Planetrics: Vivid Economics' approach to Measuring and Acting upon Climate Risks

Vivid presentation to FEEM

November 2020

vivideconomics

putting economics to good use

Planetrics supports financial institutions in responding to risks and opportunities from both physical and transition climate change impacts

Services

Strategic advisory

Case: opportunity mapping for a global private equity investor

Risk assessment

Case: BoE climate stress test for a UK retail and commercial bank

External engagement

Case: TCFD reporting for an American investment manager

Capabilities

Financial and micro-economic modelling
(e.g. FIMM & RIMM)

Macro-economic modelling
(e.g. VIEW & G-Cubed)

Physical climate risk modelling
(e.g. Global models)

Land-use & energy system modelling
(e.g. MAgPIE & TIAM)

Geospatial & big data analytics
(e.g. remote sensing)

Web-based delivery
(e.g. interface development)

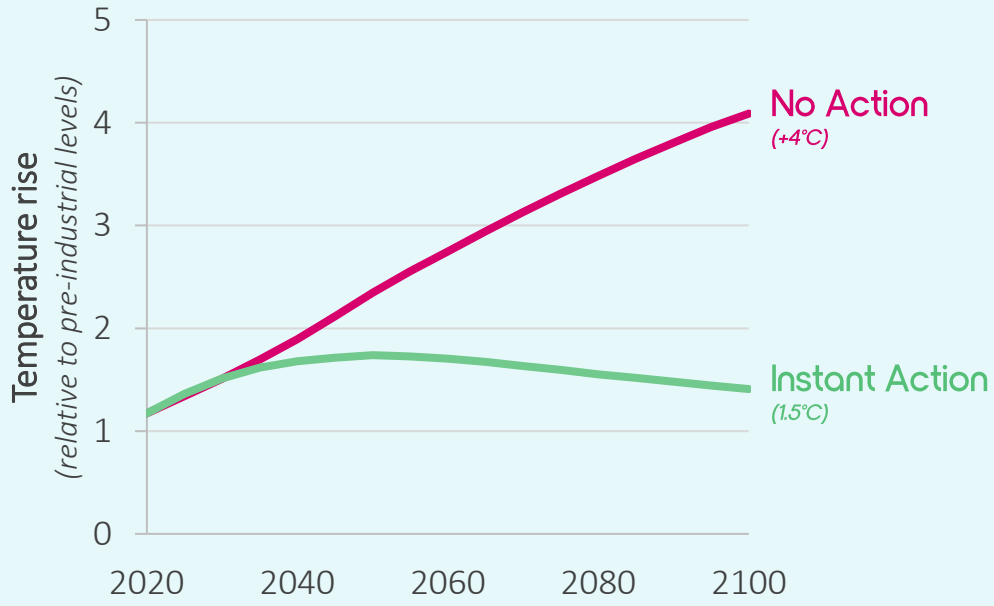
Agenda

1. The nature of climate risks
2. **Emerging frameworks** for embedding climate risk into risk management practices
3. **Illustrative results** from the climate risk toolkit

Climate change has the potential to pose both physical and transition risks for investors

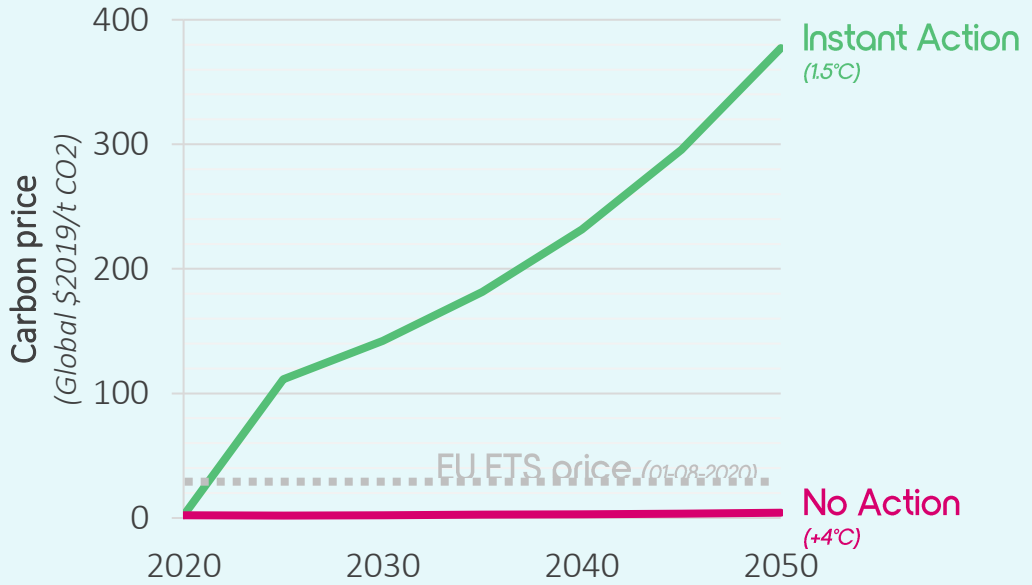
Physical risks:

- Acute: increased severity of extreme weather events, such as cyclones, hurricanes, or floods
- Chronic: sustained higher temperatures that may cause sea level rise or lasting heat waves



Transition risks:

- Direct: carbon pricing whether through a carbon price, performance standards or indirect subsidies and taxes on clean or dirty sectors
- Systemic: new demand patterns and technology change that may change market outlooks



Source: NGFS Remind runs

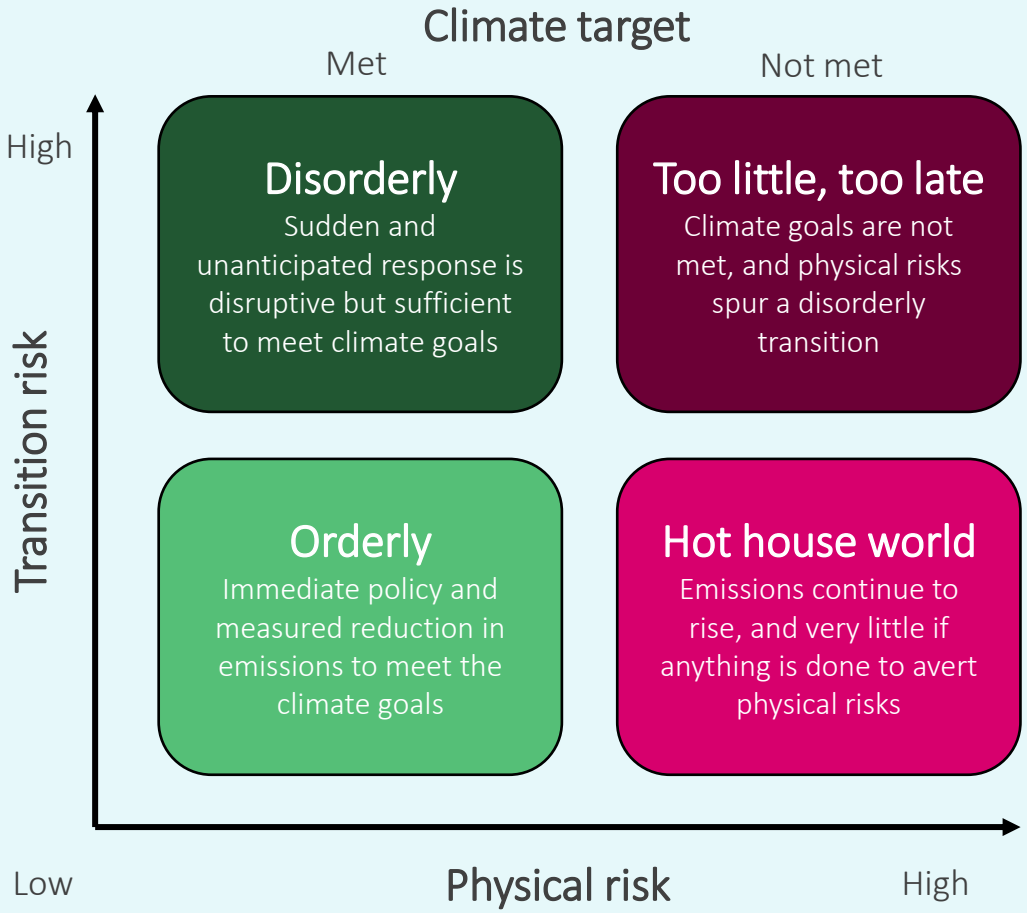
Very high transition risk implies low physical risk and vice versa, but there are intermediate levels of risk that are possible simultaneously

