

Climate Change: Harnessing the Power of Public Capital Markets

GLENMEDE

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SUMMARY

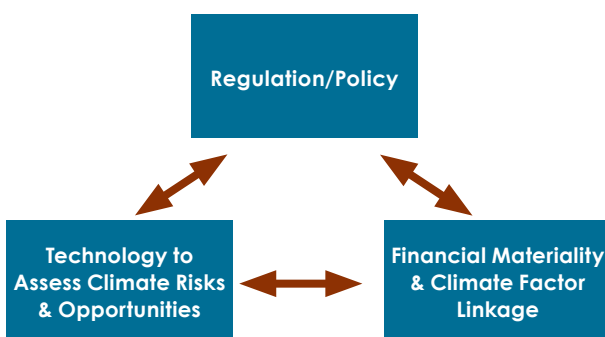
- Growing public and regulatory pressure is increasing the availability of climate risk data and analytical tools, as evidence of financial materiality accumulates.
- These developments are elevating asset managers' ability to quantify risks and opportunities in security analysis, supporting their efforts to maximize risk-adjusted returns.
- Incorporating climate risks in investment analysis is likely to raise pressure on public companies to reduce their carbon footprint.
- In turn, changing corporate behavior can help to bridge the estimated \$1 trillion to \$2 trillion gap in annual funding needed to combat the most damaging impacts of climate change.

Introduction

The explicit inclusion of environmental considerations in investment analysis has only recently begun to flourish. Regulatory pressure, changes in technology and data availability as well as an improved ability to determine financial materiality are helping to drive increased usage of climate change risks and opportunities in security analysis. These innovations could allow active asset managers to meaningfully contribute to mitigating climate change, while supporting their efforts to maximize risk-adjusted returns.

The following section covers three drivers (Exhibit 1) that have improved asset managers' ability to incorporate climate change analysis in their public market investments.

Exhibit 1: Drivers Impacting Climate Change Financial Analysis



POLICY AND REGULATION INCREASE CARBON-RELATED DATA

The ability to integrate climate-related risks and opportunities in investment analysis is aided by an ability to source standardized data from corporations on carbon-related policies. Historically, corporate reporting on carbon policies has been spotty, with no unified method of reporting and a general lack of government regulation to force consistent action. In particular, the U.S. has generally lacked specific or consistent reporting standards, despite continuing efforts, including recently by the SEC.

However, the past five years have seen a groundswell in new global regulations and policies pushing corporations to disclose climate-related data, bolstering asset managers' ability to incorporate these risks in financial analysis. These disclosure requirements typically cover the company's current carbon footprint measured by its weighted average carbon intensity, and plans for improvement that are often based on capital expenditures specifically tagged for improving environmental performance and resilience.¹

In countries lacking consistent disclosure regulations, self-regulated asset owner- and asset manager-led organizations have increasingly gained clout in pressuring corporations to disclose data and commit to incorporating these risks and opportunities in their investment portfolios.

¹ Taxonomy: Final Report of the Technical Expert Group on Sustainable Finance. European Union, 2020.

The Task Force on Climate-related Financial Disclosures (TCFD) has been particularly important in spurring disclosures for investors. The TCFD created a recommended set of 11 core climate change disclosures for its signatories that are rooted in company metrics and long-term goals for reducing carbon emissions and other climate targets, risk management processes and overarching strategies. The TCFD has over 1,110 signatories that issue standardized TCFD reports, creating a wealth of new information for asset managers to analyze.²

With governments and asset owners alike pushing for disclosure (Exhibit 2), asset managers have more data available to analyze climate change factors than ever before. But data is only as powerful as what you do with it, and humans alone are likely not the solution.

Exhibit 2

Key organizations led by asset owners and asset managers

- **Climate Action 100+ (2017):** Comprising 370 asset owners representing \$41 trillion in AUM and designed to pressure the largest 100 public companies and asset managers to act on climate change. Recommends divestment from corporations that do not comply.
- **Institutional Investors Group on Climate Change (IGCC) (2005):** Comprises 200 asset owners with over \$33 trillion of assets under management (AUM) seeking implementation of climate considerations in corporate criteria and asset manager approaches in Europe and Australia.
- **Principles for Responsible Investment (PRI) (2006):** A United Nations-supported international network of more than 2,200 asset owners and asset managers representing \$80 trillion globally with commitment to ESG integration. Climate change-related reporting — noting and scoring signatories based on climate change-related approach — mandated in 2020.
- **Task Force on Climate-related Financial Disclosures (TCFD) (2015):** More than 1,000 corporations globally, including the majority of the S&P 500, have publicly committed to annually disclosing climate-related metrics and milestones.

