

Scenarios for a Future EU Energy System Until and Beyond 2050

Charting Energy Visions towards 2060

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Agenda

- Motivation
- The European Energy Vision 2060 scenarios
- Pan-European model results
- Conclusion

Motivation – historic times

sky news

Home UK Politics World **US** Money Science, Climate

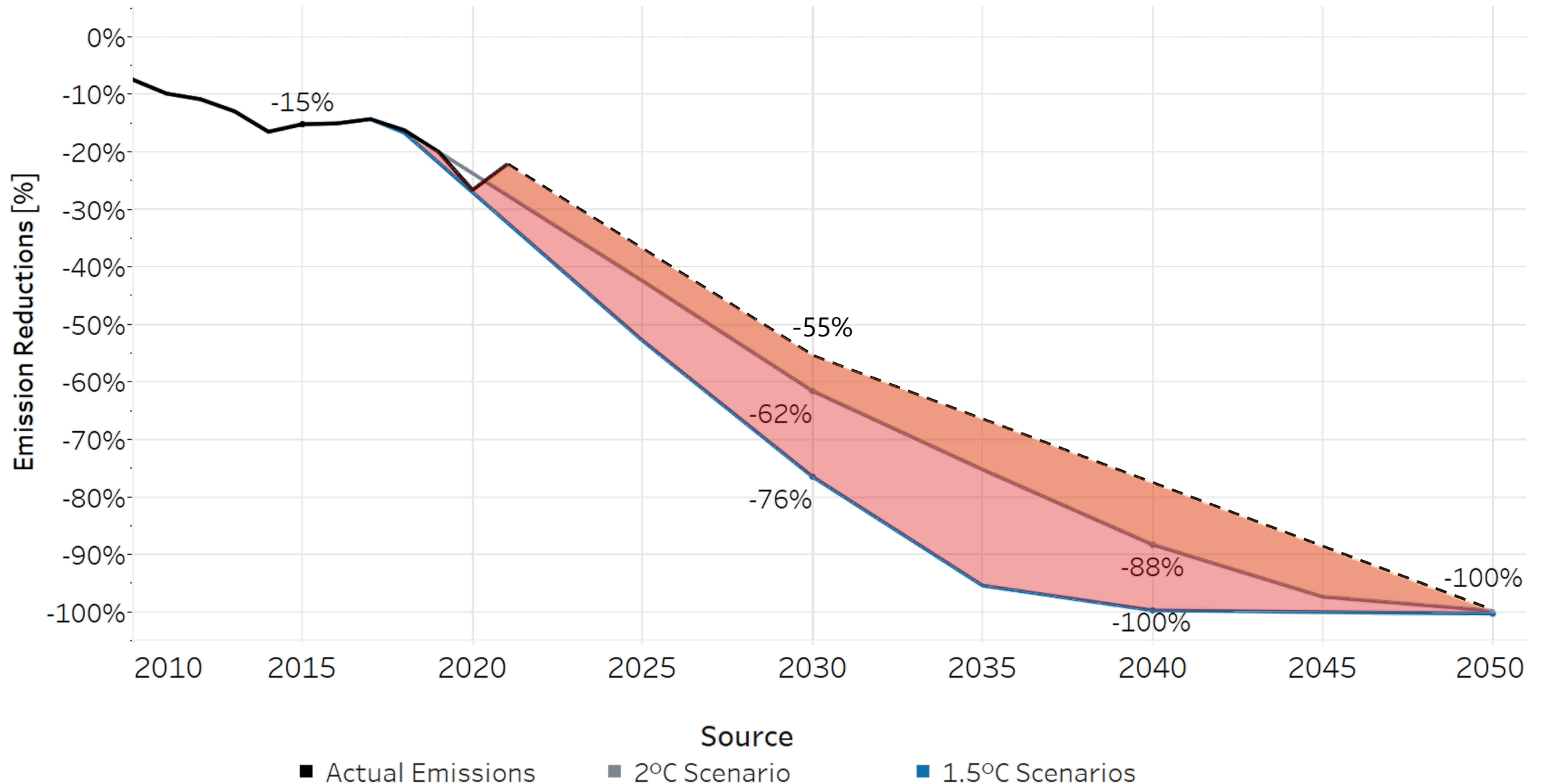
Donald Trump triggers prospect of global trade war over 'reciprocal' tariffs
increasing risk of +

US sides with Russia in UN resolution on Ukraine

German elections: Far-right AfD party achieves historic result



The current EU ambition gap – and what happens after net-zero?