Increasing transition risk means reduces physical risk, and the timing of these risks differs significantly:

- Physical risk are expected to increase over decades, with the risk of extreme impacts increasing in later periods
- Transition risks are expected to occur earlier, with the possibility of sudden policy or technology shifts at any period

Recently released NGFS* climate scenarios cover a range of physical and transition risks and offer a useful framework for mapping the interaction between risks

The NGFS scenario framework

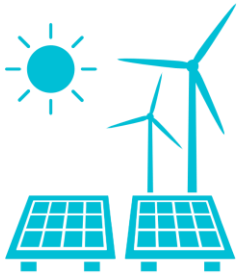


Note: *The Network of Central Banks and Supervisors for Greening the Financial System (NGFS) is a group of Central Banks and Supervisors focused on development of environment and climate risk management in the financial sector

Both transition and physical climate risks are expected to radically transform a number of critical sectors

Limited fossil & renewable energy system

- ↓ Accelerated peak in oil & gas demand, and rapid phase out of coal
- ↑ Increased electrification with renewables generating the majority of power



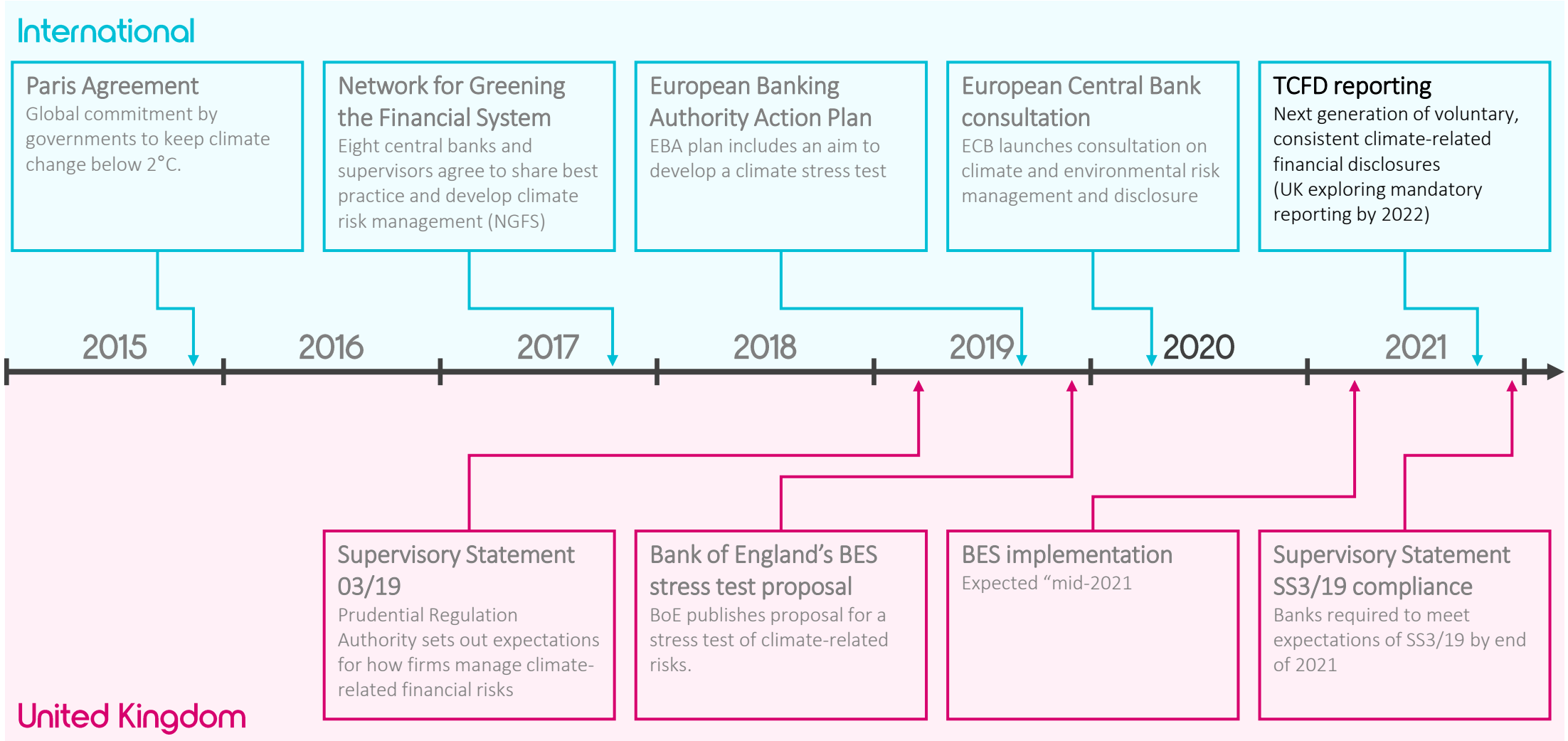
Transformed & electrified transport

- ↓ Reduce demand for emission intensive transport such as aviation and ICE vehicles
- ↑ Rapid deployment of ultra-low emissions vehicles – electrified or hydrogen

