



And yet it moves

A decade of Global Energy and Climate Outlooks
yields lower emission and temperature projections

Kimon Keramidas, on behalf of the GECO team
17 October 2025 – Brussels, ECEMP conference

Growing pace of change vs “too little too late”

Global renewable energy generation surpasses coal for first time

Record solar expansion and steady wind growth driving world's shift away from fossil fuels in 2025, report finds



Agrivoltaics for kiwis

Volta Group and Richel Group have commissioned a photovoltaic greenhouse in France for kiwi cultivation.

APRIL 14, 2025 **FRANCE**

COMMERCIAL & INDUSTRIAL PV
FRANCE



Including workers in traditional dress handling solar infrastructure

Pakistan's 22 GW Solar Shock: How a Fragile State Went Full Clean Energy



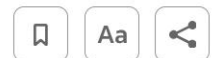
Global banking climate alliance folds four years after launch

'Net zero' financial sector group votes to cease operations after losing members under political pressure

Comment: It's time for meaningful reform of the climate COP

By Johan Rockström and Sandrine Dixson-Declève

November 18, 2024 11:03 AM GMT+1 · Updated November 18, 2024



| Industry Insight from Ethical Corporation Magazine, a part of Thomson Reuters.



< Articles

INSIGHT

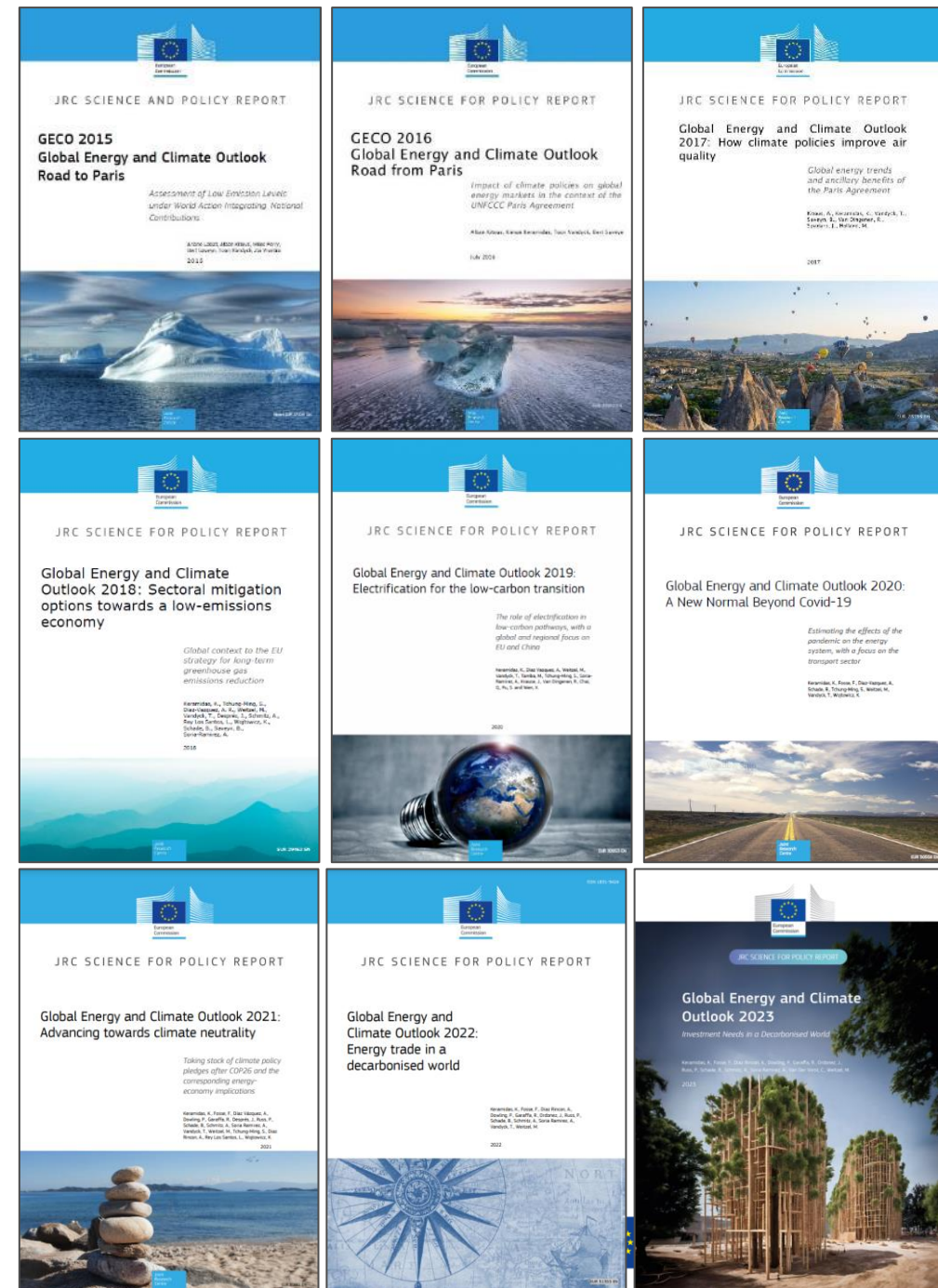
The U.S. Has Exited the Paris Agreement. Does it Matter?



Sources: IISD, 4 Nov 2020; Reuters, 18 Nov 2024; Clean Technica, 4 Apr 2025; PV Magazine, 14 Apr 2025; Financial Times, 3 Oct 2025; The Guardian, 7 Oct 2025

The 10th edition of the Global Energy and Climate Outlook

- Annual publication by JRC: global energy and emission projections under decarbonisation scenarios.
- Deep-dives into focus topics (e.g. impact of Covid-19, energy trade, **NDC updates**).
- Supporting assessments from IPCC and UNEP Gap Report and model comparison projects.



