

- The Inevitable Policy Response Forecast Policy Scenario 2023
- (IPR FPS 2023)

What is IPR?

.....
October 2023

IPR was commissioned by the PRI¹ and is supported by world class research partners and leading philanthropies, financial institutions, & NGOs

1. Principles for Responsible Investment
 2. The conclusions of the report are solely those of Energy Transition Advisers and Theia Finance Labs

Commissioned by PRI

In 2018, the Inevitable Policy Response was commissioned by PRI to advance the finance industry’s knowledge of climate transition risk & support investor efforts to incorporate climate risk & opportunities in portfolio assessment



A Climate Research Consortium

This report was produced by Energy Transition Advisers and Theia Finance Labs²

NGO partners include Carbon Tracker, Climate Bonds & Planet Tracker



Strategic Partners

In 2021, leading financial institutions joined the IPR as Strategic Partners to provide more in-depth industry input, and to further strengthen its relevance to the financial industry






Core philanthropic support

The IPR is funded in part by the Gordon and Betty Moore Foundation through The Finance Hub, which was created to advance sustainable finance, and the ClimateWorks Foundation striving to innovate and accelerate climate solutions at scale



IPR has developed global, policy-based forecasts of forceful policy responses to climate change and implications for energy, agriculture and land use

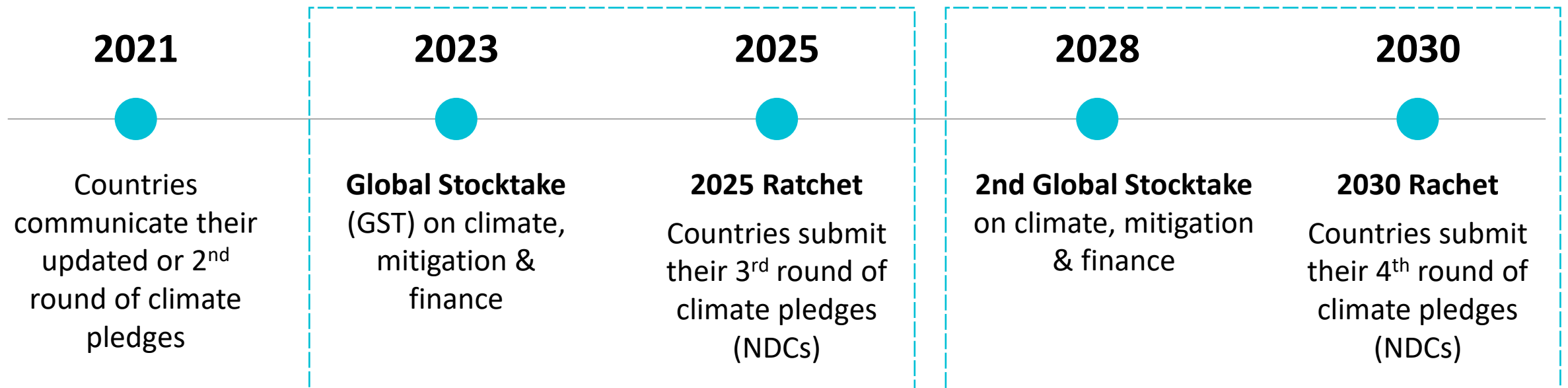
Please see the IPR [Home Page](#) for further details

Scenario	Policy Forecast Details	Open Access Database
 <p>IPR 2023 Forecast Policy Scenario (FPS)</p> <ul style="list-style-type: none">Models impact of forecasted policies on the real economy	<p>IPR FPS 2023 Summary Report</p> <p>IPR 2023 Policy Forecast</p> <p>IPR FPS 2023 Detailed Energy Results</p> <p>IPR FPS 2023 Detailed Land Use and Nature Results</p> <p>IPR 2023 Bioenergy Report</p>	<p>IPR FPS 2023 Value Drivers</p> <p>IPR Scenario Explorer</p>
 <p>IPR 1.5°C Required Policy Scenario (RPS)</p> <ul style="list-style-type: none">Required policies to align to a 1.5°C objective building on the IEA's Net Zero scenario and deepening analysis on policy, land use, emerging economies and value drivers	<p>IPR 1.5°C RPS Energy and Land Use System Results including Policy Details</p>	<p>IPR RPS 2021 Value Drivers</p>
 <p>IPR Forecast Policy Scenario + Nature (FPS + Nature)</p> <ul style="list-style-type: none">First integrated climate and nature scenario for use by investors	<p>IPR 2022 FPS + Nature detailed results</p>	<p>IPR FPS + Nature Value Drivers</p>

IPR has published a set of publicly available outputs from the FPS and 1.5°C RPS that offer significant granularity at the sector/country level, allowing investors to assess their own climate risk across 4,000+ variables

Ratchet pressures increase the likelihood that governments will strengthen policy by 2025 & again to 2030 & beyond