The European Energy Vision 2060 scenarios

- Main goals of the European Energy Vision 2060 scenarios:

Give broad overview over different economic and (geo)political futures for Europe beyond 2050

Assess feasibility of climate targets and possible pathways

Check the National Energy and Climate Plans (NECPs) of EU states for both ambition and feasibility gaps

The European Energy Vision 2060 scenarios

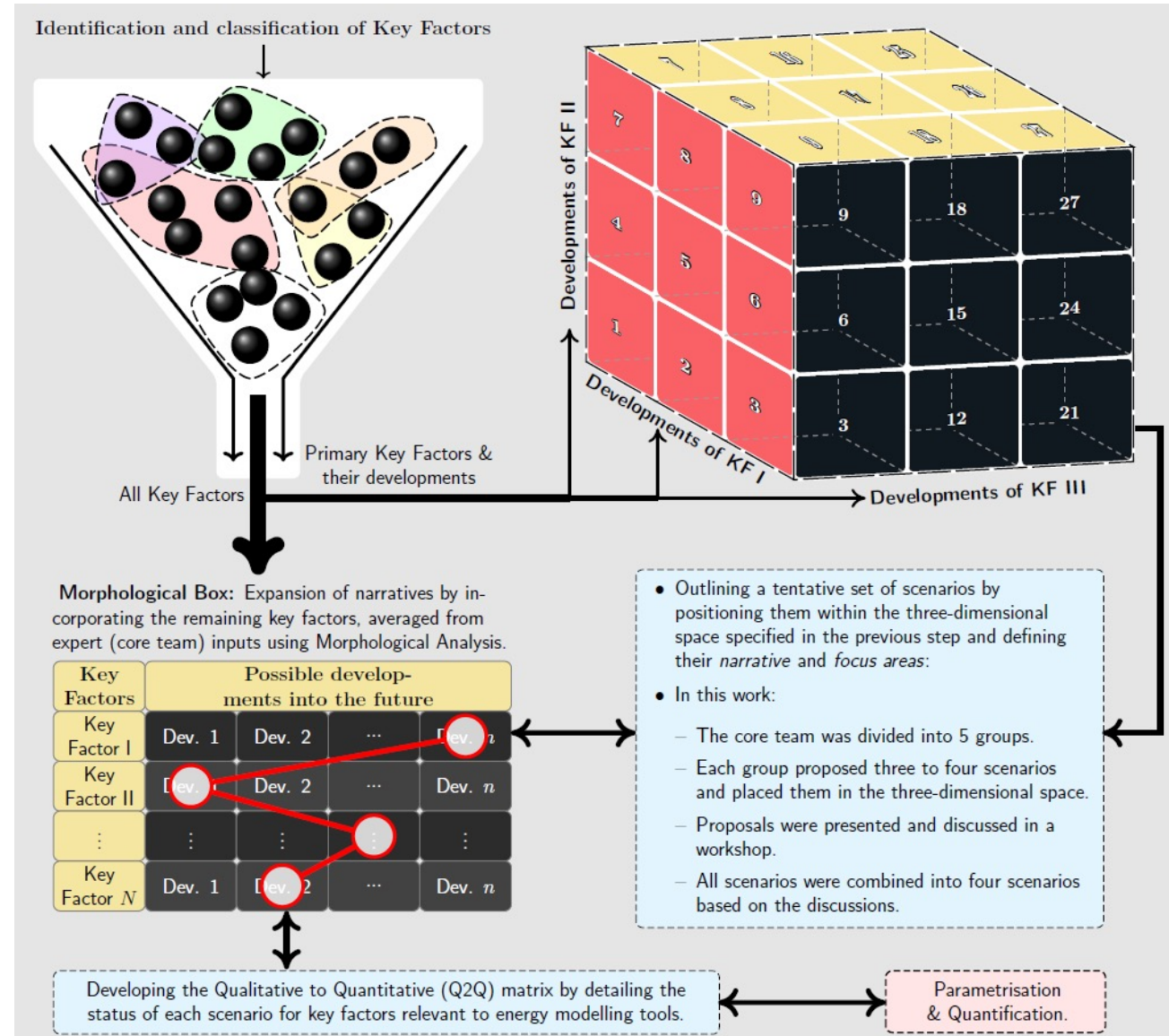
- Four-step scenario generation process:

