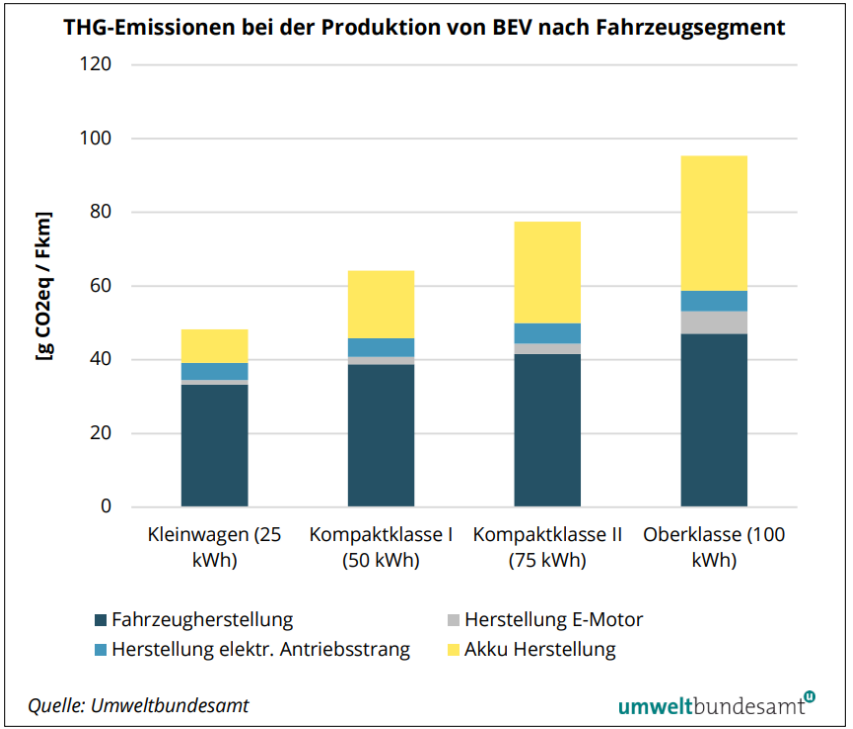
- BEV show lowest total energy consumption (23 kWh/km)
- green Hydrogen: 39% to 83% higher energy input compared to BEV
- E-Fuels: renewable energy demand higher by factor 9 to 12

→ „energy efficiency first“ principle



LCA PROPULSION SYSTEMS – VEHICLE SIZE

- Emissions from vehicle production and from battery production increase with the vehicle segment.
- A small car causes half as much GHG emissions as a upper class vehicle.