More energy efficient buildings & industry

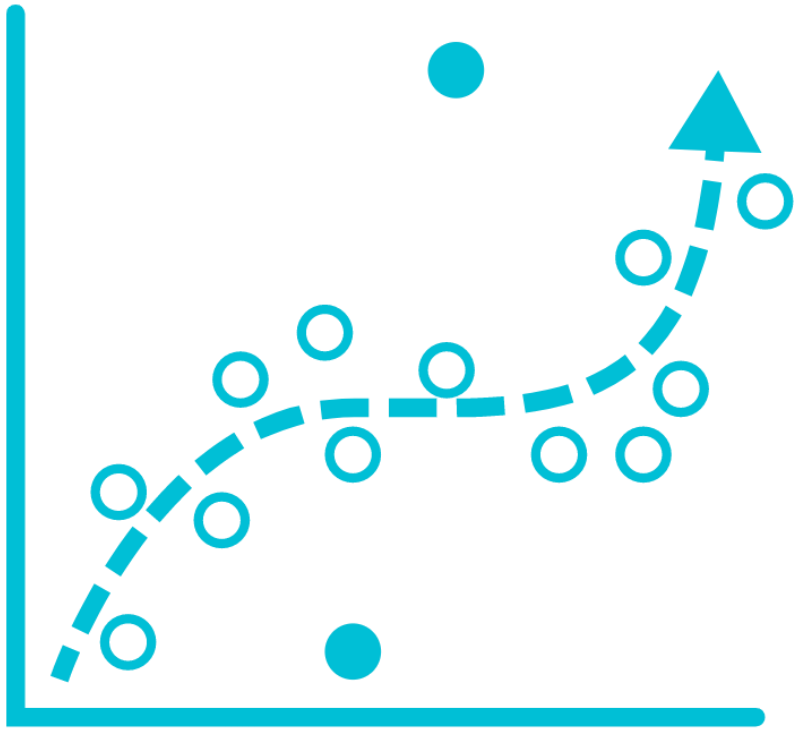
- ↓ High energy cost for inefficient firms and homes changing market dynamics
- ↑ Uptake in demand for cleantech technologies and green minerals

We respond to a changing regulatory environment with increased focus on identifying and managing climate risks in the financial sector



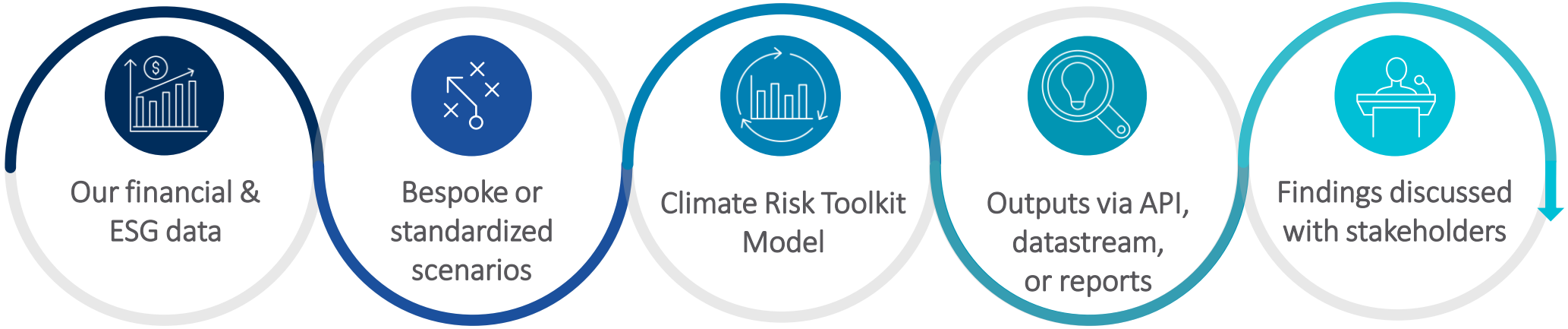
Scenario analysis is at the core of how investors are measuring and acting upon climate risks

- **The timing, magnitude and nature of climate change impacts on companies' business models, strategies and financial performance is uncertain**
- To appropriately incorporate these potential impacts in strategic decisions investors need to analyse the potential risks and opportunities under various possible states of the world, exploring a wide variety of sensitivities.
- Scenario analysis is a **process for identifying and assessing** the potential implications of a range of plausible future states under conditions of uncertainty
- Organizations consider **how the future might look** if certain trends continue or certain conditions are met



Planetrics provides a robust modelling suite which is straightforward and intuitive to use, facilitating its deployment across different stakeholders in a firm

We follow five main steps and encourage client interaction throughout:



Your outcomes:

Enhanced **strategy and decision-making**
Optimised **portfolio and benchmark selection**
Targeted **investee engagement**
Facilitated **TCFD and regulatory reporting**

A flexible 4 step framework that allows detailed bottom-up scenario analysis and quantification of investor implications by sector, asset class & securities

1. Scenarios

Transition pathways

'Positive' (optimization focused) :
- *Least-cost abatement*

'Normative' (policy/technology-driven):
- *Policy design & timing*
- *Technology & behavioral change*

Physical pathways

Inputs:
- *Transition pathway*

Sensitivities:
- *Climate sensitivity*
- *Potential feedbacks*

2. Economic shocks

Indirect impacts

Transition risk:
- *Demand changes (e.g. EV sales)*
- *Price changes (e.g. oil prices)*

Physical risk:
- *Changes to sectoral composition and gross value added (GVA)*

Direct impacts

Transition risk:
- *Direct costs (e.g. carbon taxes)*
- *Implicit costs (e.g. standards)*

Physical risk:
- *Chronic damages (e.g. temperature)*
- *Acute damages (e.g. flooding)*

3. Asset value streams

Exposure

- *Location,*
- *Market, and*
- *Emissions intensity*

Action

- *Abatement (e.g. fuel change)*
- *Adaptation (e.g. flood defenses)*

Competition

- *Relative competitiveness*
- *Market share adjustments*
- *Cost pass through*

4. Financial implications

$ impacts

Equities (DCF modelling):
- *Listed*
- *Private**

•Debt (Default risk modelling):
- *Corporate*
- *Sovereign*

Alternatives (DCF/market modelling):
- *Real Estate**
- *Infrastructure**
- *Commodities*

