

PRI / UNEP FI Conference – Towards a resilient economy

Keynote 4: Mark Fulton Presentation
MELBOURNE

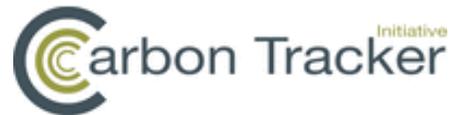


Climate Change: Preparing for an inevitable policy response



Consortium partners

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- This project was commissioned by the PRI with support from:



Financial markets are underprepared for climate-related policy risks

A forceful policy response to climate change is not priced into today's markets.

Yet it is inevitable that governments will be forced to act more decisively than they have so far, leaving investor portfolios **exposed to significant risk**.

The longer the delay, the more disorderly, disruptive and abrupt the policy will inevitably be.

PRI, Vivid Economics and ETA are building a **high conviction policy-based forecast** of the financial impact of this Inevitable Policy Response (IPR), including a Forecast Policy Scenario:

- How will it affect the economy?
- Which sectors are most at risk?
- Which asset classes will be impacted?

Growing awareness and momentum on climate issues makes a near-term, forceful policy response more likely

Changing weather trends



Impacts on security

The effects of a changing climate are **a national security issue.**



– *US Department of Defense*

Cheaper renewable energy

FINANCIAL TIMES

Europe 'watershed' as green energy set to overpower coal



JUNE 3, 2019

New climate research

Global warming report, an 'ear-splitting wake-up call' warns UN chief



Civil society action



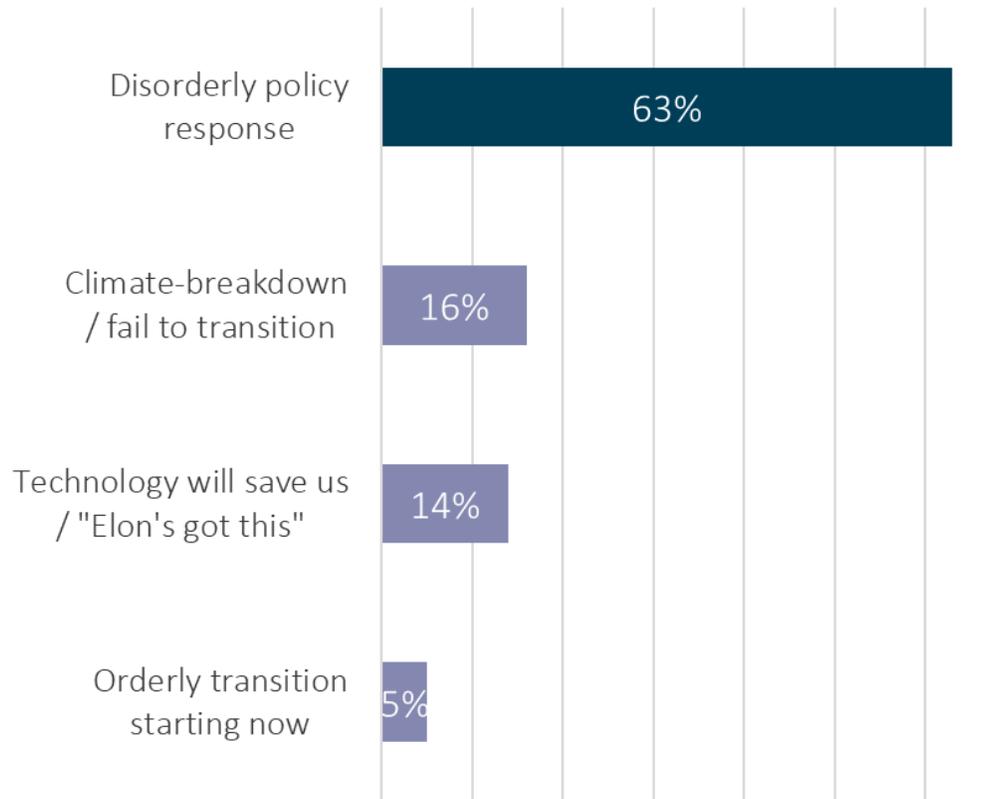
Stakeholders demanding clarity

The catastrophic effects of climate change are already visible around the world. We need collective leadership and action across countries, and we need to be ambitious.



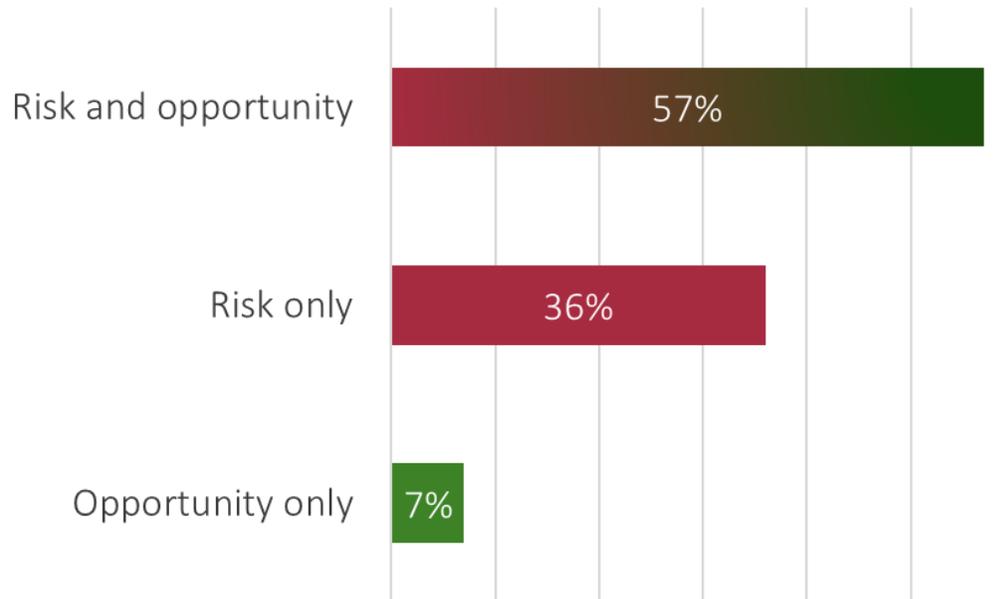
Investors acknowledge that there will be a policy response, and that it will be delayed and disruptive, but do not appear to have priced in the risk

Which of the following scenarios is most likely?