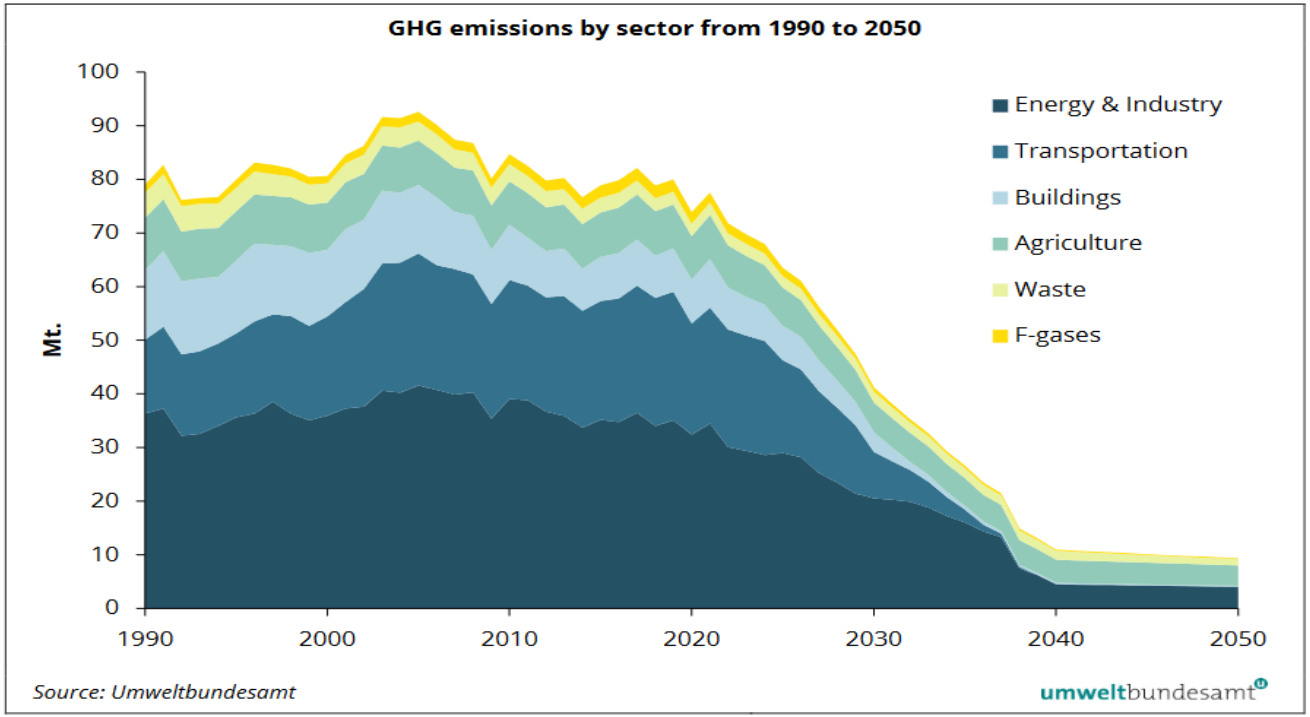
CHALLENGES/QUESTIONS

- There is not enough renewable energy to maintain current production and lifestyle
- Where does the renewable energy come from?
- How sustainable is the biomass, how green is the hydrogen? Where to put wind- and solar power stations?
- Adjustment or construction of energy network necessary (gas, hydrogen, electricity, district heating)
- Technology cannot do it alone – changes in lifestyle (vehicle size, vehicle use…) needed
- We do have enormous challenges due to multiple crisis
- Who dares to tell the people? Where is the clear strategy?

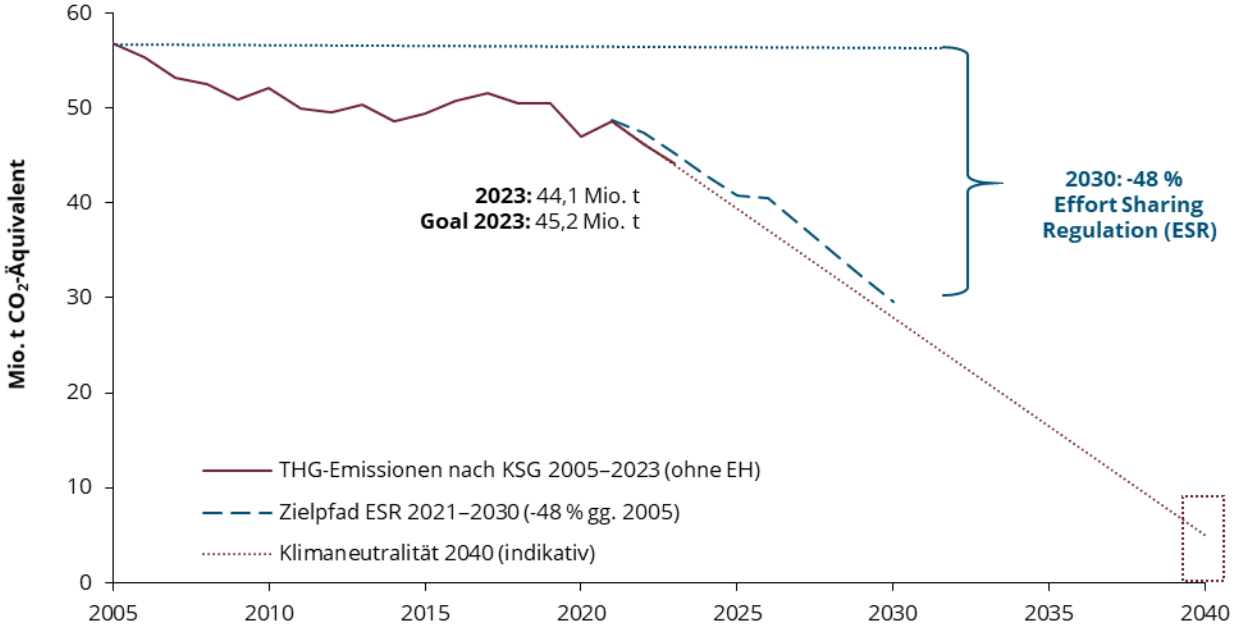
CONCLUSIONS/ANSWERS

- Energy- and climate scenarios show:
  - Massive reduction in energy demand, especially in the transport sector, is possible – and urgently required
  - Necessary expansion of renewable energy system is feasible
  - Transition scenario shows positive economic and social effects (better than WAM, excellent against basic development)
- Infrastructure development is urgent but to handle (NIP – strategic environmental assessment)
- We need technology and innovation: technology for efficiency, innovation for a change of our lifestile
- Respect the principle “Energy Efficiency first” in every decision
- Climate- and Energy transition will also have a positive impact in the areas of resource use and biodiversity

GHG EMISSIONS SCENARIO TRANSITION



GHG-EMISSIONEN AUSTRIA 2005–2023
EU GOAL 2030 (ESR) & 2040



CONTACT & INFORMATION

Guenther Lichtblau

Tel. Nr.: +43 664 966 86 10

E-Mail: guenther.lichtblau@umweltbundesamt.at

Umweltbundesamt
www.umweltbundesamt.at

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