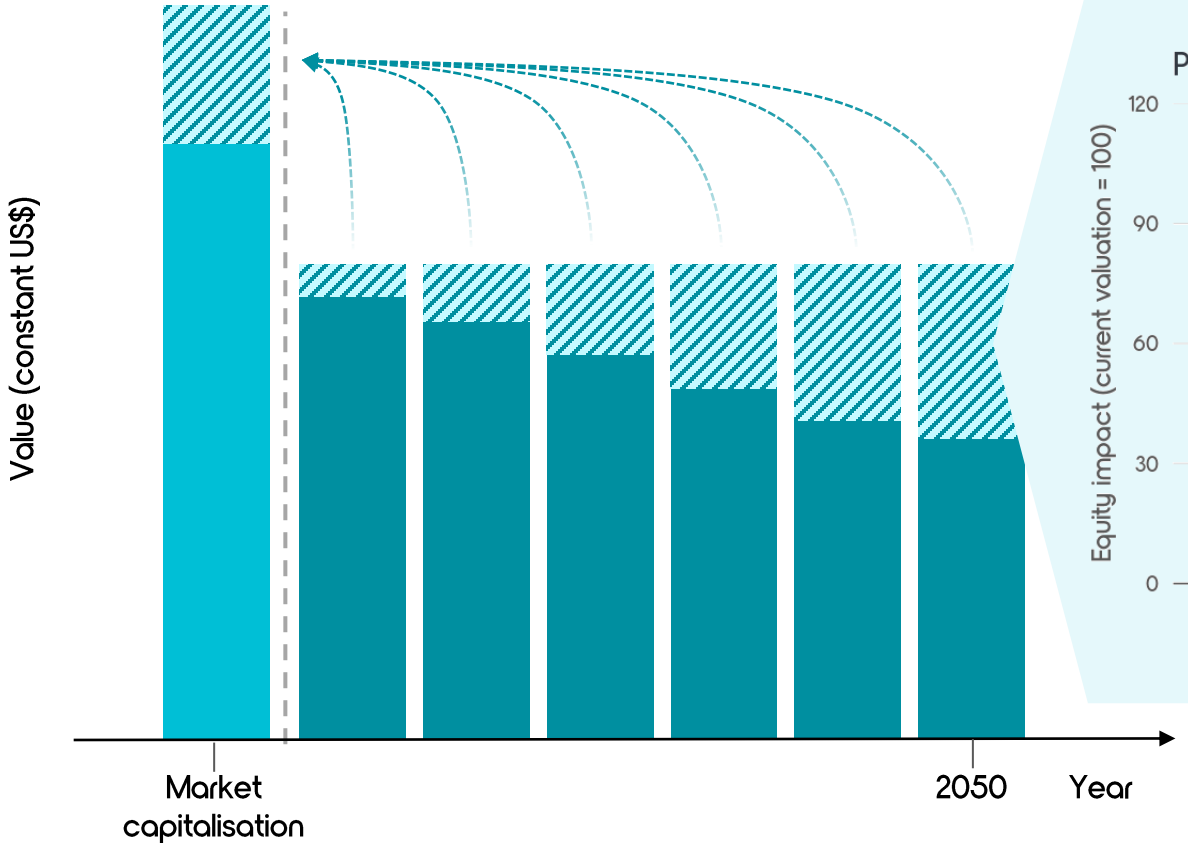
What makes the toolkit distinctive

- Offers bespoke scenarios
- Incorporates indirect impacts
- Accounts for action and competition
- Covers all asset classes

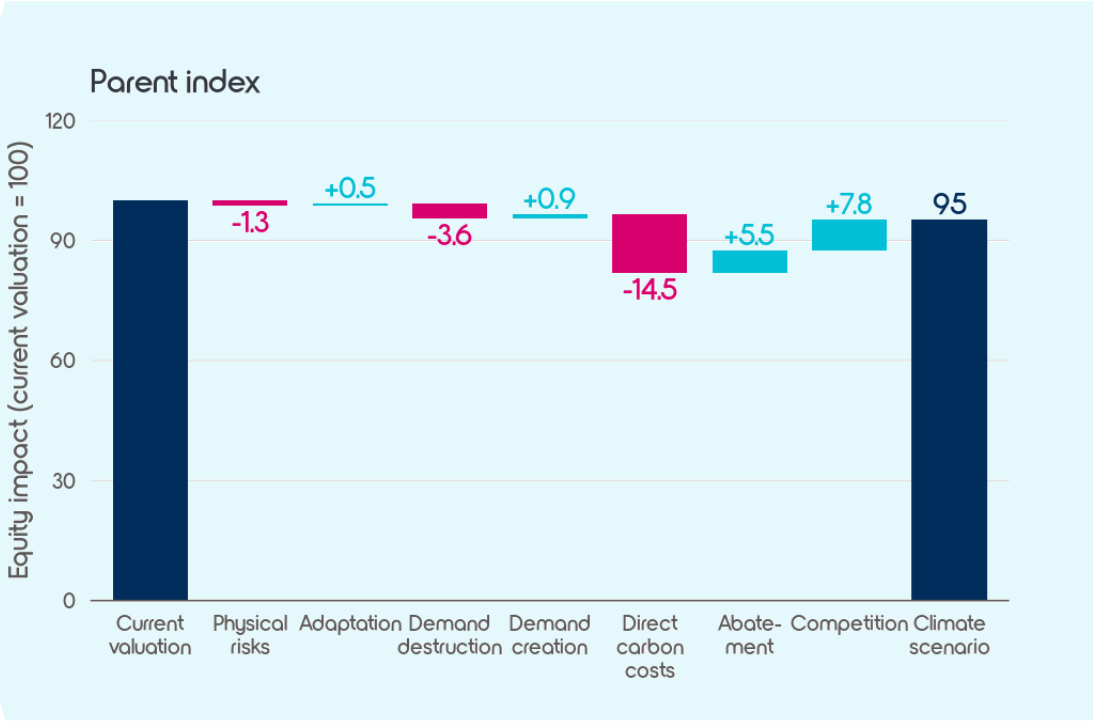
Notes: *Investor specific (resolution of analysis data dependent)

Our approach models future cash flows across scenarios and interprets climate impacts as differences against a 'baseline' scenario as illustrated in IPR

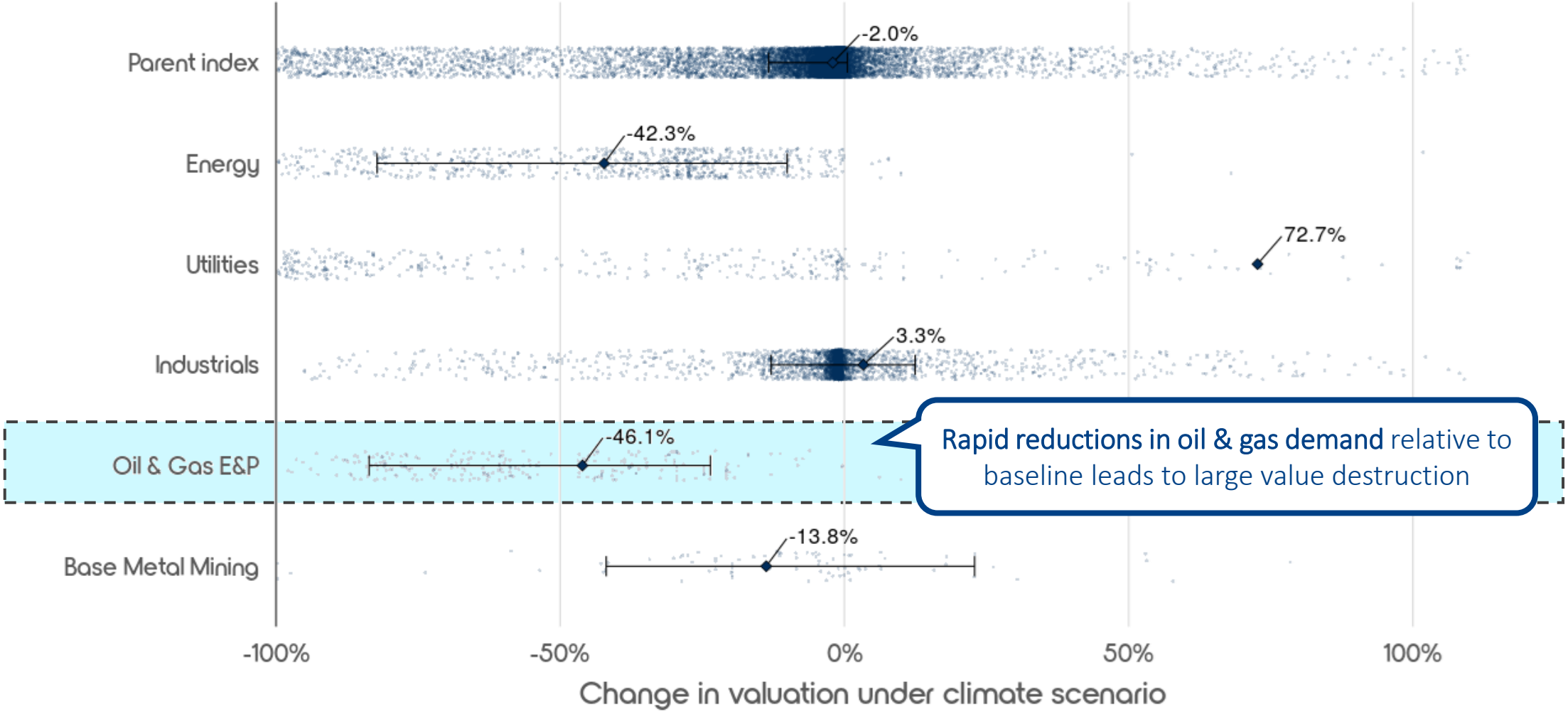
Total value impairment equals the present value of annual changes in earnings