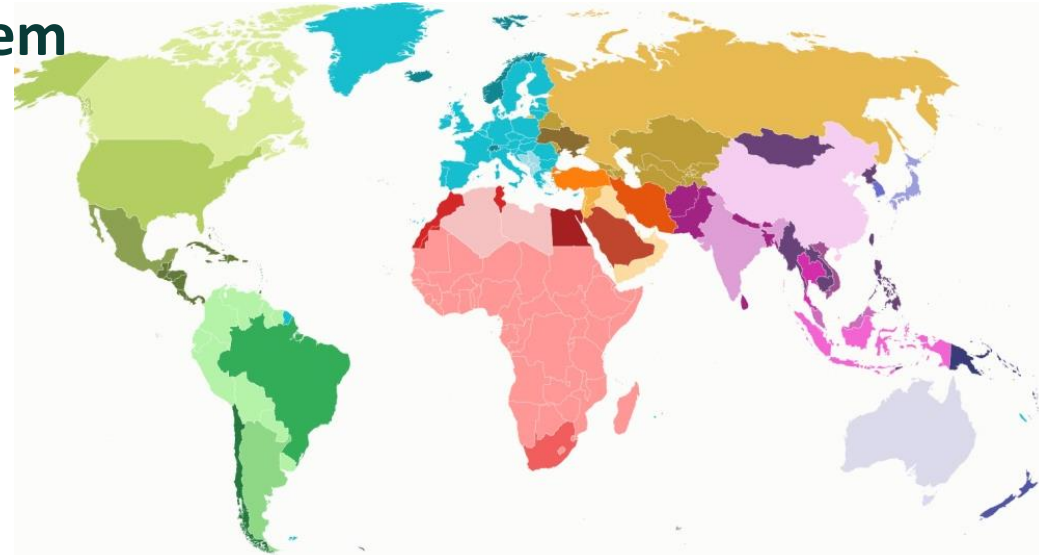
POLES: Prospective Outlook on Long-term Energy Systems

Projections of the evolution of the world energy system

- Partial equilibrium, recursive dynamic, simulation
- Long-term (to 2050-2100)
- EU + 39 countries / regions (OECD, G20)

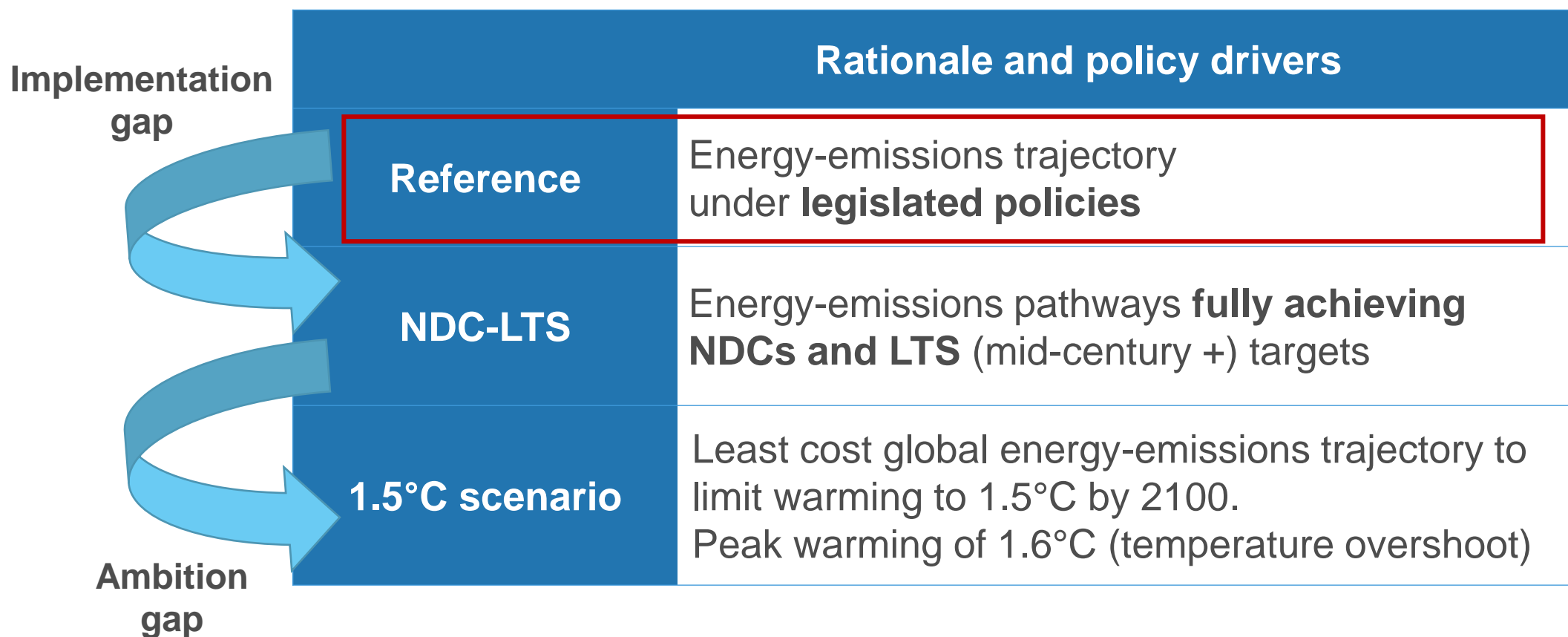
Output

- International energy prices & trade
- All energy sources and vectors
- All GHG emissions (linkage with specialist tools for non-energy)