Source: UN PRI September 2018

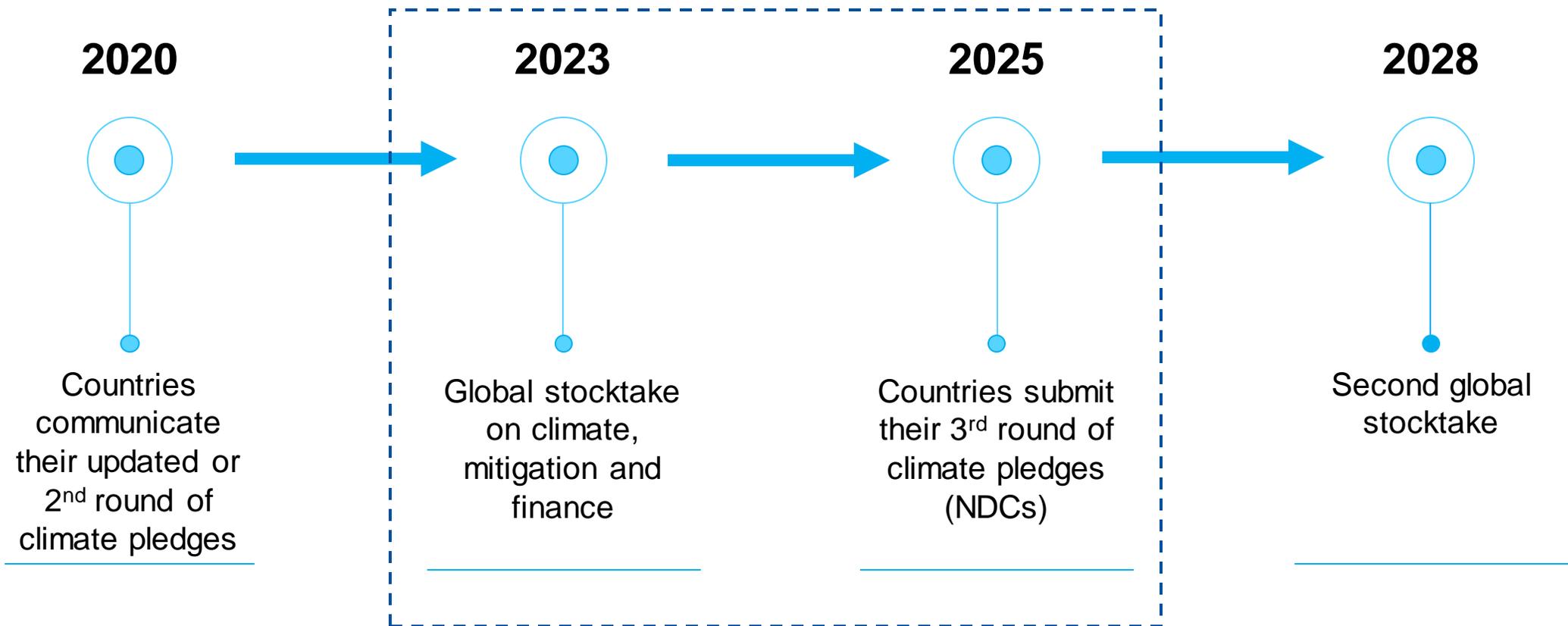
Is climate change a risk or opportunity?



93% of institutional investors say climate change is still not being priced in by the key global financial markets as an investment risk

Source: BNY Mellon Investment Management and CREATE-Research

Timing: Paris Ratchet process triggers a cumulating policy response into 2025



Policy announcements are expected to accelerate in 2023-2025

Value-add of the IPR: Forecast Policy Scenario

- **A high conviction policy-based forecast**, not a hypothetical scenario that optimizes policy to meet a temperature constraint
- **Designed to be an alternative** to, for example, the IEA NPS for business planning by corporations, investors and governments
- **Covers all regions of the world**, with specific policy forecasts for key countries and regions
- **Sets out the gap to 1.5°C** scenarios and how this might be filled by greater policy aspiration
- **Transparent**: on expectations for policy and deployment of key technologies, such as Negative Emission Technologies
- **Complete**: includes macroeconomic, energy system, and land use models linking crucial aspects of climate across the entire economy
- **Fully integrating land-use** to ensure the full system impacts of policies, and highlight the critical role of land use
- **Applicable to TCFD**: aligned forward-looking analyses

Later this year, the IPR will extend from macro and sector level results to portfolio and company level financial impacts to show investors the cost and impacts of this delayed, forceful and disruptive policy response forecast, and to make the case to ACT NOW and aspire to a more orderly transition to 1.5°C

We believe that any forecast will need to contain these elements. We welcome feedback on the forecasted policies and the results to enhance value-add and relevance on an ongoing basis.

Key policies we forecast are detailed in the Policy Forecasts:



Coal phase-outs

- Early coal phase-out for first mover countries by 2030
- Steady retirement of coal-fired power generation after 2030 in lagging countries



ICE sales ban

- Early sales ban for first mover countries by 2035
- Other countries follow suit as automotive industry reaches tipping point



Carbon pricing

- US\$40-80/tCO₂ prices by 2030 for first movers
- Global convergence accelerated by BCAs to ≥\$100/tCO₂ by 2050



CCS and industry decarbonisation

- Limited CCS support in power
- Policy incentives primarily for industrial and bioenergy CCS
- Public support for demonstration, and then deployment of hydrogen clusters



Zero carbon power

- Significant ramp-up of renewable energy globally
- Policy support for nuclear capacity increase in a small set of countries, nuclear managed out elsewhere



Energy efficiency

- Increase in coverage and stringency of performance standards
- Utility obligation programs,
- Financial and behavioral incentives



Land use-based GHG removal

- Strong policy support for re/afforestation
- Stronger enforcement of zero deforestation
- Controlled expansion of bioenergy crops



