



**Setting the context – the ingredients of the climate and energy transition are centered around:**

- Technology as a driver.
- Policy as an enabler and forcer.
- Temperature targets for the climate which act as a constraint and require swift action which policy can force.
- Changes in consumer preferences towards sustainability.
- Action by financial markets to support the transition.

**What is The Inevitable Policy Response?**

- Within this context of technology trends and consumer preferences, and the need to act swiftly, the IPR forecasts realistic policy action to force the climate transition which will affect the real and financial economy. Companies will need to respond, and investor portfolios will be affected.
- The IPR is broken into three parts:
  - A Forecast Policy Scenario (FPS) lays out the implemented policies from 2025 to 2050 based on policy announcements between 2023-25.
  - A trend-constrained pathway from 2050 to 2100 that reflects land-based and Greenhouse Gas Removal (GGR) technology constraints – which include Negative Emissions Technologies (NETs) such as Bioenergy CCS (BECCS) - as known today, and continued linear trends in energy, transport and industry.
  - A 1.5°C Aspirational discussion which looks at how this could accelerate further, particularly if there were another policy push after 2035, and the need for GGR, which includes NETs such as BECCS, past 2050.
- As such, the FPS prepares participants in financial markets for what is policy / regulatory risk.

**Financial markets are underprepared for climate-related policy risks**

A forceful policy response to climate change within the near term is not priced into markets today.

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.

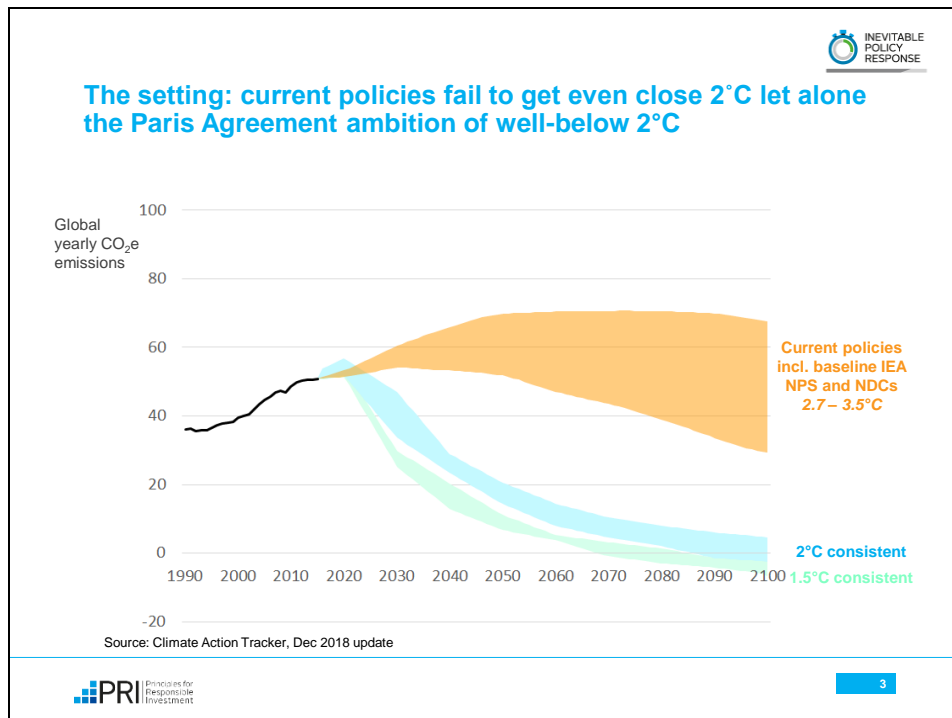
The longer the delay, the more disorderly, disruptive and abrupt the policy will inevitably be.

In anticipation, the PRI, Vivid Economics and ETA are building a landmark forecast of the financial impact of this **Inevitable Policy Response (IPR)**, including a Forecast Policy Scenario:


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

- **It's more probable than not that climate policy and regulation will become tougher in the next 3 -5 years *than it is today*.**
- **The longer the delay, the more disruptive and costly the policy response to business and therefore investors.**
- **Investors need to act now to protect and enhance value** by assessing the implications of the Inevitable Policy Response for portfolio risk.
- **Research has thus been commissioned to model and forecast** the potential risk to investors.
- From September, we will publish detailed modelling:
  - How much it will cost the economy?
  - And, for the first time:
    - Which **asset classes** will be impacted?
    - Which of the world's **sectors** are most at risk?