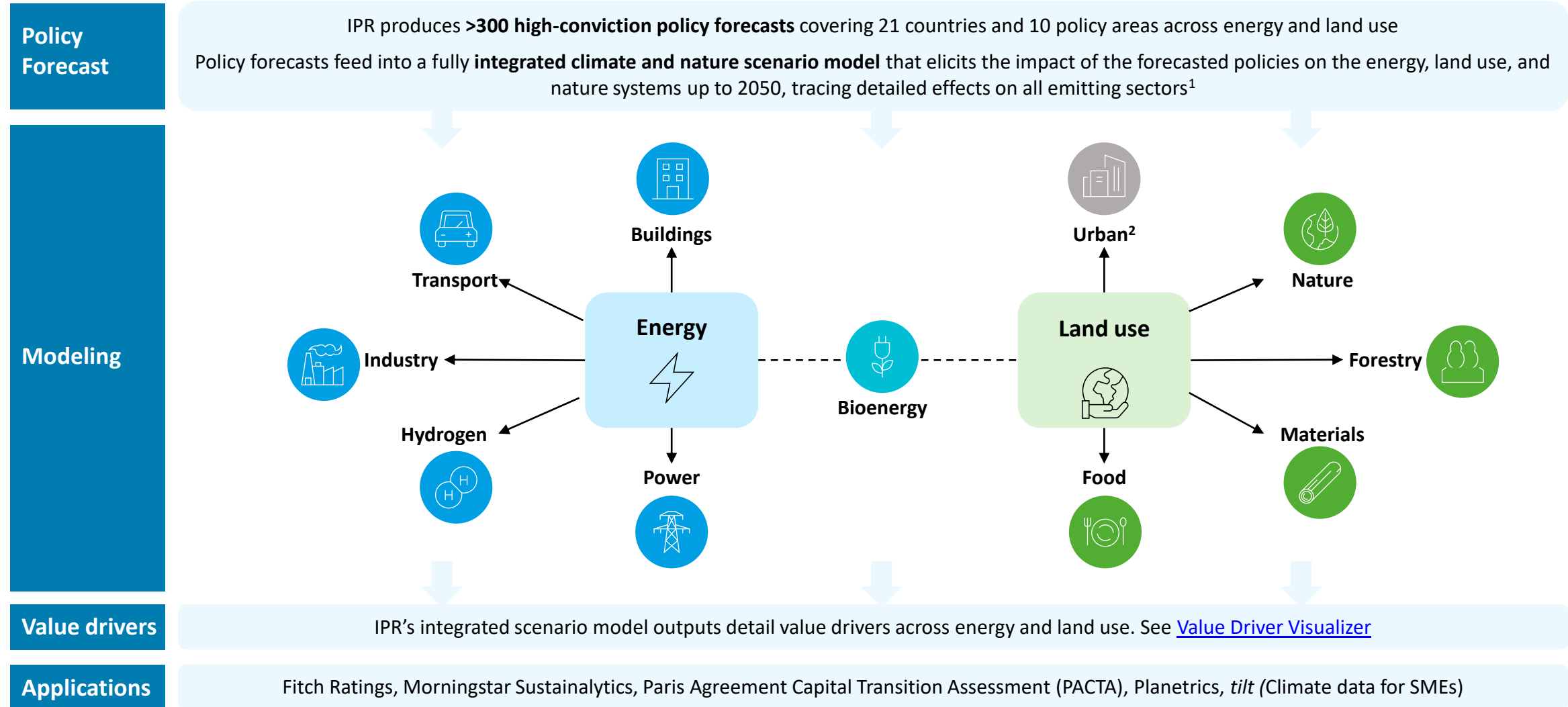
Paris Ratchet cycle/process triggers a cumulating policy response into 2025, 2030 & beyond



Policy announcements are expected to continue 2023 - 2025 with ongoing acceleration in 2028 - 2030. Recognition of Overshoot grows from 2025.



IPR offers a range of applications to help financial institutions navigate the climate transition

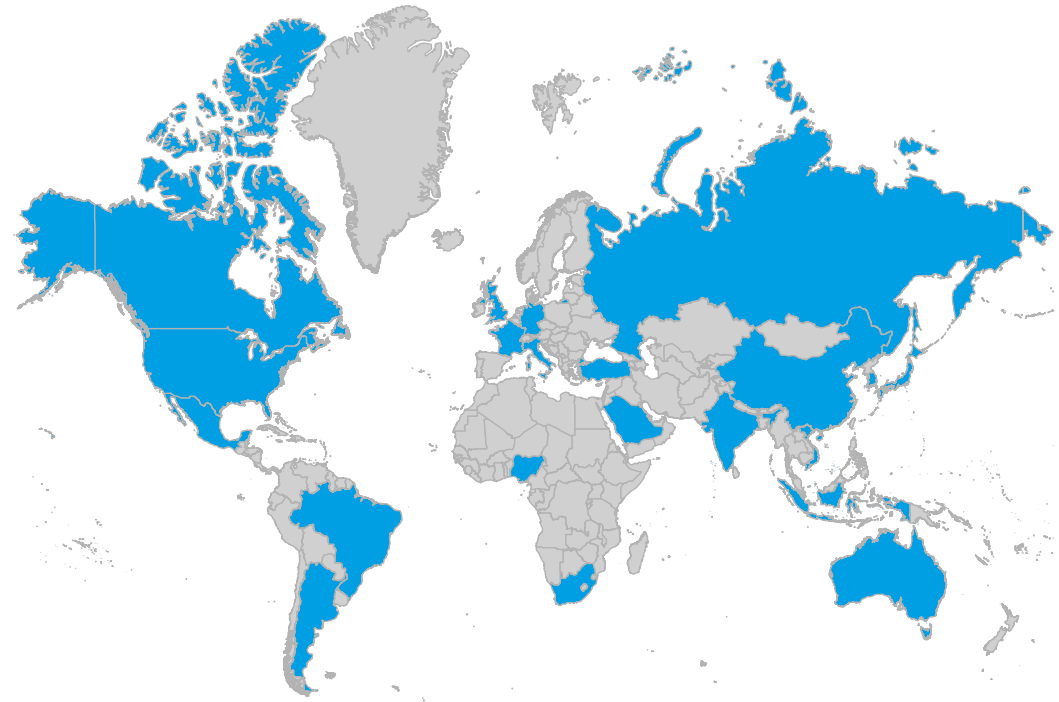


1. IPR also develops a '1.5°C Required Policy Scenario'(1.5°C RPS) building on the IEA NZE by deepening analysis on policy, land use, emerging economies, NETs and value drivers. The RPS scenario is also run through the model and can be used by those looking to align to 1.5°C. 2. Urban areas are not modelled in detail in IPR

The IPR 2023 forecast provides an update to IPR 2021, covering 21 major economies accounting for 74% of global CO₂ emissions

