Scenario analysis for institutional investors

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Head Of Sustainability and Responsible Investment Strategy
### LGIM’s Climate Impact Pledge
Qualitative and quantitative analysis

<table>
<thead>
<tr>
<th>Climate Statement</th>
<th>Transparency</th>
<th>Board</th>
<th>Votes</th>
<th>Strategy</th>
<th>Reputation</th>
<th>Public policy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disclosure Scores</td>
<td>Environmental Score</td>
<td>GSG Verification</td>
<td>Commitment</td>
<td>Functionality</td>
<td>Independence</td>
<td>SECTION (total)</td>
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</table>

**More data – better analysis**
Scenario analysis
Climate Impact Pledge - LGIM engagement

84 companies:

13 have done no scenario analysis

- But what’s disclosed are mainly poor in quality

Investors want more information

- Shareholder resolutions

Room for improvement

- Median score for 20/100
- No company got a maximum score
- Companies scored better on individual sections on climate risks & climate opportunities

Shows the need to join these up through scenario analysis
The quality of scenario analysis varies

Insurers at the forefront

- AXA: stress-testing fixed income and equity portfolios against a 2°C scenario
  - “To improve the 2°C alignment of its portfolios, AXA has identified a number of alternative companies for intra-sectorial stock reallocation in the automotive and utilities sectors.”

Source: AXA, Award on Investor Climate-related Disclosures, October 2016
The quality of scenario analysis varies

Banks are making inroads

<table>
<thead>
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<th>Environmental Stress Testing &amp; Policy Changes</th>
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</thead>
<tbody>
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<td><strong>JPMorgan Chase</strong> has assessed how evolving climate change regulations may impact its global power portfolio. In March 2016 the bank utilized findings from its portfolio review to update its Environmental and Social Policy Framework, including revising its coal financing policy to eliminate financing to new “green” coal mines, prohibiting financing of new coal-fired power plants in high-income OECD countries, and enhanced due diligence for other companies linked to coal production.</td>
</tr>
<tr>
<td><strong>In 2015 PNC Financial</strong> completed its first analysis of how environmental issues, including implementation of the US EPA’s Clean Power Plan, could impact its wholesale credit portfolio. PNC has committed to conducting annual environment-related stress tests going forward.</td>
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<td><strong>In 2015 Royal Bank of Canada</strong> analyzed approximately 100 of its largest clients in the energy and utilities sectors to estimate potential losses due to stranded asset risk.</td>
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<td><strong>UBS</strong> uses scenario-based stress testing to estimate its portfolios’ exposure to increasing climate change regulations and severe weather events. In 2015 the bank assessed potential impacts of increasing climate change regulations and severe weather event scenarios on its energy and real estate loan portfolios.</td>
</tr>
<tr>
<td><strong>Westpac</strong> has begun undertaking scenario modeling to “assess the longer term economic impacts of limiting global warming to two degrees Celsius”. The bank presented its research in its 2016 Sustainability Performance Report, released in November 2016.</td>
</tr>
</tbody>
</table>

Source: Boston Common Asset Management, *On Borrowed Time: Banks and Climate Change*, study of 28 banks
The quality of scenario analysis varies

Banks are making inroads

- But a large gap still remains

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Source: Boston Common Asset Management, *On Borrowed Time: Banks and Climate Change*
The quality of scenario analysis varies

Lack of metrics, non-committal language

- Little clarity on either risks or opportunities

“As a result of our strategy and scenario work we [will]:

- Prepare for diverse portfolio and policy environments.
- Monitor global regulation and legislation developments and engage appropriately.
- Focus near-term technology investments on reducing both costs and emissions where feasible, for example in the Oil Sands [...].
- Monitor for potential disruptive technologies which might impact the market for oil and gas.”

Source: ConocoPhillips
The quality of scenario analysis varies

Details on portfolio resilience and assumptions

- Articulates **opportunity**

Reusing our own planning assumptions with those used in the IEA’s 450 scenario (broadly aligned with a 2°C framework) in the World Economic Outlook 2016 shows a **positive impact of around 6% on net present value** over the lifetime of all projects.

Source: Statoil, Climate Roadmap
The quality of scenario analysis varies

Inclusion of metrics, disclosure of uncertainties

<table>
<thead>
<tr>
<th>Percentage contribution to FY2016 revenue (a)</th>
<th>Attractiveness of investment outlook (b) in Central case</th>
<th>Change in attractiveness of investment outlook (c) in Global Accord compared to Central case</th>
<th>Impacts under our Global Accord scenario</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thermal Coal</td>
<td><img src="Image" alt="Thermal Coal" /></td>
<td>↓</td>
<td>• Remains competitive on the cost curve and generates acceptable returns.</td>
</tr>
<tr>
<td>4%</td>
<td><img src="Image" alt="Thermal Coal" /></td>
<td></td>
<td>• Careful consideration would be required before pursuing growth opportunities given the current returns and growing regulatory and societal pressures that could impact future asset values.</td>
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<td><img src="Image" alt="Thermal Coal" /></td>
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<td>• Failure to achieve a breakthrough in commercialising low emissions technologies such as CCS would reinforce this view.</td>
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| Gas (d)                                      | ![Gas](Image)                                           | ↑                                                                                      | • Key transition fuel as concerted efforts to reduce emissions are expected to increasingly focus on utilising gas for power generation and transportation. |

20-year average Business EBITDA contribution

Central case

**Global Accord scenario**

**Shock event**

- Energy Coal
- Metallurgical Coal
- Conventional Oil & Gas
- Shale Oil & Gas
- Copper (incl. uranium)
- Iron Ore
- Potash

Source: BHP Billiton, Climate Change: Portfolio Analysis, 2015, 2016