1. Exploration of key uncertainties

2. Drafting the scenario narratives

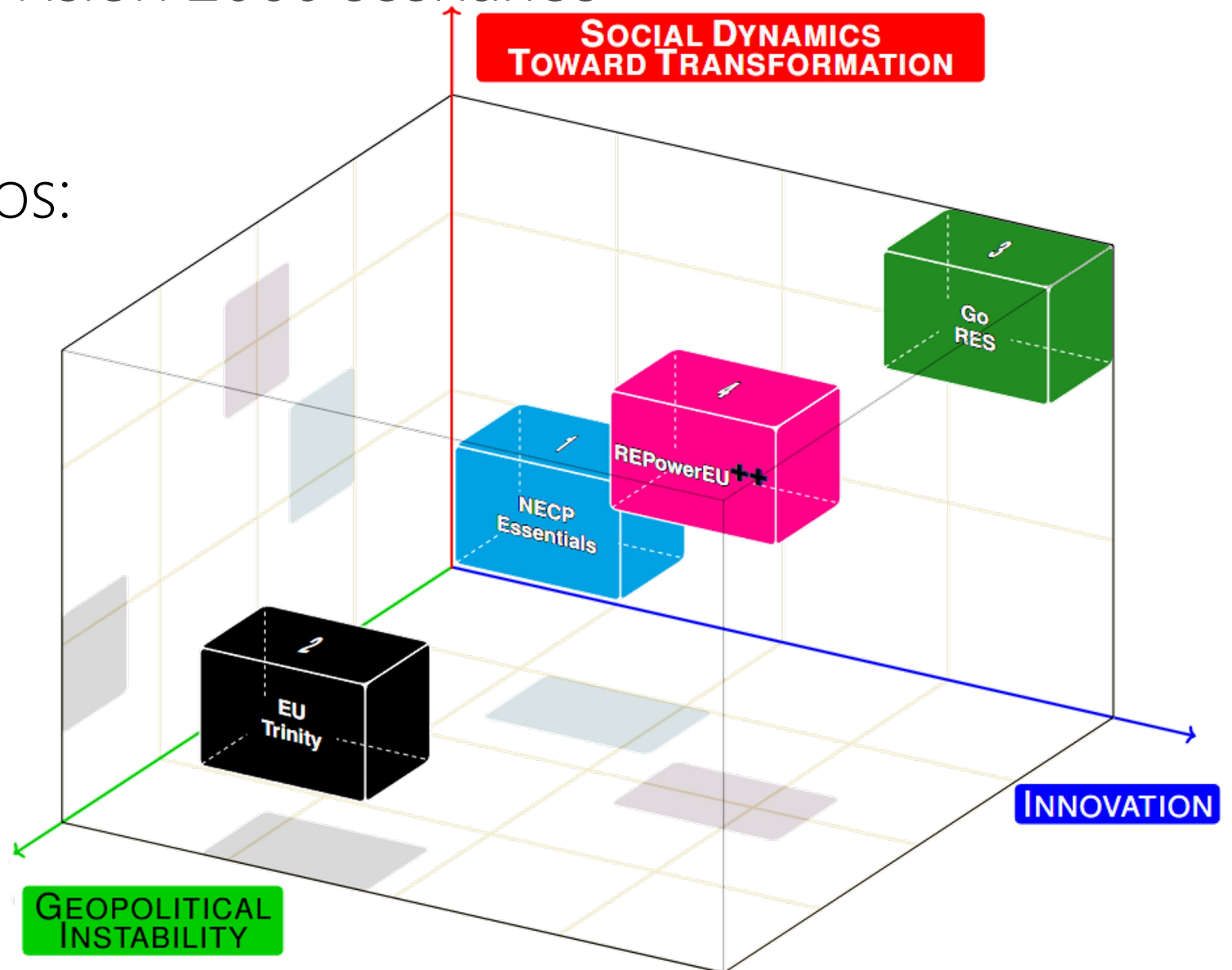
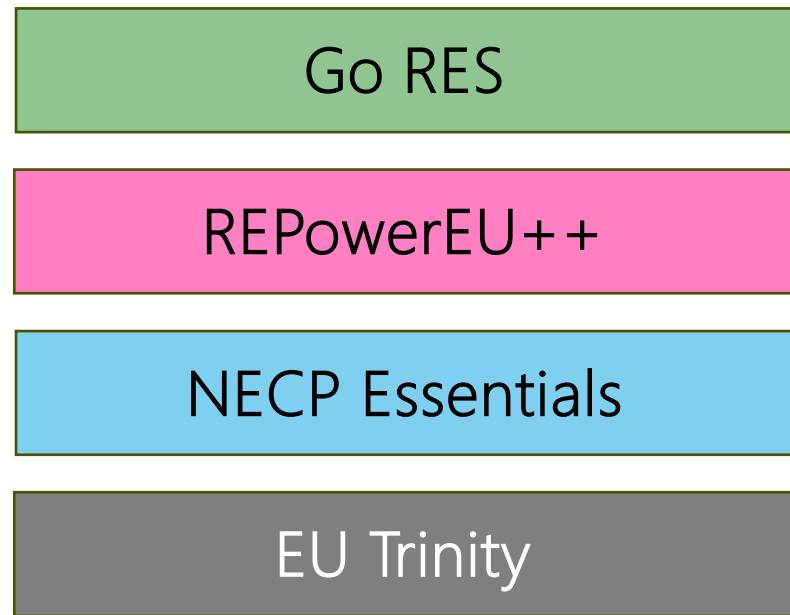
3. Morphological analysis