 New for IPR 2023

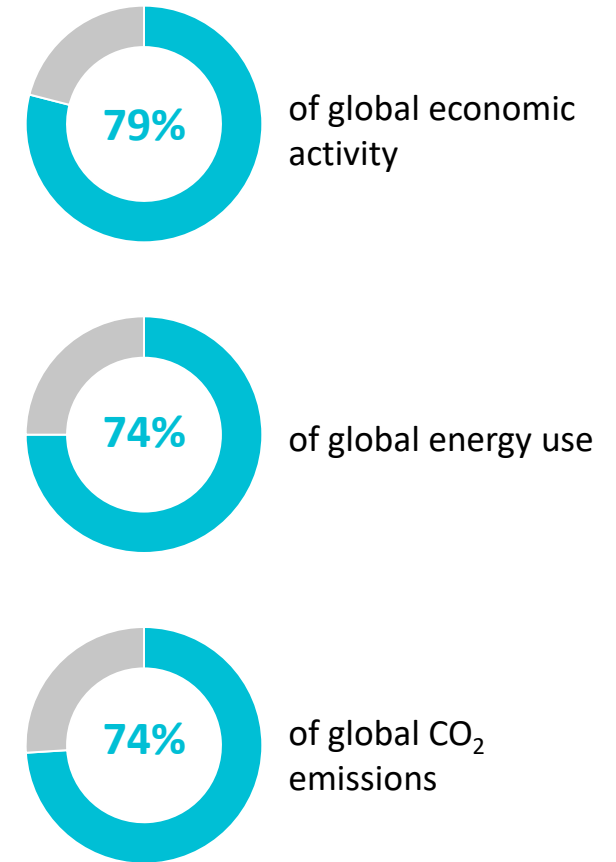
IPR policy forecasts cover G20 countries plus Nigeria and Vietnam...



... And covers policy across all major energy and land use sectors...

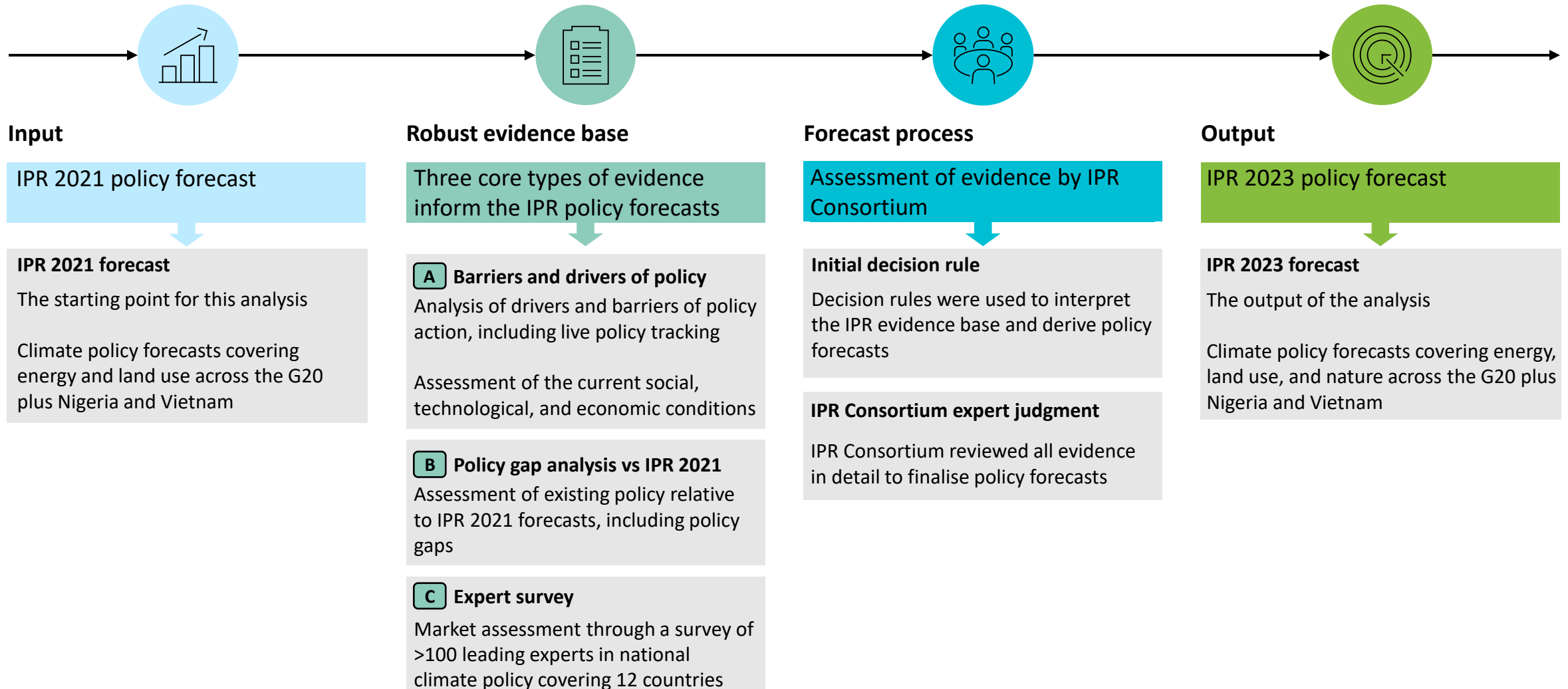
- Power
- Transport
- Buildings
- Industry
- Agriculture
- Land use
- Nature

... With IPR countries accounting for



Source: [GPD, energy use, emissions](#). Latest available data was used.