Earning impacts in each year can be disaggregated into five channels



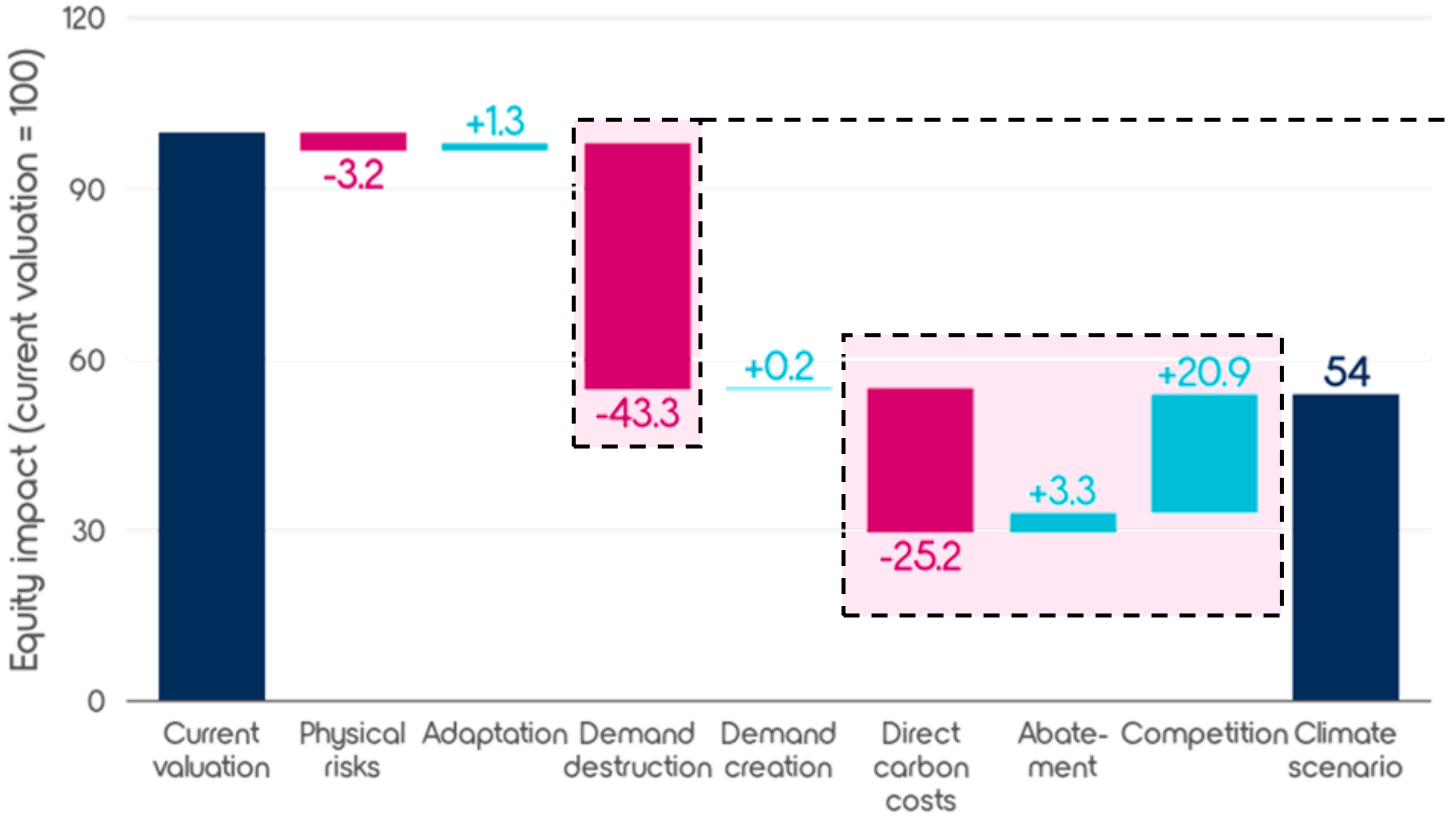
Sector and index level impacts for 20,000 global equities under an orderly transition scenario (2°C) relative to current policies



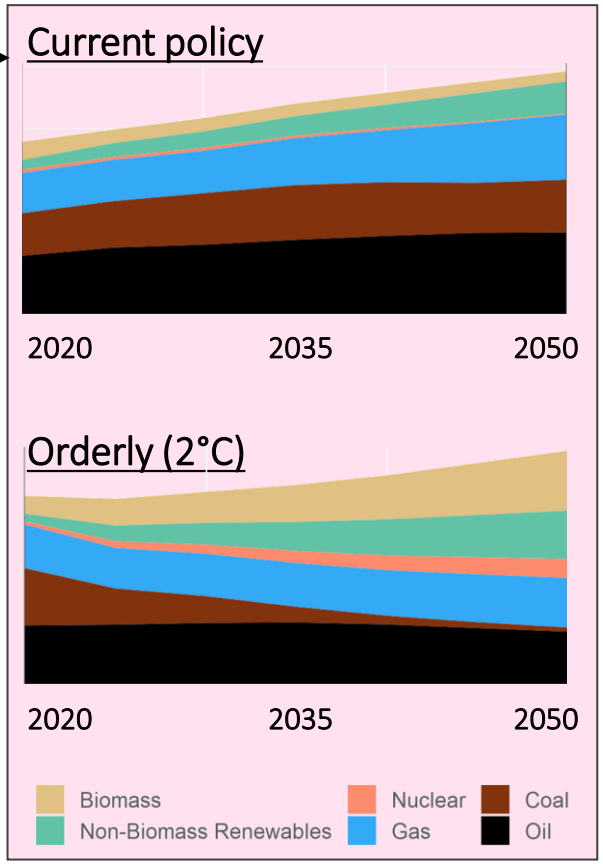
Note: Based on NGFS Marker scenarios (Immediate 2C with CDR (Orderly, REP) relative to Current Policies (Hot House World))