4. Creation of key factor matrix

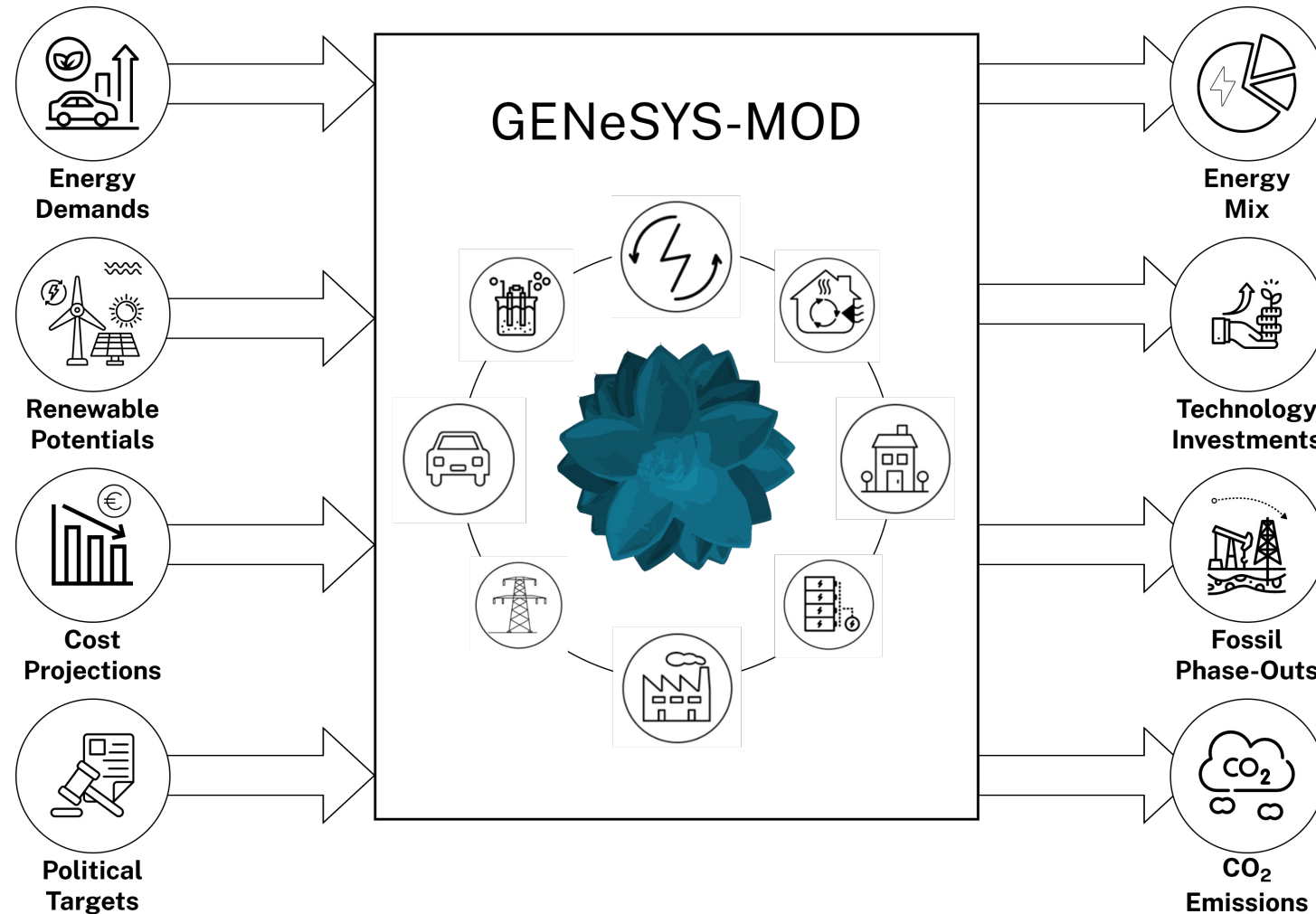


The European Energy Vision 2060 scenarios

- The resulting scenarios:



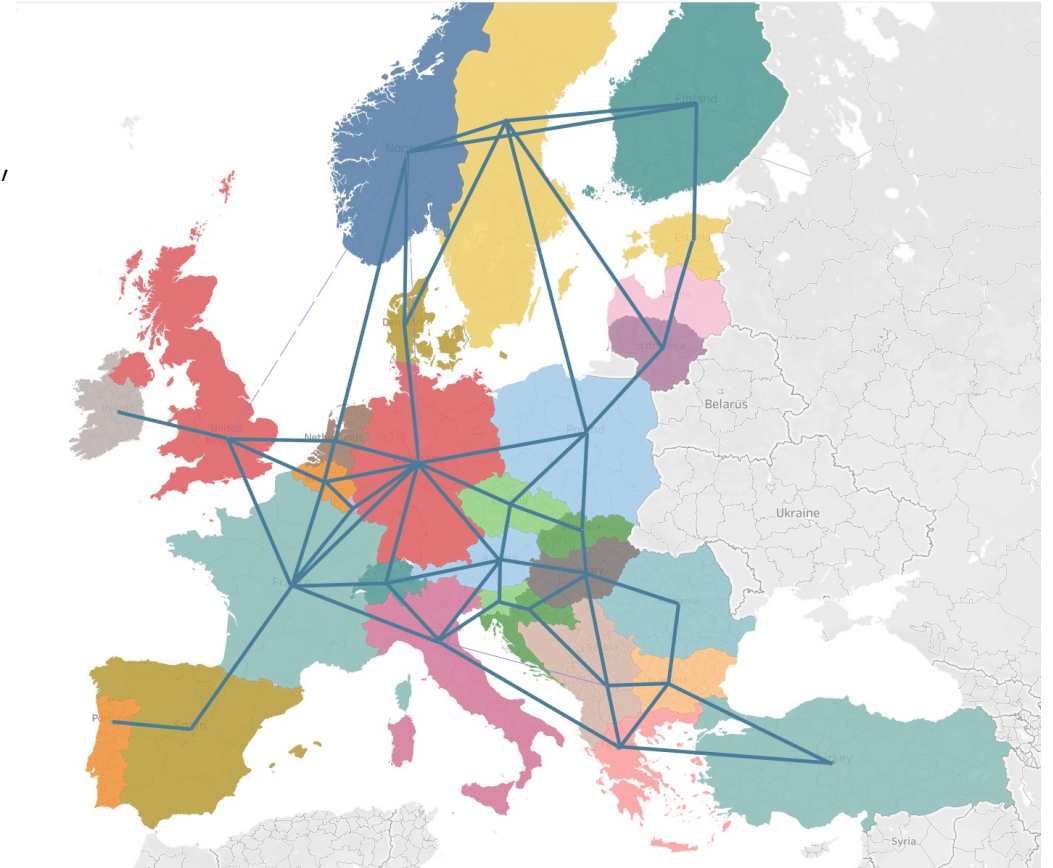
The Global Energy System Model (GENeSYS-MOD)