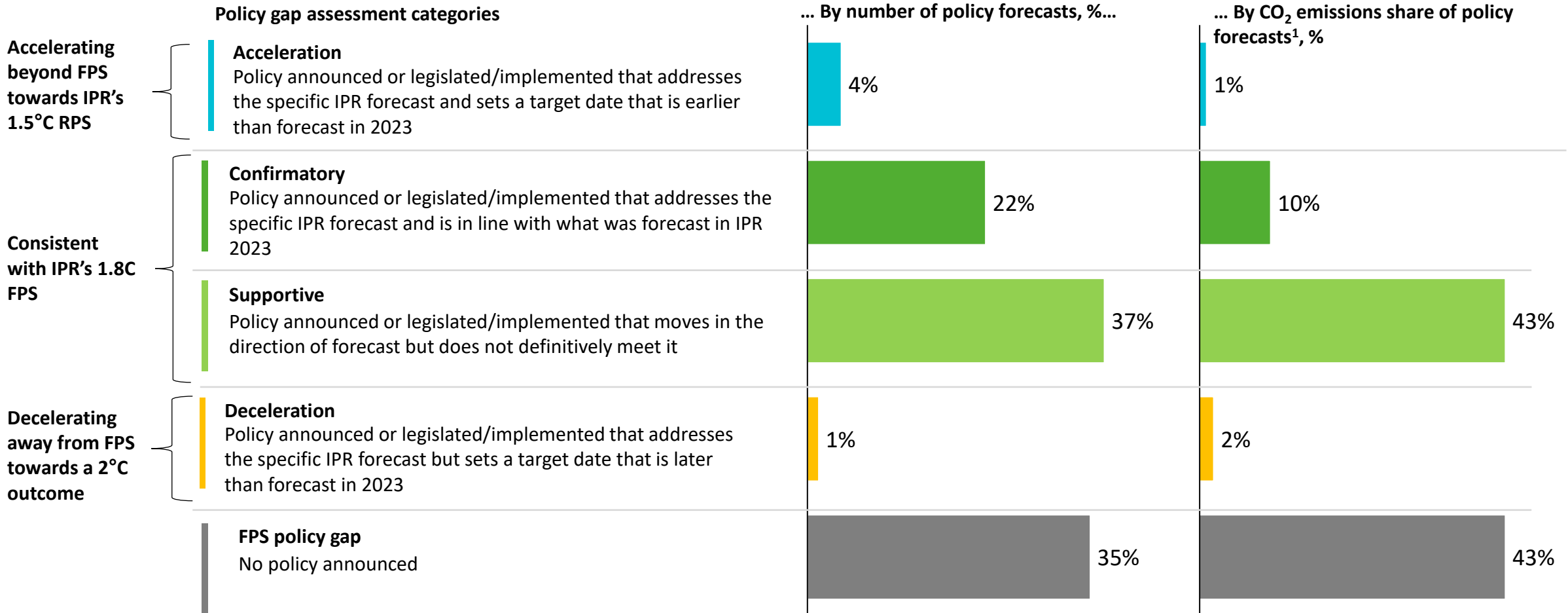
IPR policy forecasts are informed by a robust evidence base, including a survey of >100 climate policy experts



Over 50% of IPR 2023 forecasts have policy in place that is confirmatory or supportive of the forecast

Existing policy developments are assessed against the IPR's 2023 forecasts...

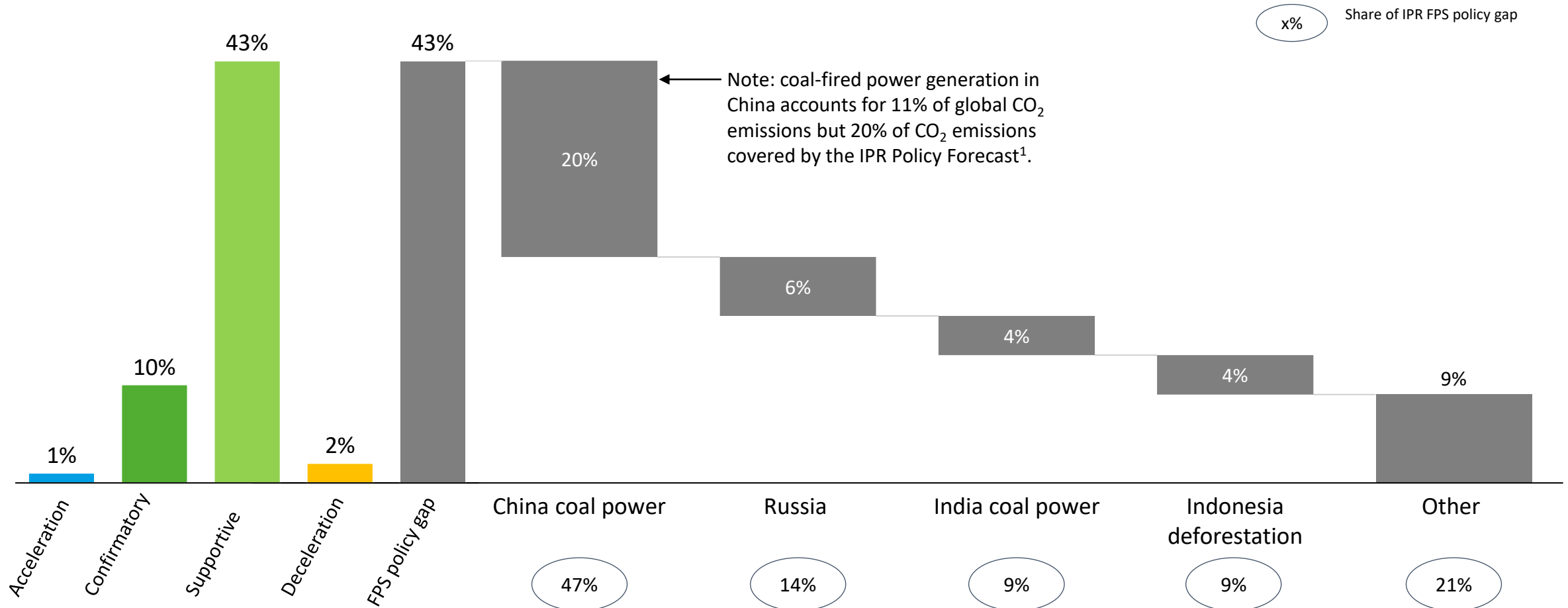
...With over 50% of forecasts having policy in place that is confirmatory or supportive of the forecast and ~40% of forecasts having a policy gap



1. Weighted by CO₂ emissions covered by IPR's policy forecasts.

The key policy gaps (no announcement as yet) in the FPS Forecasts

Breakdown of IPR policy forecasts with no existing policy announcements to meet them, weighted by CO₂ emissions¹



1. Weighted by CO₂ emissions covered by IPR's policy forecasts. IPR policy forecasts do not cover all CO₂ emissions and therefore the percentage breakdowns shown will likely be higher than if this analysis was done for all countries and sectors, covering all global emissions. For example, coal-fired power generation in China accounts for 11% of global CO₂ emissions but 20% of emissions covered by IPR policy forecasts.