Oil & gas E&P: Negative impacts from both demand destruction and carbon costs, though most operational cost increases can be passed on

Oil & gas E&P impacts under NGFS Orderly (2°C)



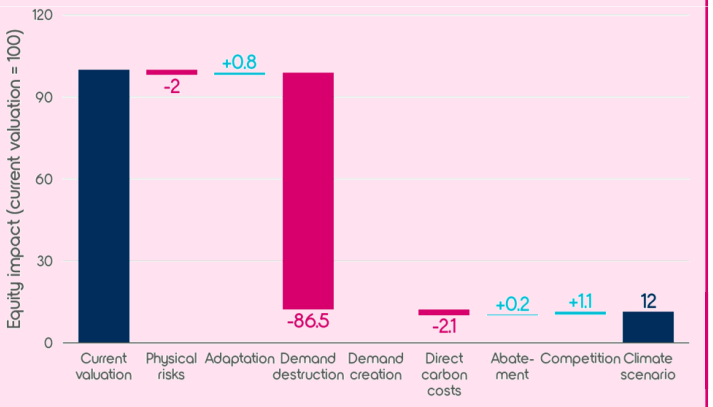
Key variables



Oil & gas E&P: Demand destruction and carbon pricing adversely impact the oil & gas sector, but coal producers are even more impacted

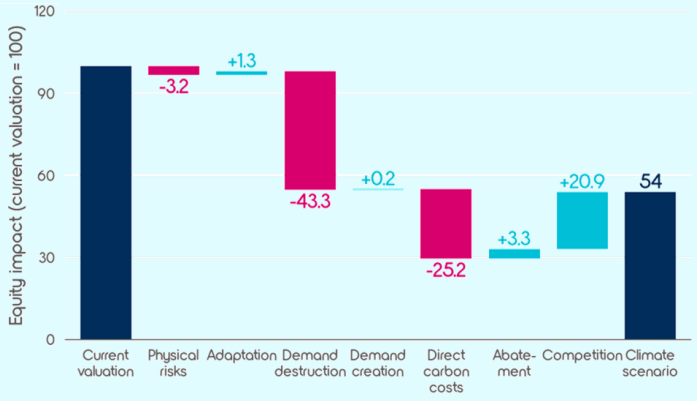
North American coal miner

- Integrated energy companies which also include coal mines faces very substantial demand destruction as thermal coal is phased out of the energy system.



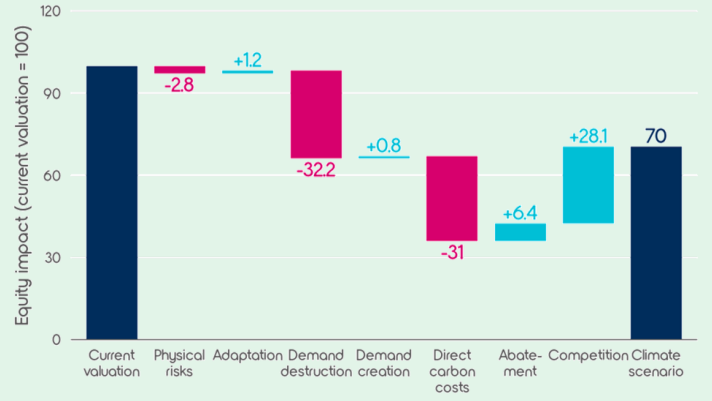
Sector average

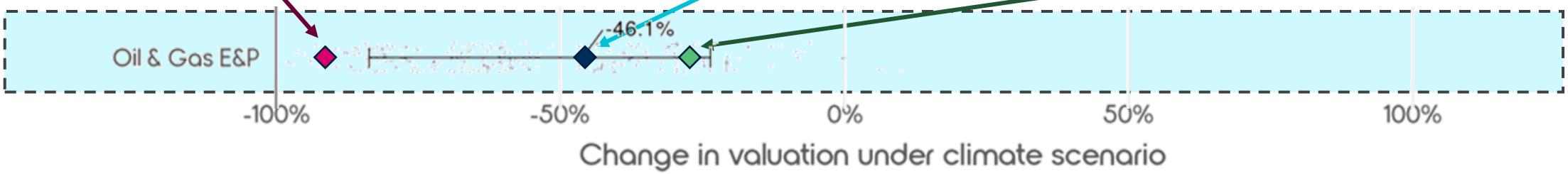
- Fall in demand for fossil fuels leads to a large negative impact for the sector.



European oil & gas company

- Integrated oil & gas companies face substantial demand destruction and carbon costs, however, carbon costs can be mitigated through abatement and cost pass through





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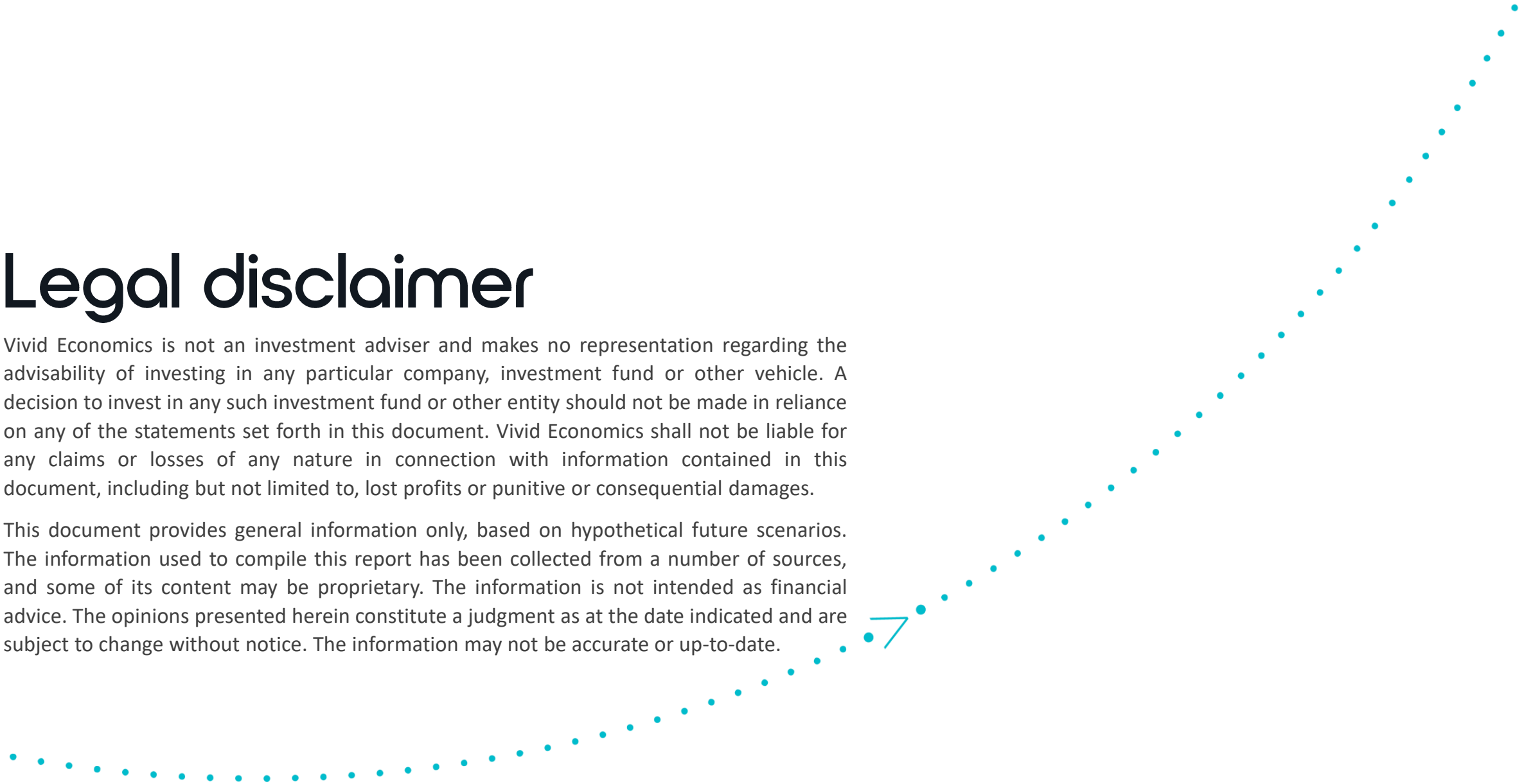