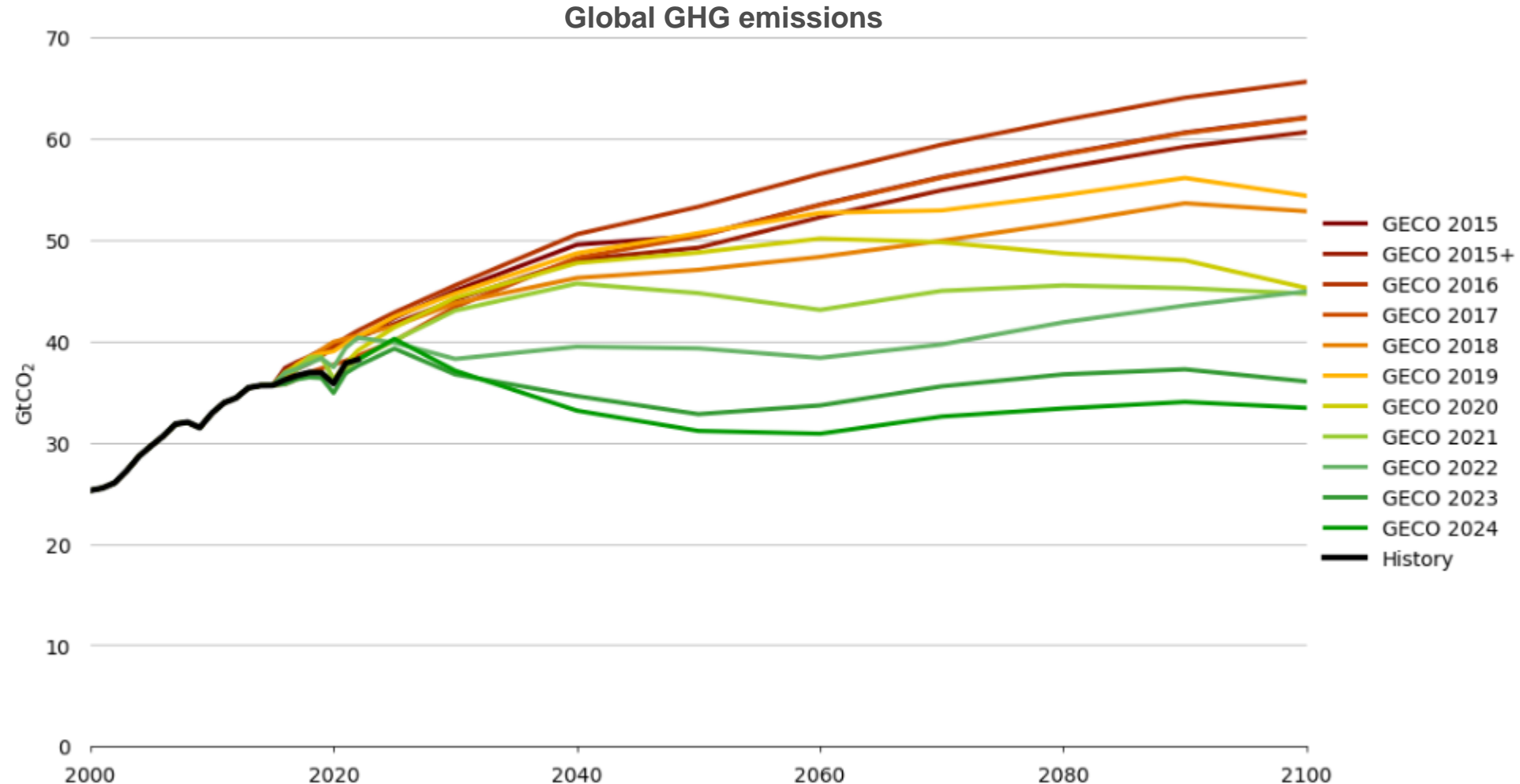
- Used in European Commission, IPCC Assessment Reports, UNEP Emissions Gap Reports, ...

Energy-emissions pathways in 3 main decarbonisation scenarios



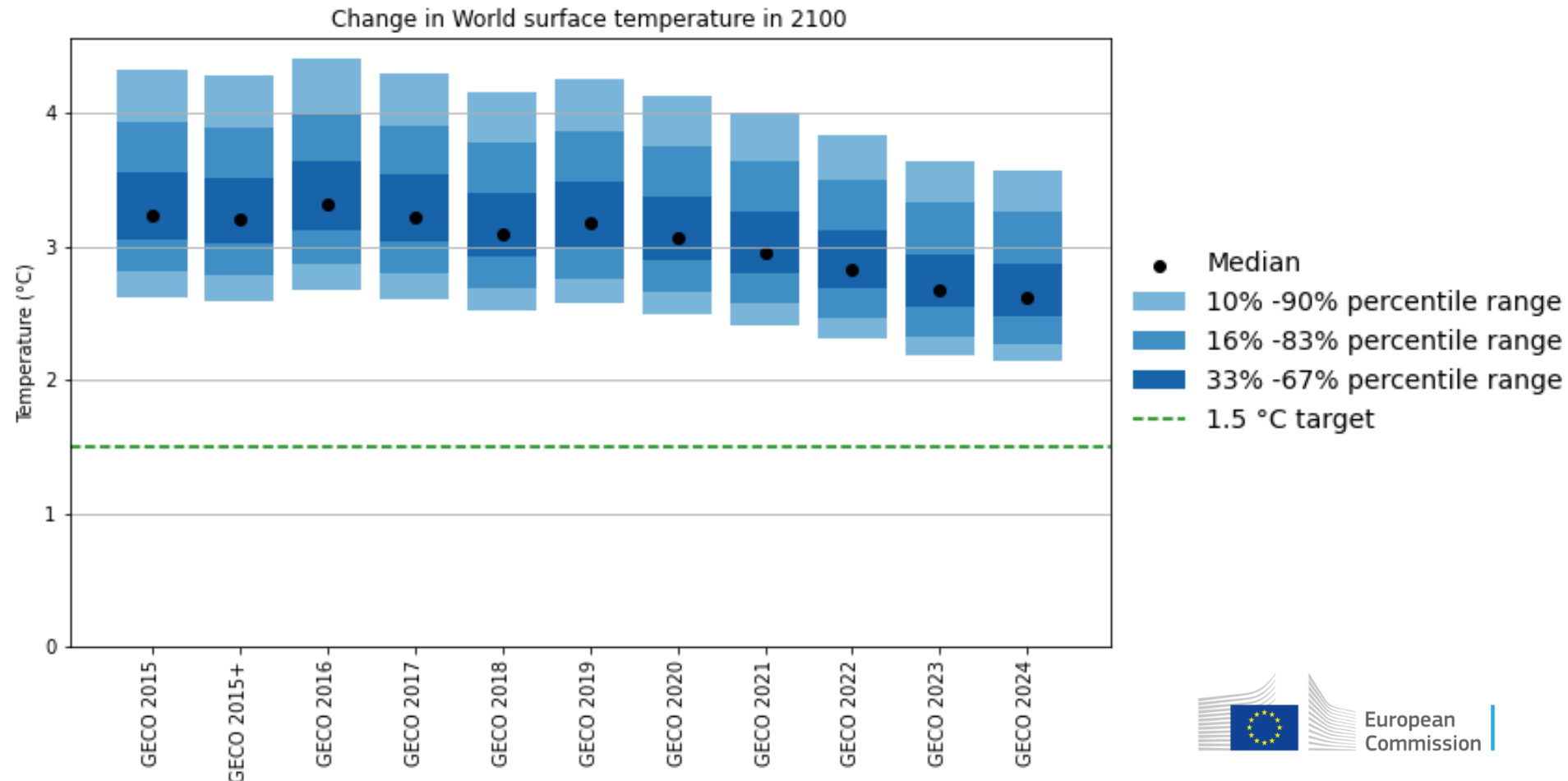
Reference scenarios emissions were projected to grow – now they are projected to stabilize