Comprehensive Analysis : IPR 2023 policy forecasts across energy, land use and nature

Policy ambition¹: ■ Tier 1 ■ Tier 2 ■ Tier 3

Country ²	Economy wide		Power			Buildings	Transport		Industry	Agri	Land use	Nature			
	Net zero CO ₂ emissions	Carbon price (/tCO ₂)	New coal phase out	All coal phase out	Clean power	Zero-carbon heating	Light-duty vehicles	Heavy-duty vehicles	Fuel combustion	Industrial process	Low-carbon agriculture	Net deforestation	Deforestation free supply	Protection & restoration	Nature incentives
China	2060	\$50	2030	2045	2050	2045	2035	2040	2070	>2070	2030	2025	2035	2035	2030
US	2050	\$30	<2023	2035	2040	2040	2040	2045	2055	2065	2030	2025	2035	2035	2030
India	2065	\$50	2025	2060	2060	N/A	2040	2045	>2070	>2070	2035	2025-35	>2035	2040	>2035
Russia	>2065	\$0	2030	2060	2060	2050	2050	2055	>2070	>2070	2035	2025-35	>2035	>2040	>2035
Japan	2050	\$70	2025	2045	2045	2040	2040	2040	2055	2065	2025	2025	2035	2030	2030
Germany	2045	\$120	<2023	2035	2040	2030	2035	2040	2050	2060	2025	2025-30	2030	2025	2030
South Korea	2050	\$70	2025	2045	2045	2040	2035	2040	2055	2065	2030	2030	>2035	2040	2030
Indonesia	2060	\$50	2025	2050	2050	N/A	2045	2050	2070	>2070	2035	2030	>2035	>2040	2035
Saudi Arabia	2060	\$20	N/A	N/A	2060	N/A	2040	2045	2070	>2070	N/A	2030	>2035	2040	>2035
Canada	2050	\$100	<2023	2030	2035	2035	2035	2040	2055	2065	2025	2025	2035	2035	2030
Brazil	2050	\$50	2025	2045	2050	N/A	2045	2050	2060	2070	2030	2030	2035	2030	2030
Turkey	2060	\$30	2030	2045	2050	2050	2040	2045	2070	>2070	2035	2025	>2035	>2040	>2035
South Africa	>2065	\$30	2025	2050	2050	2050	2040	2045	>2070	>2070	2035	2035	>2035	2040	2035
Mexico	>2065	\$30	<2023	2038-40	2050	N/A	2040	2045	>2070	>2070	2035	2030	>2035	2040	2035
Australia	2050	\$70	2023	2038-40	2045	2035	2040	2045	2055	2065	2030	2025-30	2030	2030	2025
UK	2050	\$120	<2023	<2030	2035	2035	2030	2040	2055	2065	2025	2025	2030	2030	2025
Vietnam	2060	\$50	2025	2050	2050	N/A	2040	2045	2070	>2070	2030	2025	>2035	>2040	2030
Italy	2050	\$120	<2023	<2030	2045	2035	2035	2040	2060	2070	2025	2025	2030	2030	2030
France	2050	\$120	<2023	<2030	2035	2035	2035	2040	2055	2065	2025	2025	2030	2030	2025
Argentina	2060	\$30	2023	2045	2050	2045	2040	2045	2070	>2070	2035	2030	>2035	2040	2035
Nigeria	>2065	\$20	2030	2045	2050	N/A	2045	2050	>2070	>2070	2035	2035	>2035	>2040	>2035

1. Tiers reflect different levels of climate ambition.
 2. Ranked by CO₂ emissions, [European Commissions Emissions Database](#)

The Value Drivers Database Explained

The IPR Value Drivers database is the one of the largest and most comprehensive in the world enabling direct input into investor valuation models

- Driven by the Forecasts, FPS derives Data outputs :
 - All major jurisdictions covered
 - Annualised data
 - Emissions by GHG type
 - Investment by technology type by jurisdiction by sector
 - Power Demand by fuel type by jurisdiction
 - All major sectors covered
 - Huge Land Use component
 - Price data derived
- Unique data points
- Designed in collaboration with IPR Strategic Partners and research partners
- Will facilitate opportunity to build new wave of product
- Hundreds of thousands of data points



Jurisdiction: 21 world regions including 12 G20 countries*

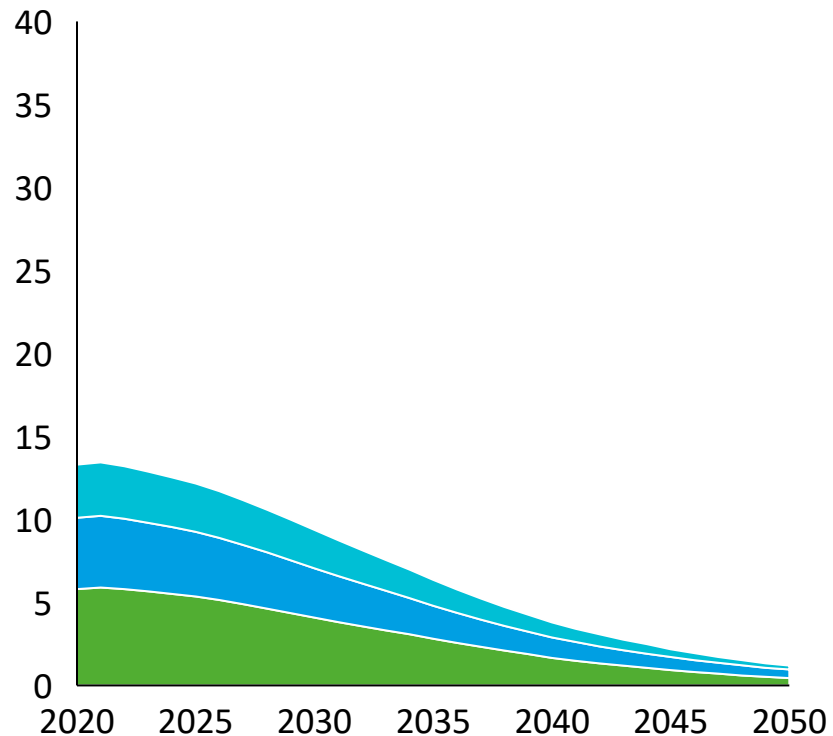
- **Countries:** Australia, Brazil, Canada, China, India, Indonesia, Japan, Russia, South Africa, South Korea, United Kingdom, United States
- **Composite regions:** Central and South America, Eastern Europe, Eurasia, Gulf Cooperation Council, Middle East and North Africa, South Asia, South East Asia and Oceania, Sub-Saharan Africa, Western Europe