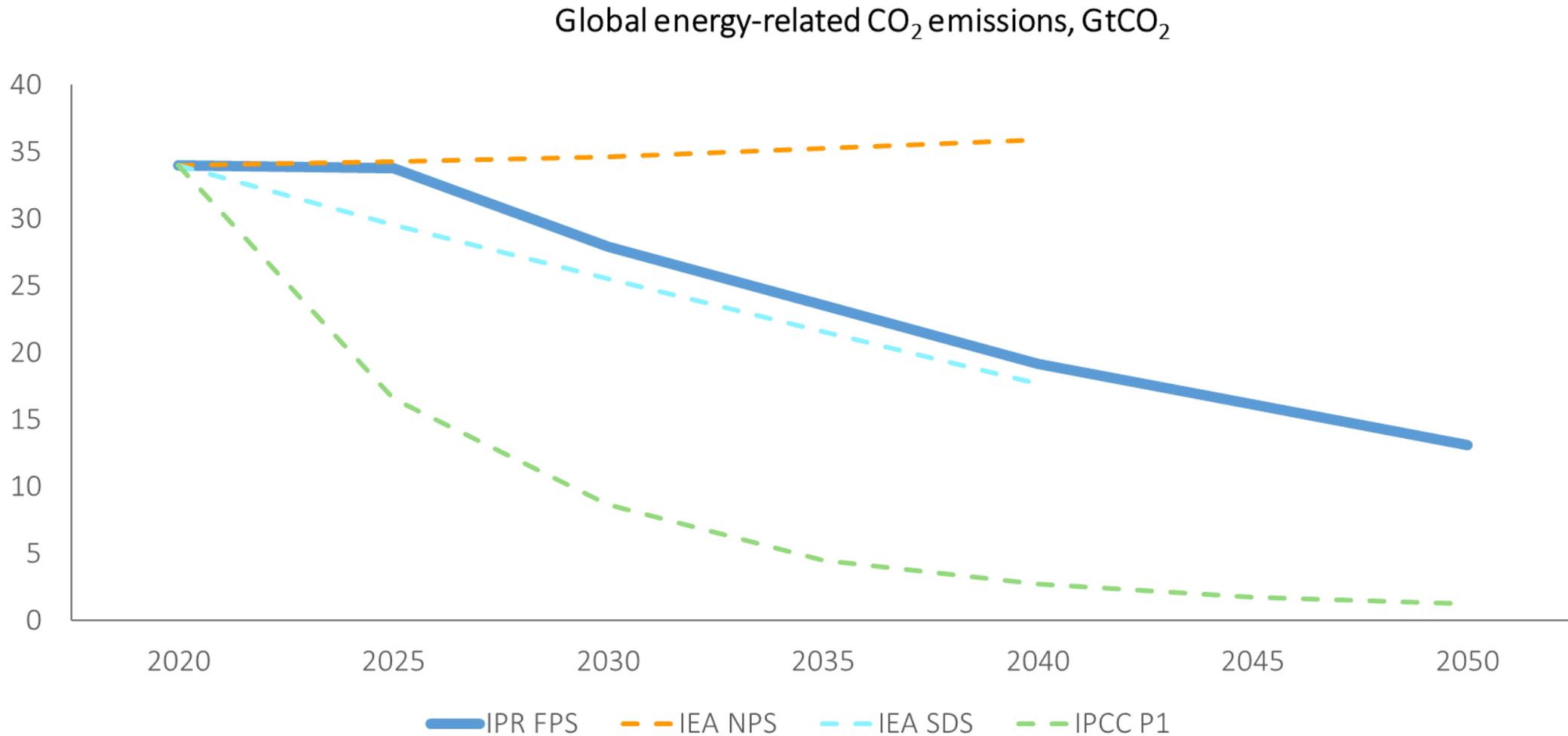
Agriculture

- Technical support to increase agricultural productivity
- Increasing public investment in irrigation and AgTech
- Incremental behavioural incentives away from beef

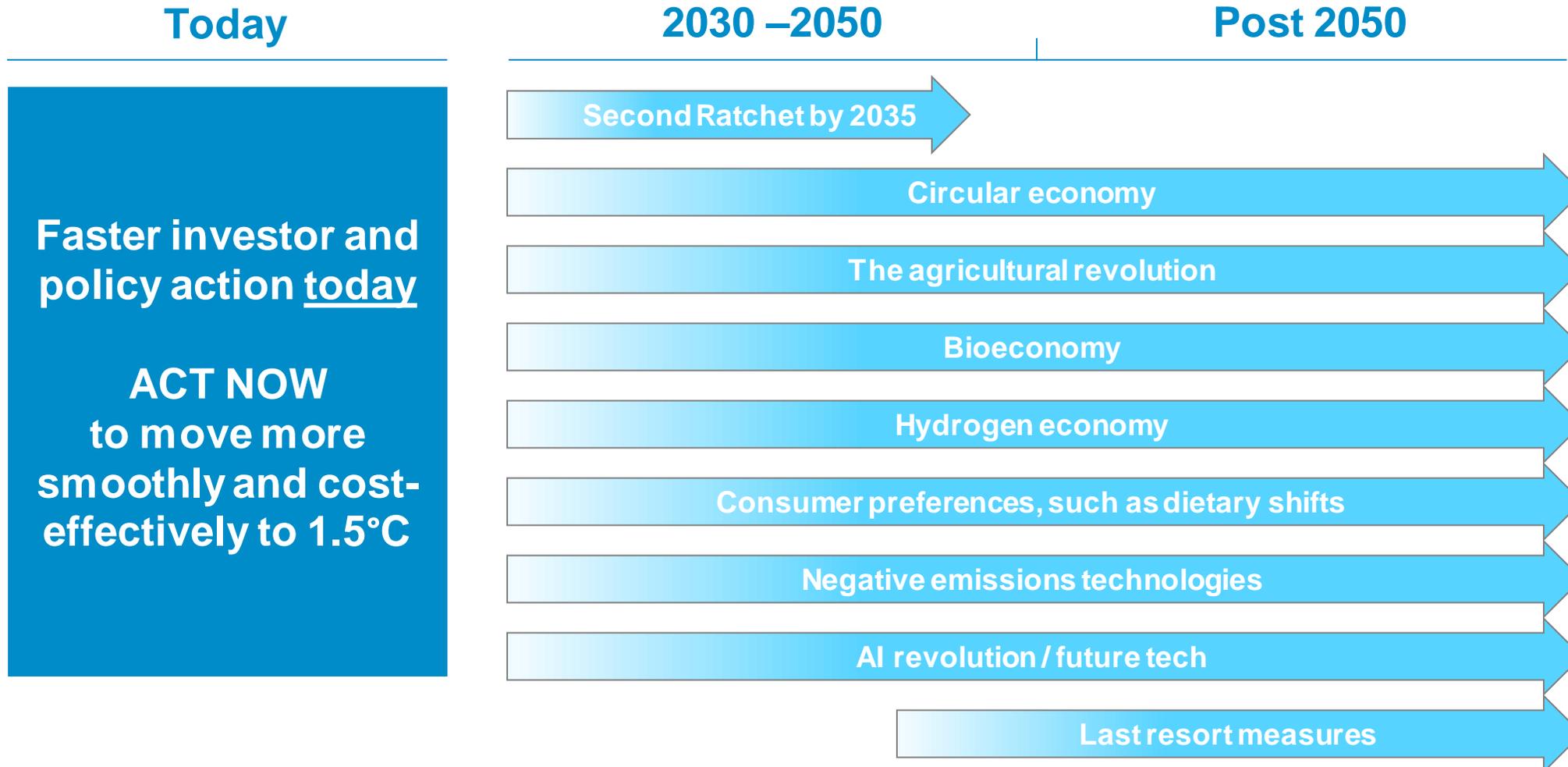
Enabling a green economy

'Just Transition' lens to ensure social and political feasibility

The IPR: Forecast Policy Scenario (FPS) facilitates discussion around a business planning case to fully value climate-related policy risk