- Recent projections see **emissions peak** in the coming years, then stabilize below current emissions
- 2100 emissions projections now cut by half
- With growing economy (x5 by 2100) and population (stabilization at 10 bn)

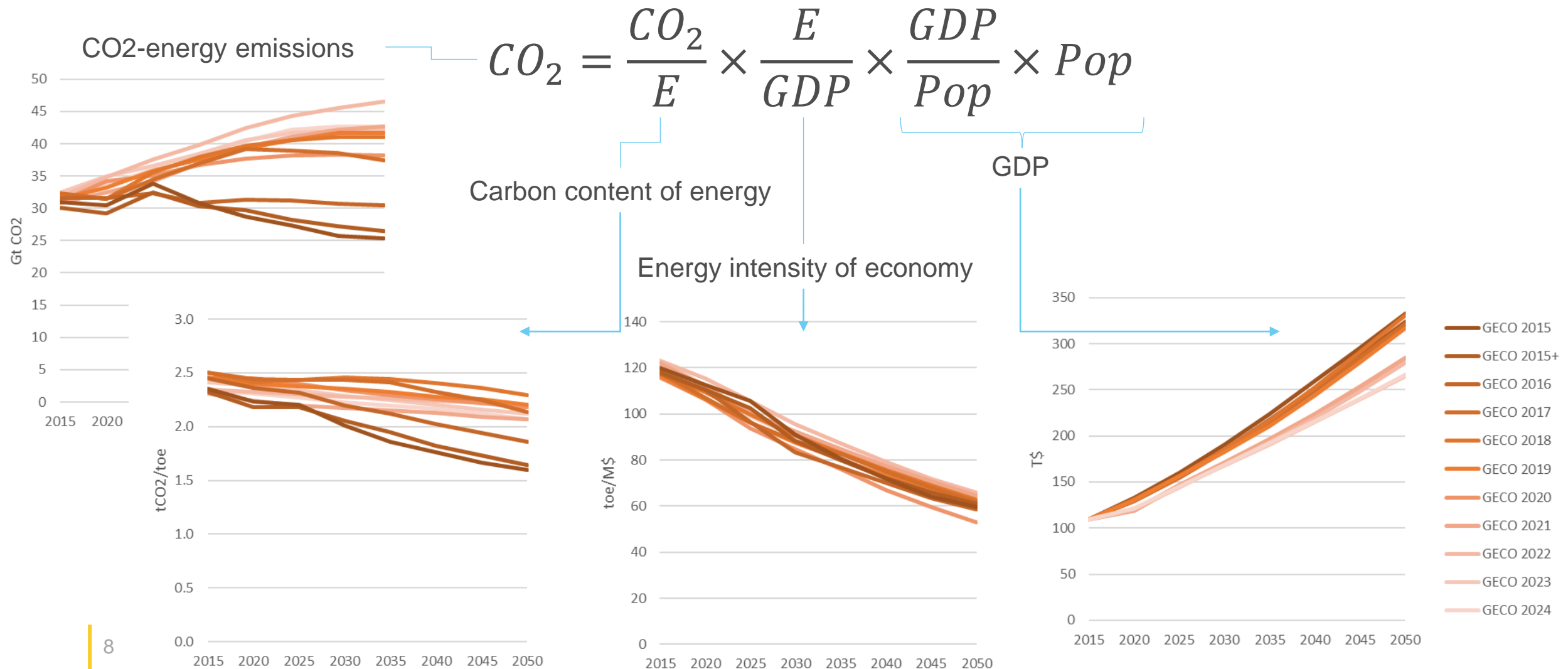


Ref. scenarios move away from extreme climate change, temperature gain of 0.6°C

- 2100 temperature change down from 3.2°C to 2.6°C (median)
- Emissions of non-energy & industry CO₂ (LULUCF, non-CO₂, air pollutants) use latest GECO
- Temperature obtained with the online MAGICC tool (probabilistic setting)



