Energy Transitions Commission

10 YEARS

Keeping global warming below 2°C: Six priorities

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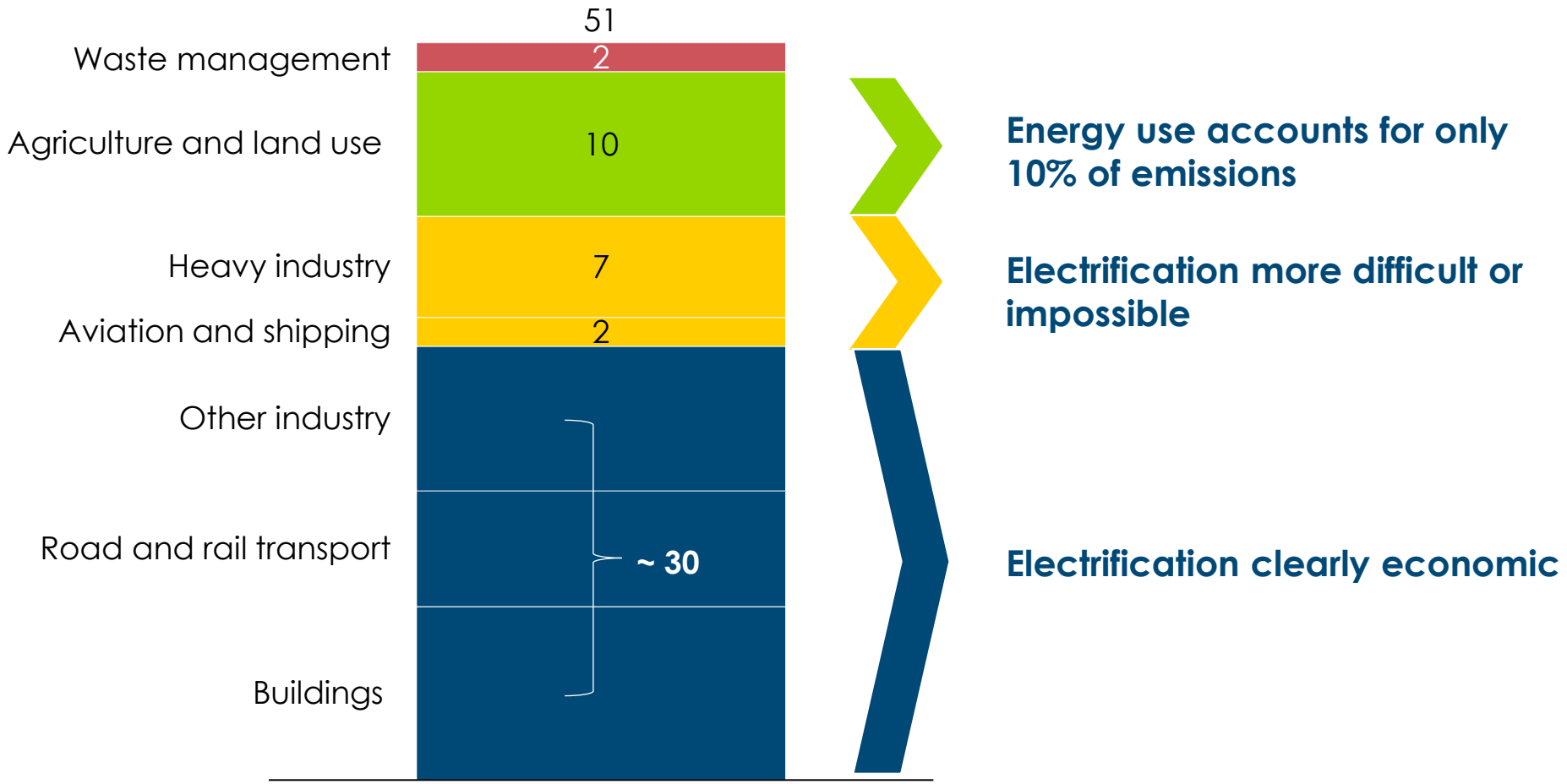
Chair, Energy Transitions Commission

The Global School of Sustainability at LSE

9th February 2026

GHG emission by broad sector

$GtCO_2eq$



The economics of the energy transition – challenges and opportunities

Investments

- Cost to some category of consumer
- Cost of capital crucial issue

Costs of going fast enough

- Subsidies for early tech deployment
- Double running gas grid and expanded electricity system
- Retiring existing coal plants before end of life

Distributional issues

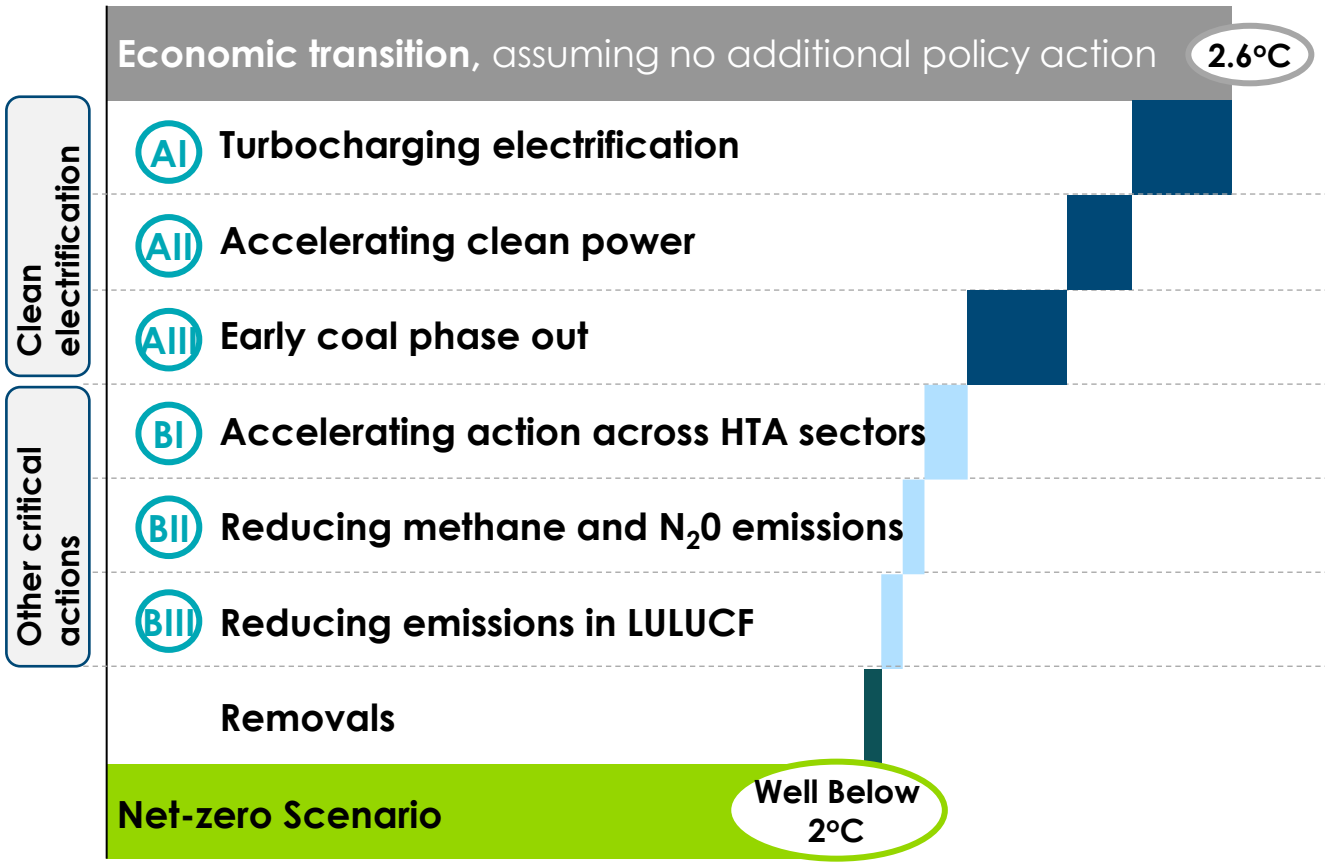
- Jobs: both opportunity and threat more limited than often suggested
- Within countries: residential heat harder than shipping
- Between countries: global sunbelt cost advantage
- Economic rents: demand reduction vital to transition beyond fossil fuels

China opportunity and challenge

- Faster emissions reductions essential – including hard to electrify sectors
- Clean-tech dominance: global low-cost opportunity but local industry threat
- Climate finance: the most important provider?

Peak warming in the 21st century and key mitigation areas

°C



Key levers of change

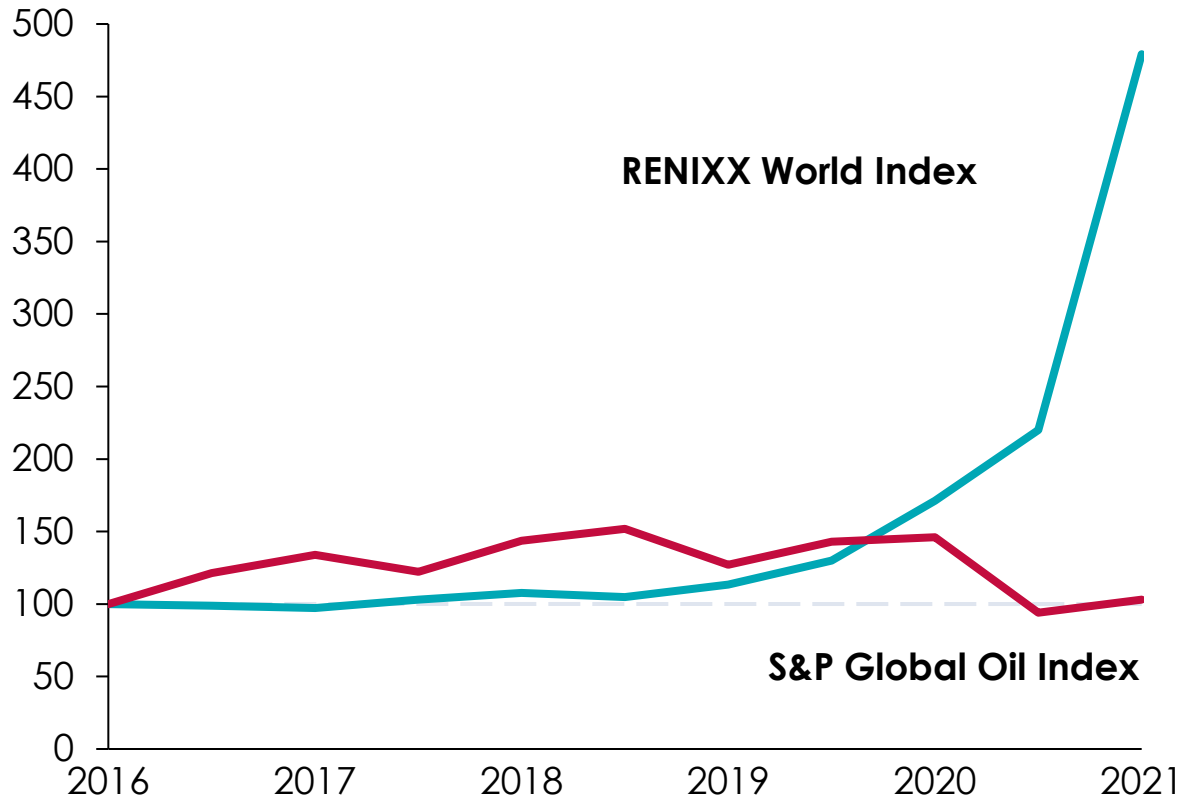
- Accelerating electric vehicles, heat pumps and industrial electrification, doubling energy efficiency
- Tripling renewables, extending grids and deploying storage
- Decreasing coal generation by decommissioning of old plants or displacing baseload demand
- Low-carbon steel, cement, aluminium and chemicals + sustainable aviation/shipping
- Cutting non-CO_2 emissions from O&G production and distribution as well as waste and agriculture
- Ending deforestation and increasing ecosystem restoration
- Scaling carbon dioxide removals from nature and engineered sources, alongside ambitious emissions reductions

Source: Systemiq analysis for ETC; BNEF (2025), *New Energy Outlook 2025.*

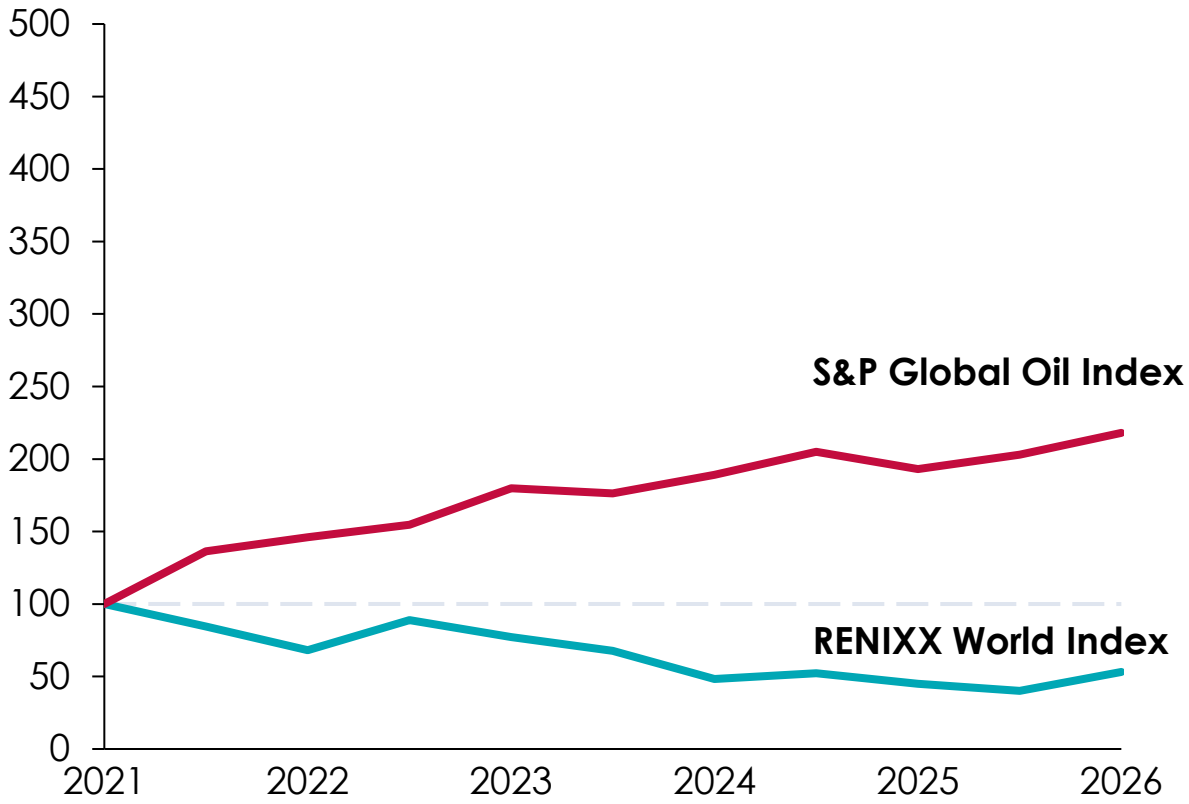
Return on equity for renewables vs fossil fuels