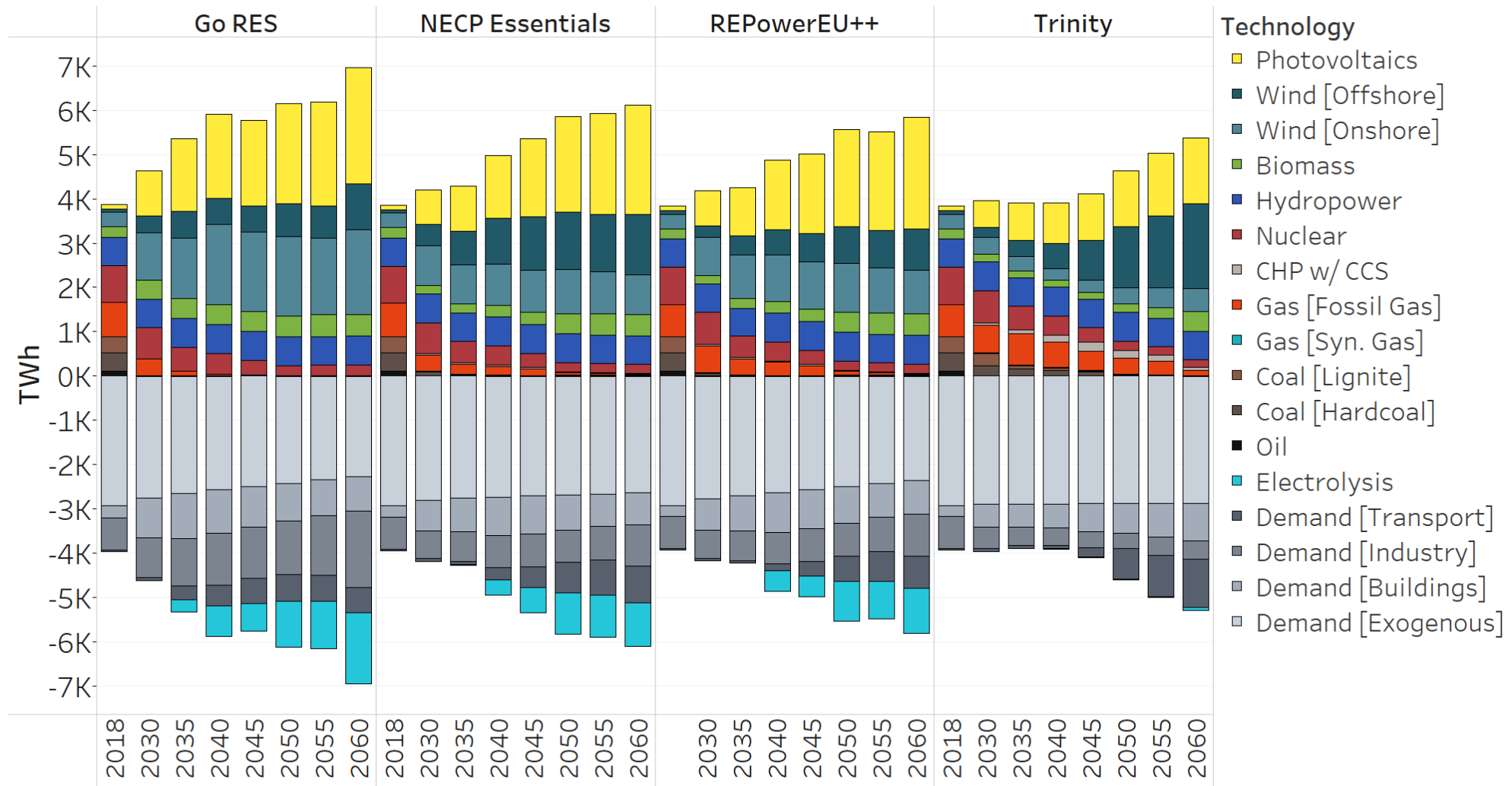
Scenario set-up: GENeSYS-MOD Europe v4.0

European energy scenarios:

- 30 regions (mainland EU-25, Norway, Switzerland, UK, Turkey, and an aggregated Balkan region)
- Timeframe: 2018 – 2060
- Reduced hourly timeseries, via a reduction algorithm
- Covers the sectors: Electricity, Buildings, Industry and Transportation

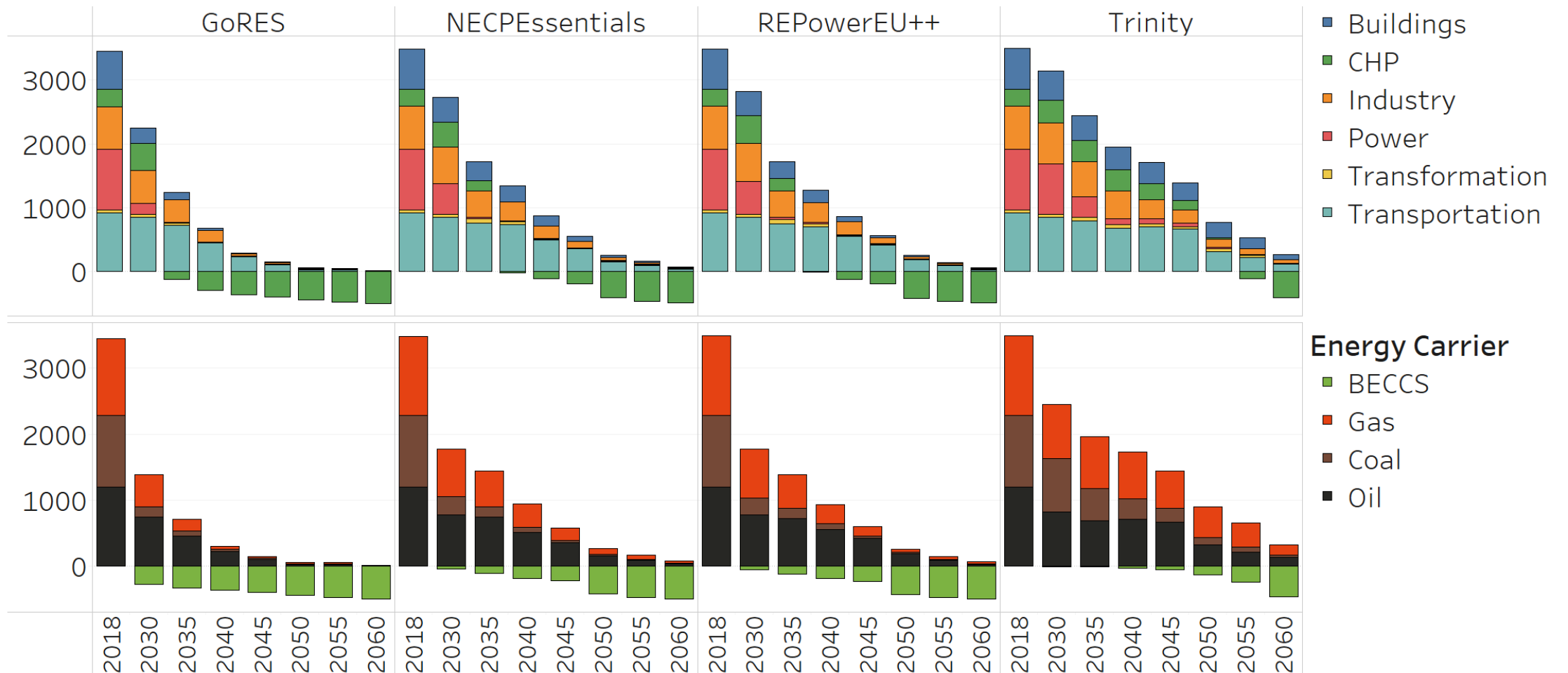


Model results: Electricity generation & consumption

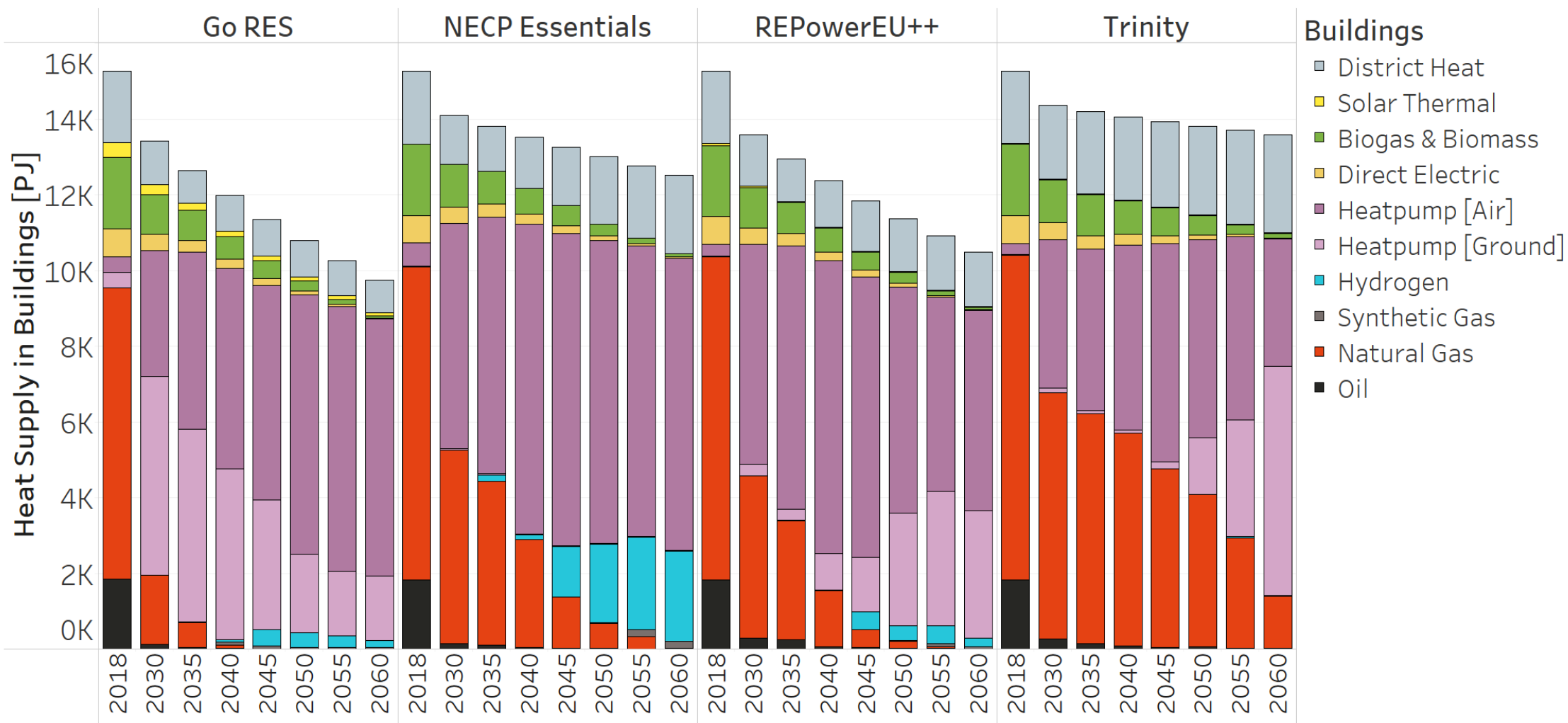


Model results: Emission trajectories

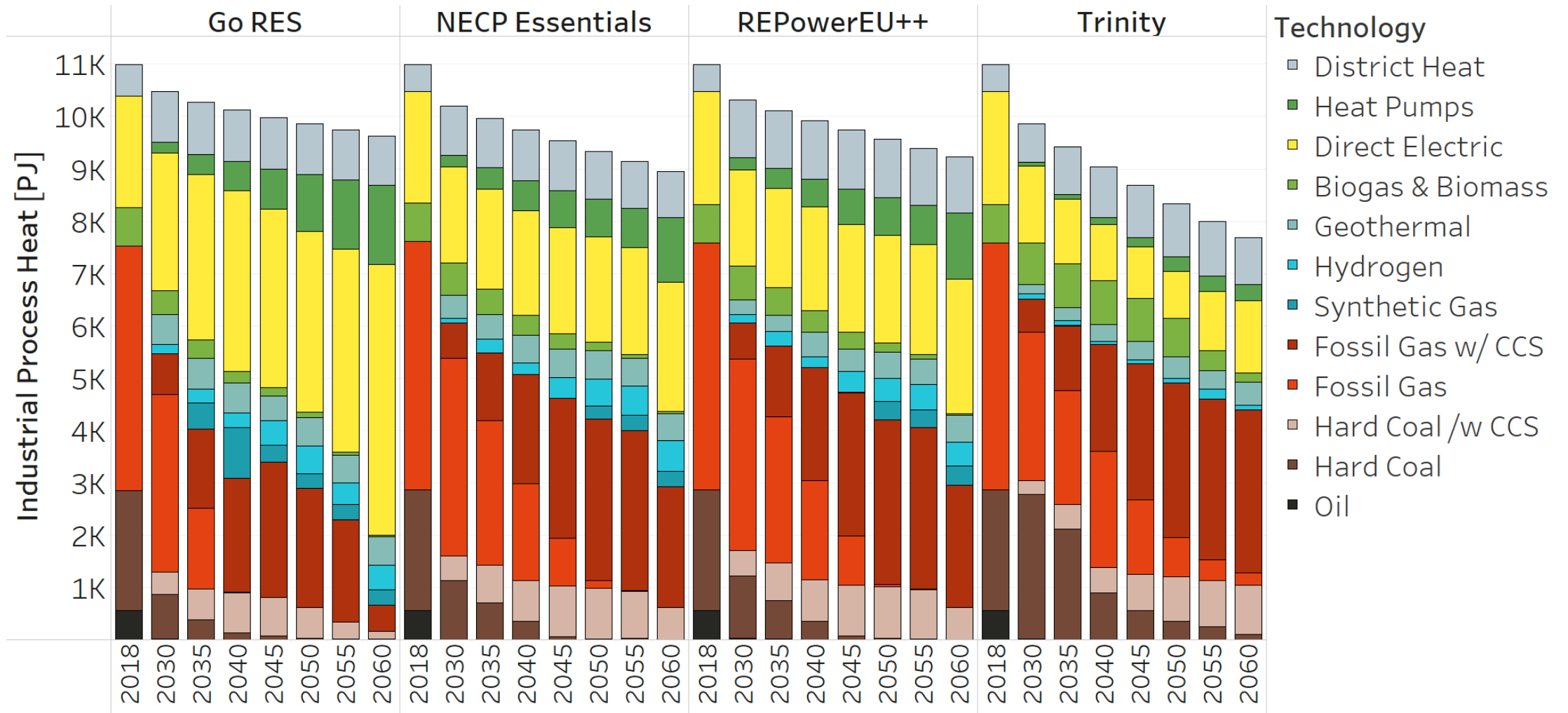
Emissions per sector (top) and per energy carrier (bottom)