Ref. scenarios emissions – Kaya decomposition

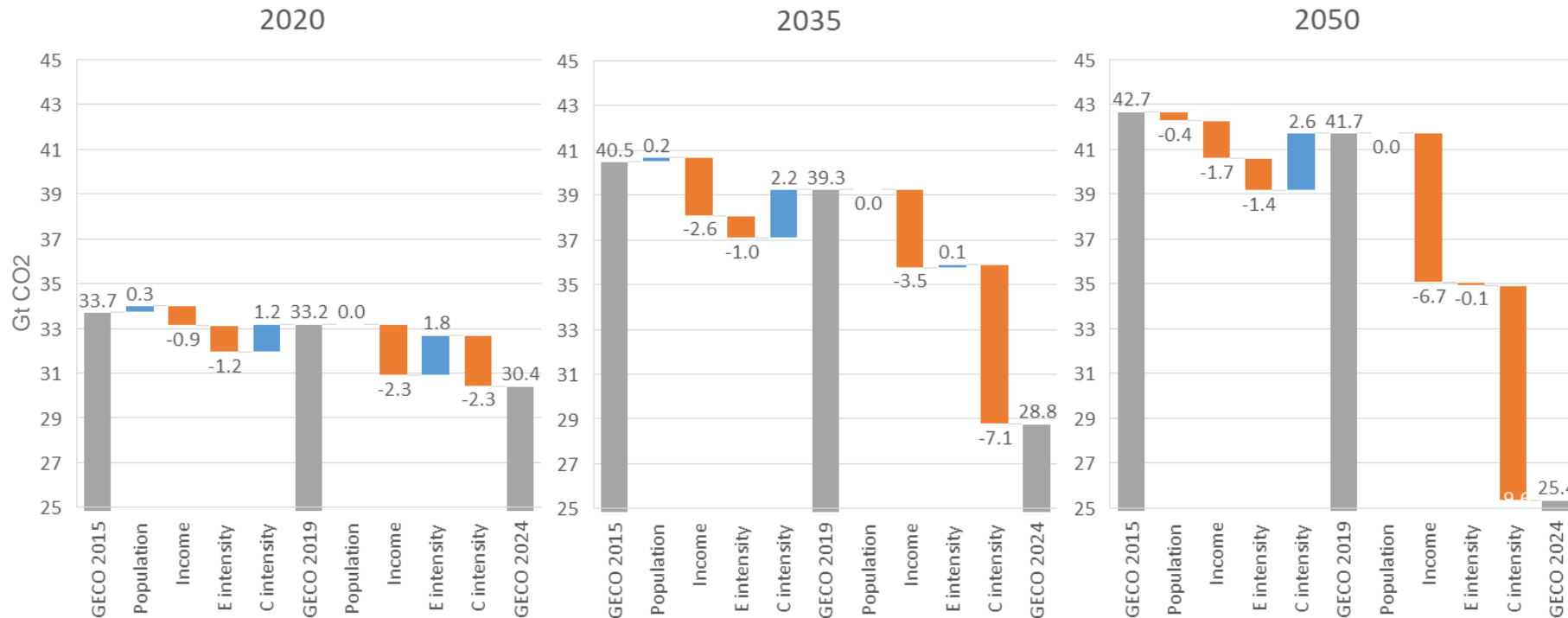


Ref. scenarios emissions - Kaya

$$CO_2 = \underbrace{\frac{CO_2}{E}}_E \times \underbrace{\frac{E}{GDP}}_E \times \underbrace{\frac{GDP}{Pop}}_{Pop} \times Pop$$

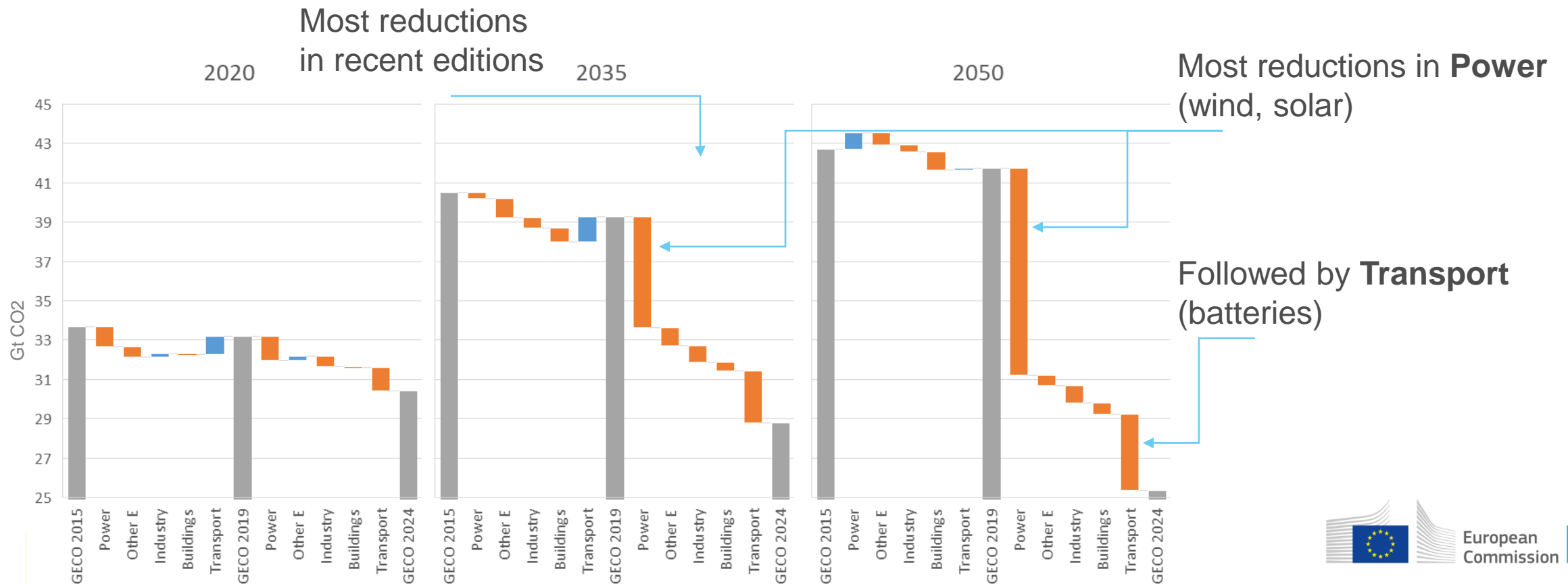
2050: 50% of GECO 2015-2024 difference
Most carbon intensity, esp. latest GECOs
Policy + cost + model developments

