International Finance Corporation
World Bank Group

Climate Risk Management: Drivers

Washington, DC, May 7, 2018

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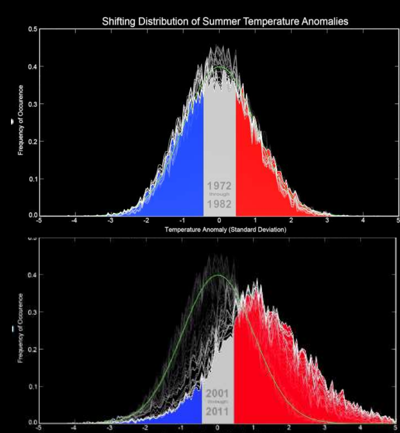
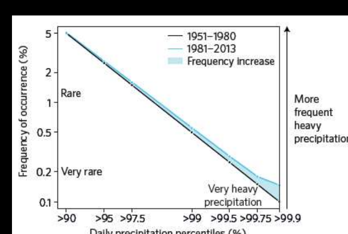
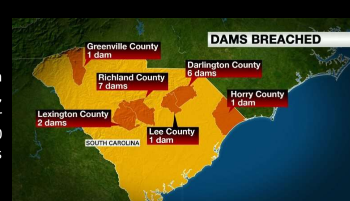
Changing climate conditions, effects





Range	Population in range	Expected frequency outside range
μ ± 1σ	68.2689492137%	31.7310507863%
μ ± 2σ	95.4499736104%	4.5500263896%
μ ± 3σ	99.7300203937%	0.2699796063%
μ ± 4σ	99.9936657516%	0.0063342484%
μ ± 5σ	99.9999426697%	0.0000573303%
μ ± 6σ	99.9999998027%	0.0000001973%

South Carolina, October 2015: 1:1000 year events



Sources: NASA 2012. Fischer 2016

Case examples – climate impacts on mining operations

Flooding, Australia
2010 – 2011 flood in Queensland, Australia resulted in damage to mines and transportation infrastructure amounting to a cost of over US$2B to the local coal industry.

Community Conflict, Chile
In February 2015, during a prolonged drought local residents blocked access to Antofagasta's Los Pelambres mine site, demanding a desalination plant was built immediately to prevent the mine from using water from the Choapa River.

Power outages, Ghana
In 2006 Newmont's Ahafo gold mine in Ghana was prompted to cut its monthly production by 35 per cent due to intermittent hydroelectric power supplies as a result of drought conditions.

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Climate Risks

Financial and Credit

- Market conditions
- Project costs
- Asset depreciation
- Efficiency and performance
- Outputs
- Loss contingencies
- Country risk

Operational

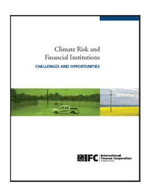
Strategic and developmental

Environmental and Social

Legal

Reputational

- Underlying cash flow values may be significantly altered; revenues and costs
- Equity: changes in valuation
- Supply and demand, futures prices
- Depreciation: financial models may overestimate useful lives of physical assets
- Change in insurance costs and availability
- Business interruption



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TCFD, background

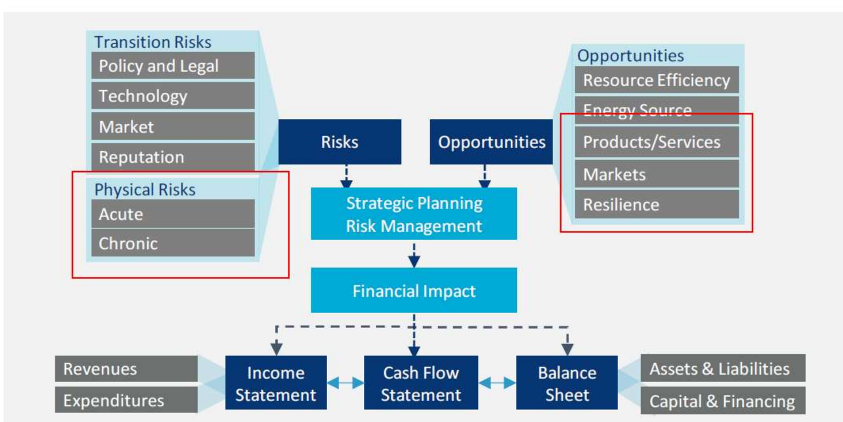
G20 Finance Ministers and Central Bank Governors asked the Financial Stability Board (FSB) to review how the financial sector can take account of climate-related issues.

The FSB established the Task Force on Climate-related Financial Disclosures (TCFD) to develop recommendations for more effective climate-related disclosures that:

- could "**promote more informed investment, credit, and insurance underwriting decisions**" and,
- in turn, "would enable stakeholders to **understand better** the concentrations of **carbon-related assets in the financial sector** and the financial system's **exposures to climate-related risks**."

TCFD, Focus on financial impact

The Task Force focused on financial impact of climate-related risks and opportunities on an organization, rather than the impact of an organization on the environment.



Rating agencies

Moody's Warns Cities to Address Climate Risks or Face Downgrades

Bloomberg, November 29, 2017

- Communities in Texas, Florida, other coastal states at risk
- Credit rating agency says it's adding climate to credit risks

Coastal communities from Maine to California have been put on notice from one of the top credit rating agencies: Start preparing for climate change or risk losing access to cheap credit.

In a report to its clients Tuesday, Moody's Investors Service Inc. explained how it incorporates climate change into its credit ratings for state and local bonds. If cities and states don't deal with risks from surging seas or intense storms, they are at greater risk of default.