The preliminary results will be the first step in an ongoing process, as we continue to update and refine our modelling in response to major external developments and with feedback from stakeholders.




- IPR is needed because most research shows the world is on track for more like a 3°C outcome.
- The most quoted and used scenario used by investors and companies as the “base case” and is the IEA’s New Policies Scenario (NPS) and the NDCs.
- The NPS is in effect an NDC scenario which includes announced policies but not the potential for further policy action and is therefore conservative.
- If the science is right, this outcome would create intolerable pressure on governments to act well before we get to 3°C.



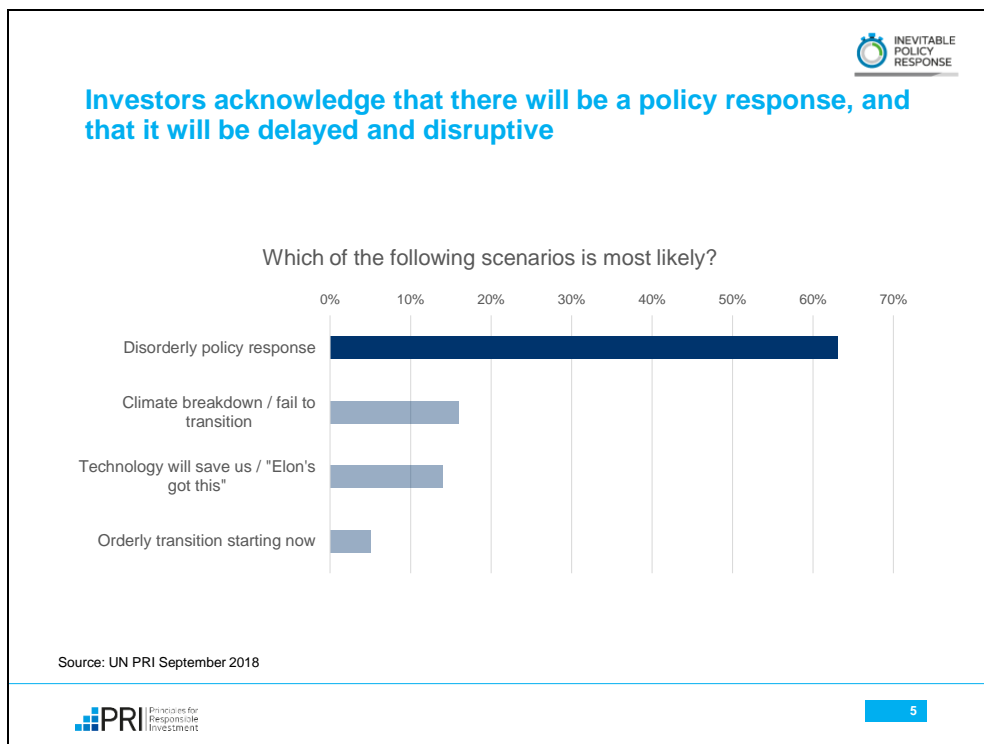
## Growing awareness and momentum on climate issues makes a near-term, forceful policy response more likely

<p style="text-align: center; background-color: #0056b3; color: white; padding: 2px;"><b>Changing weather trends</b></p> 	<p style="text-align: center; background-color: #0056b3; color: white; padding: 2px;"><b>Impacts on security</b></p> <p>The effects of a changing climate are a <b>national security issue</b>.</p> <p>- US Dept. of Defense </p>	<p style="text-align: center; background-color: #0056b3; color: white; padding: 2px;"><b>Cheaper renewable energy</b></p> <p style="text-align: center; background-color: #f9e79f; padding: 2px;"><b>FINANCIAL TIMES</b></p> <p>Europe 'watershed' as green energy set to overpower coal</p> <p>- 03/06/2019</p>
<p style="text-align: center; background-color: #0056b3; color: white; padding: 2px;"><b>New climate research</b></p> <p>Global warming report, an 'ear-splitting wake-up call' warns UN chief</p> 	<p style="text-align: center; background-color: #0056b3; color: white; padding: 2px;"><b>Civil society action</b></p> 	<p style="text-align: center; background-color: #0056b3; color: white; padding: 2px;"><b>Stakeholders demanding clarity</b></p> <p>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.</p> 