Indexed (100) at the starting period

Pre-Russia invasion of Ukraine



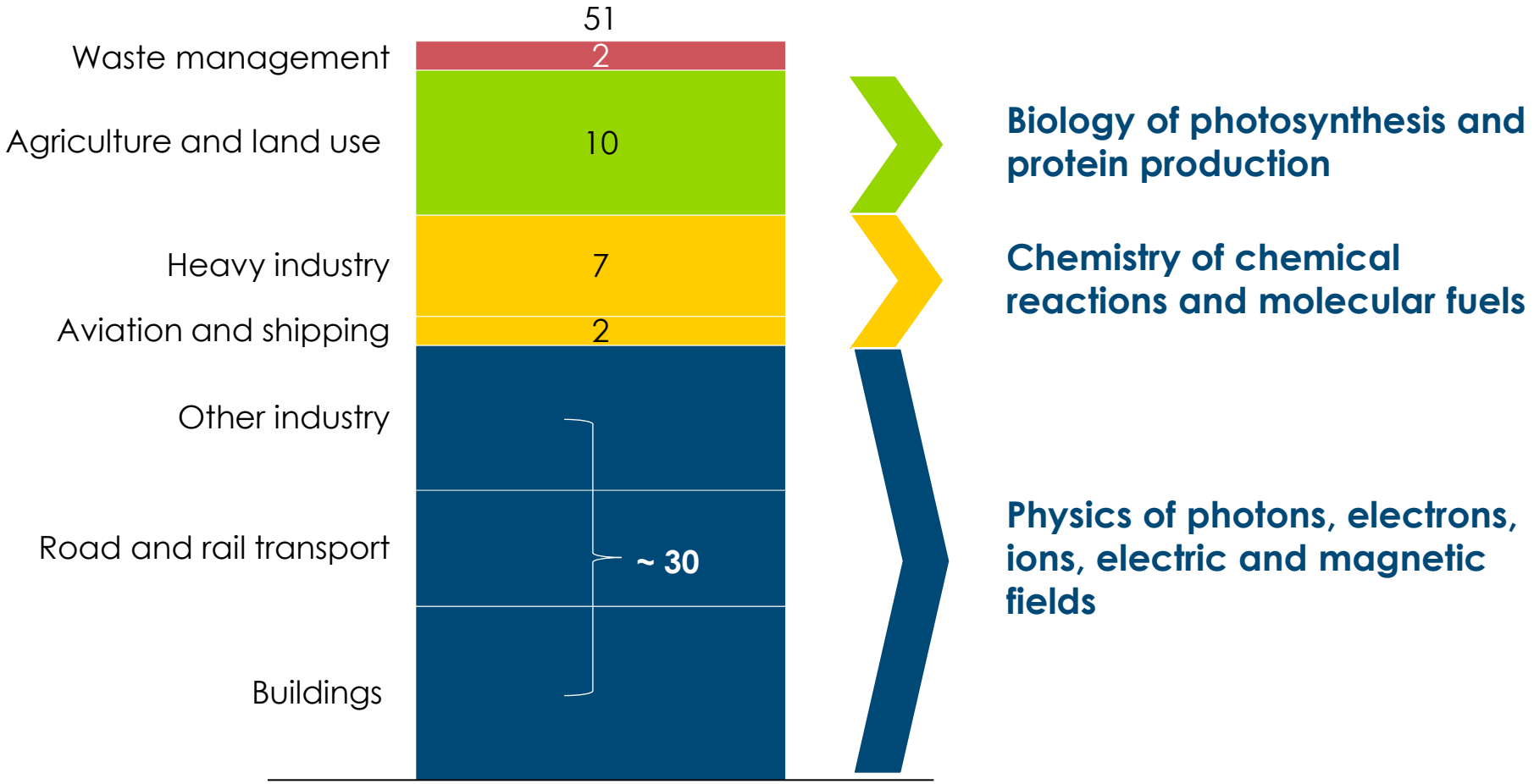
Post-Russia invasion of Ukraine



Notes: RENIXX World Index tracks the 30 largest companies in the global renewable energy sector by market capitalization. Data interpolated between 6 monthly points.
Source: S&P (2026), *S&P Global Oil Index;* Reuters (2026), *RENIXX WORLD INDEX.*

GHG emission by broad sector

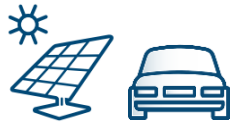
Gt CO_{2eq}



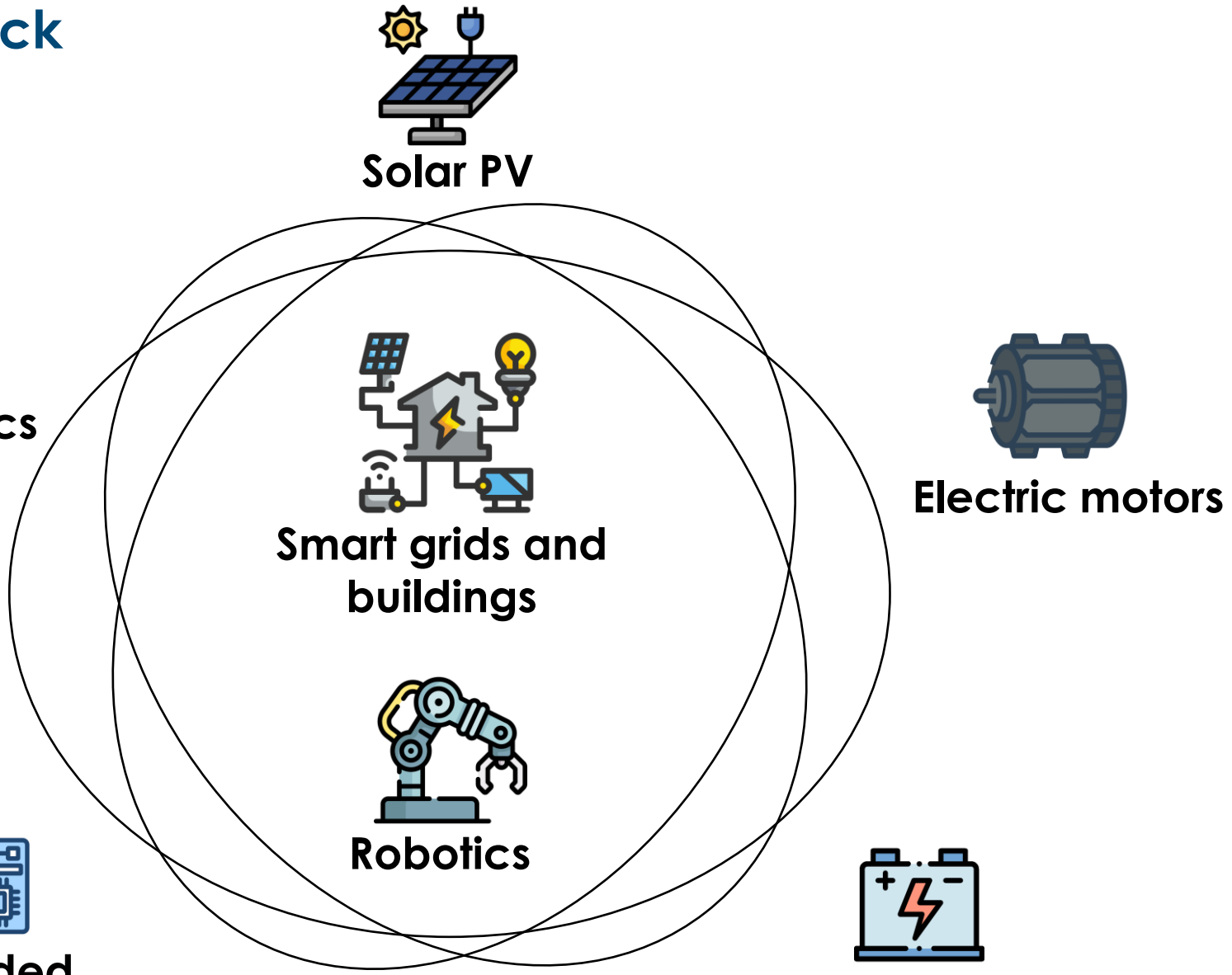
Technologies and cost reduction

Fastest cost reduction

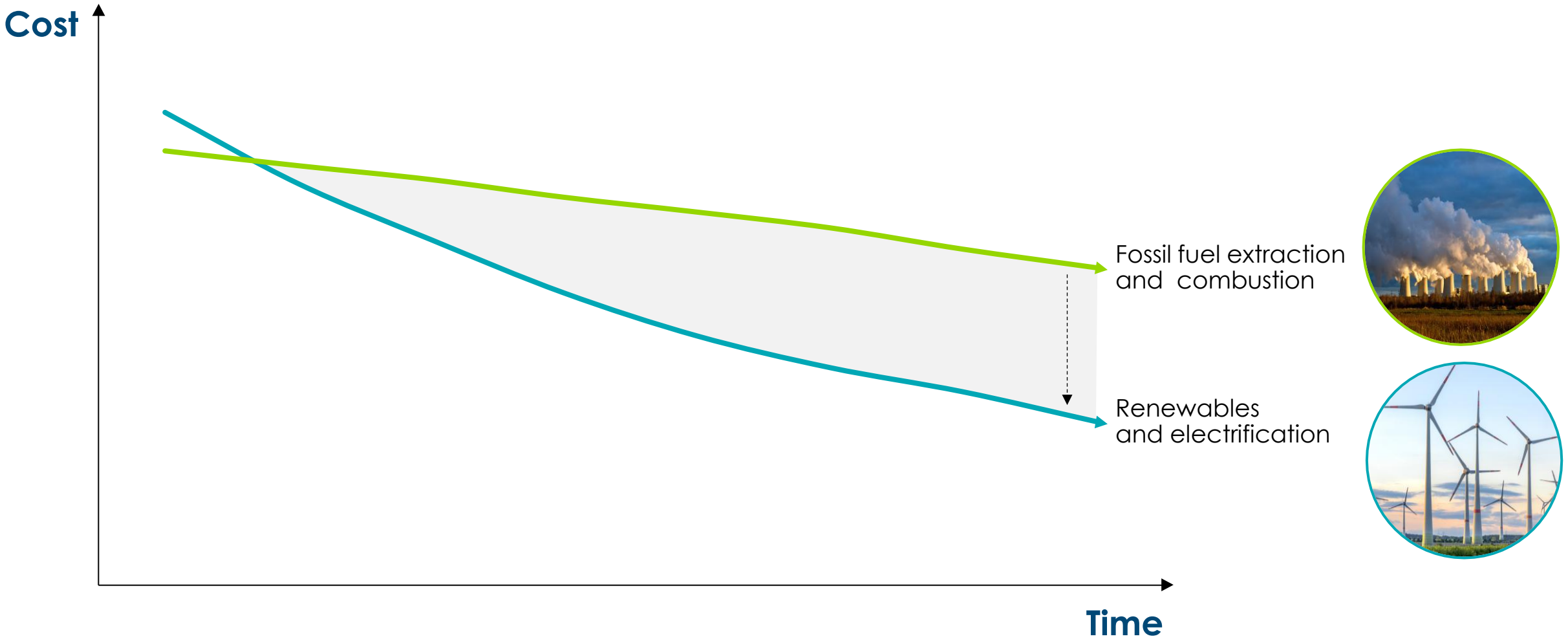
Slower/nil cost reduction

Solar PV, EVs and batteries		▪ Mass produced in large-scale, replicable factories ▪ Easily transported ▪ Easily deployed / installed
Heat pumps		▪ Mass produced in large factories ▪ Easily transported ▪ Complex installation
Wind		▪ Turbines supply chains very complex, scale of production is orders of magnitude smaller than PV/batteries ▪ Higher degree of customisation for projects ▪ Transport and installation more complex
Electrolyser and green H_2		▪ Can be mass produced, but balance of system costs and specific project complexities important
CCUS		▪ Customised engineering design and deployment
Large-scale nuclear		▪ Hugely complex large-scale systems