IPR value drivers provide key insights

Energy and Land GHG emissions¹ by region, GtCO₂e/year

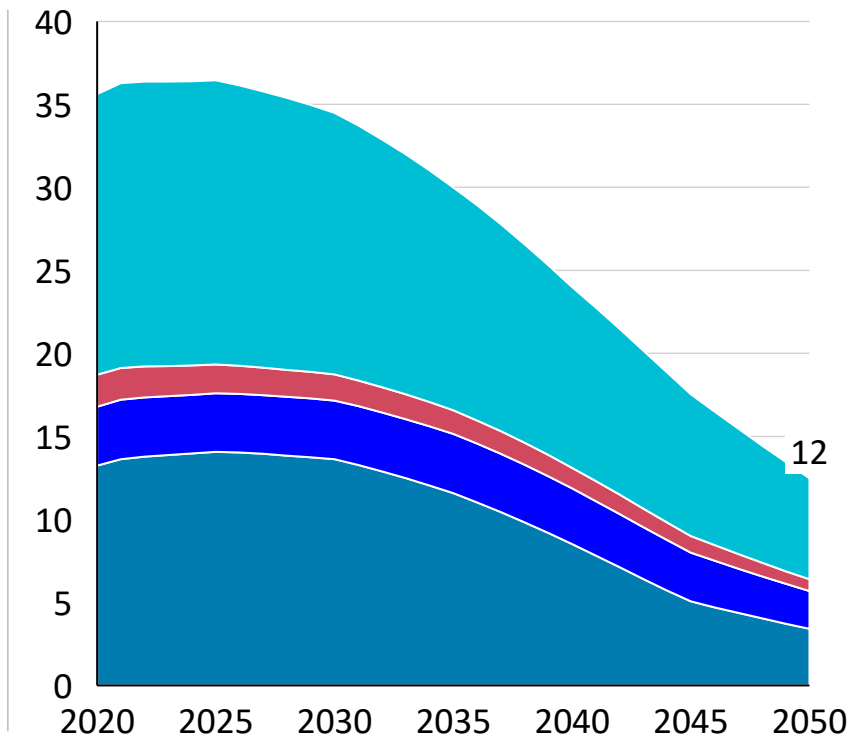
USA EUR Other AE

Advanced Economies (AEs)



CHN IND RUS Other EMDE

Emerging markets & developing economies (EMDEs)

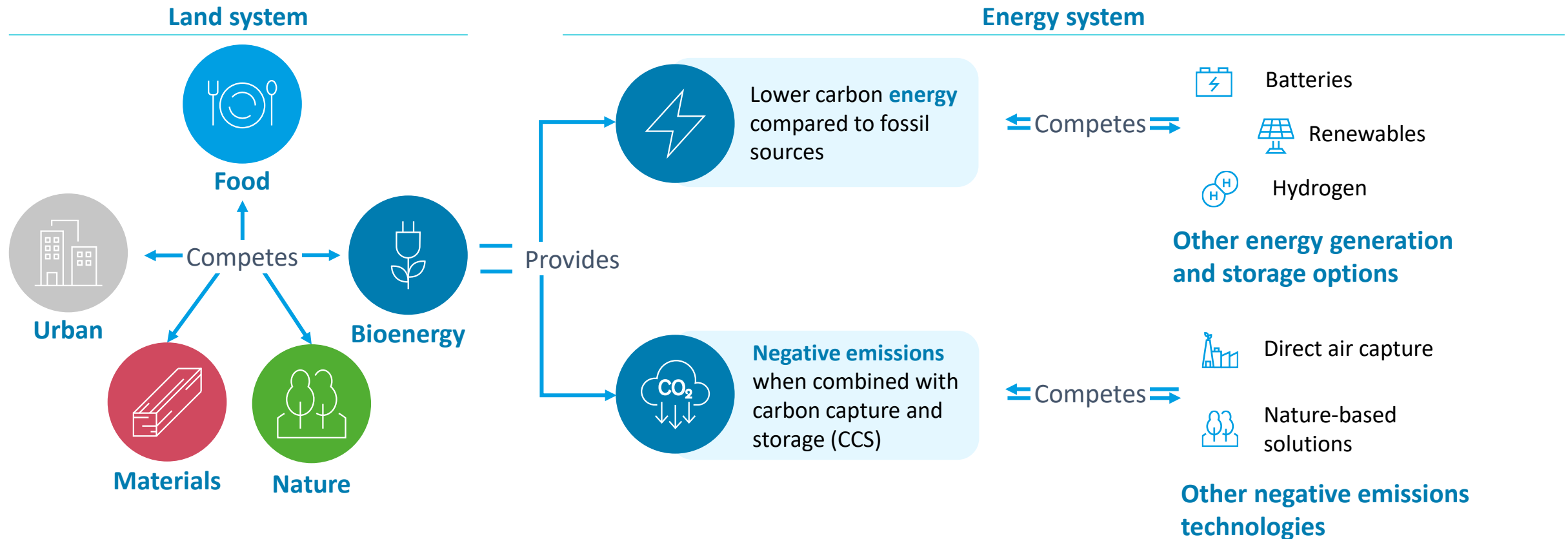


- Except for the uptick in emissions following the recovery in activity post-COVID, **AEs see GHG emissions fall rapidly** to near-zero by 2050. **AEs could reach net-zero energy emissions** with CO₂ removals from DACCS (not shown)
- In EMDEs, **emissions continue to grow throughout the 2020s** due to growing population and incomes. **They still emit 12 GtCO₂e in 2050** mainly from industry. Even easier-to-decarbonize sectors like power and transport do not do so fully
- Emissions reductions in both AE and EDME land systems are driven by Nature-Based Solutions

1. Emissions on a production basis. Includes carbon removals from BECCS but not DACCS

Land is key feature of IPR

Climate, nature, and affordability outcomes represent **constraints on the outputs** we consume from the land system. Maintaining and restoring forested area, for example, is necessary for emissions and biodiversity targets to be realized.