4

### Why a forceful policy response is inevitable

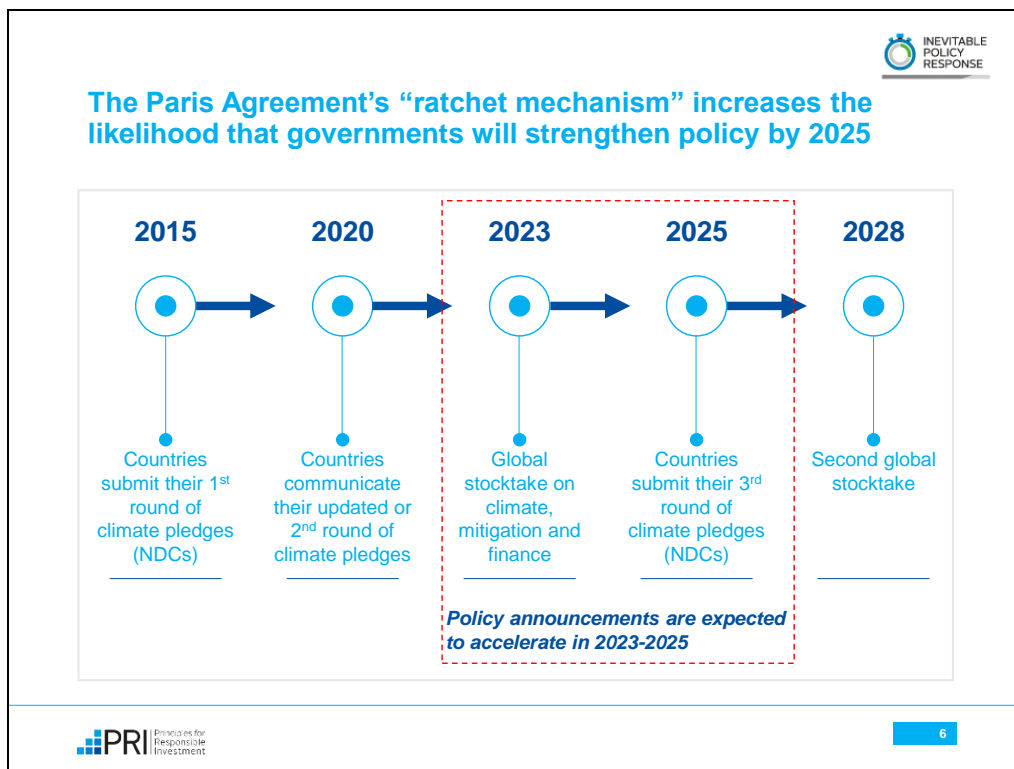
- The simple argument is that if the climate science is right then failure to reach the temperature goal of Well below 2°C simply is so disruptive to the world economic system and society some policy response is indeed *inevitable*. It is inconceivable governments could not react.
- The realities of climate change will inevitably catch up with governments across the globe – and they are beginning to. Pressure for policy action will continue to increase and come from all angles – environmental, social, and economic - fuelled by fears over national security; enabled by advances in technology and upward pressure by electorates and businesses to act.
- From an economic standpoint, the main drivers are the low costs of green alternatives and the gains of shifting to a low carbon economy. It is in many cases cheaper to substitute solar with batteries for coal-fired power stations for instance.
- Meanwhile businesses are faced with the uncertainty of not knowing when there will be concerted policy action. In response, a striking number of business investors are publicly supporting the climate transition, providing an economic and market mandate to policy makers for action.
- Civil society action in the face of climate disruption continues to accelerate (Greta Thunberg)
- **In this climate, the question for investors now is not *if* governments will act, but *when* they will do so, *what* policies they will use and *where* the impact will be felt.**



### When a forceful policy response will take place


The question of *when a forceful policy response takes place remains central to any forecast*. Indeed, there is evidence that investors believe that policy will catch up eventually.