The electro tech stack

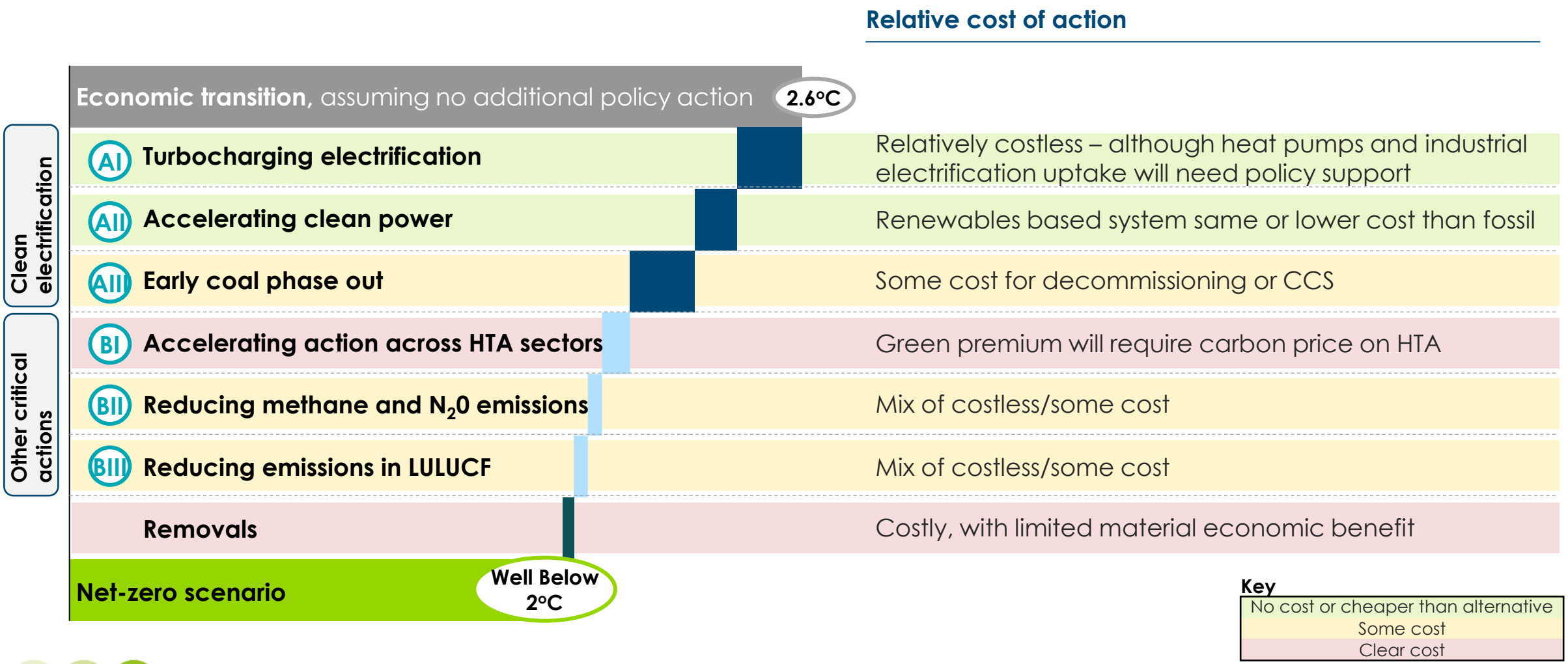


Electro tech vs fossil fuels



Peak warming in the 21st century and key mitigation areas

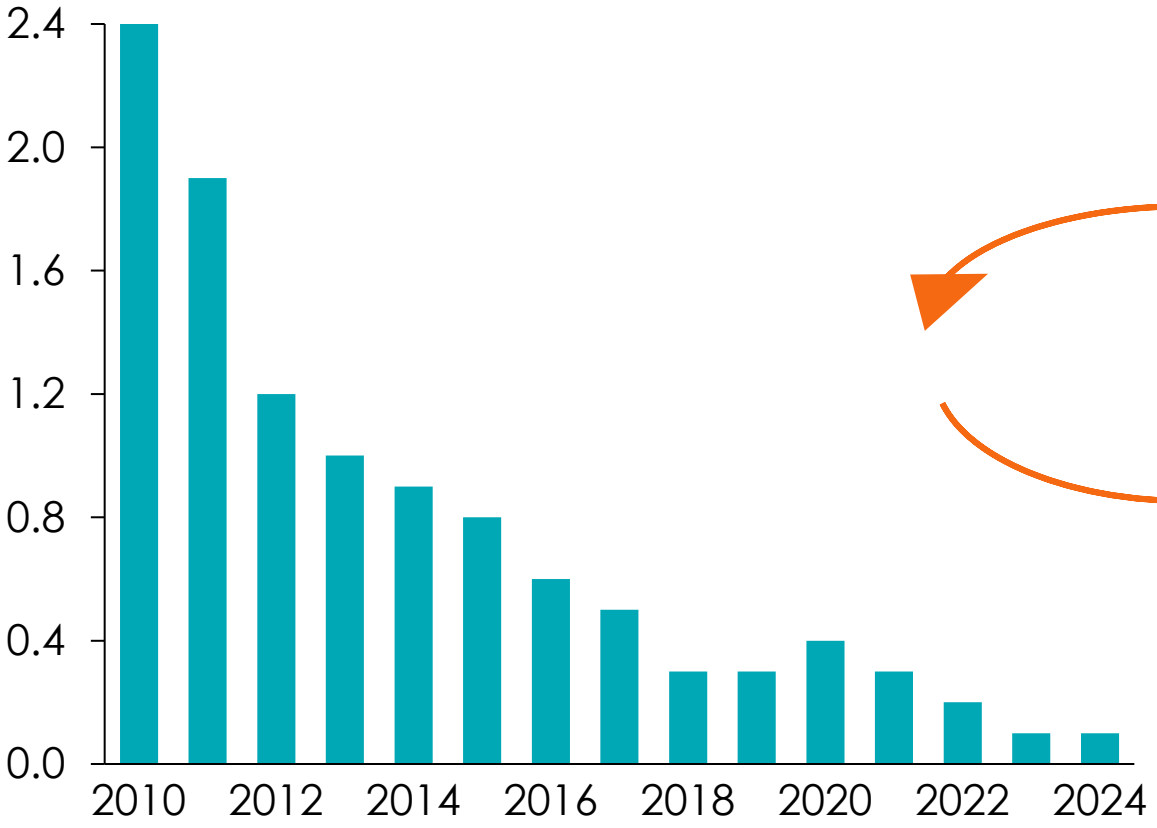
°C



Self-reinforcing loop of Solar PV deployment

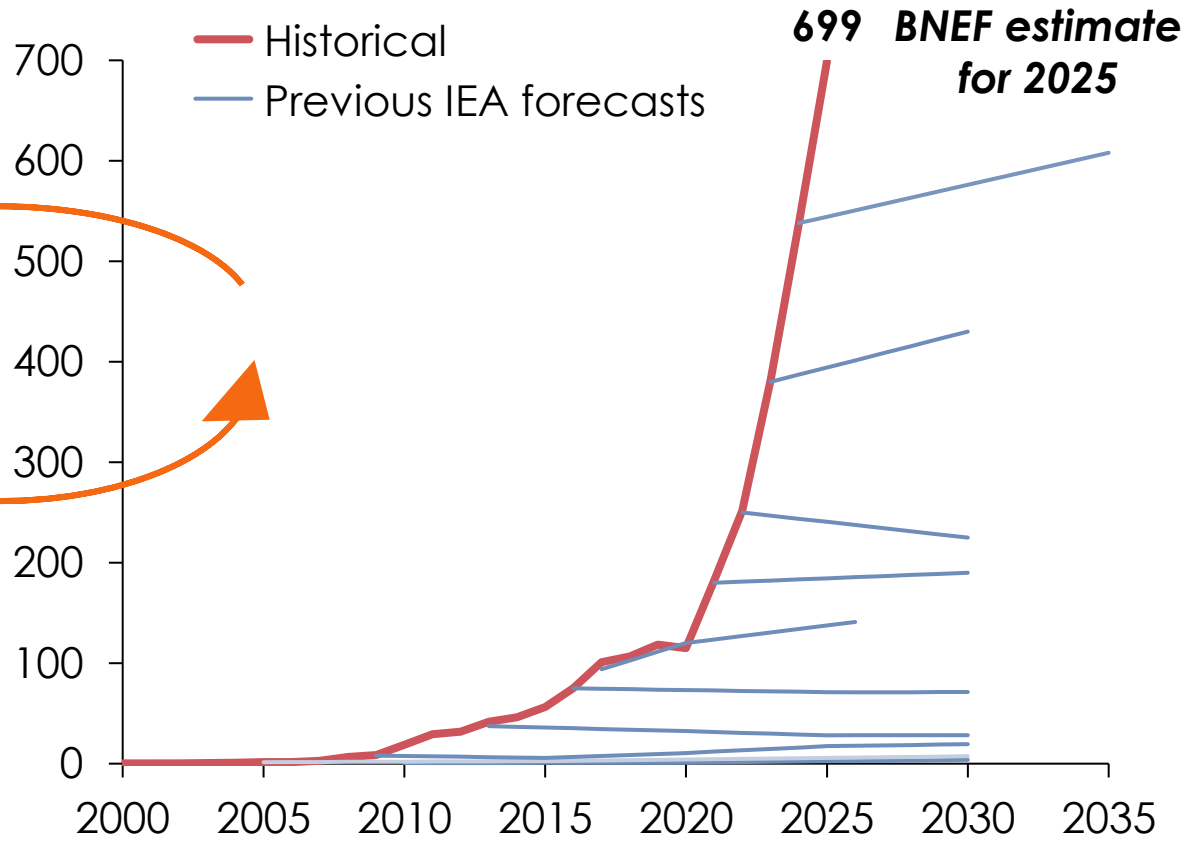
Benchmark capex for a typical module fixed-axis utility-scale photovoltaic power project

$ per Watt



Annual solar PV installations compared to IEA forecasts

GW

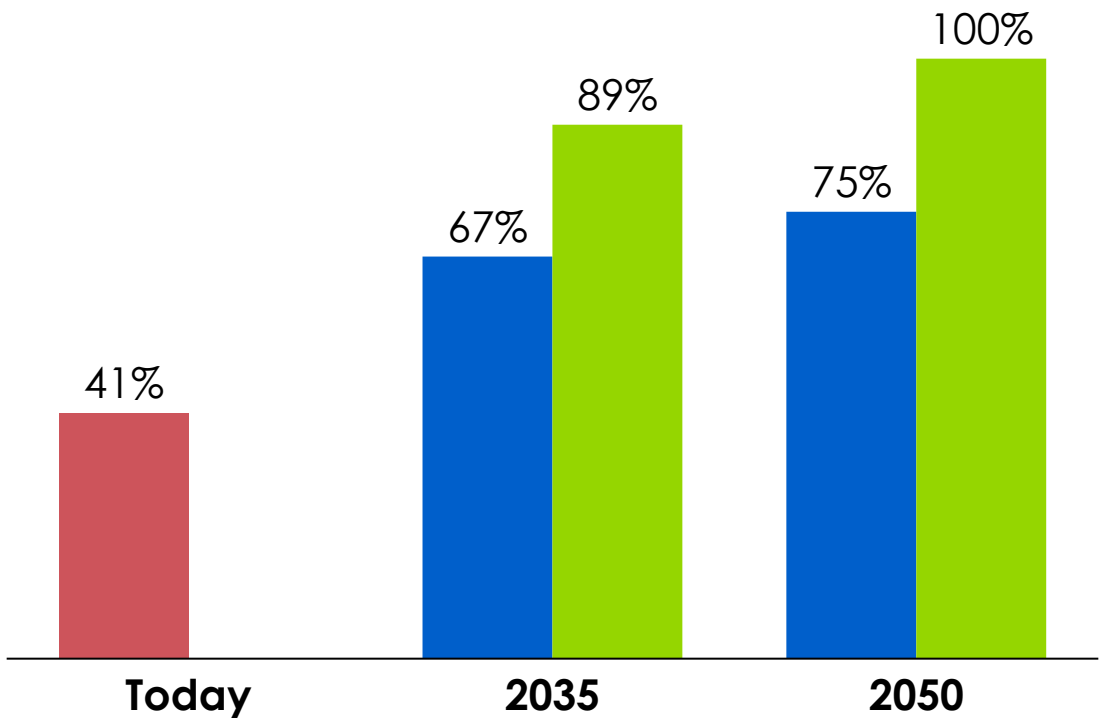


Source: BNEF (2025), *Solar Modules Are Cheap and Will Become Even Cheaper;* IEA (multiple years of publication), *World Energy Outlook.*