50%
COVID, slowdown
External assumption



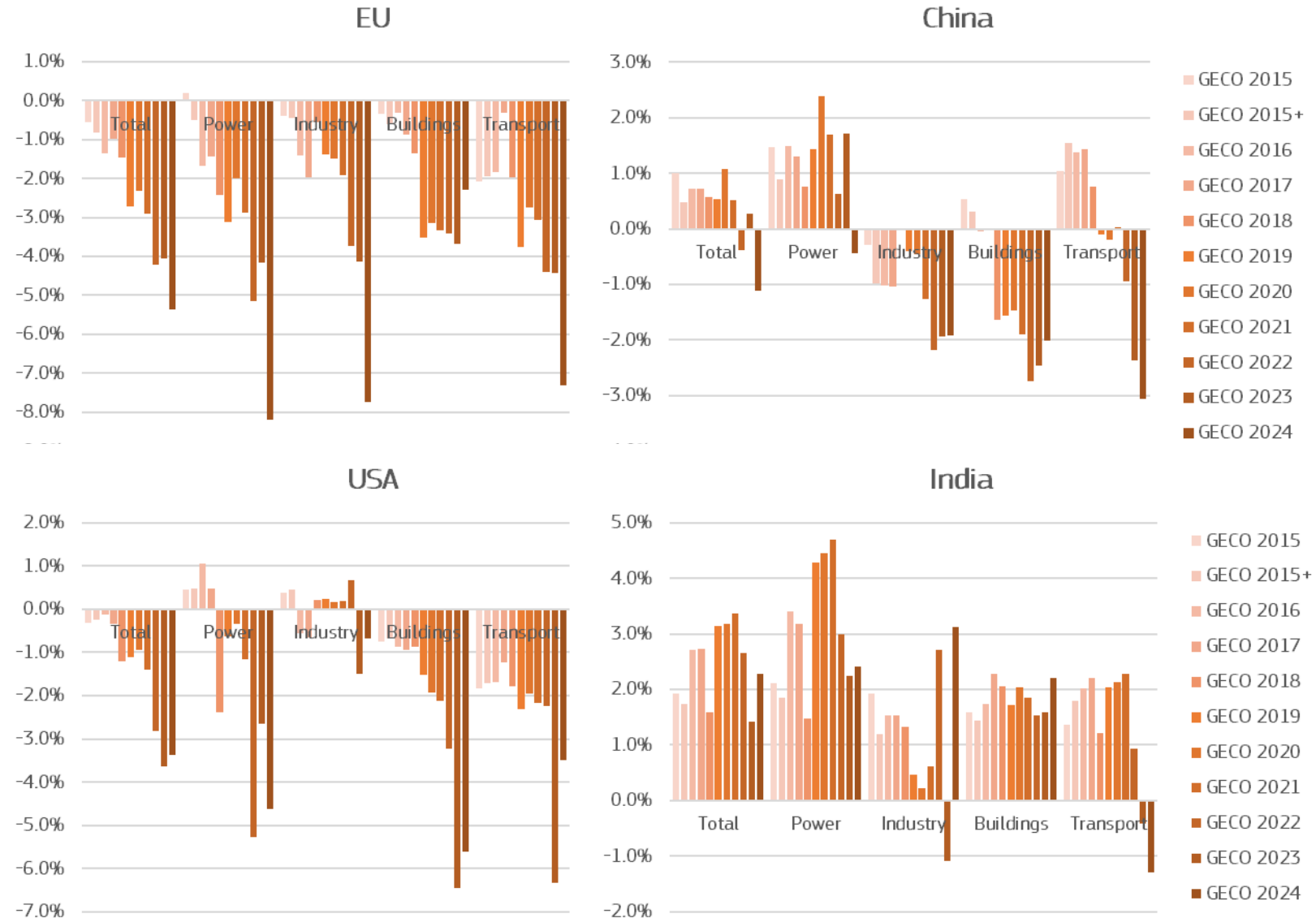
Ref. scenarios emissions – by sector

Emissions = Power + Other energy + Industry + Buildings + Transport



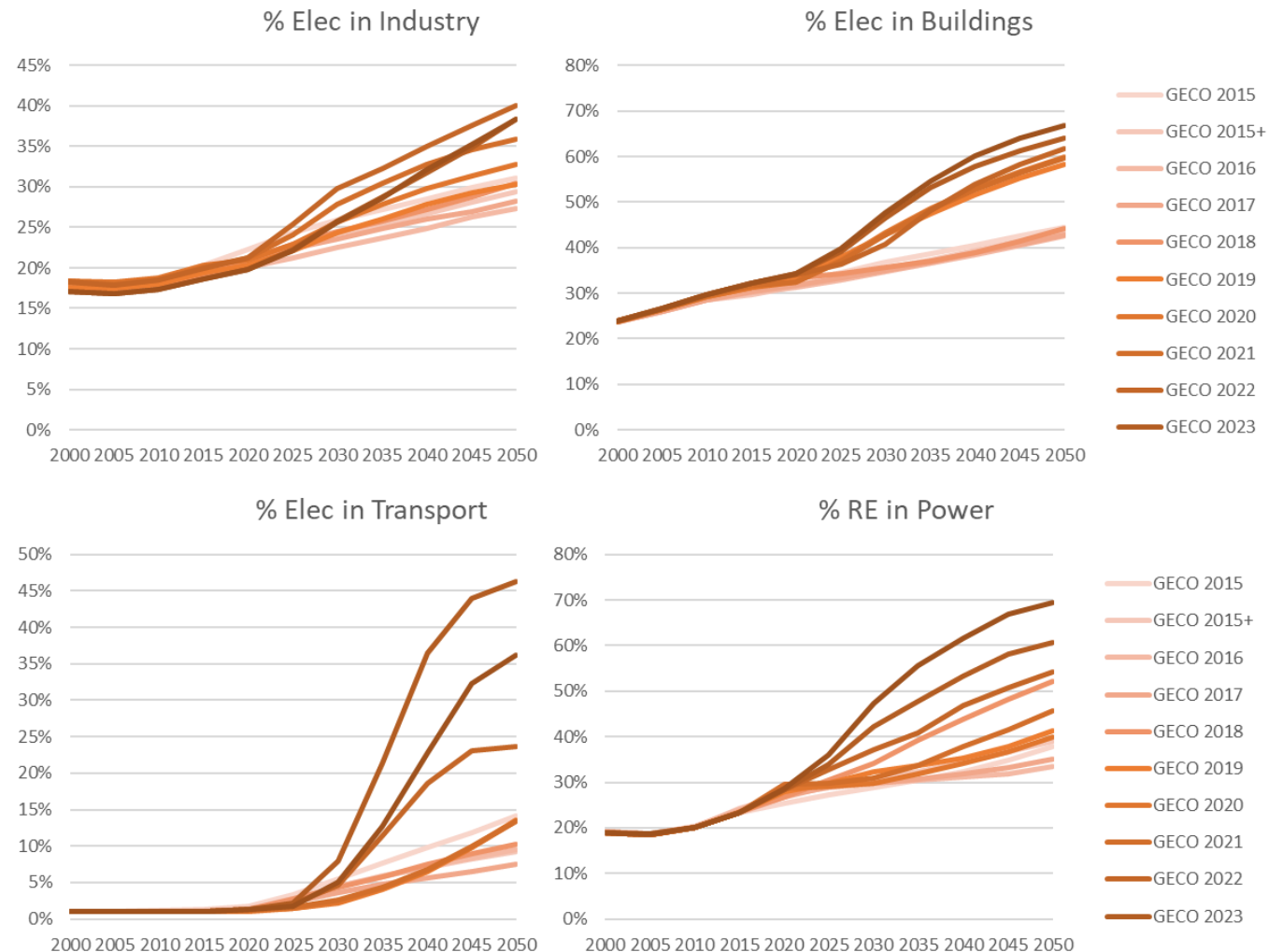
Ref. scenarios emissions – by country

- CO2 emissions growth rate 2020-2050, by sector
- Global pattern of decreasing projections over time observed across all world regions