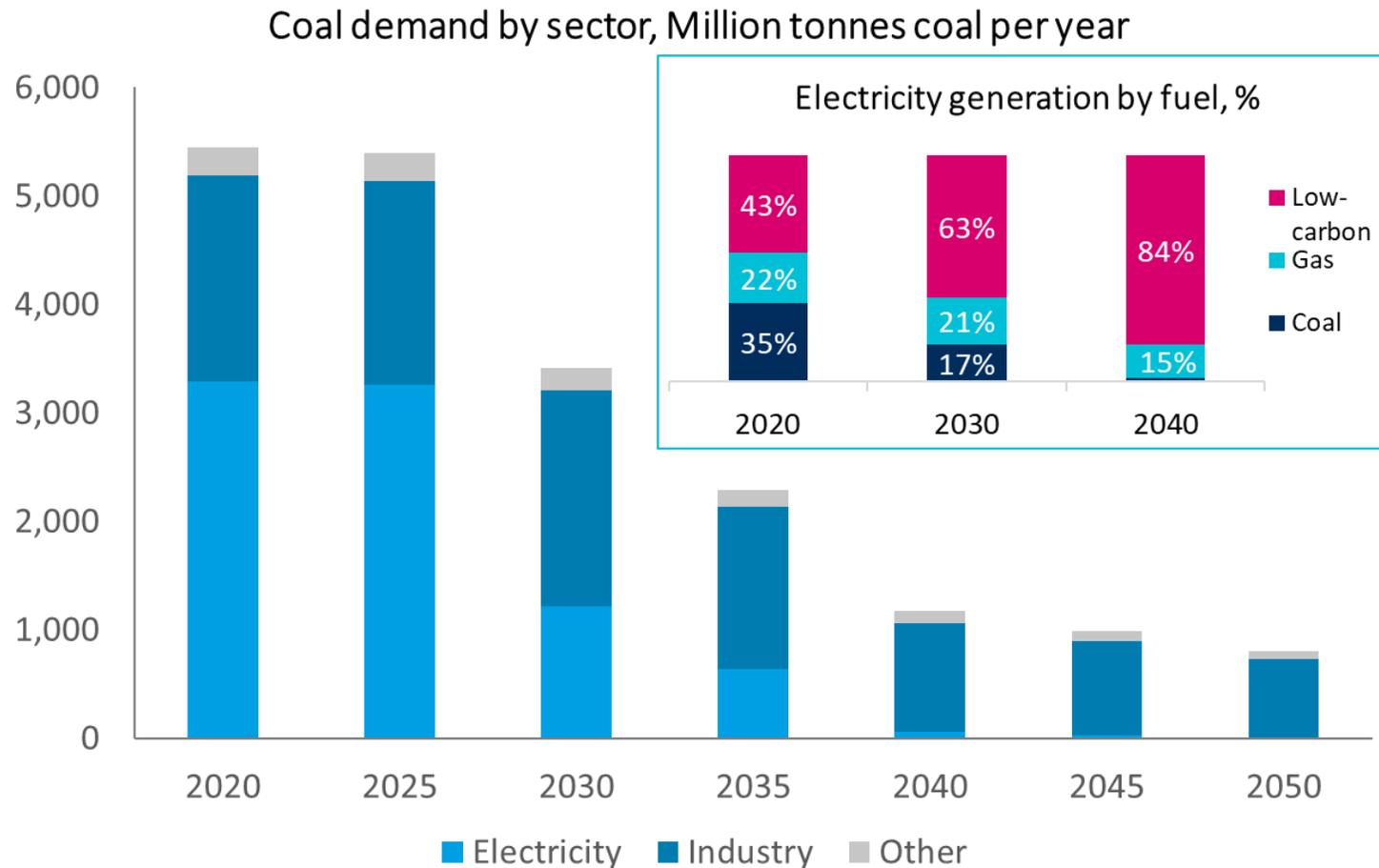
Achieving the 1.5°C target will require accelerated and substantial effort across multiple emerging solutions to go further than FPS.





Forecast Policy Results

Coal demand is at its peak and will decline rapidly by 2025

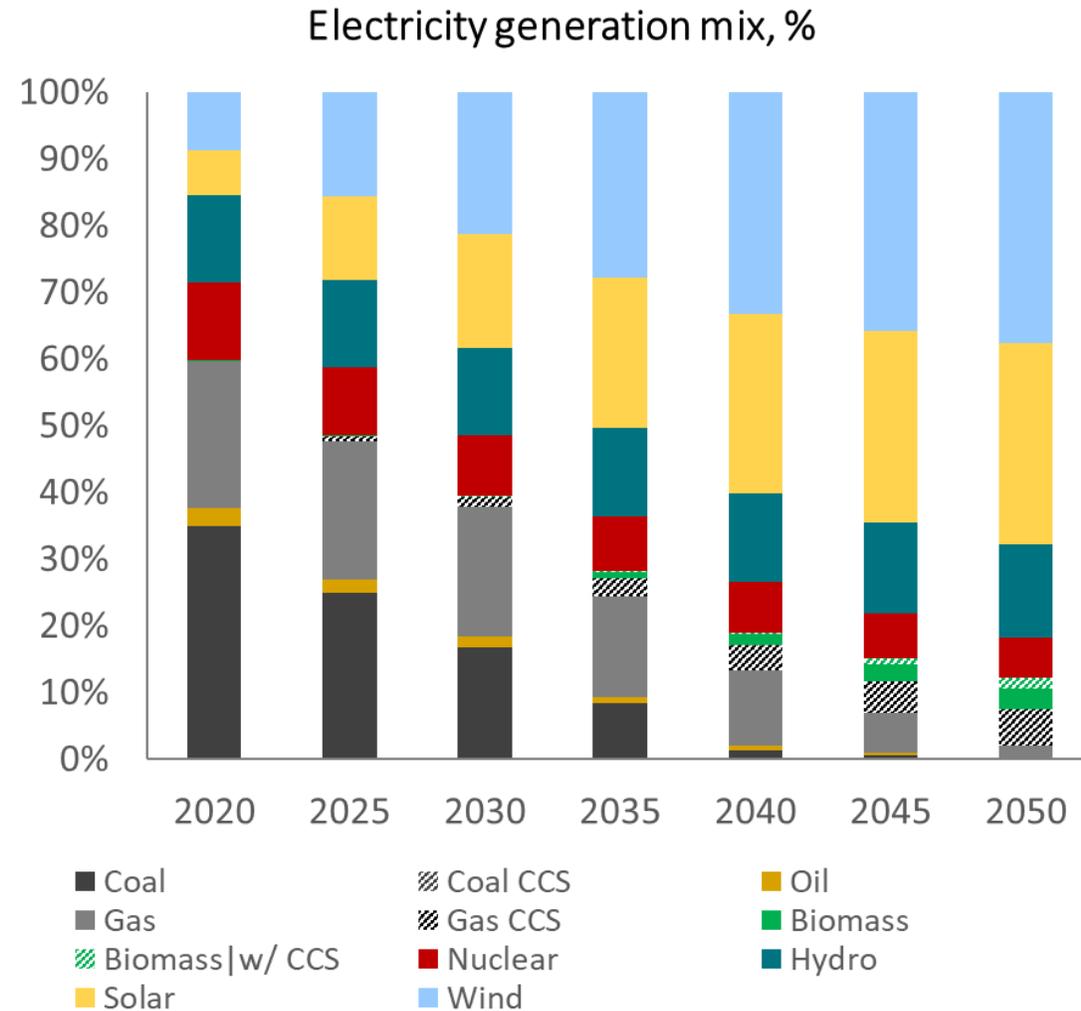


Driven by relative costs and policy, demand for coal for electricity falls steeply from 2025

- Coal is almost completely phased out of the electricity sector by 2040
- In the 2030s demand for coal in industry decreases significantly
- Electricity, gas and hydrogen replace coal across industry

Note: 'Other' coal use includes energy used in the energy industry, use in agriculture and losses