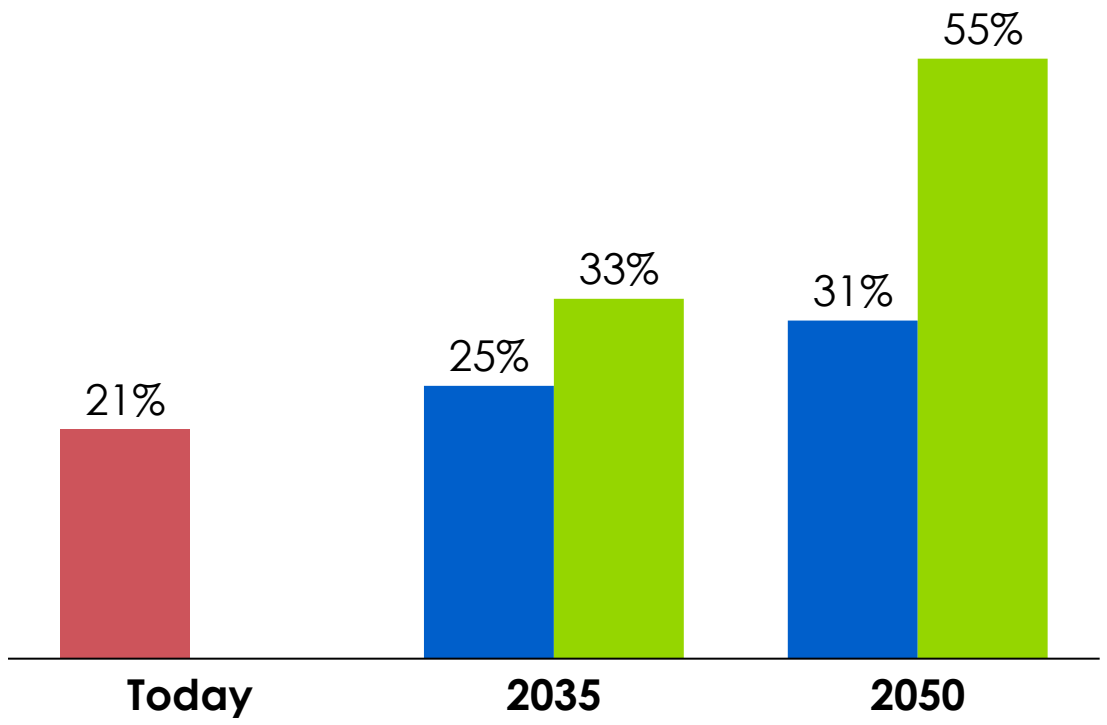
Electrification and clean generation

BNEF Economic Transition IEA Net Zero

Clean Generation as share of Electricity Supply



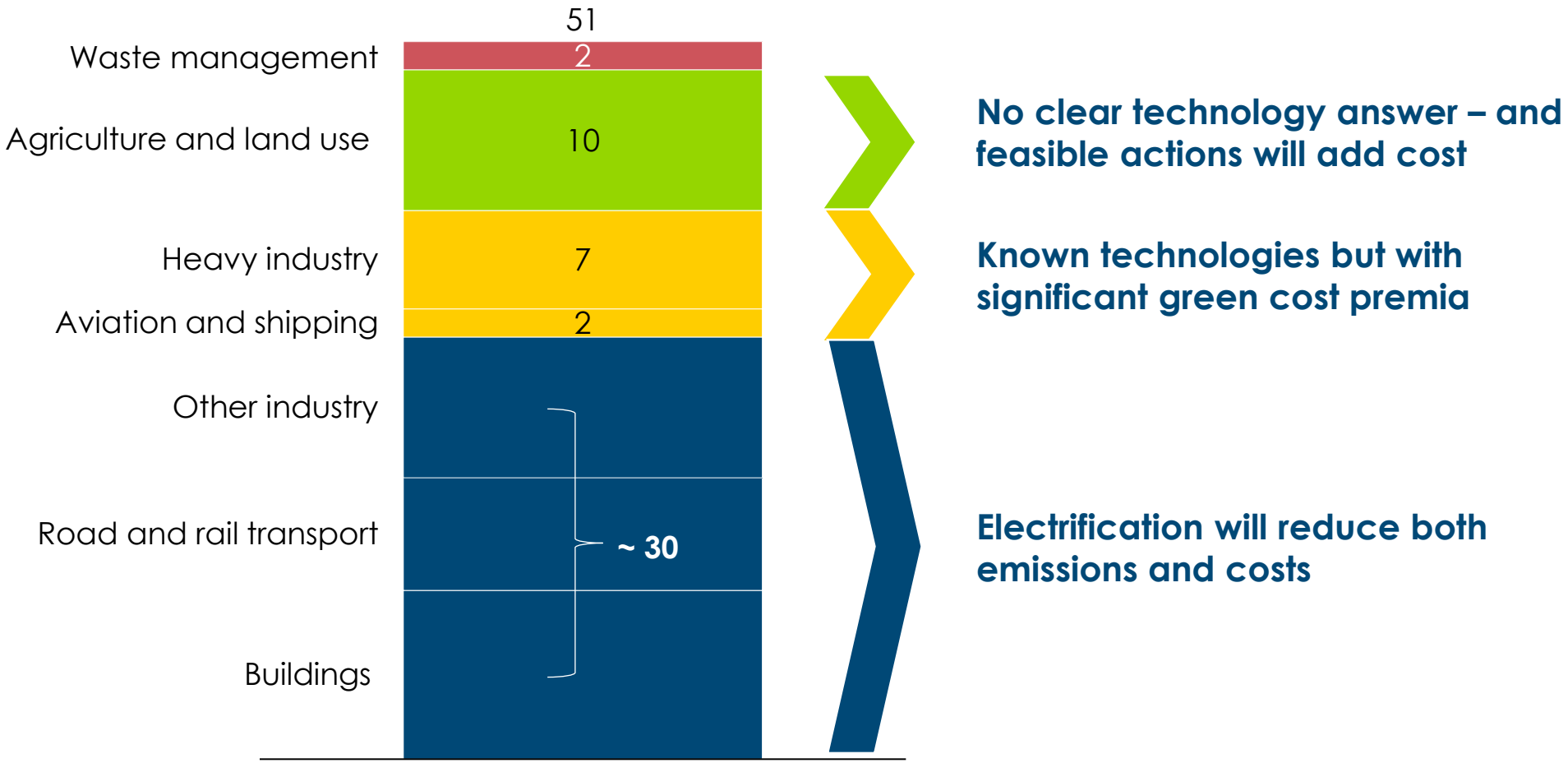
Electricity as share of Energy Demand



Note: Clean generation includes nuclear and abated fossil fuel
Source: BNEF (2025), *New Energy Outlook 2025;* IEA (2025) *World Energy Outlook.*

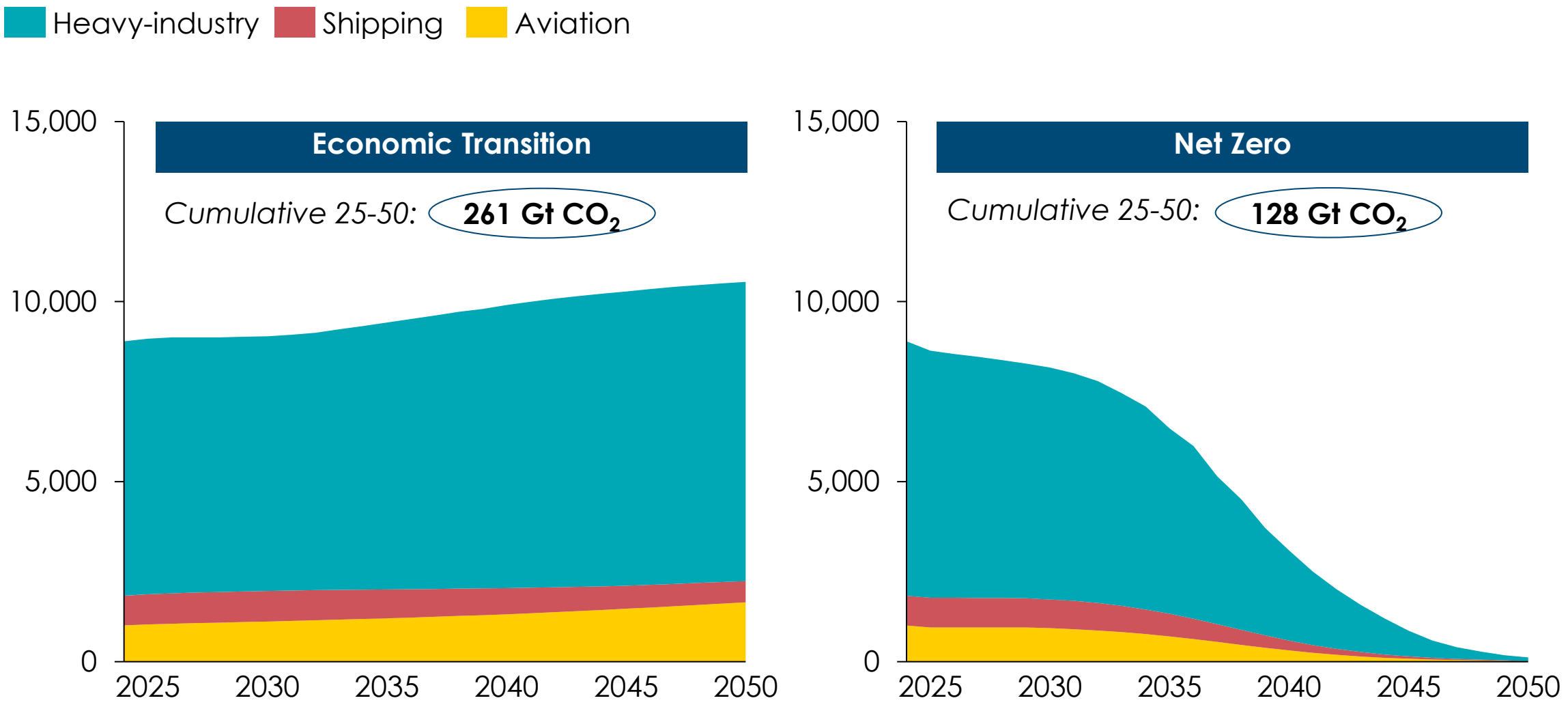
GHG emission by broad sector

Gt CO_{2eq}



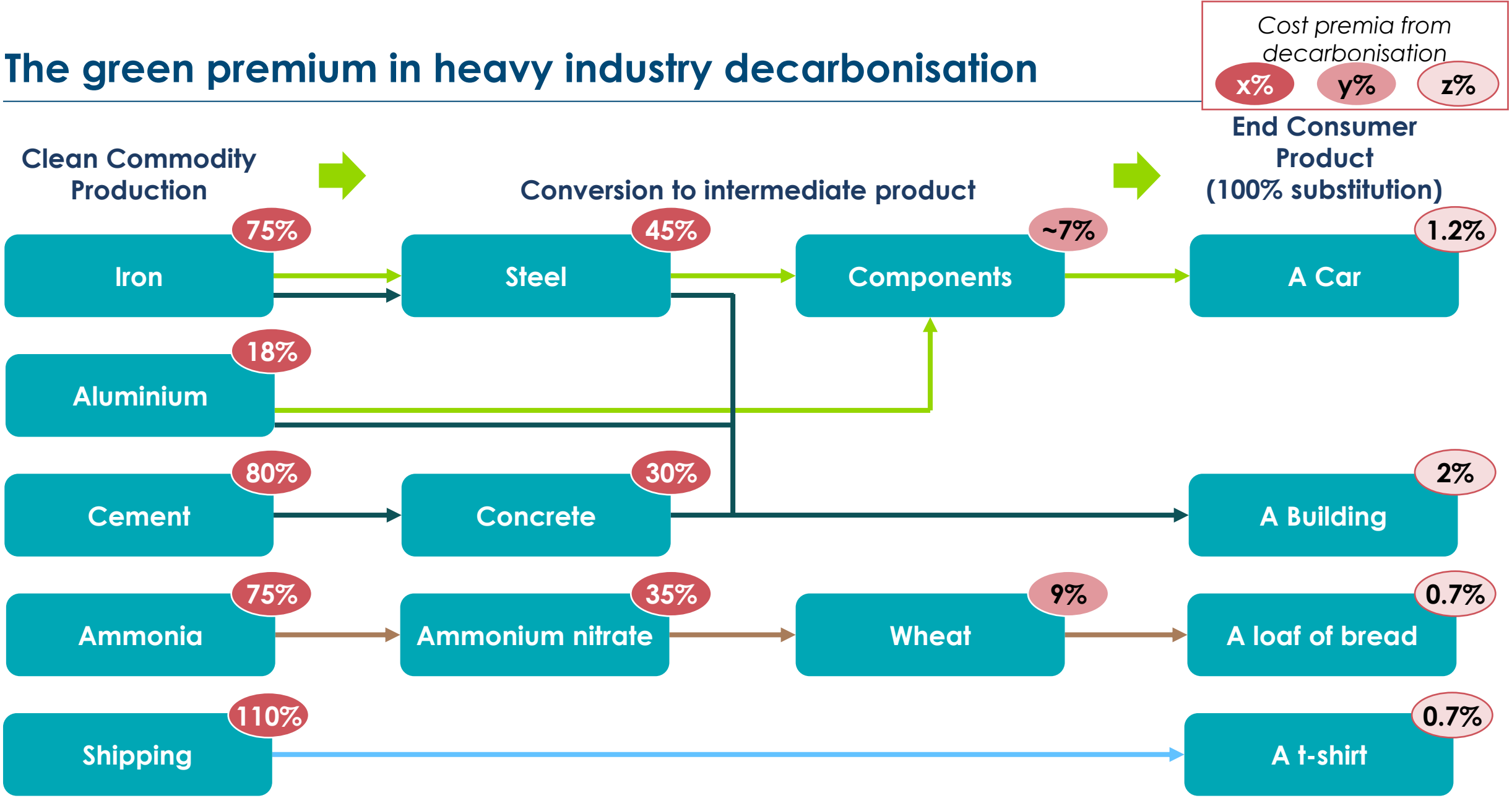
Emissions from hard to electrify sectors, BNEF Scenarios

Mt CO_2



Source: BNEF (2025), *New Energy Outlook 2025.*

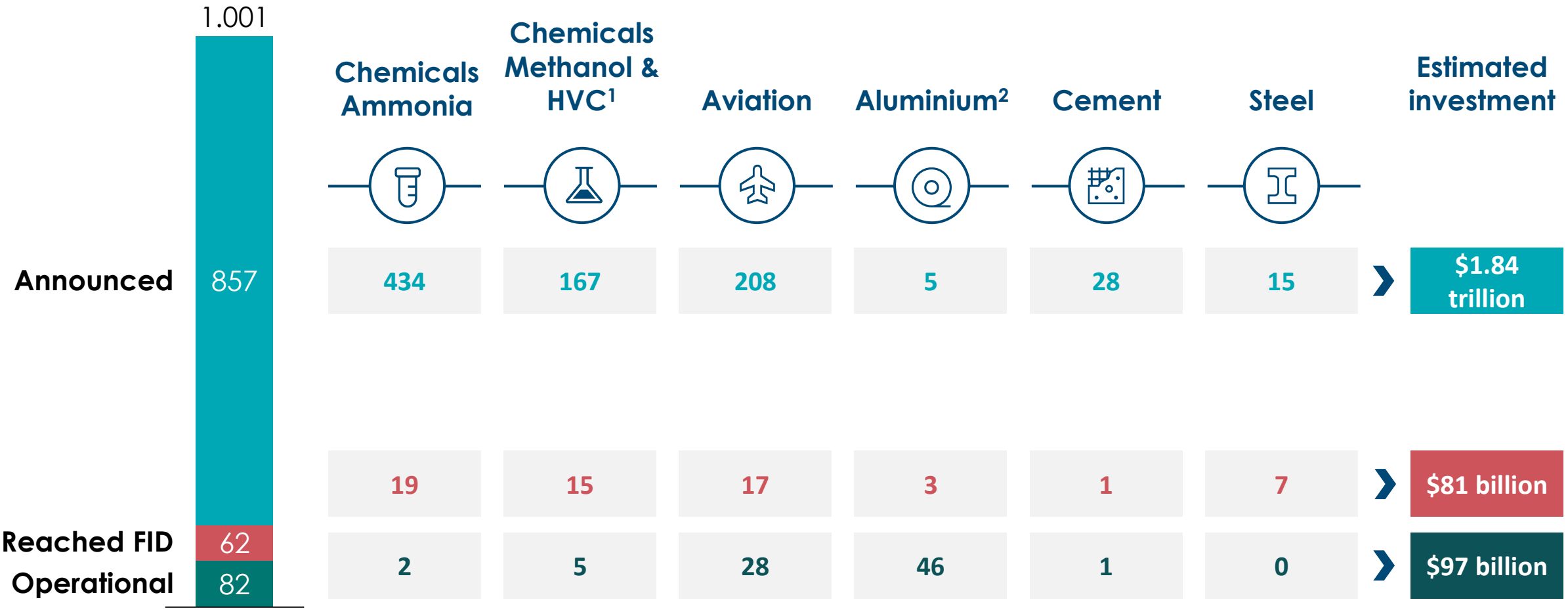
The green premium in heavy industry decarbonisation



Note: Assumes 100% cost pass through, costs are based on productions in low-cost regions of Europe.
Source: Systemiq analysis for the ETC, ETC (2020), *Making Mission Possible*.