- At the UN PRI in Person September 2018 meeting the opening plenary was asked to vote on what they thought the most likely outcome would be to the climate transition.
- The option included a “Disruptive Policy Response” which entails both a delay and forceful element.
- This was the leading expectation – in effect IPR.
- When combined with technology trends – a key driver of IPR itself – this came to a 75% level of expectation.














**When a forceful policy response will take place**

- The Paris Agreement has a ratchet process every 5 years of gathering together all the policy announcements at all levels of government, placing pressure on members to act at the same time – starting with the Global Stocktake (2023).
- This is not some global meeting that produces the result, but it gives a framework for governments at all levels – Regional, National, State and Local to operate within, and presses them to raise ambition.
- The ratchet mechanism also supports countries that exceed their targets to push for higher ambition thresholds.
- There is a significant degree of political capital at stake.
- We expect continued action and announcements before 2025 in certain regions, but the 2023 stocktake leading to the 2025 ratchet and pledges are the key focus of our Forecast.



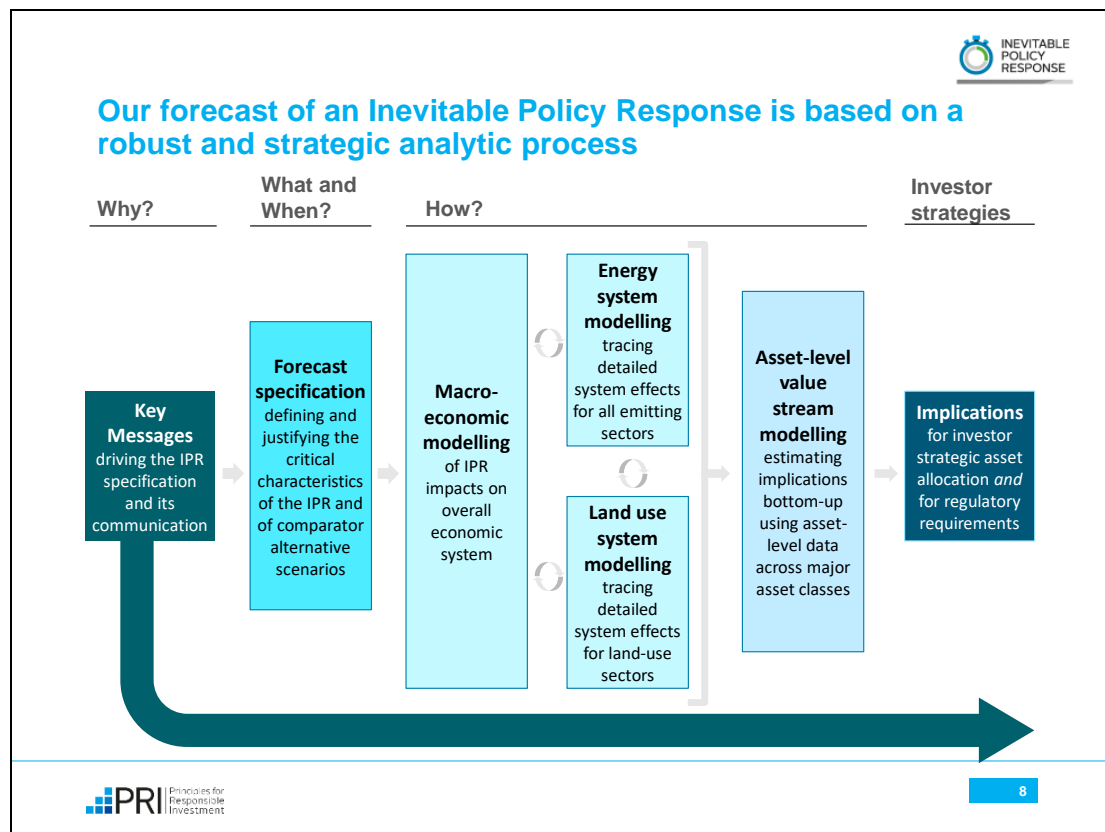
## The most likely policy levers to secure an accelerated and 'just' transition are starting to emerge