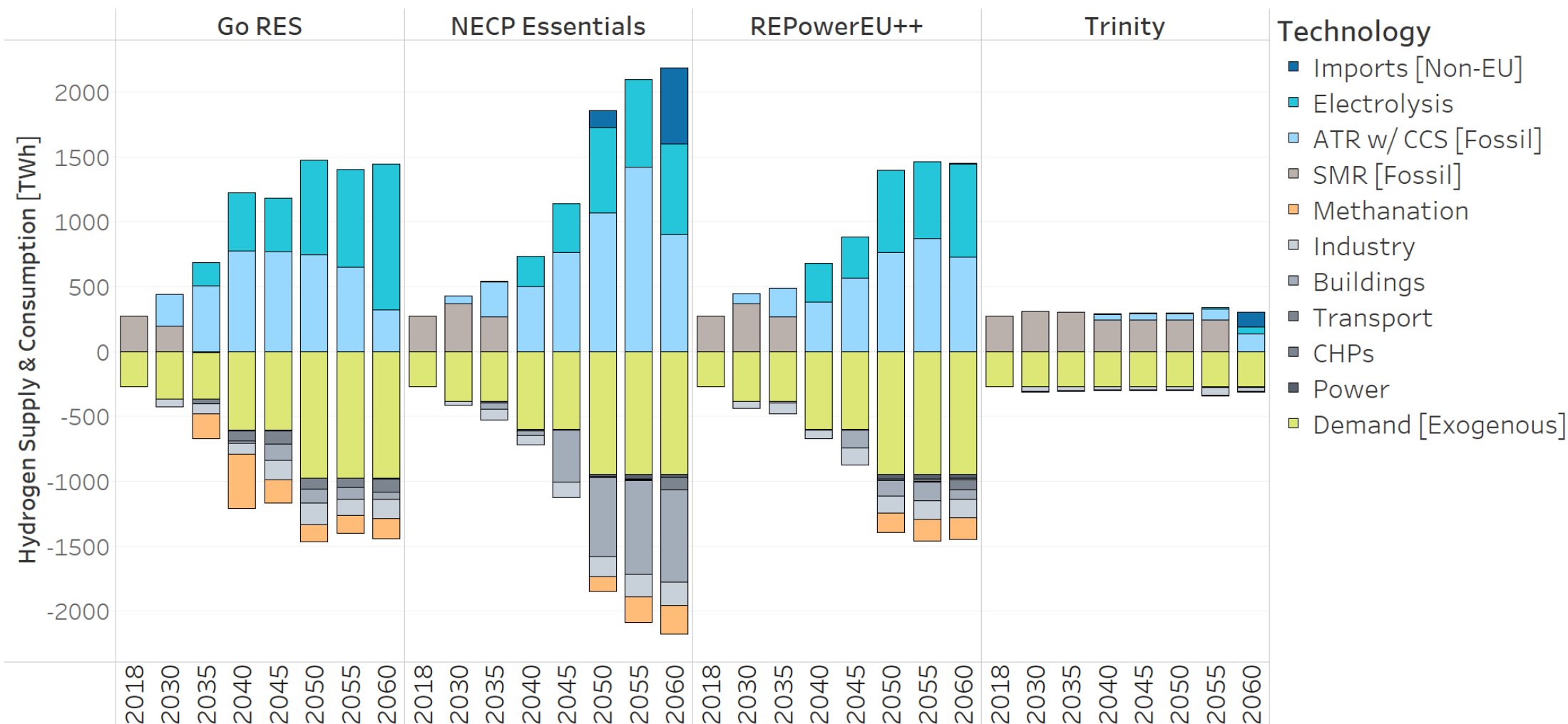
Model results: Buildings



Model results: Industry



Model results: Hydrogen



Conclusions – Energy Visions for 2060

- We developed four new qualitative storylines for the future European energy system until 2060, specifically also including geopolitical risks
- Ambitious climate targets are extremely difficult to reach without global and European collaboration
- Some quite clear and stable trends across scenarios: RES expansion, heat pumps, BEVs, ...
- More uncertainty regarding hydrogen applications and scale of CCS and flexibility requirements



Thank You for Your attention

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 <https://github.com/GENeSYS-MOD>



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