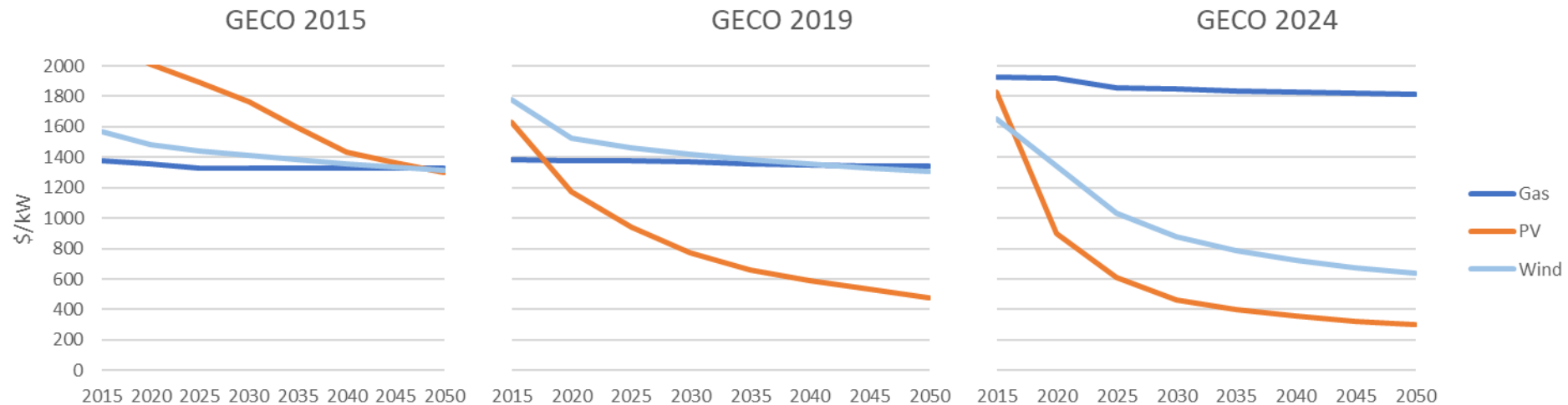
Ref. scenarios emissions - drivers

- Electro-techs reach maturity: wind, solar, batteries, heat pumps
- Direct policy support (EU 2000s-2010s) and expansive industrial policy (China 2010s-2020s) helped decrease technologies costs
- However, means for deeper emissions cuts still need policy support (H2, DAC, synfuels...)



Ref. scenarios emissions - drivers

Overnight investment costs:



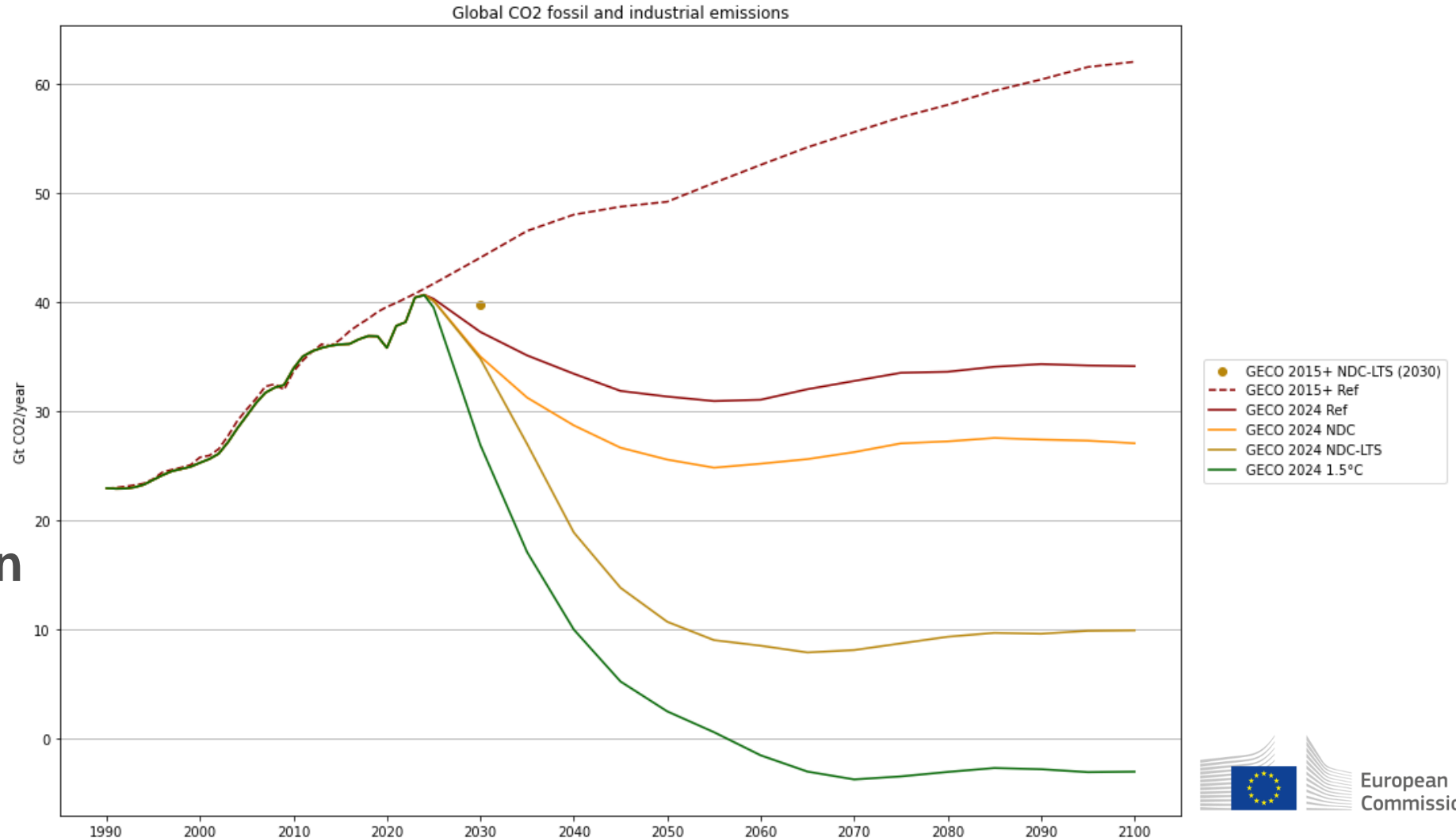
Policies + costs + modelling: effects difficult to disentangle