Global Project Tracker pipeline

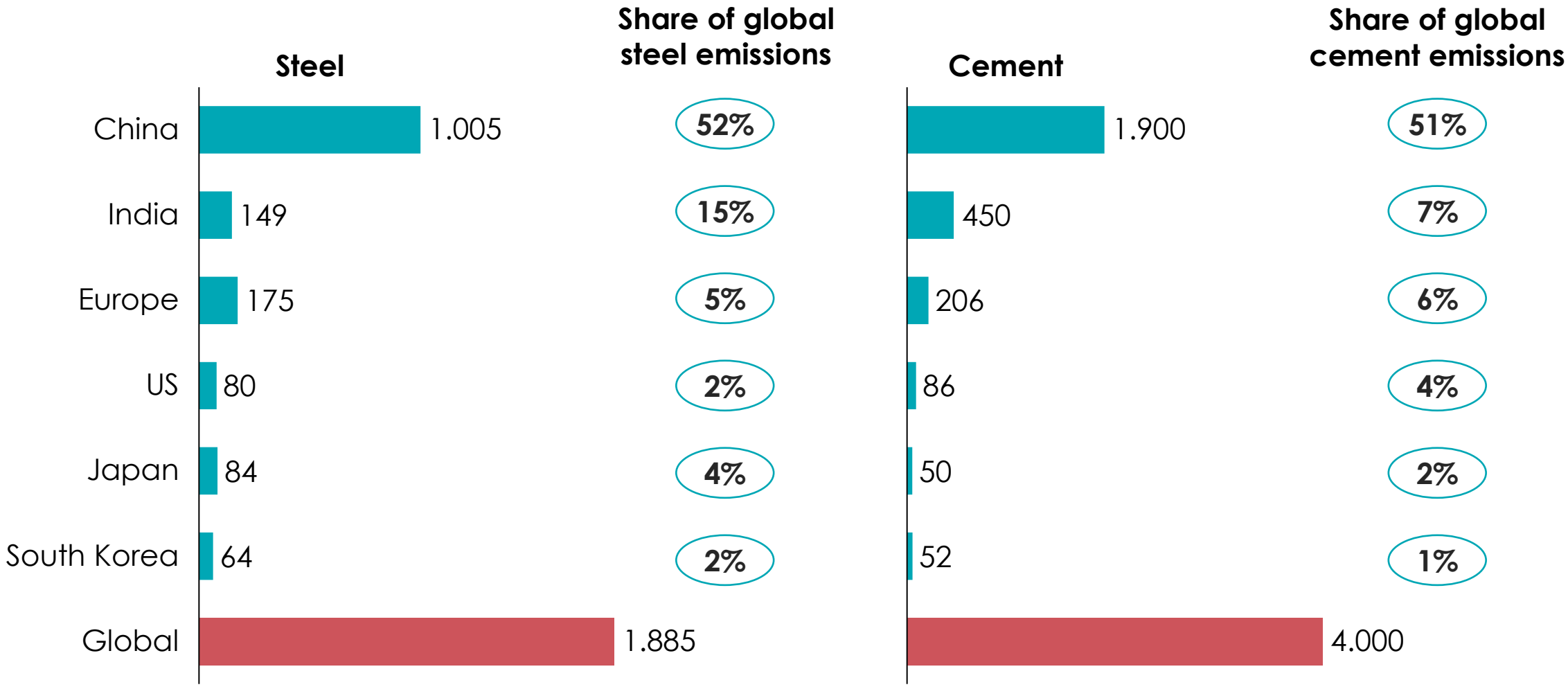
Total projects by project stage, November 2025



Notes: 1) HVC (High Value Chemicals) includes: Olefins (Ethylene, Propylene), Aromatics (Butadiene, Benzene, Toulene, Xylene) 2) Over half of operational plants are in the Aluminium sector, most of which are legacy clean assets.
Source: MPP (2025), *Global Project Tracker*. For per sector sources, products in scope and technologies in scope please refer to MPP Global Project Tracker

Crude Steel & Cement production and emissions, 2024

Million tonnes



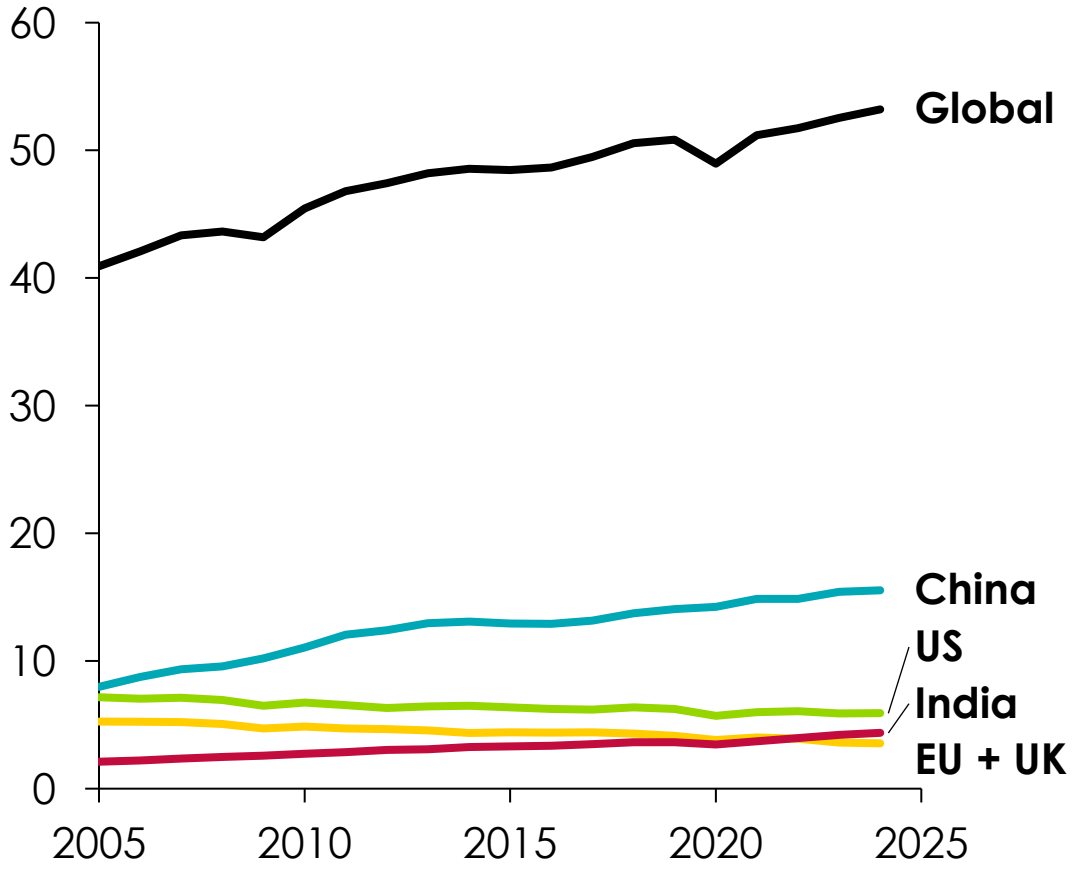
Source: World Steel Association (2025), *World Steel in Figures 2025;* Global Cement (2025), *Global Cement Top 100 2026;* BNEF (2025), *New Energy Outlook 2025.*

H2 DRI demonstration plant, Shandong province

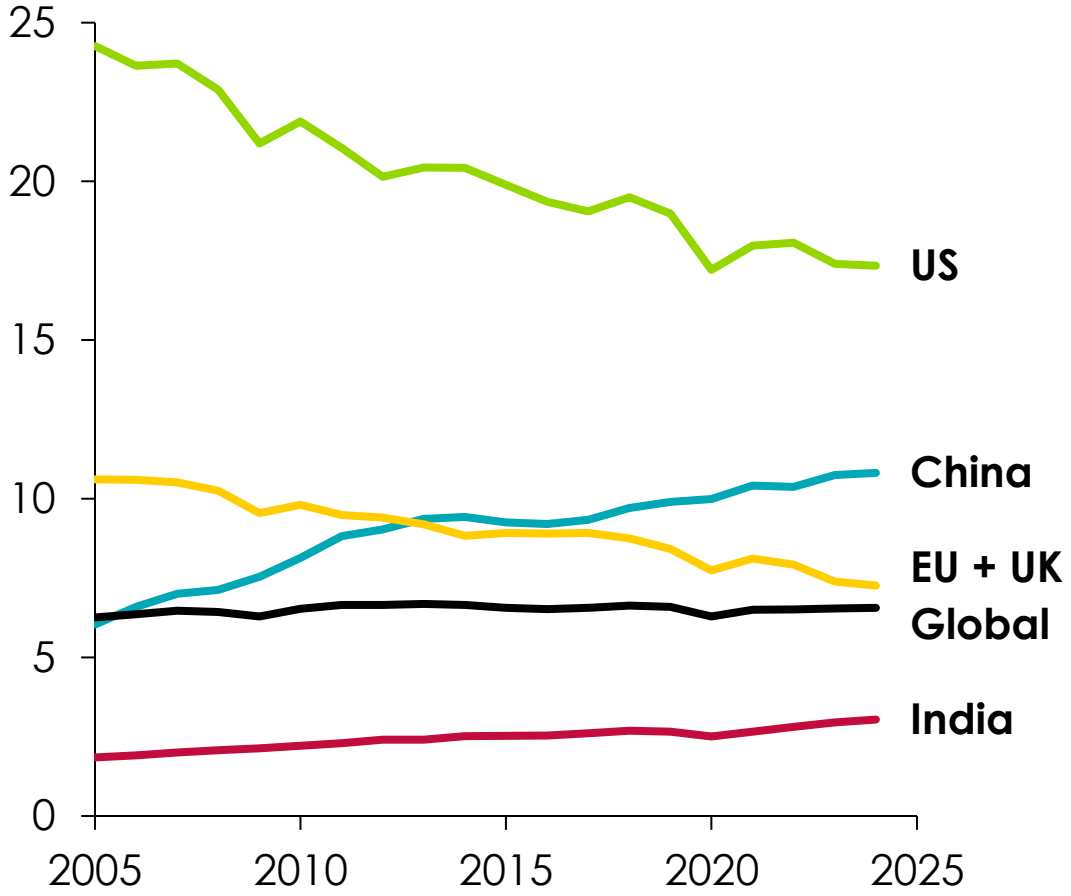

Envision

GHG emissions by country

GHG Emissions Gt CO_2eq

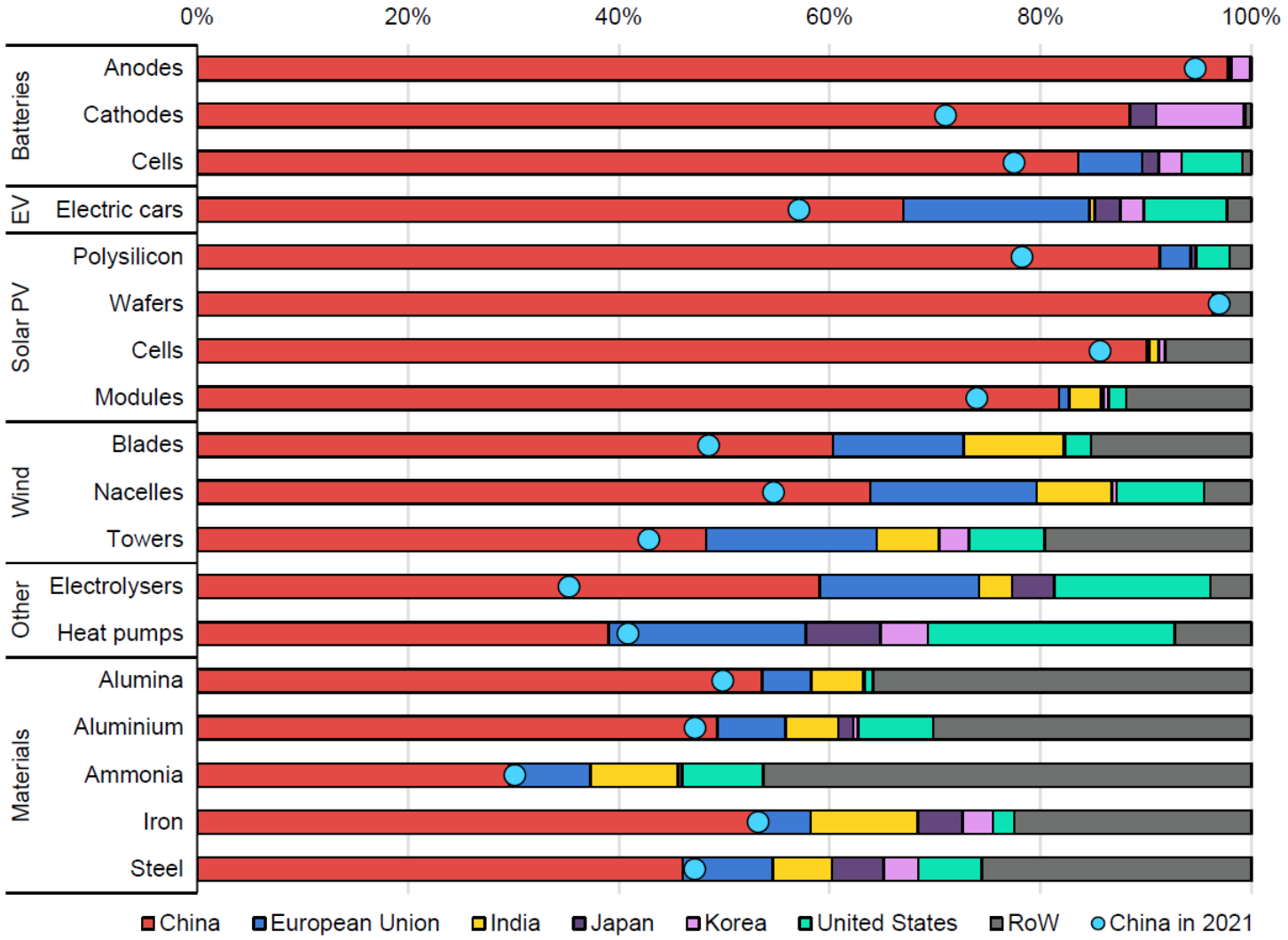


Emissions per capita (tCO_2eq/capita/y)



Source: EDGAR (2025), *GHG emissions of all world countries.*

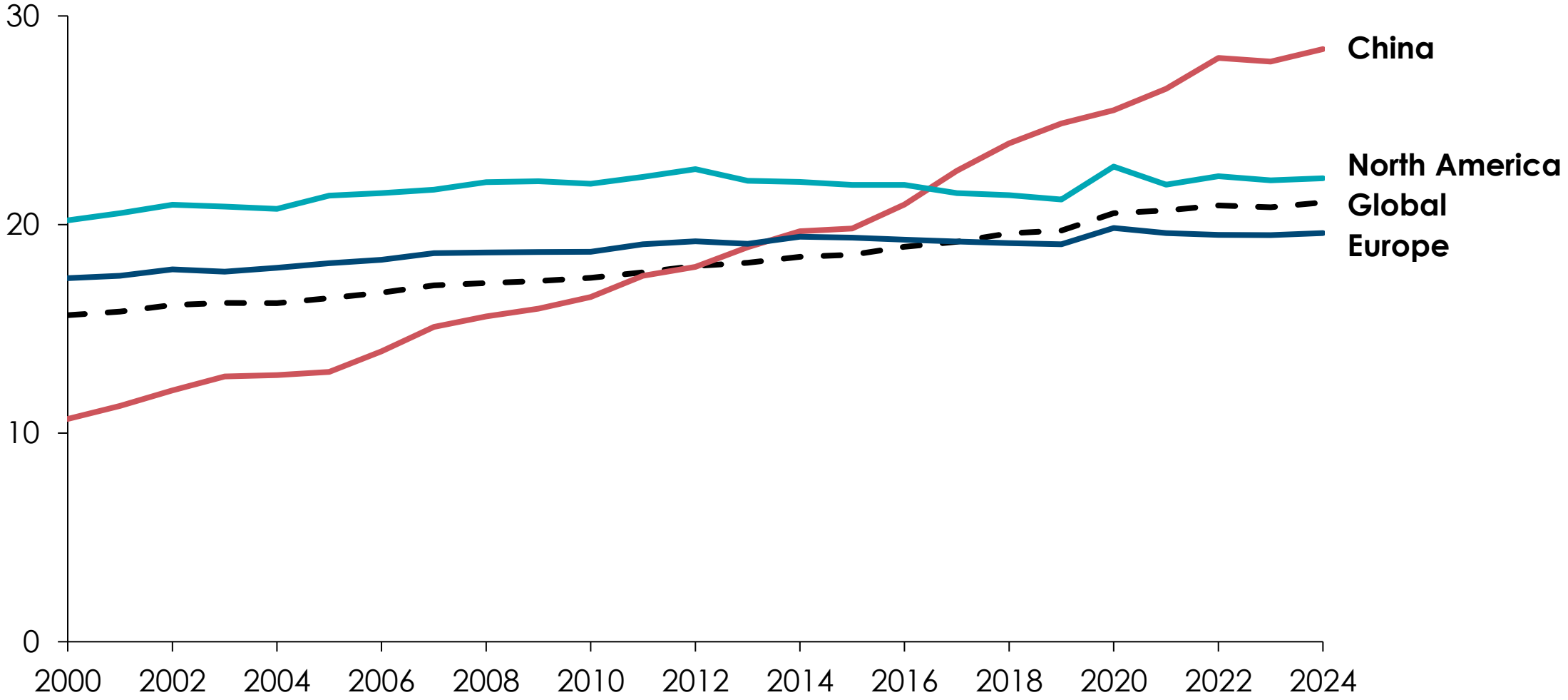
Installed global manufacturing capacity by country/region 2023