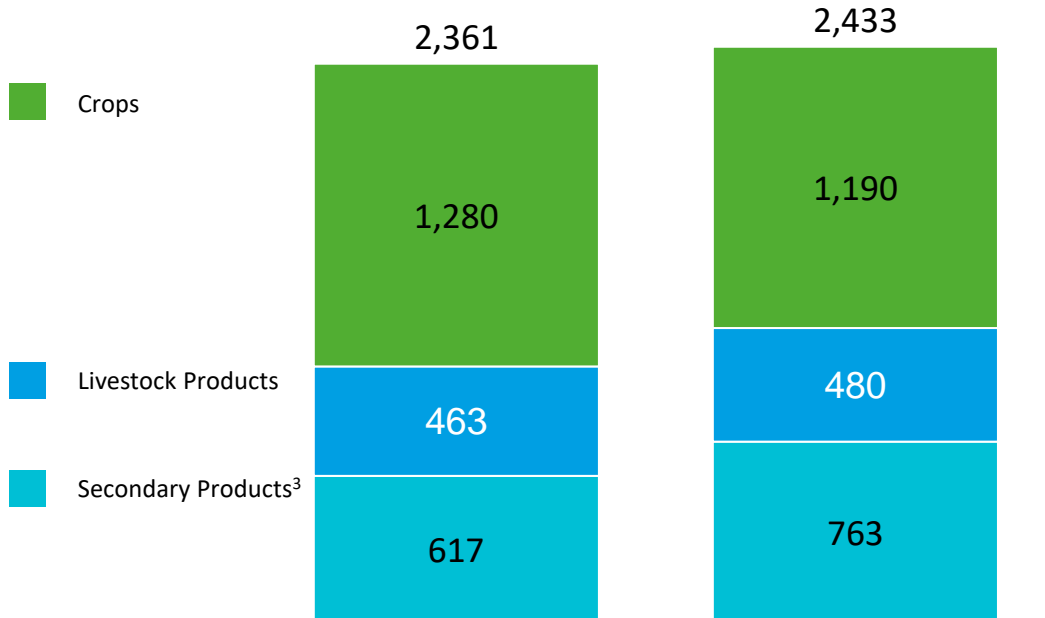


Improving yields, changing consumption habits, and reducing waste can all **ease competition** and improve tradeoffs

Cattle and sheep represents a small percentage of global average per capita caloric intake, but they could be responsible for ~20% of global emissions by 2050

Global Caloric Intake⁴

Kcal/capita/day



Dairy and beef consumption, %

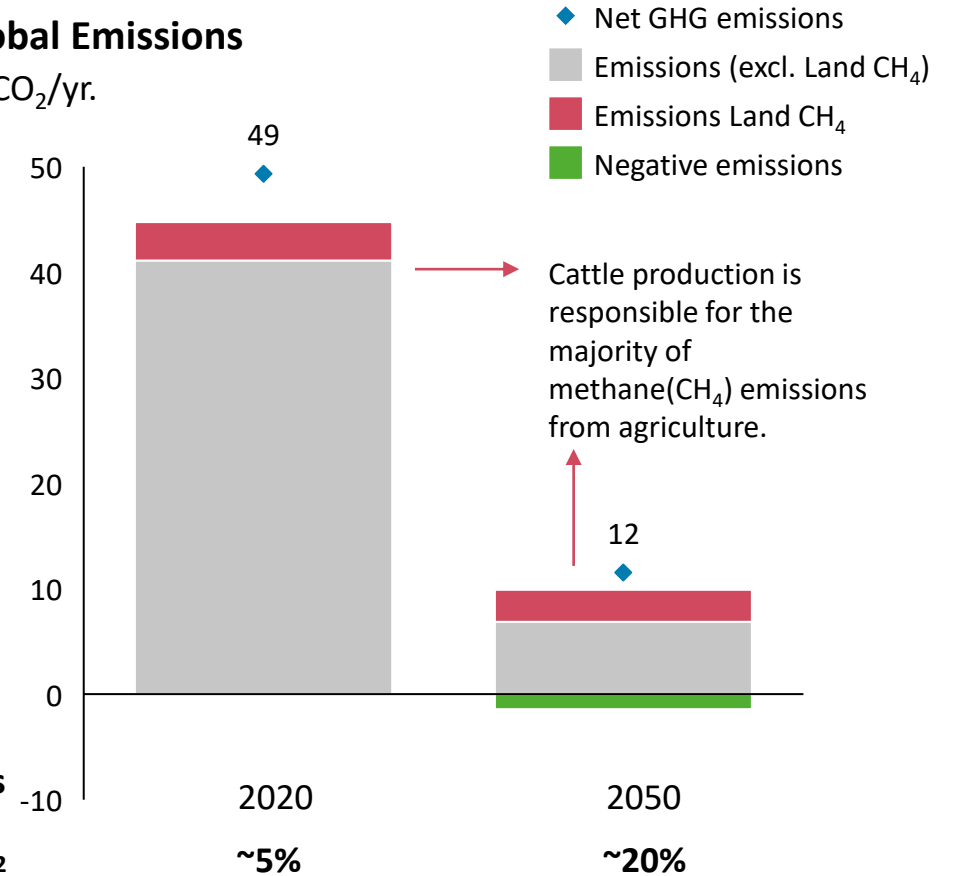
2020
~12%

2050
~10%

Dairy and beef as share of total global emissions², %

Global Emissions

Gt CO₂/yr.