"What we want people to realize is: If you're exposed, we know that. We're going to ask questions about what you're doing to mitigate that exposure," Lenny Jones, a managing director at Moody's, said in a phone interview. "That's taken into your credit ratings."

In its report, Moody's lists six indicators it uses "to assess the exposure and overall susceptibility of U.S. states to the physical effects of climate change." They include the share of economic activity that comes from coastal areas, hurricane and extreme-weather damage as a share of the economy, and the share of homes in a flood plain.

Based on those overall risks, Texas, Florida, Georgia and Mississippi are among the states most at risk from climate change. Moody's didn't identify which cities or municipalities were most exposed.

Bond rating agencies such as Moody's are important both for bond issuers and buyers, as they assign ratings that are used to judge the risk of default. The greater the risk, the higher the interest rate municipalities pay.

Bloomberg News reported in May that towns and counties were able to secure AAA ratings despite their risks of flooding and other destruction from storms, which are

Investors

BlackRock analysis helps define climate-change risk

Study says investors fail to price in effect of extreme weather on portfolios
April 4, 2019

Investors underestimate the risks that extreme weather poses to their portfolios, according to landmark research by BlackRock that could drastically alter how the investment industry considers climate change in its risk management processes.

BlackRock's study looked at three US asset classes — municipal bonds, commercial real estate and US utility stocks — and said climate change was already having a tangible effect on securities. It warned that the trend would only accelerate.

The study, published Thursday, said investors in the $3.8tn municipal bond market could experience losses as vulnerable cities saw their economies suffer, with gross domestic product dipping by more than 1 per cent.

BlackRock also expected securities backed by commercial real estate mortgages to face an average loss rate of up to 3.8 per cent as properties faced cash flow shortages after severe storms and floods.

The greater incidence of hurricanes and wildfires over the past 12 months has highlighted the effect of global warming. Investors, however, have been slow to take note of

Investor Networks

TCFD-based reporting to become mandatory for PRI signatories in 2020

18 February 2019

The strategy and governance indicators of the PRI's climate risk indicators are to become mandatory for signatories to report on from 2020.

Supporting the adoption of the recommendations of the Task Force on Climate-related Financial Disclosures (TCFD) is a high priority for the PRI as they provide a global framework for translating information abou climate into financial metrics.

As part of our programme on championing climate action, in 2018, the PRI introduced TCFD-aligned indicators to its Reporting Framework. Despite the indicators being voluntary, over 480 investors representing US$42 trillion opted to complete the indicators and submit responses. In 2019 the climate indicators will again be voluntary.

However, from 2020, it is the PRI's intention to make the climate indicators within SG 01 CC, SG 07 CC and SG 13 CC, mandatory to report but voluntary to disclose. The remaining PRI climate risk indicators will sta voluntary with a view to becoming mandatory as good practice develops.

Signatories will retain the option of being able to make their responses to this module either private or public. To support signatories in developing a response to the climate indicators, the PRI has consolidated guidance notes, investor case studies, webinars and a matrix of climate reference scenarios on a resource page.

Climate-related risks and opportunities are set to grow in the coming years. The impacts of 1.5°C of warming are now better understood with the IPCC reports stating that the world is on track to miss a manageab level of warming by a wide margin.

The PRI is concerned that the longer the world goes without a safe trajectory on climate change, the greater the risks for investors of an abrupt policy response,

Commenting on this announcement, Fiona Reynolds, CEO of the PRI said, "It is increasingly important for investors to incorporate emerging mega risks such as climate change into their view of the future. TCFD provides the best available framework for systematically including climate-related risks and opportunities into investment strategy.

Regulation

UK insurers to be scrutinised by BoE over climate change planning

Financial Times, March 21

Insurers in the UK will be tested next month by the Bank of England to scrutinise how well they are planning for climate change amid concern some are not properly considering how it might affect their assets.

The BoE has also advanced plans to test lenders against a climate-related shock, the central bank's governor, Mark Carney, revealed in a speech on Thursday about how the financial sector is planning for climate-relat risks. He first detailed plans to include climate change in part of banks' stress tests in an interview with the *Financial Times* late last year.

"Next month, the PRA will ask UK insurers, as part of a market-wide insurance stress test, to consider how their businesses would be affected in different physical and transition risks scenarios," Mr Carney said. "The PRA is increasingly focused on cognitive dissonance in some insurers whose careful management of climate risks on the liability side of their balance sheets is not always matched by similar considerations on the asse side."

The PRA is the Prudential Regulation Authority; the part of the BoE that supervises the UK's largest lenders and insurers and runs annual stress tests.

Mr Carney told the FT in December that lenders could face climate-related risks as part of their stress tests as soon as 2019, in what would be an unprecedented move for a central bank of a major financial centre.

Every other year, the UK's biggest banks have to undergo a so-called exploratory scenario as part of the PRA's stress tests of their balance sheets. Banks cannot pass or fail this part of the exercise. Instead they are required to scrutinise whether they are doing enough around a particular issue.

Mr Carney said on Thursday that the BoE is working with the Network for Greening the Financial System, which is a group of other banking supervisors from around the world, to develop the scenarios the BoE would deploy in such a stress test.

Climate Resilience Rating Systems and Standards

- World Bank Group, developing Climate Resilience Rating system: metrics that will separately rate climate resilience *of* a project or investment, and climate resilience through a project or investment.
- Climate resilience of a project to assess the confidence in climate resilience (avoidance of financial and E&S underperformance due to climate change effects experienced over relevant time spans).
- Accompanying documents will provide guidance notes on addressing climate risks and designing and operating resilient assets by sector.
- International Organization for Standardization(ISO): ISO/DIS 14090 - Adaptation to climate change — Principles, requirements and guidelines

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Thank you!

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