<b>Coal phase outs</b>	<b>ICE sales bans</b>	<b>Carbon pricing</b>	<b>CCS and industry decarbonisation</b>	 'Just Transition' lens
 The UK has committed to phase out unabated coal use by 2025, and support for a just transition is starting to emerge	 All new cars to be emissions-free in the Netherlands by 2030	 There are 57 carbon pricing initiatives around the world and 20% of global emissions are covered by a carbon price	 Very low deployment by 2030 for all countries and regions	
<b>Energy efficiency</b>	<b>Nuclear capacity</b>	<b>Agriculture</b>	<b>Land used based greenhouse gas removal</b>	 Enabling a green economy
 A coalition of 8 European cities have pledged to completely decarbonise their existing building stocks by 2050	 China has 46 nuclear reactors in operation and 13 under construction	 Substantial investment in R&D and global climate finance for maintaining historic rates of improvement in agricultural yields	 Well-functioning payment systems to support uptake of scalable technologies, including re/afforestation and bioenergy production	


7

### What a forceful policy response will look like

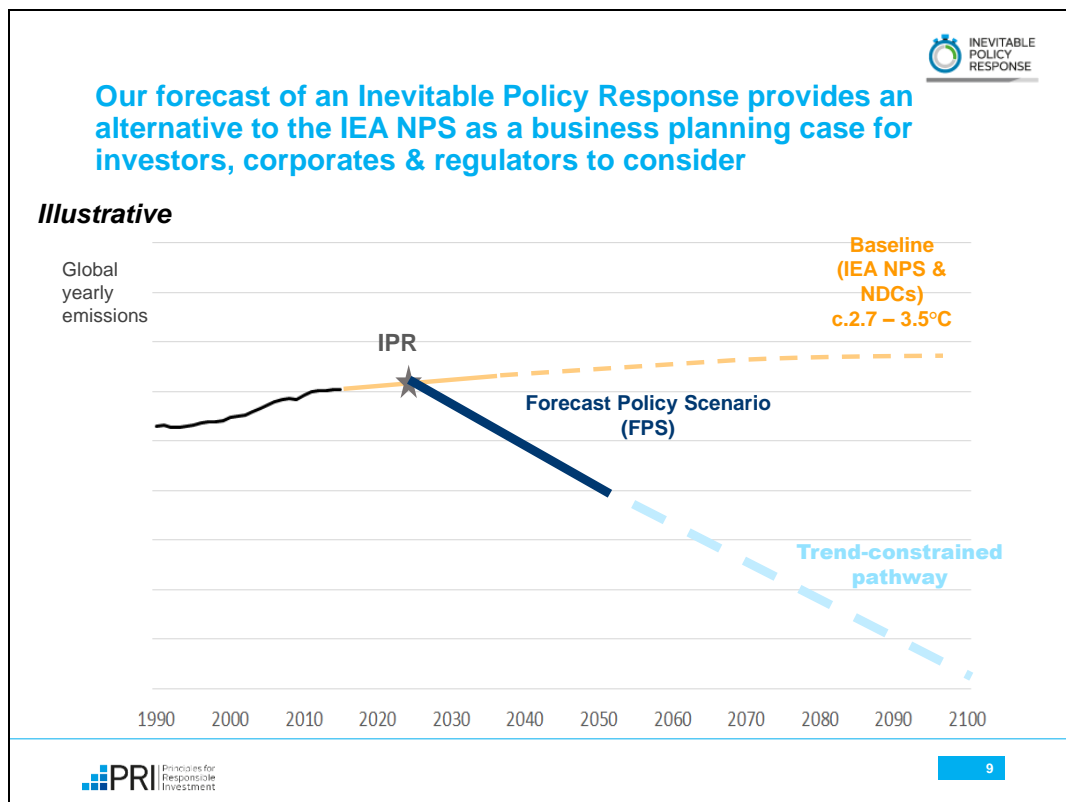
- Modelling policy forecasts is central to the project.
- Recent trends suggest policy will develop within some clearly defined levers.
- The IPR analyses in detail the policies we expect to see, and where they will have impact.
- Our policy assumptions build on consensus views, existing initiatives and recent announcements, but assumes a heightened level of ambition.
- All policies will be considered based on technical feasibility and under a just transition lens.
- A key theme is the costs of green technologies. As their cost falls, policy makers will be able to more easily impose greater performance standards across the economy, making it more efficient. Good examples are bans on coal and internal combustion engine, and rising energy efficiency standards.
- *Enabling a green economy and a Just Transition lens are key underlying assumptions*