Source: IEA (2024), *Clean Technology Perspectives.*

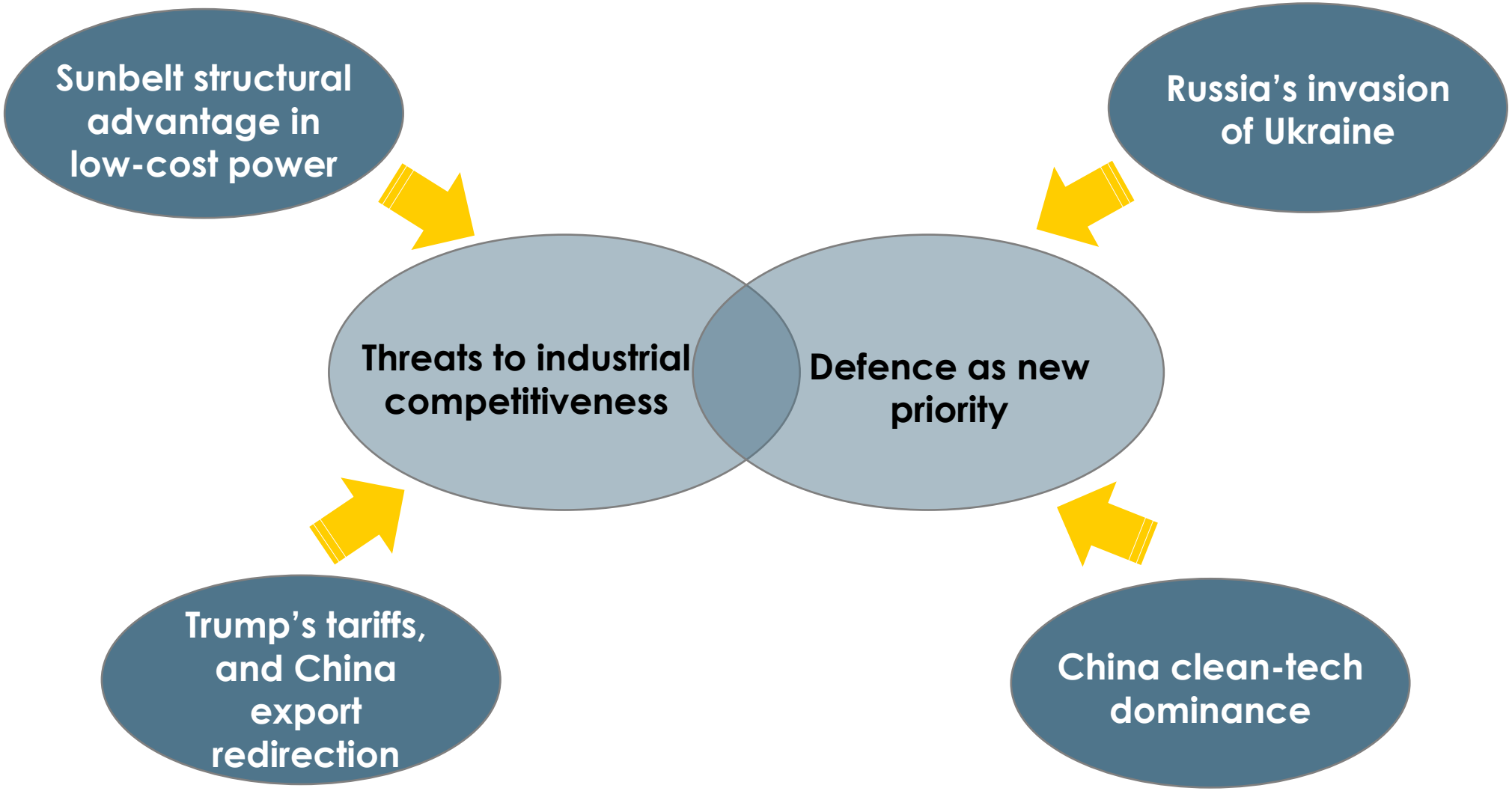
Electricity share of final energy demand

%



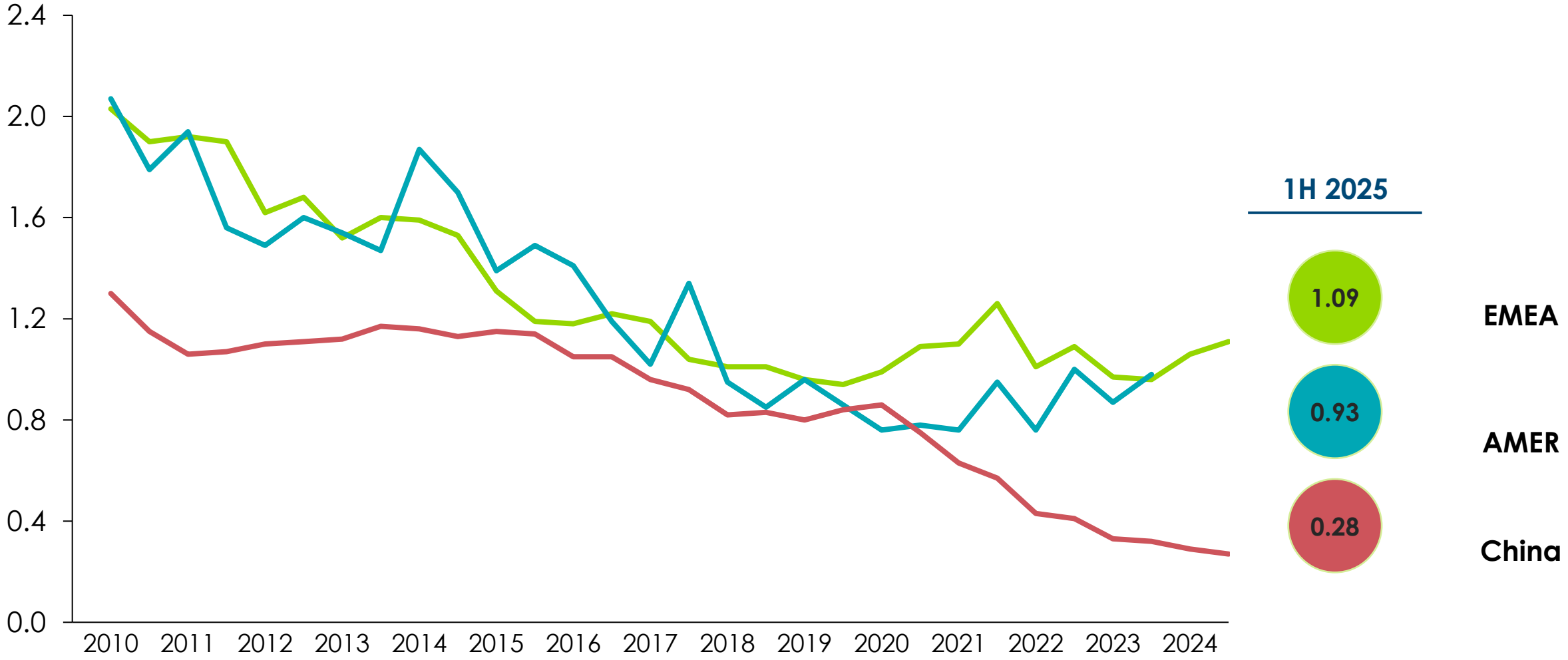
Source: BNEF (2025), *New Energy Outlook 2025.*

Europe's perfect storm



Wind turbine prices by region, 2010-2025

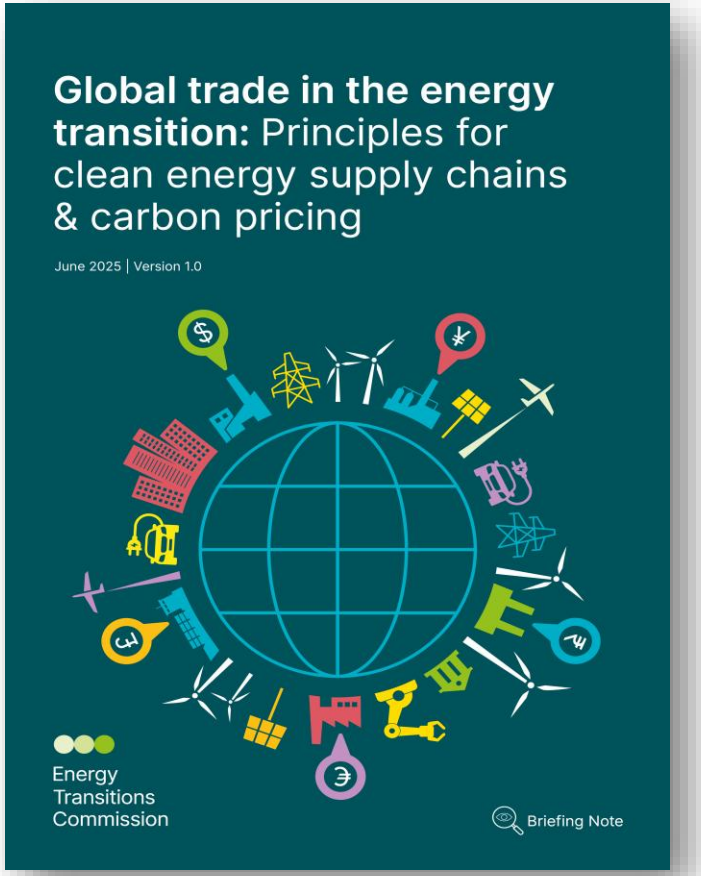
$ million/MW, 2025 real



Source: BNEF (2025), *Wind Turbine Price Index 1H 2025: Still on the Rise;* U.S. Bureau of Labor Statistics (2025), *Consumer Price Index for All Urban Consumers (CPI-U), All Items, US City Average, Not Seasonally Adjusted.*

Developing domestic supply chains: five principles

1. Aim for diversified supply chains but **not complete autarky**
2. **Vary policy by sector** to reflect different starting points and inherent characteristics
3. Use **tariffs in a fact-based and WTO compliant** fashion
4. Focus primarily on the **location of employment and value added**, rather than ownership.
5. Think straight about **different dimensions of "security"**



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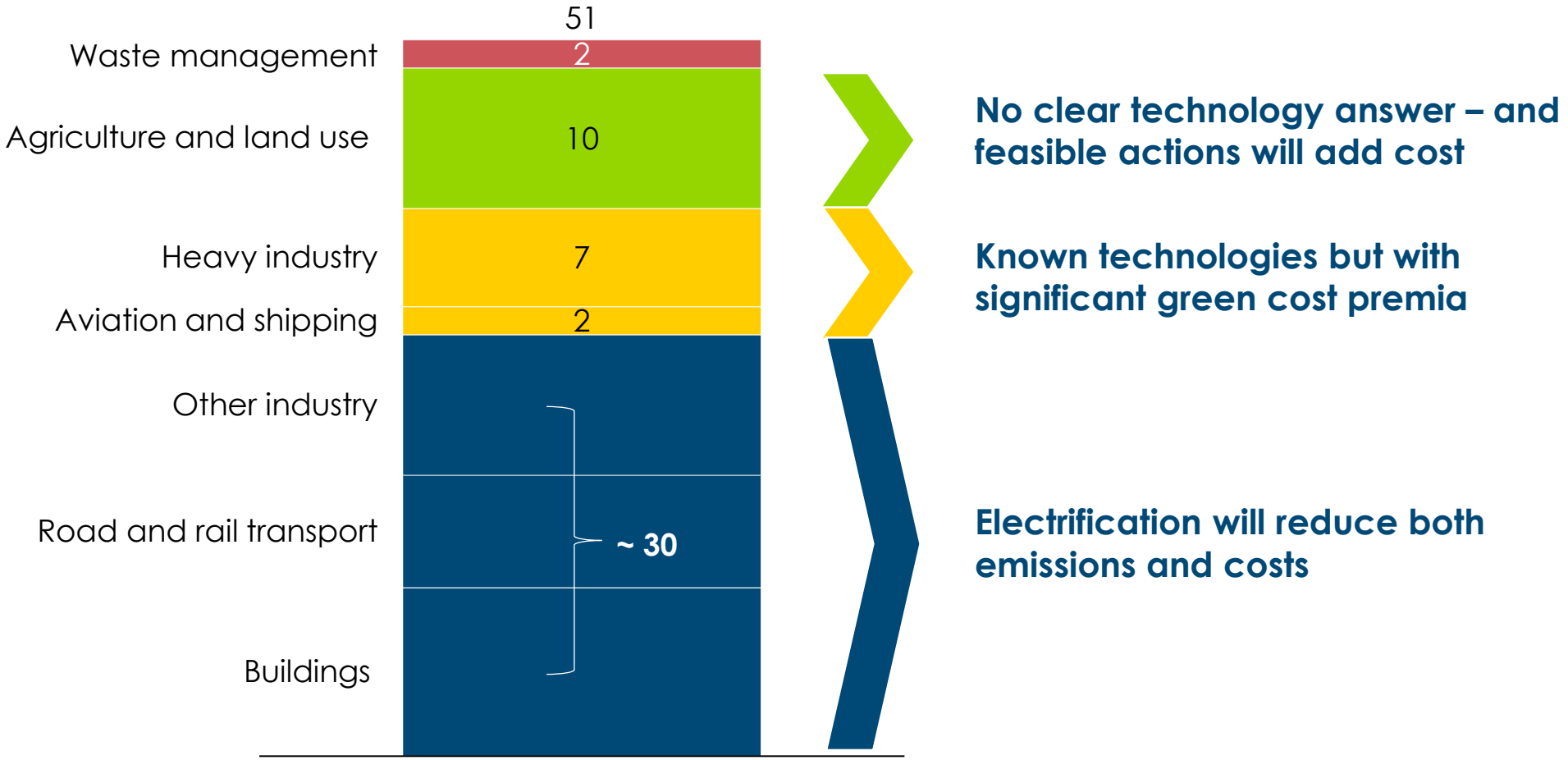