TECHNOLOGY IMPROVEMENTS SPUR DATA AVAILABILITY

The amount of available ESG data is vast and relatively new. A mere 20% of S&P 500 companies offered any ESG-related reporting at the start of the last decade. Today, this figure is approaching 90%³. However, there are two issues at play regarding the applicability of climate-related data: the lack of standardization and

the large gap in publicly available information outside of what is disclosed by the largest companies. This has created a need for technology to help asset managers gather and consistently incorporate these large and often unstructured pools of data in financial analysis.

An enormous number of ESG data providers have entered the market over the past five years to help solve these issues for asset managers. They range from broad-based ESG ratings providers, such as MSCI, Sustainalytics, and ISS-Ethix, to more specialized providers focused only on the environment. One emerging concept involves combining company-level data, such as revenue sources, physical locations, patents and emissions, with top-down drivers such as policy scenarios to calculate the specific risk to capital.

Climate change is a non-linear set of disparate factors all intrinsically linked, complicating efforts to quantify the effect on a company's balance sheet or income statement. Still, some data providers seek to calculate this risk — MSCI's Carbon Delta refers to it as "Climate Value-at-Risk" (MSCI's methodology is found in Exhibit 3)⁴ Other climate-focused data providers, such as Four Twenty Seven Climate Solutions, ClimateService, and CO-Firm similarly seek to apply a quantifiable value to environmental risk.

Providers such as MSCI and Four Twenty Seven Climate solutions predominantly use publicly disclosed information as their baseline. But other technology solutions that procure unstructured sets of data have emerged to help asset managers identify how climate change could tangibly affect companies. Providers using advanced satellite imagery and infrared technology can help investors track a global company's supply chain and map it against areas where disruptions due to droughts, wildfires, or other catastrophic events are more likely to occur, or where there is a higher likelihood of stranded asset risk through a premature write-down or conversion to a liability. (Please refer to Exhibit 4 by Four Twenty Seven Climate Solutions⁵). Additionally, infrared technology can be used to identify a company's global emissions. As disclosures expand, carbon taxes are implemented, and shareholder sentiment increases against companies with high carbon footprints, this technology could be useful in assessing regulatory compliance.

We believe that climate change data and analytical solutions that allow asset managers to clearly link and quantify the effect on a company's balance sheet and income statement will become an increasingly relevant part of fundamental analysis.

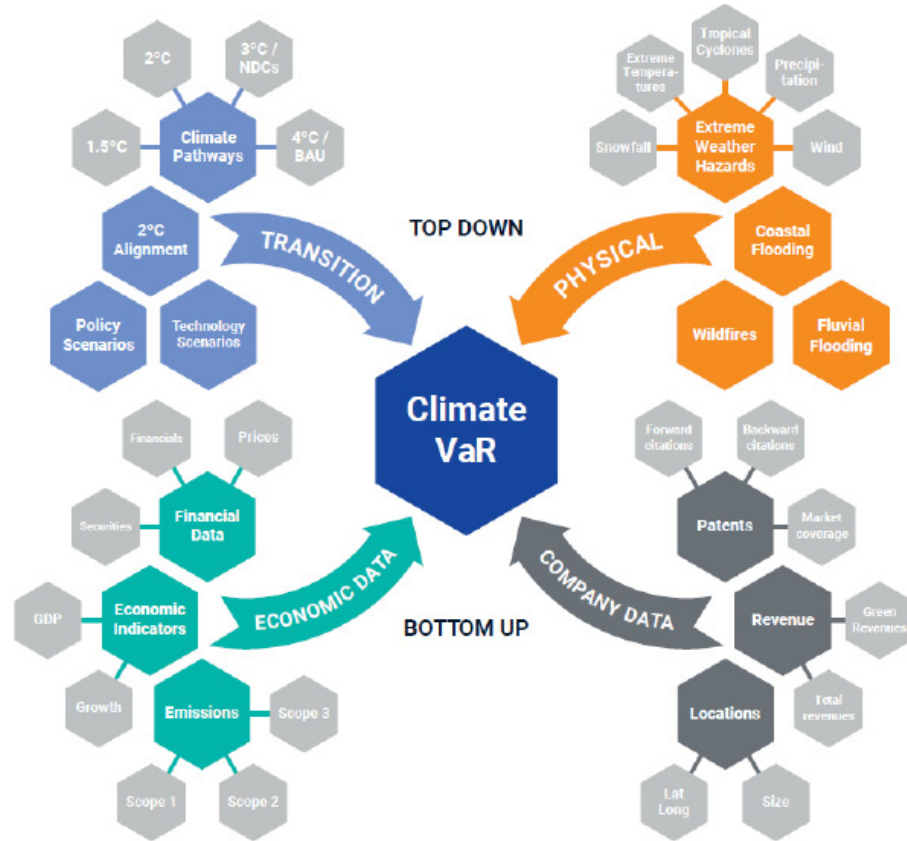
² Task Force on Climate-Related Financial Disclosures: 2019 Status Report. 2019.