1. Using GWP 100 emissions values

2. We use enteric fermentation as a proxy for methane emissions from ruminants, which account for 70%-80% of total methane emissions from agriculture. This excludes a portion of emissions from animal waste management. Total emissions from animal waste management (covering all livestock products, not just ruminants) account for only 5-15% of overall methane emissions from land.

3. Including sugars, alcohol, brans and other secondary products

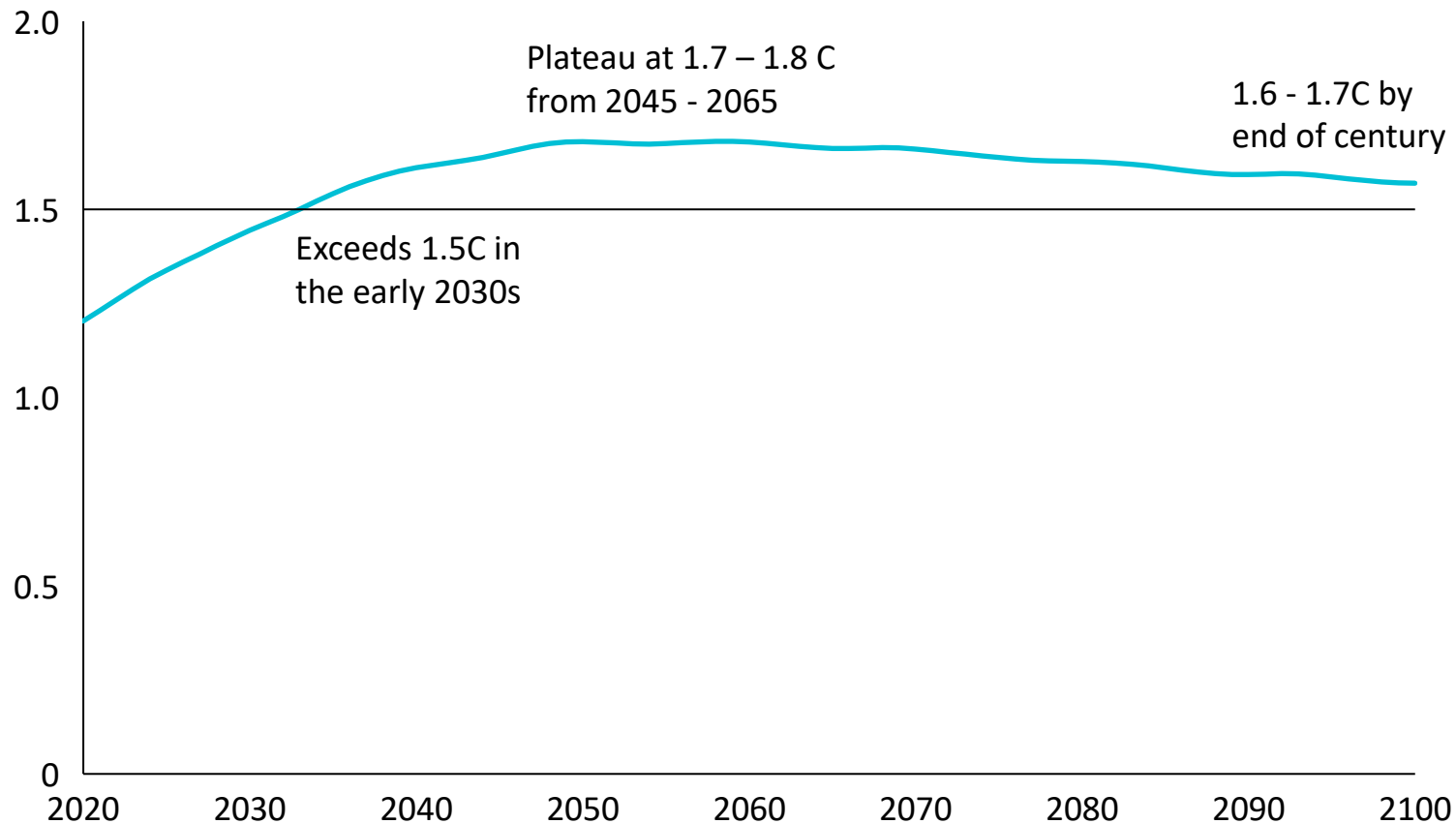
4. Caloric intake is caloric demand net of food waste

Source: Springmann M, Wiebe K, Mason-D' Croz D, Sulser T, Rayner M, Scarborough P. Health and nutritional aspects of sustainable diet strategies and their association with environmental impacts: a global modelling analysis with country-level detail

Ultimately, our central forecast implies temperatures will peak at 1.7°C-1.8°C suggesting the Paris Agreement will be achieved...recognizing that uncertainties around temperature sensitivities remain and the battle is not won.

FPS 2023 forecasts peak temperatures of 1.7-1.8C around 2045, dropping to 1.6-1.7 C by 2100 if DACCS continues

Surface temperature anomaly, degrees C above pre-industrial reference period¹



IPR FPS 2023 forecasts²

- An exceedance of 1.5C in the early 2030s
- Peak temperatures of 1.7 - 1.8C around 2045 - 2065
- A decline to 1.6 – 1.7C by 2100 and 1.5C by 2130³, based on direct air carbon capture and storage (DACCS) deployment estimates
- Net-zero CO₂ emissions around 2060 and net-zero GHG emissions around 2080
- Overall likelihood of staying below 2°C warming is at >90%

1. The pre-industrial reference period is 1850 to 1900, defined in Kelvin. Temperature anomalies in Kelvin and Celsius are equivalent.
 2. Based on MAGICC 7
 3. Assuming only impact of continuation of DACCS levels

Disclaimer

This report has been created by Energy Transition Advisers and Theia Finance Labs (The Inevitable Policy Response Consortium). This report represents the Inevitable Policy Response's own selection of applicable data. The Inevitable Policy Response is solely responsible for, and this report represents, such scenario selection, all assumptions underlying such selection, and all resulting findings, and conclusions and decisions.

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