New Collective Quantified Goal on Climate Finance (NCQG)
- decision text adopted at COP29

Paragraph 7

"Calls on all actors to work together to enable the scaling up of financing to developing country Parties for climate action from all public and private sources to at least USD 1.3 trillion per year by 2035;"

Paragraph 8

"Reaffirms, in this context, Article 9 of the Paris Agreement and decides to set a goal, in extension of the goal referred to in paragraph 53 of decision 1/CP.21, with developed country Parties taking the lead, of at least USD 300 billion per year by 2035 for developing country Parties for climate action: From a wide variety of sources, public and private, bilateral and multilateral, including alternative sources;"

Paragraph 9

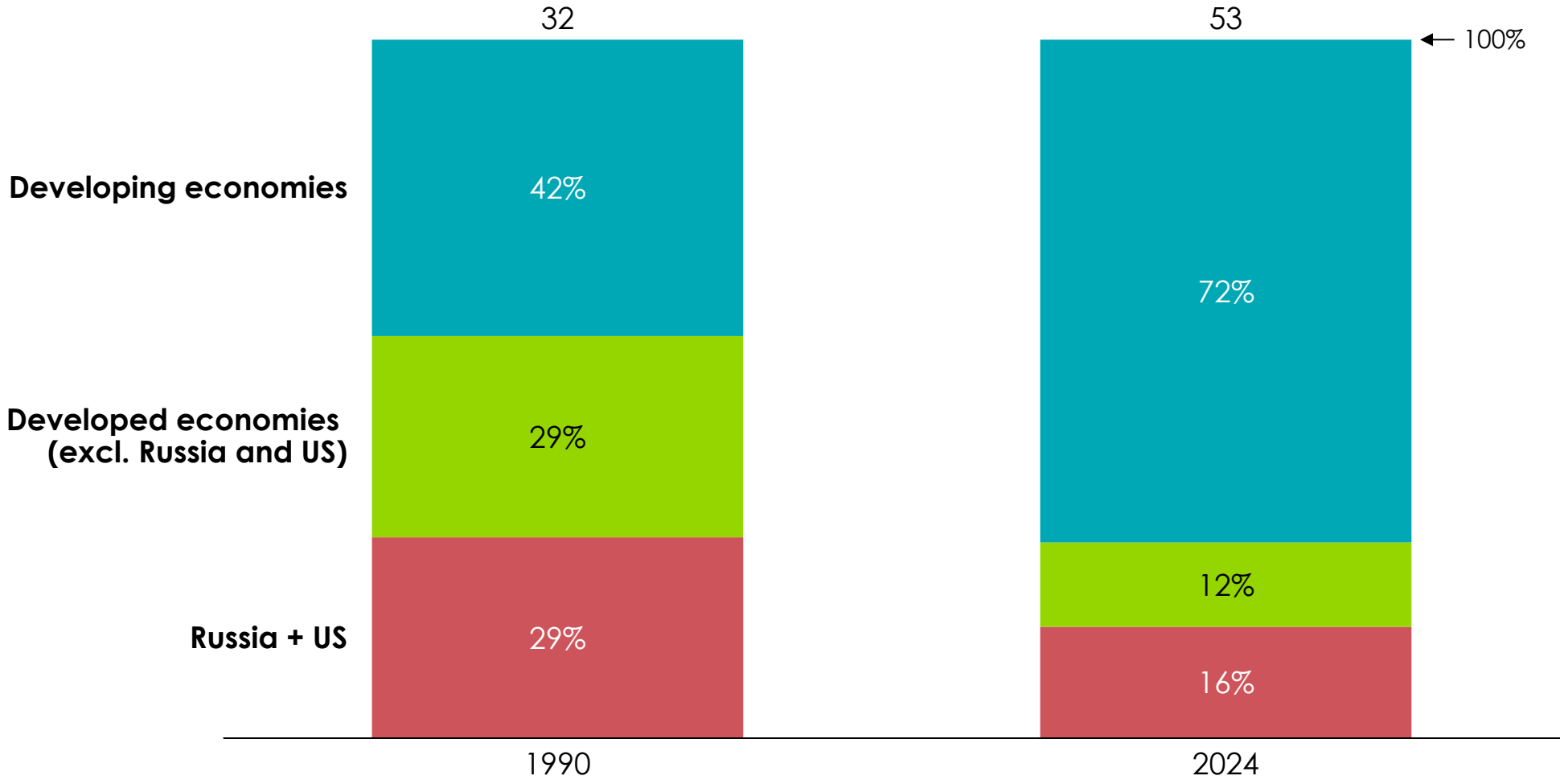
"Encourages developing country Parties to make contributions, including through South–South cooperation, on a voluntary basis;"

50

Source: Our World in Data (2025), *Carbon dioxide concentrations in the atmosphere*.

Emissions balance

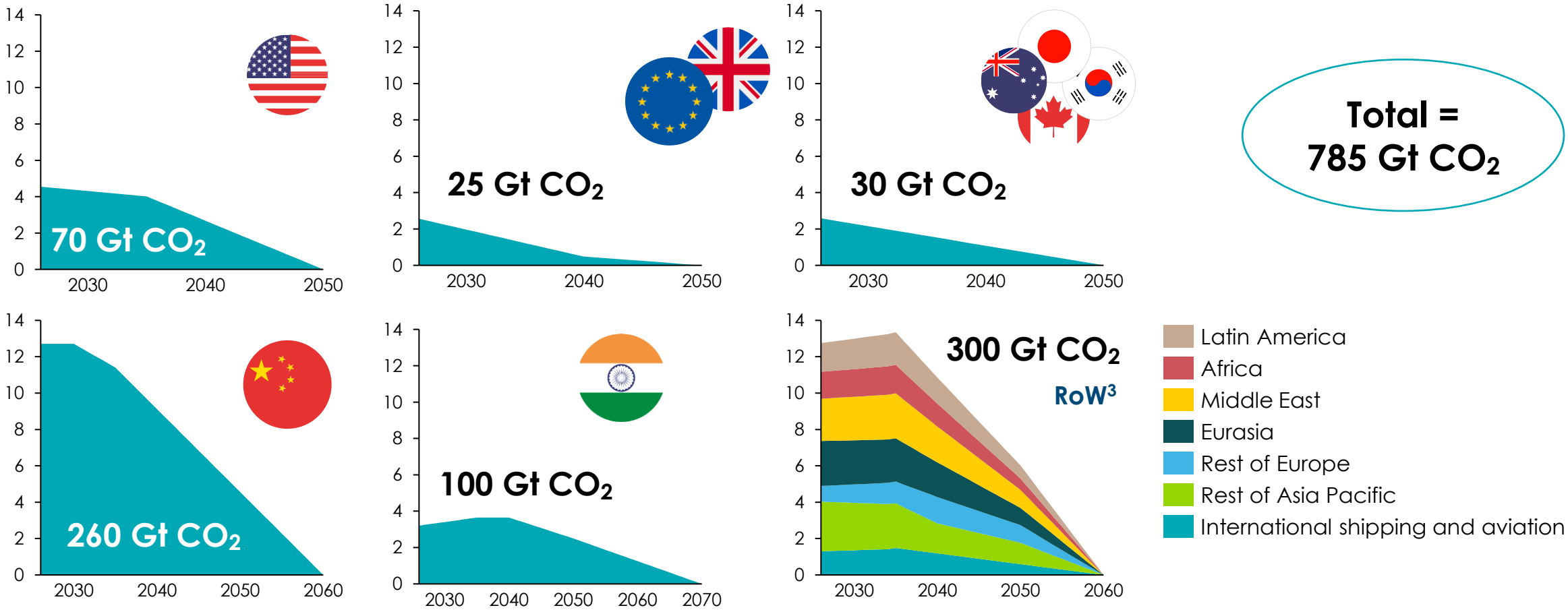
Gt CO_2eq



Note: Developed economies refer to countries in Annex I of the Kyoto Protocol (1996).
Source: EDGAR (2025), *GHG emissions of all world countries.*

Cumulative future energy related emissions implied by current NDCs and pledges

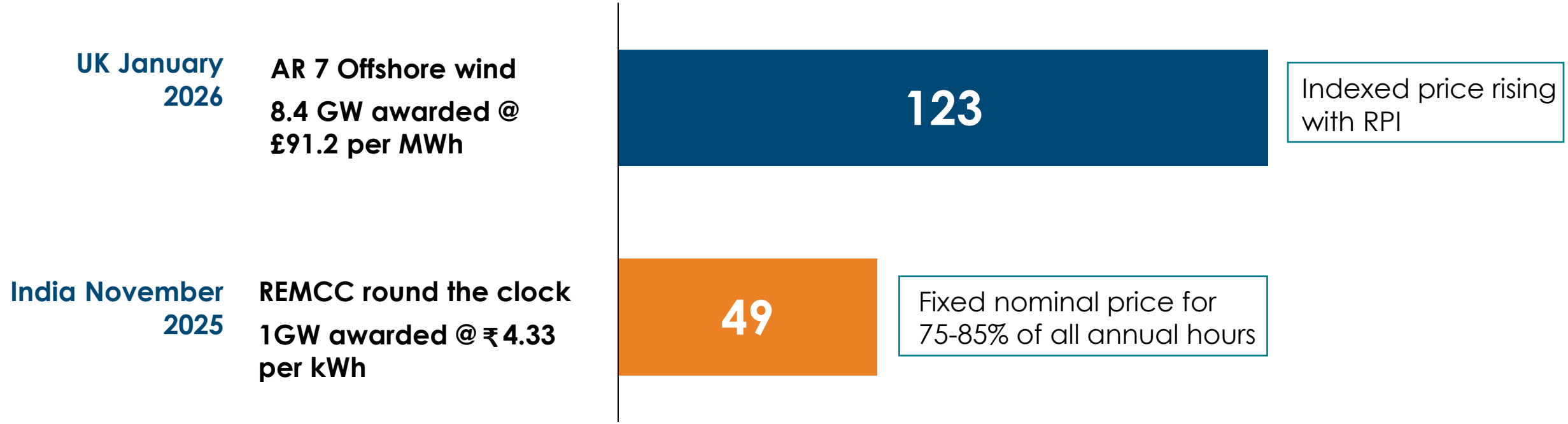
Gt CO_2



Source: IEA (2025) World Energy Review; JRC/IEA 2025 Report (2025) *GHG emissions of all world countries*; Climate Change Tracker (2025), *Current Remaining Carbon Budget and Trajectory*.

Clean power auctions in UK and India

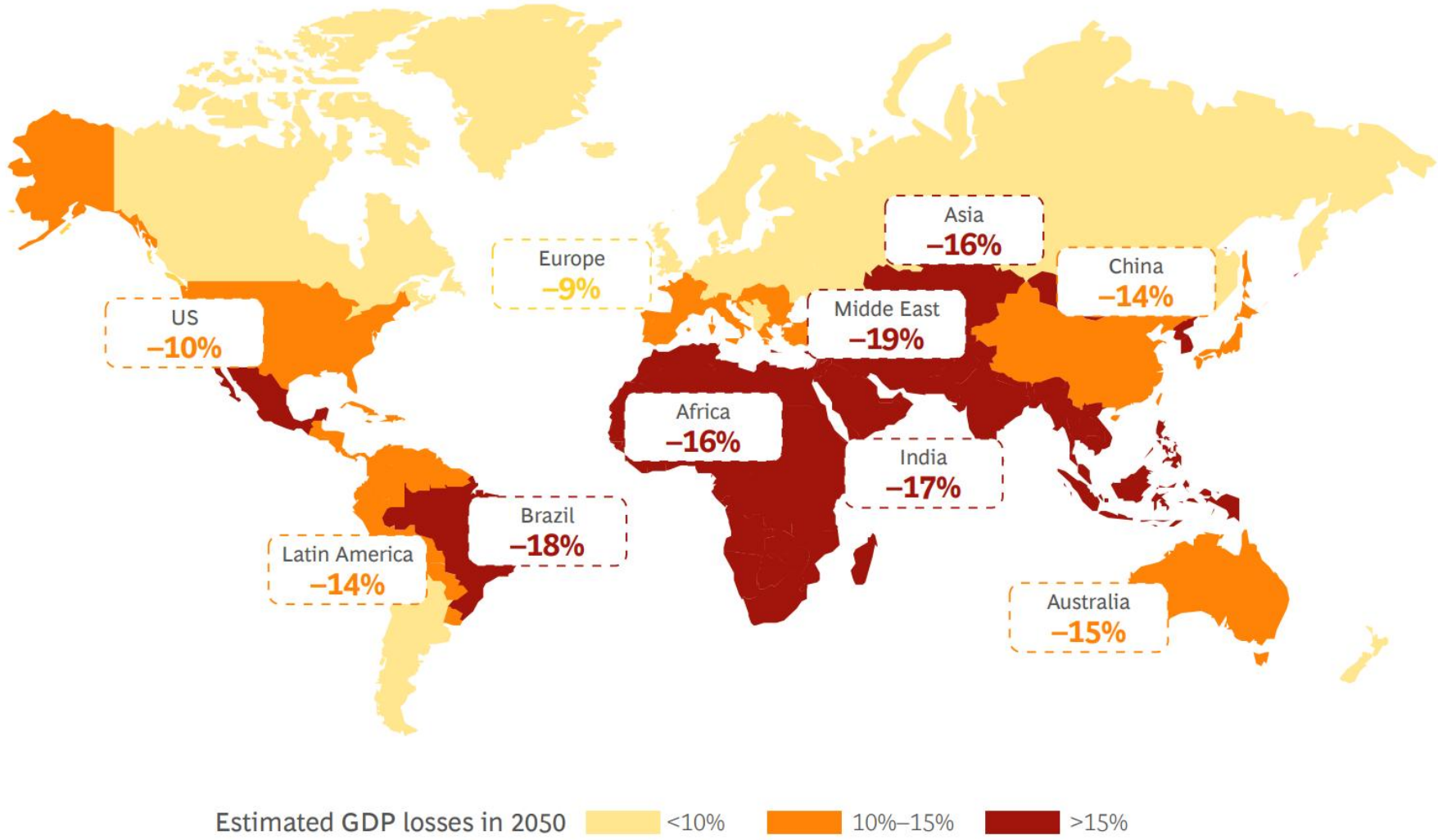
$ per MWH price



Source: MERCOM (2025), *Renewable Power Auction*; UK Government (2025), Contracts for Difference (CfD) Allocation Round 7: results.