**Advantages of our model:**

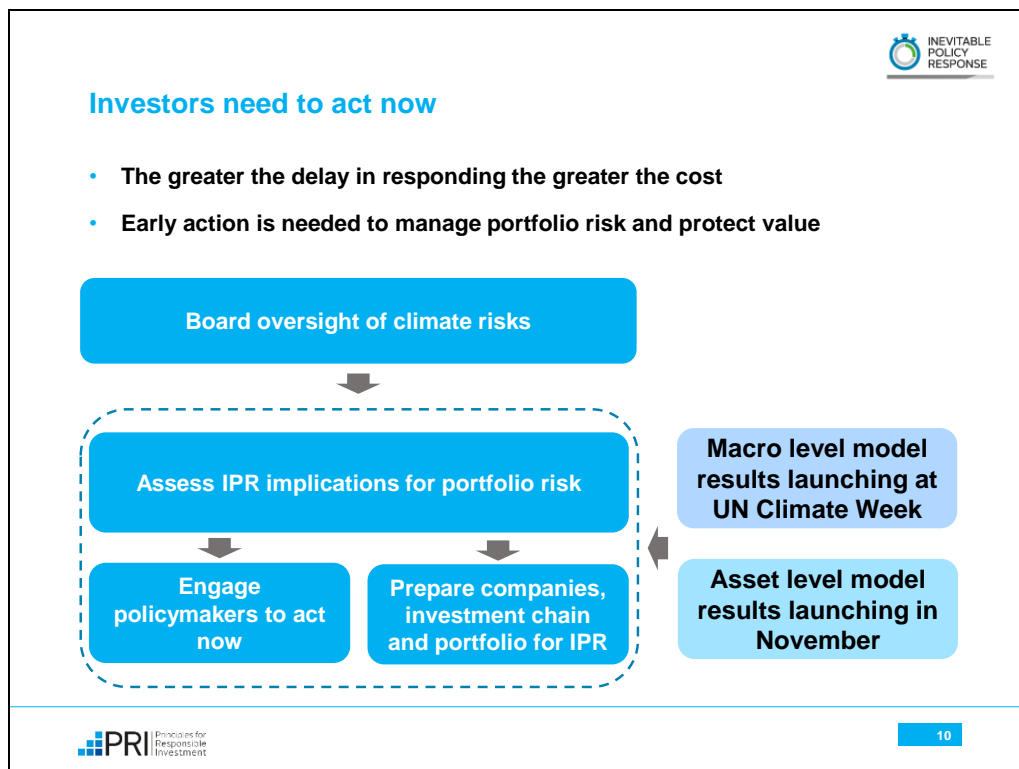
- **Transparency** – defining and justifying a realistic outline of future policy response.
- **Implications at the company level** – estimating implications at the asset level for the first time.
- **Completeness** – more accurately capturing the interaction between impacts of the macro economy, the energy system and the land use system.