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putting economics to good use

Presenter

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Managing Director

planetrics
a vivid economics company

Thomas heads up the Planetrics team overseeing project work and data analytics development for banks, investors and the insurance industry. His work spans across all the major assets classes in addition to steering the company's mission to prepare financial institutions for climate stress testing in Europe, North America, and Asia-Pacific.

Before joining Planetrics, Thomas was the Finance Practice Lead at Vivid Economics, where he led advisory work for financial, energy and industrial companies on the implications of energy market developments, future technology pathways and new policy changes. He was awarded the Grantham PhD scholarship at the London School of Economics (LSE) which allowed him to utilise asset level data to identify optimal extraction and investment patterns in the oil and gas industry. As part of his research, Thomas has been a visiting scholar at the University of Oxford and acted as an external consultant for the OECD. He has also previously worked in both the German and Danish energy sector including WINGAS GmbH and the energy division of the Confederation of Danish Industries.

Thomas holds an MSc and a PhD in Environmental and Resource Economics from the LSE and a BSc in Economics from the University of Copenhagen.

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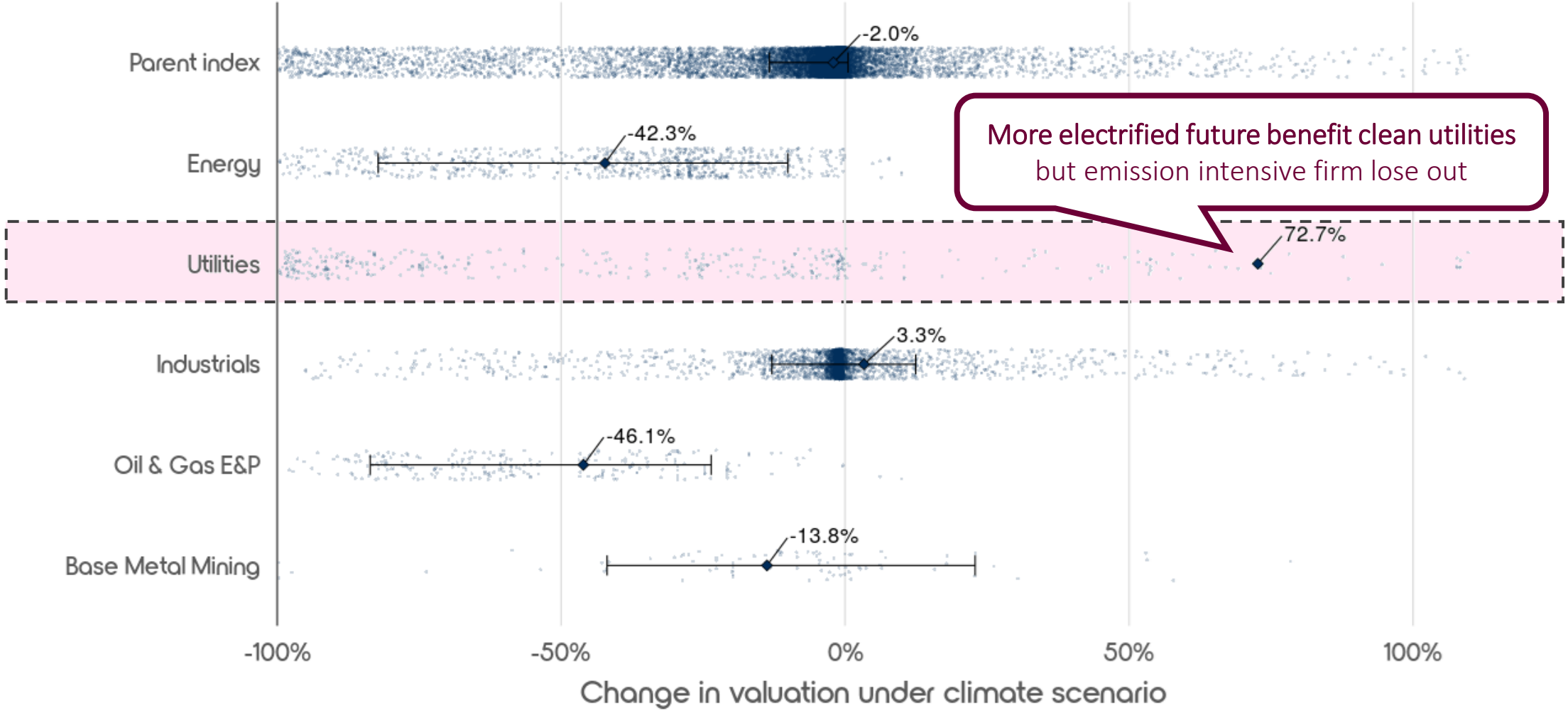
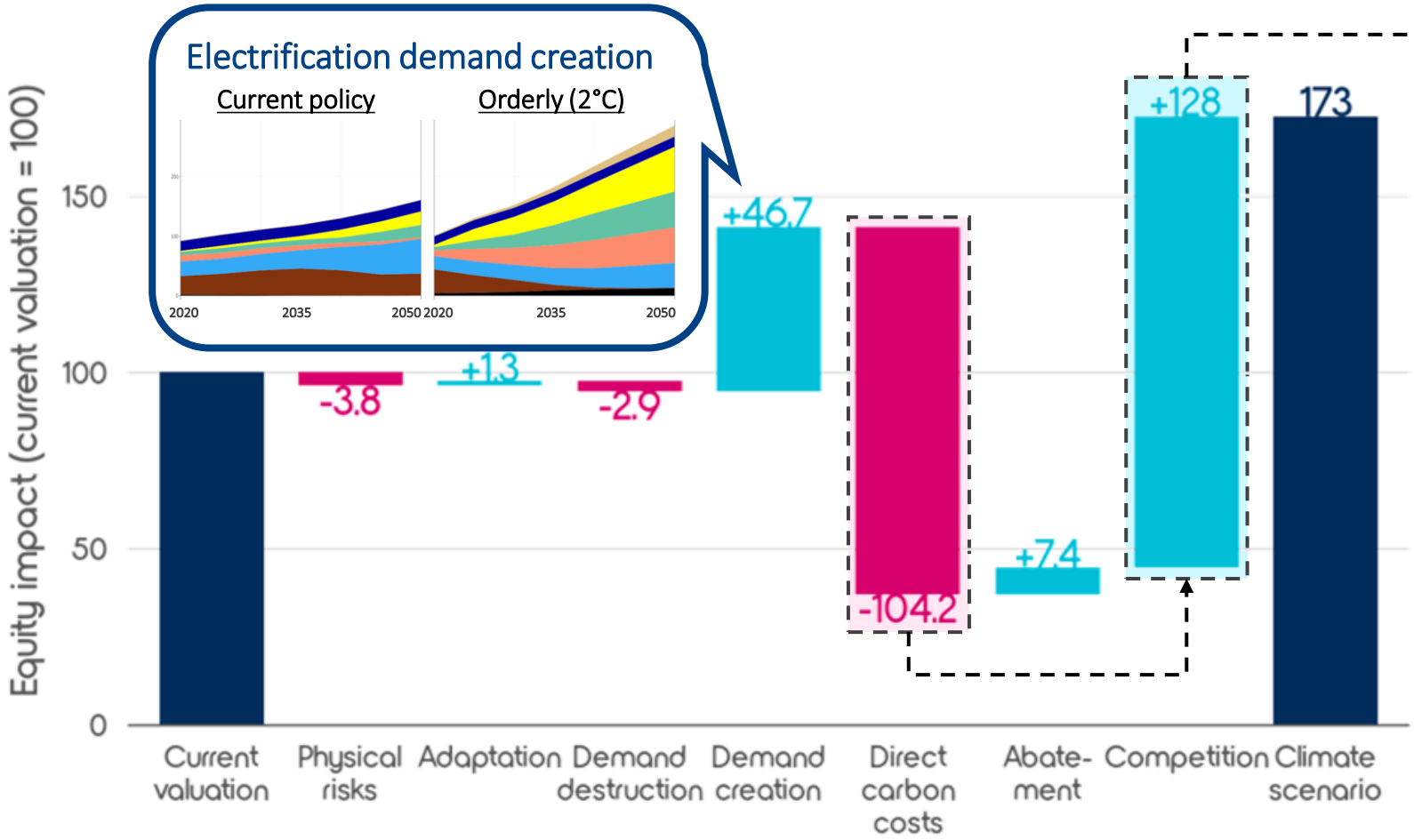