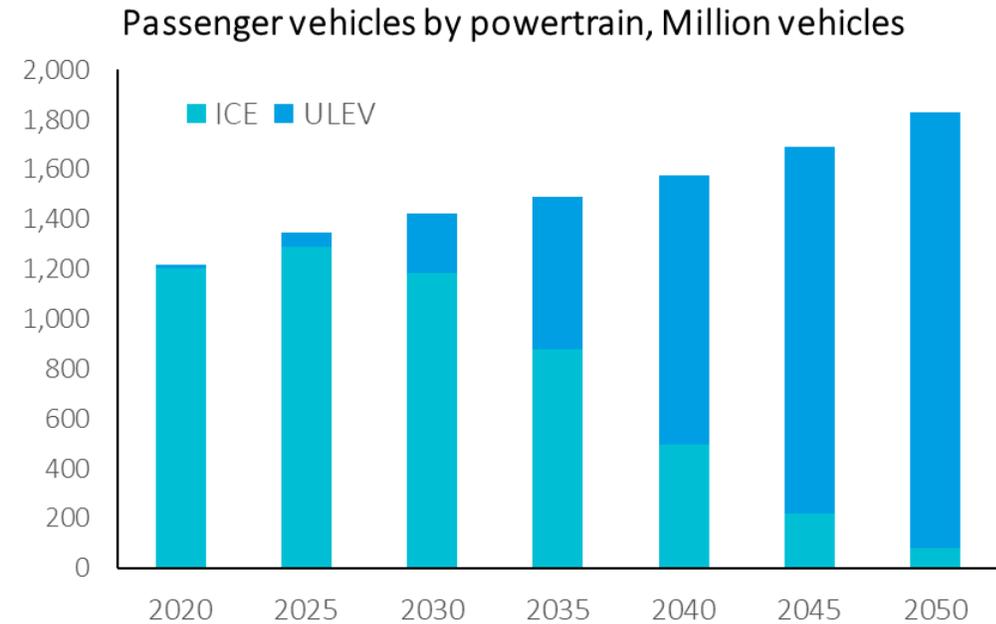
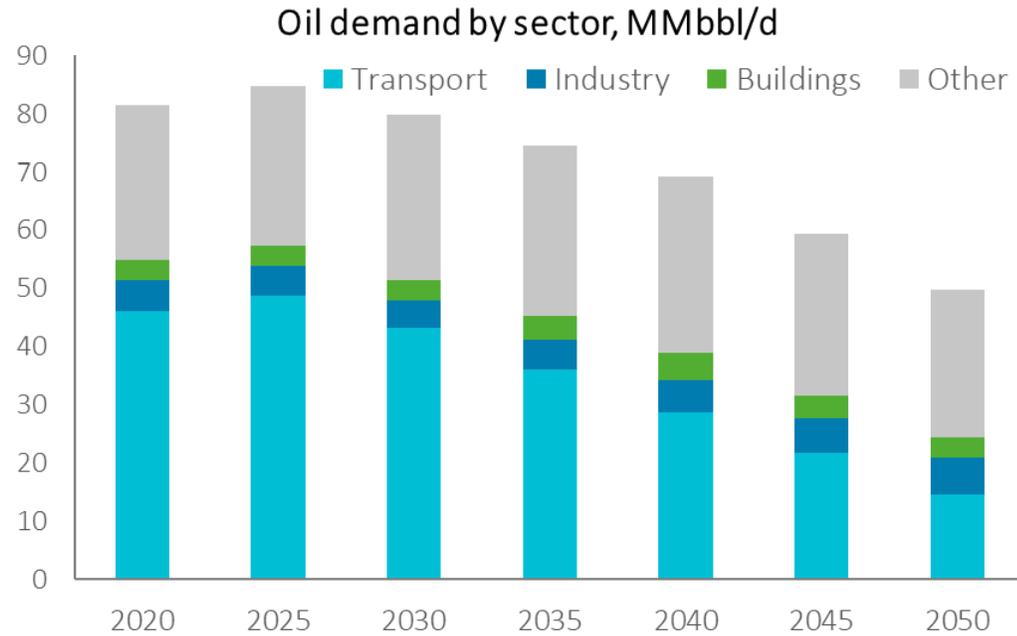
Renewable generation grows quickly and supersedes fossil fuels by 2030



Renewables replace virtually all fossil fuels in electricity generation by 2050

- Solar and wind alone will generate approximately 2/3 of all electricity in 2050
- IPR FPS has 74% renewable generation in 2040, more than in the IEA SDS, IEA NPS, and BNEF NEO
- Coal is phased out by 2050 while gas retains a minor role.
- Slow development of CCS is a barrier to use of biomass as a negative emissions technology as are land use constraints
- Nuclear doesn't grow to replace fossil fuels or renewables given cost and societal issues

Oil demand peaks 2026-28 and falls rapidly as transport uses alternative fuels

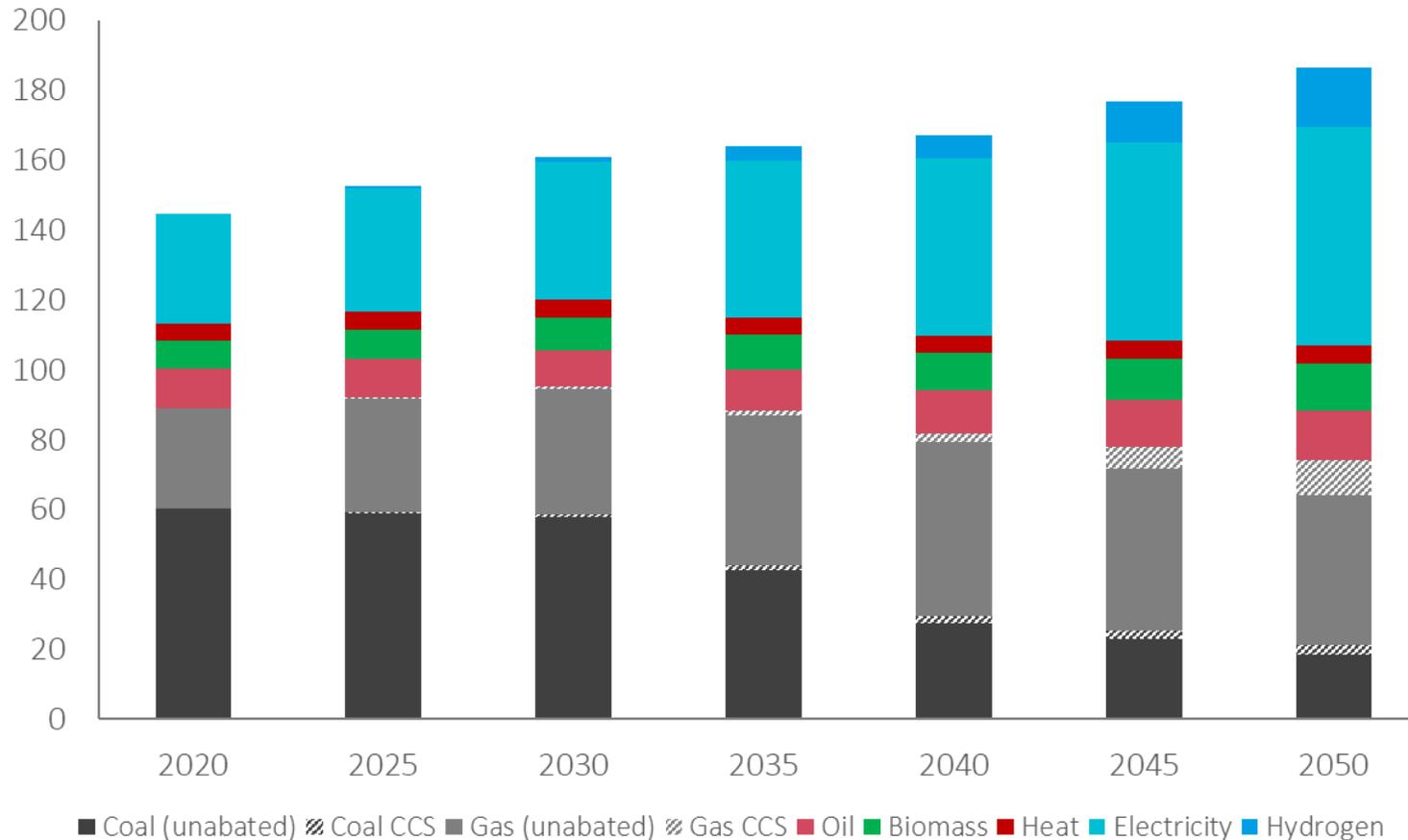


Oil demand peaks between 2026-28 driven by improving ICE efficiency and early uptake of electric vehicles