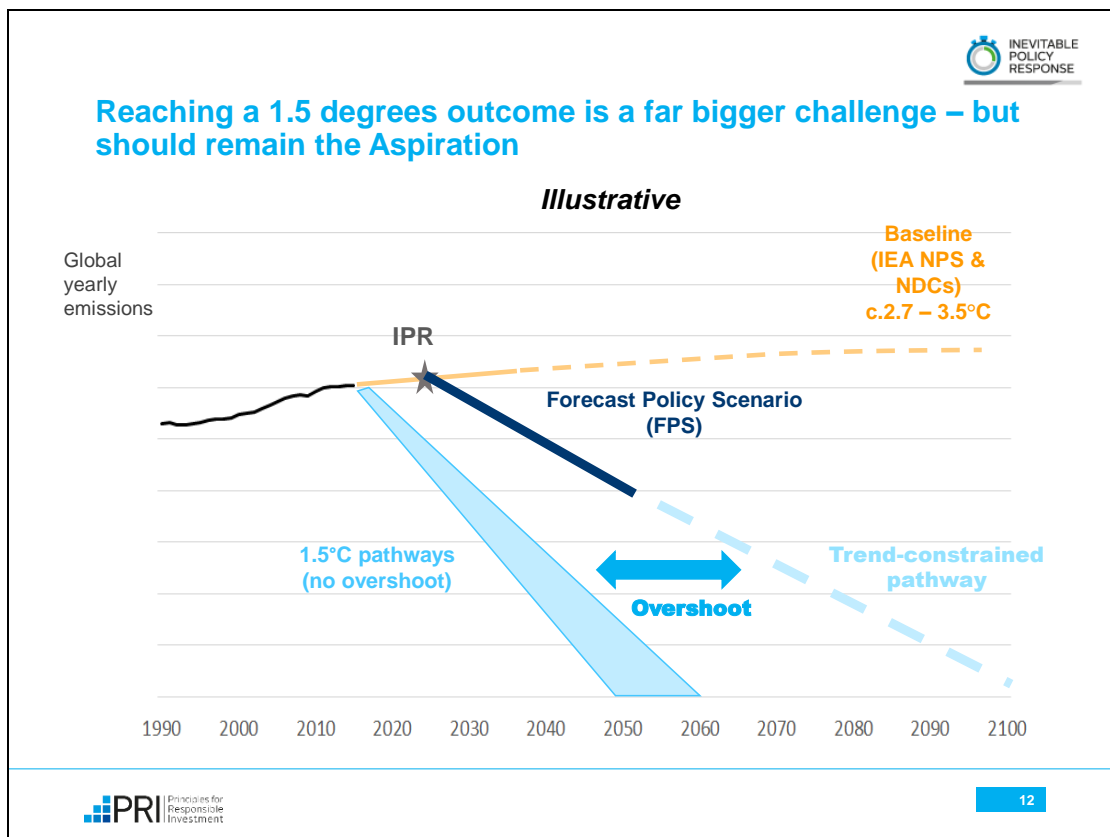
### How do we model the Inevitable Policy Response?

- IPR is a *framework* for using financial climate modelling as a business planning tool that includes asset level impacts on portfolios.
- It centers on a forecast of policy and technology pathways rather than a low probability scenario used as a tail event stress test. We call this the Forecast Policy Scenario (FPS),
- While policy makers are expected to aspire to the Paris Agreement of “well below 2C” the IPR Forecast is not constrained to meet a particular carbon budget.
- As such it seeks to facilitate discussion to replace the frequently quoted IEA NPS scenario as a business planning case for investors, companies and regulators.
- *Beyond 2050, we show a trend-constrained pathway that reflects land-based and Greenhouse Gas Removal (GGR) technology constraints – which include Negative Emissions Technologies (NETs) such as Bioenergy CCS (BECCS) - as known today, and continued linear trends in energy, transport and industry.*




- Investors need to act now to protect and enhance value by assessing the implications of the IPR Forecast for portfolio risk. The greater the delay in responding, the greater the potential cost.
- This is true for policy makers, investors and corporations.
- And action from investors will help shape the transition in conjunction with policy action, supplying capital to green energy investments and encouraging a switch from high carbon activities. Our research programme will culminate in a Forecast-based set of modelling results reaching down from high level macro numbers to assets and portfolio impacts for investors.
- The PRI encourages investor signatories to engage in forward looking analysis and strategic planning to better prepare for transition and mitigate financial losses associated with IPR. Careful attention is recommended for strategic asset allocation, portfolio structure, governance approaches, and risk management responses. Specific actions include:
  - Prepare an **IPR plan**
  - Review **investment committee role** on IPR
  - Encourage **asset managers** to respond via IPR product offering
  - Use **FPS in TCFD disclosures**.
  - Assess **the resilience of investment strategy against FPS**

# Still aspire to the Paris Agreement..



- The carbon budget for a 1.5°C outcome is 580GtCO<sub>2</sub>e at a 50% chance of achieving that based on the new IPCC estimates.
- Given GHG emissions running at more than 37 GtCO<sub>2</sub> per year, this would require a Net Zero year of 2060 at the latest.
- *The FPS and corresponding trend-constrained pathway overshoot this 1.5°C pathway and therefore challenges policymakers further in order to stabilise the climate by 2100.*
- Most 1.5°C scenarios tend to assume the Net Zero year around 2050 and 2060 with significant NETs post the Net Zero year.
- Given our conservative approach to technologies not at scale, such as CCS, we look at options to close this gap in this aspirational context.