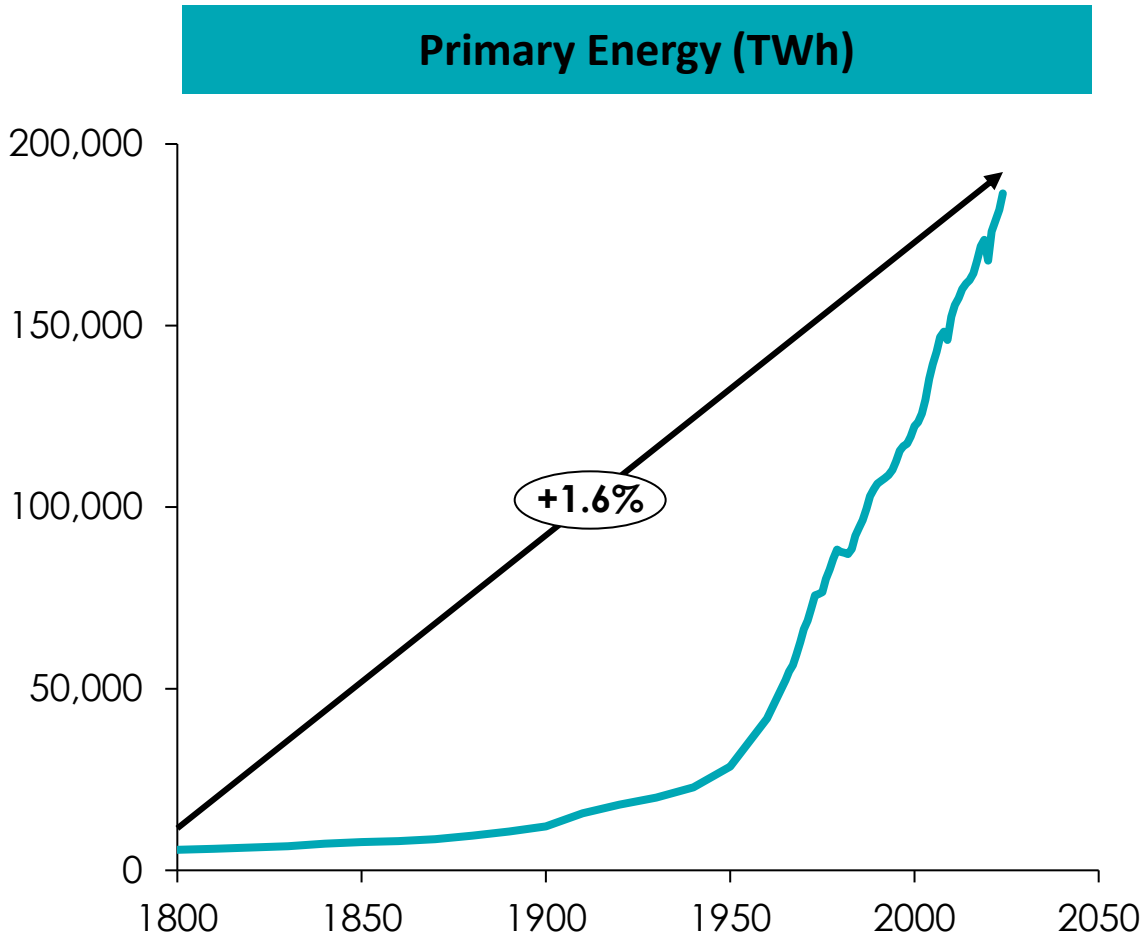
Economic losses due to climate change

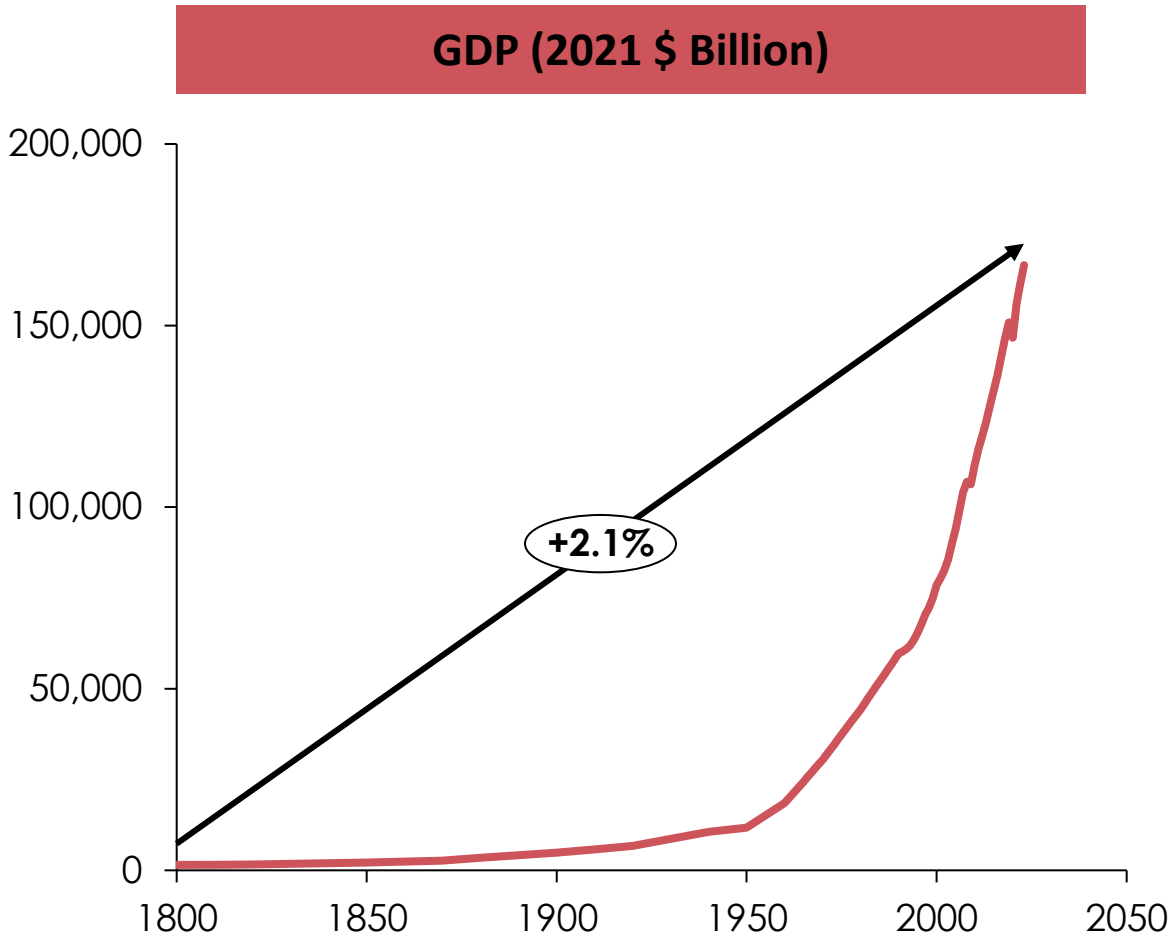
% of national GDP



Source: BCG & Cambridge University (2025), *Too Hot to Think Straight*.

Total GDP vs. Primary Energy Demand, 1800–2023

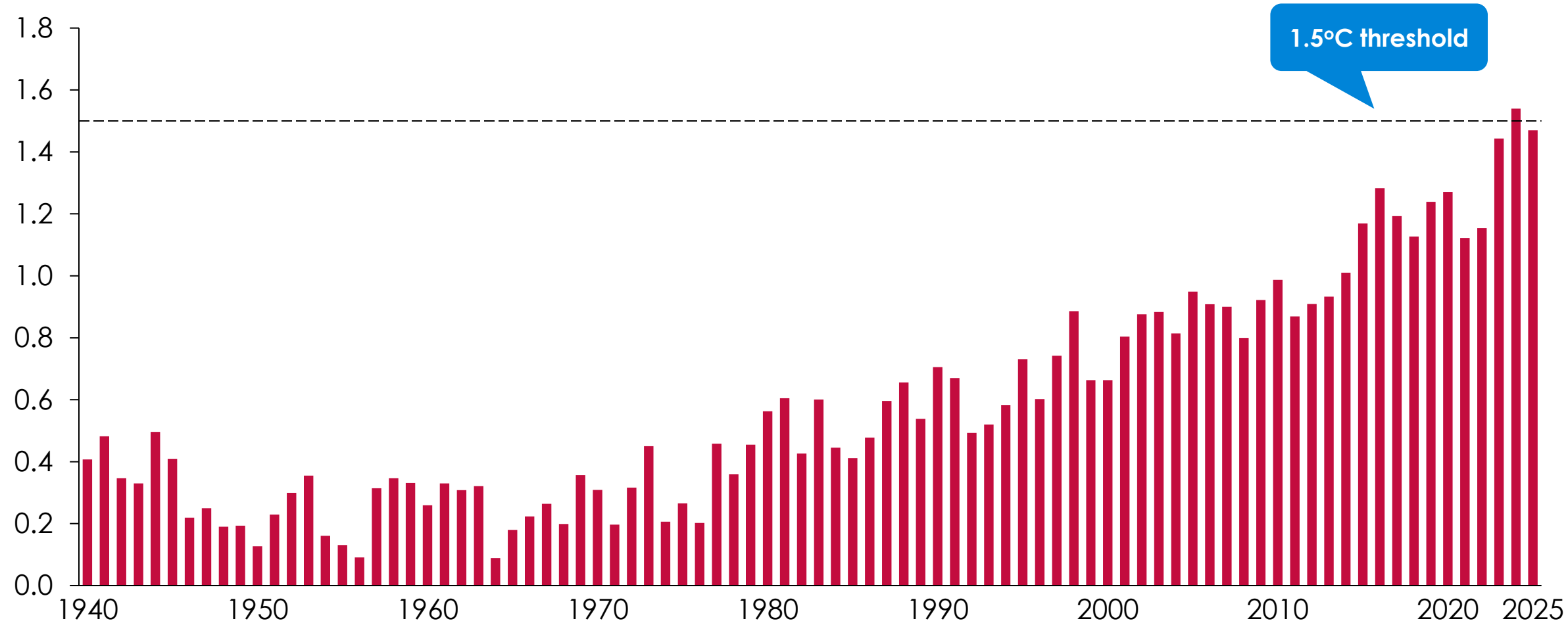




Source: ETC (2025), *Energy productivity: Increasing efficiency in an expanded, electrified energy system*

Global surface temperature increase above pre-industrial level

°C above pre-industrial levels; Reference period: pre-industrial (1850-1900)



Source: Copernicus (Accessed Jan 2026), Global climate highlights 2024, NOAA global temperature

Extreme weather in the past 18 months

Jan 2025

Los Angeles, USA

Sep 2025

Valencia, Spain

Nov 2025

Pakistan

Jan 2026

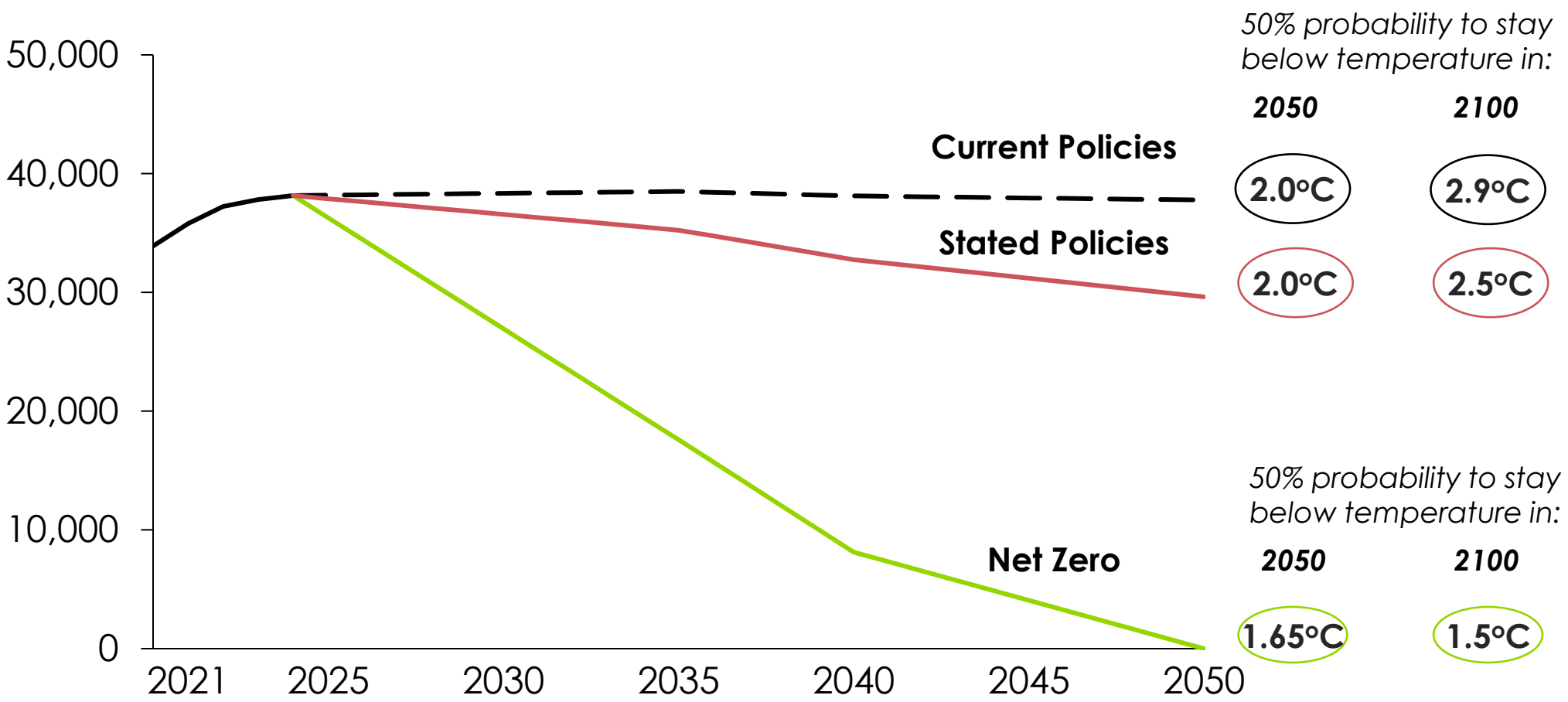
Australia

Jan 2026

Mozambique

IEA emission scenarios 2024 and implied peak temperature

Energy-related Mt CO_2



Note: IEA Scenarios have emissions interpolated between 5-10 years; using Current Policies: A.4a; Stated Policies: A.4b; Net Zero: Table A.4c.
Source: IEA (2025), World Energy Outlook 2025.