- Oil in transport decreases by around 70%, while total oil demand decreases around 40% 2025-2050
- Road transport oil demand peaks in 2025, while oil demand in aviation and shipping and as a feedstock for petrochemicals remains significant through to 2050

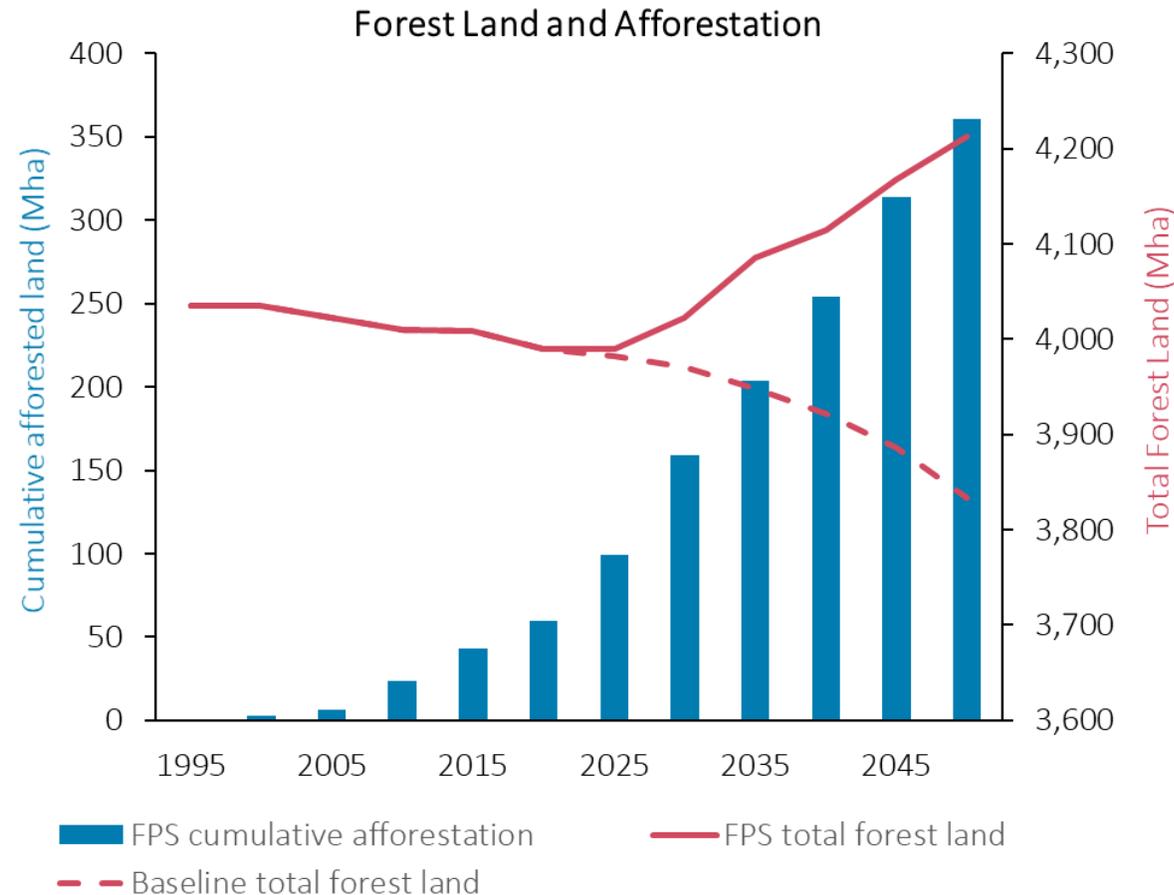
Electrification, hydrogen and CCS contribute to the progressive decarbonisation of industry

Industry fuel mix, EJ per year



- Coal-to-gas switching – proven, economical and non-disruptive – accelerates as a near-term solution
- Electrification, hydrogen, and CCS contribute in medium to long term with the carbon price playing an important role
- Fuel mix changes proceed at a pace consistent with economics of emerging technologies, and long plant lifecycles

Deforestation continues until mitigation policies phase into the land sector, and afforestation and reforestation efforts ramp up substantially



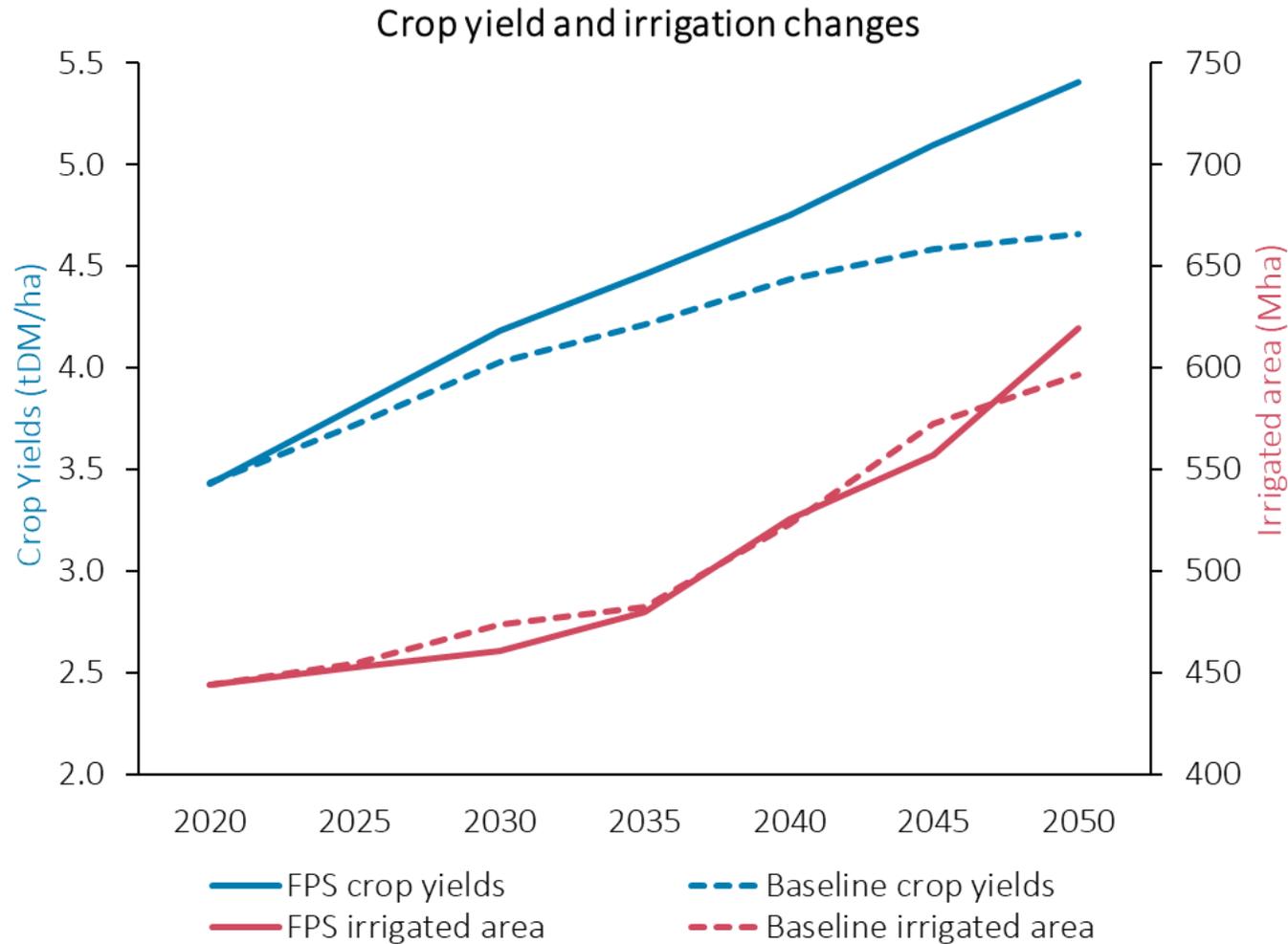
Note: 'Total Forest Land' is defined here as dense, high-carbon stock forest land only