A virtuous cycle of increasing decarbonisation policy ambition:

- Climate-energy policies → create more favourable market conditions
- Deployment of low-emission technologies → cost reductions
- Lower the costs of each subsequent climate policy intervention

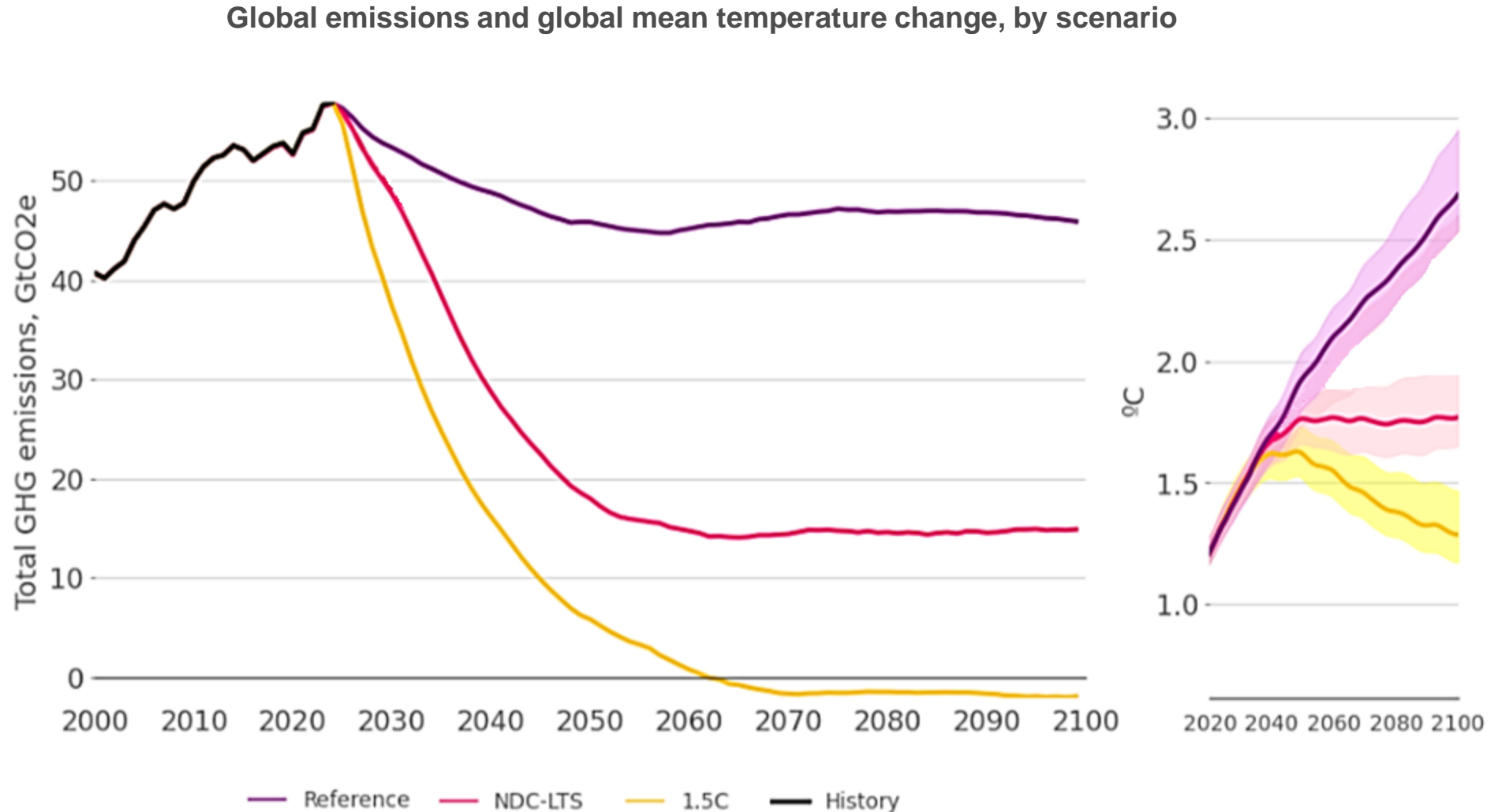
Glass half-empty: large implementation and ambition gaps remain

- Global CO2 emissions **peaking** in all 2024 scenarios
- Large prevailing **ambition** and **implementation** gaps



Glass half-empty: large implementation and ambition gaps remain

- Large prevailing **ambition** and **implementation** gaps
- Additional efforts needed to shift from Ref (2.6°C) to reaching Paris Agreement



Conclusions

- Looking back at 10 years of reference projections (current policies scenarios) yields large emissions reductions
- Reference emissions projections stabilize instead of increasing, and are cut by half by 2100
- This is observed across all world economies and across multiple sectors
- Virtuous cycle of policy intervention – technologies costs reduction
- But important gaps remain!
Implementation (to announced policies) and ambition (to align policies to well below 2°C)

Thank you

https://joint-research-centre.ec.europa.eu/scientific-activities-z/geco_en

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