## PRI's ambition is to limit warming to 1.5°C

- Aiming for a 1.5°C target matters – it is a much better outcome for the world than 2°C.
- Stakeholders should aspire to 1.5°C – and that ideally, they would set targets to reach this goal including a second policy ratchet.
- However, in the interim they should proceed with realistic and transparent forecasts.

**But our forecast tells that we will overshoot the 1.5°C target**

Therefore, Policy makers need also to focus R&D spending on key areas of the “Known Unknowns” such as:

- **Faster policy action – ACT NOW**
- Negative Emission technologies for industry
  - Scale up of CCS enables bioenergy use with CCS (BECCS) and in industry, while we see negligible CCS deployment in fossil-fuel fired electricity generation.
  - Direct air capture
- More aggressive agricultural practices
  - Dietary Change leading to less beef usage
- AI and autonomous vehicles
- Hydrogen and bioenergy
- Consumer preferences
- Low-carbon materials


13

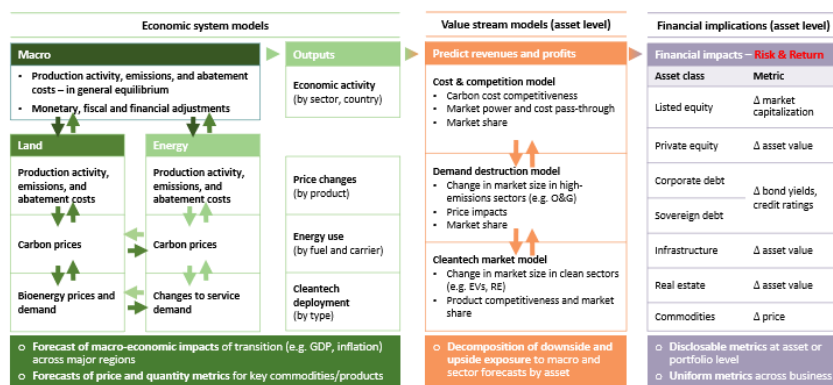
- As the FPS is primarily aimed at demonstrating latent risk in investor portfolios, it differs from climate scenarios by working up from probable policy and technology developments, rather than working back from a pre-defined target temperature.
- For those that aspire not merely to better price in policy developments, but to themselves contribute to goals such as the Paris Agreement target of limiting warming to 1.5°C, or to reach net zero emissions by 2050, the PRI encourages such ambition.
- The IPR highlights the challenges such an ambition will need to overcome given current political and technological realities, and pinpoints specific areas where stakeholders need to act now to achieve such goals.
- Negative emissions technologies such as Bio Energy with Carbon Capture and Storage (BECCS) and direct air capture and aggressive agricultural practices are key to most attempts to address an overshoot in a 1.5°C target.
- We will explore the various “known unknown” technologies and policy options that can contribute to reducing the overshoot.

# Appendix

## Our model analyses the impact of climate-related policy and regulatory risks on the financial markets

### ADVANTAGES OF OUR MODEL:

- **Transparency** – defining and justifying a realistic outline of future policy response
- **Implications at the company level** – estimating implications at the asset level for the first time
- **Completeness** – more accurately capturing the interaction between impacts of the macro economy, the energy system and the land use system



- The Forecast will cover a wide range of policies (incl. carbon pricing, demand-side, supply-side and LU policies) which are translated into the macro, energy systems and land use models
- These three ‘system’ models, which are aligned across key variables produce a set of economic outputs, including:
  - GDP per region/country, inflation rates and interest rates;
  - The energy mix;
  - The technology mix (e.g. EV deployment);
  - Changes in land use.
- The asset model uses these macroeconomic outcomes as inputs to provide projections of:
  - Market capitalisation impacts (MSCI ACWI);
  - Corporate debt impacts (MSCI ACWI issuers);
  - Sovereign debt impacts (for key regions / countries);
  - Infrastructure and PE impacts (based on assumptions on representative portfolios).
- Implications for strategic asset allocations will then be derived from these results.

Slide 16



## Project partners

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This project has been commissioned by the PRI.



**PRI** Principles for Responsible Investment



**vivid economics**  
putting economics to good use



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Slide 17

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Slide 18



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Slide 19

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