Deforestation practically eliminated by 2030, as domestic climate policy targets implemented, and international payments increasingly introduced

- Rapid re/afforestation to meet feasible NDC land use targets in coming decade
- Re/afforestation is driven by emerging payment systems – national and international – and impact of increasing prices in carbon markets
- World meets the Bonn Challenge of 350 Mha of land restoration with large delay

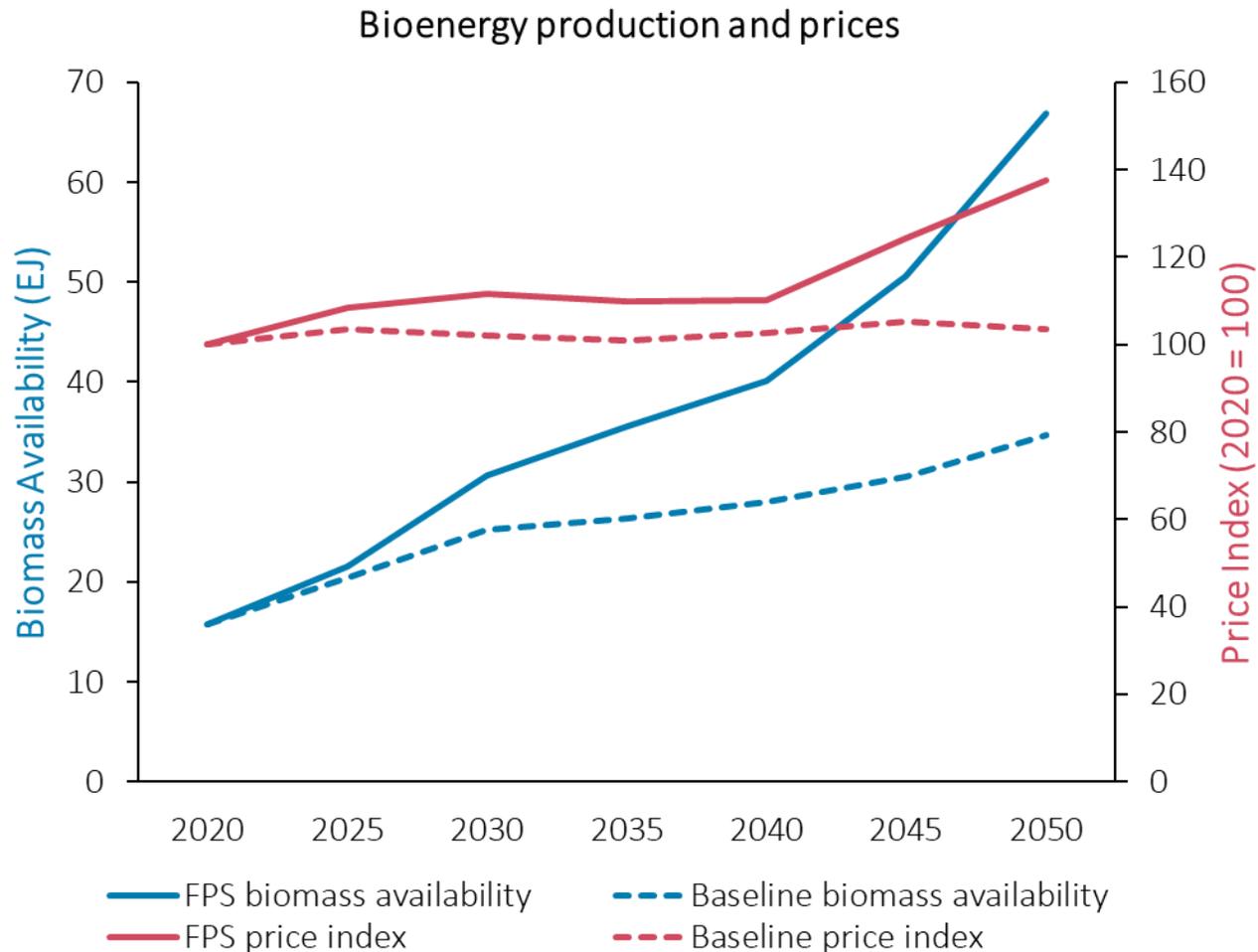
Re/afforestation to 2050 draws almost \$800 billion in offsets financing

Land competition induces substantial investment in yield-enhancing technologies



- Aggregate global productivity increases by 58% between 2020 and 2050
- Much of this is driven by baseline catch-up improvements in developing country agricultural systems (e.g. irrigation)
- Increasing public and private support for R&D and agricultural extension
- Global estimates for yield enhancing investments total more than \$20 trillion from 2015 to 2050

Bioenergy crops represent 65 EJ annually by 2050, with the bulk coming from 2nd generation crops



- Bioenergy supplies nearly 65 EJ annually by 2050 – consistent with studies showing 100-125 EJ in 2100 of bioenergy as the sustainable limit
- But environmental sustainability and land competition constrain bioenergy production
- Consistent with literature estimates of 100-125 EJ in 2100 of bioenergy as the sustainable limit
- Bioenergy production increases across the globe, although relatively sooner in China, North America and Europe

Headline takeaways for investors

Deep and rapid changes in the energy system

- Oil to peak in 2026-28
- Thermal coal virtually non-existent by 2040
- Renewables generating approximately half of all electricity in 2030

Transport electrified inside 20 years

- ICE sales bans, supported by falling cost of EVs, drive rapid deployment of ultra-low emissions vehicles
- Making up almost 70% of passenger vehicles by 2040

Major changes in land use

- Deforestation virtually eliminated by 2030, with pressures on supply chains
- Large opportunities to invest in nature-based solutions

Rapid reductions in carbon emissions, but not enough to hit 1.5°C

- >60% fall in global CO₂ emissions by 2050
- New innovative policy and industrial solutions, not yet proven or achieved at scale, are needed to achieve 1.5°C

Key Equity Market Findings: Disruption at the Sector and Company level

Overall, **risk to financial markets is significant, but appears manageable with the iShares MSCI ACWI ETF fall by a noncyclical 3.1% or \$1.6trn**

This includes downside demand and cost exposure of \$2.1trn (or a 4% fall in share values) offset by about \$0.5trn from green demand creation.