Note: Based on NGFS Marker scenarios (Immediate 2C with CDR (Orderly, REP) relative to Current Policies (Hot House World))

Utilities: The impact of carbon costs on fossil generation are offset by fast growing renewables that benefit from carbon pricing and demand creation

Utility sector impacts under NGFS Orderly (2°C)



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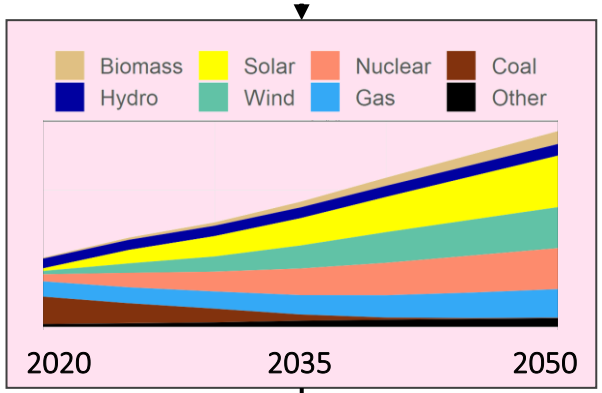
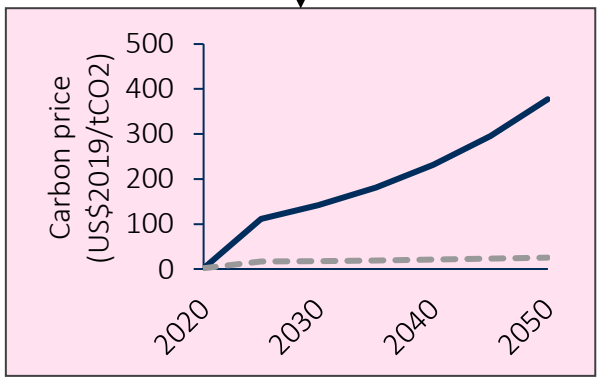
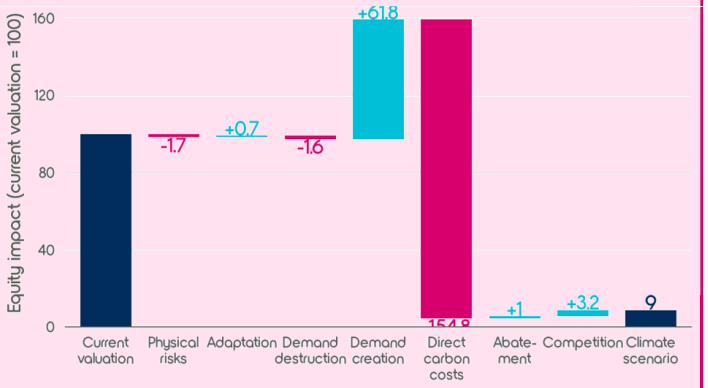




Utilities: Carbon intensive generators are forced to exit the market as low carbon utilities gain market share and benefit from higher electricity demand

North American coal power utility

- Dirty producers faces very substantial direct carbon costs largely as a result of its coal generation. Negative impacts reach 91%.



Sector average

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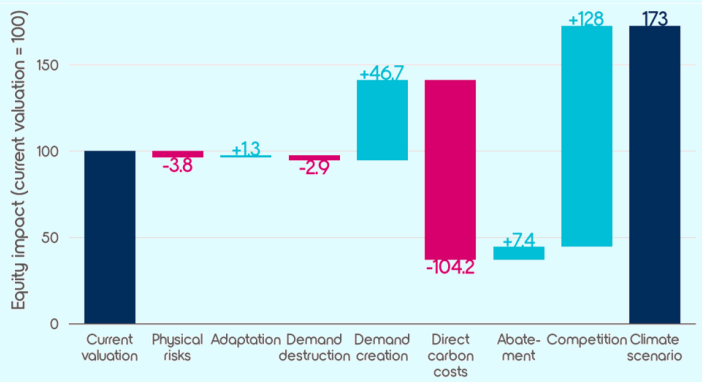

European wind power utility

- Cleaner unities with a generation mix that is less carbon intensive than competitors, allow some companies to benefit from stricter policy. The overall for this European utility is +111%.