The most disruption is seen at sector and company level, with some big winners and losers

Some primary sectors will be pure losers or winners – mean company valuations in the energy sector fall by 33%

Within other sectors there is large variation across companies, for example, 80% of impacts in the Utilities sector lie between -62% to 41% of current valuation

Many companies likely to succeed in the green upside are not listed in the common indices

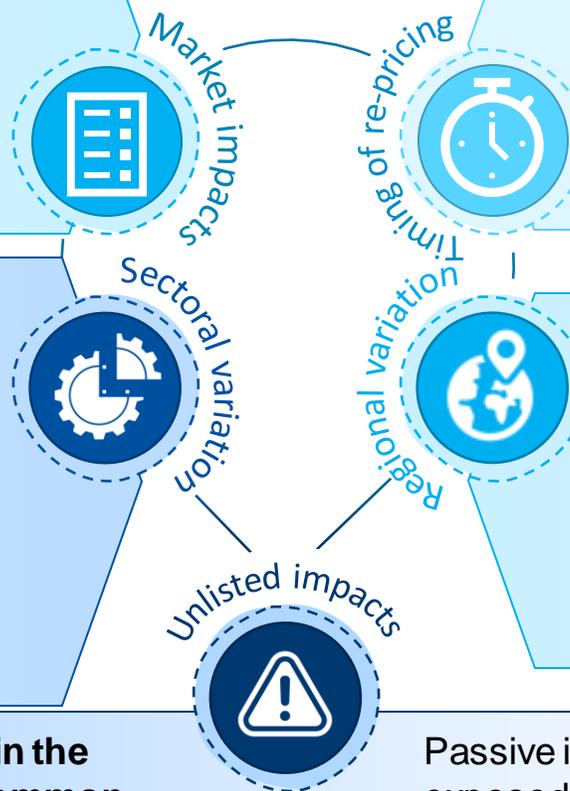
Passive investors are therefore unlikely to be as exposed to the upside as the downside of the Inevitable Policy Response.

If repricing occurs in 2025, when the policy forecasts start to affect cash flows of companies, **the impact further rises to -4.5%**.

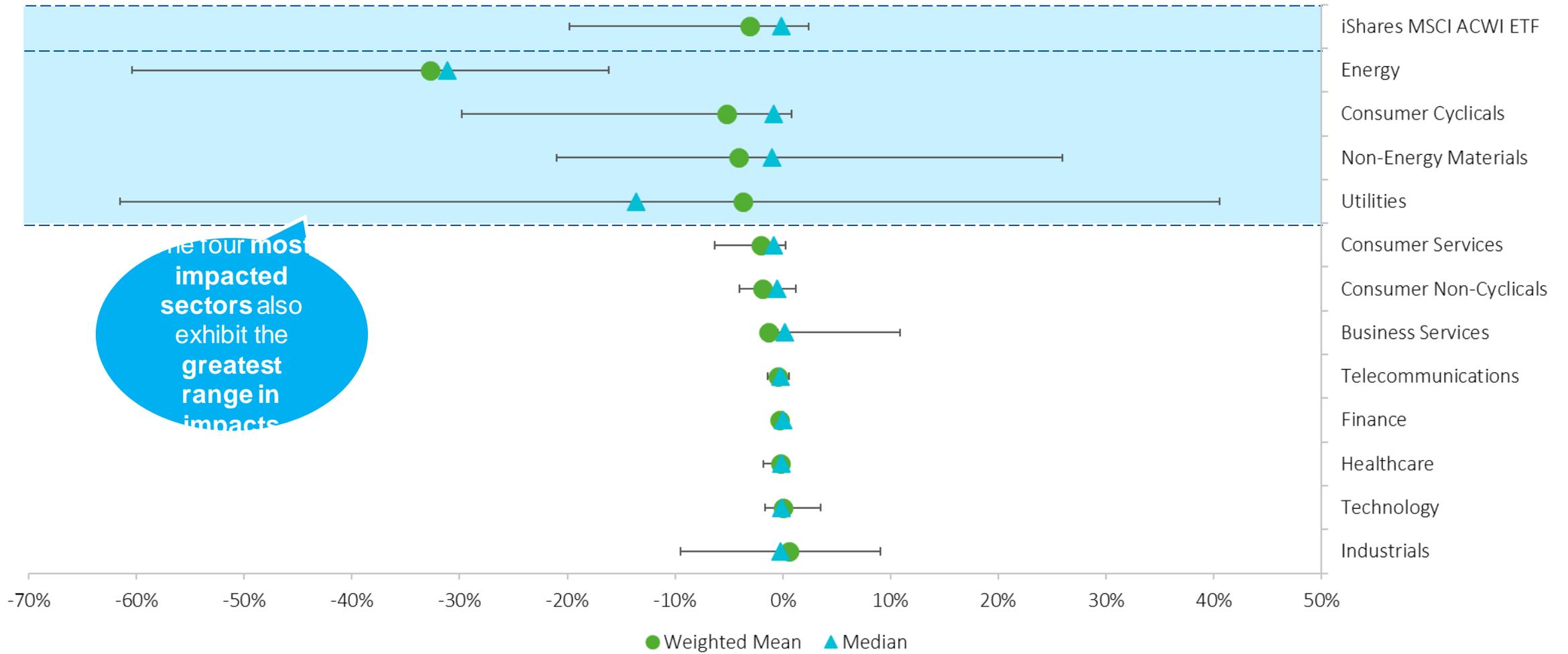
Increased volatility is also likely with a more event-driven price adjustment so the impact could be more significant

Non-OECD domiciled companies are more negatively affected on average – although in some regions (like China) this may reflect the lack of listed vehicles.

Nevertheless, at a country domicile level there is **significant dispersion of results** – for example, in the United States



Sectoral: Within-sector variation can be significant, particularly for the four most impacted sectors in the index: Energy, Consumer Cyclicals, Non-Energy Materials and Utilities



The four most impacted sectors also exhibit the greatest range in impacts

Actions for investors

- The analysis highlights the importance of forward-looking climate risk assessment and the limitations of portfolio carbon footprinting in capturing the nuance of impacts across and particularly within sectors.
- Draw on IPR in investor implementation of the TCFD recommendations on forward-looking risk assessment and climate scenario analysis alongside Paris aligned scenarios
- Asset owner actions:
 - ◇ Prepare for FPS as a likely central business case
 - ◇ At the same time, continue to advocate and engage for earlier and more ambitious climate action to minimize the disruption from a disorderly transition and from physical impacts resulting from global mean temperatures exceeding 1.5°C
 - ◇ Review equity asset allocation and define mitigation strategies for both passive and active investments.
 - ◇ Incorporate IPR into manager selection, appointment and monitoring
 - ◇ Engage service providers on IPR, including in appropriate indices and proxy voting recommendations
 - ◇ Consider climate as a factor potentially creating alpha.
- Passive investors: draw on IPR in stewardship and consider benchmarks informed by IPR
- All investors: draw on IPR to engage exposed sectors to transition
- Further implications for investor action are set out in the section below

Thank you!

Please see PRI website for further details:

<https://www.unpri.org/climate-change/what-is-the-inevitable-policy-response/4787.article>

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