³ FLASH REPORT: 86% of S&P 500 Index@ Companies Publish Sustainability / Responsibility Reports in 2018. G&A Institute. www.ga-institute.com/press-releases/article/flash-report-86-of-sp-500-indexR-companies-publish-sustainability-reports-in-20.html.

⁴ MSCI. Climate Value-at-Risk, MSCI, 2020, www.msci.com/documents/1296102/16985724/MSCI-ClimateVaR-Introduction-Feb2020.pdf/f0ff1d77-3278-e409-7a2a-bf1da9d53f30?t=1580472788213.

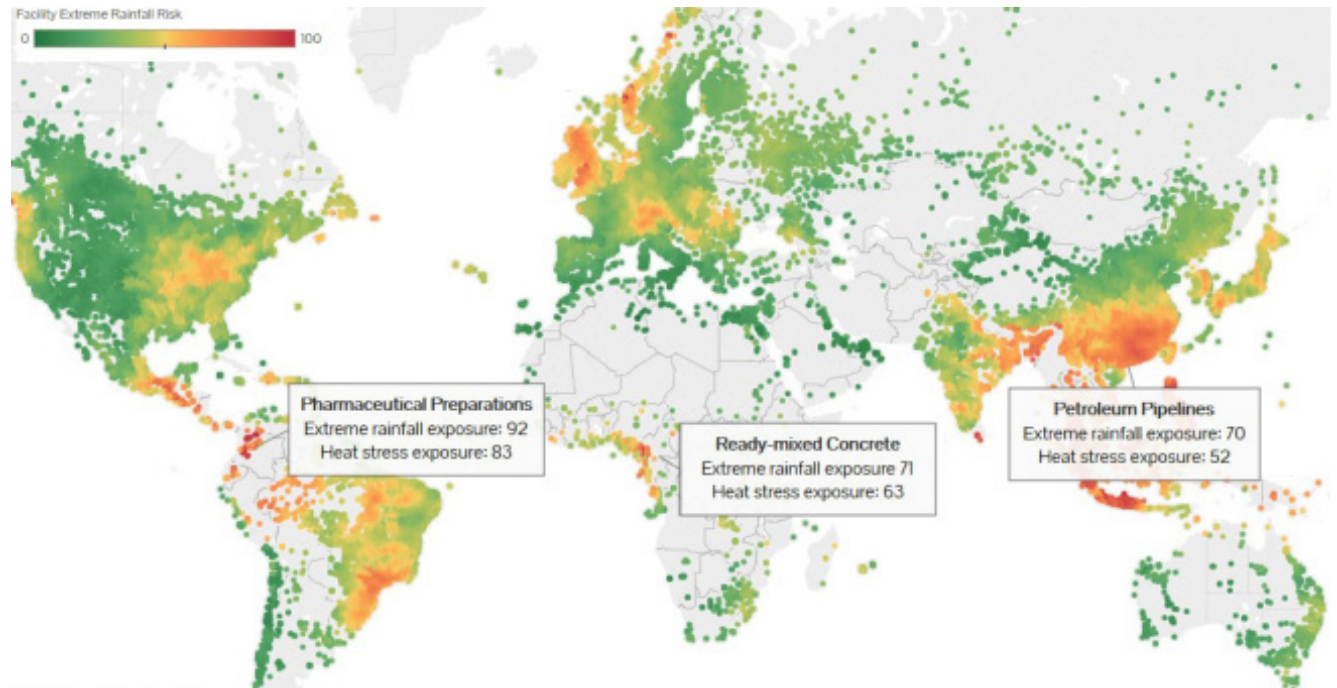
⁵ Four Twenty Seven Climate Solutions. Corporate Risk Screening, 2019, www.427mt.com/wp-content/uploads/2017/10/Corporate-Product-Sheet-Nov2019.pdf.

Exhibit 3: Climate Value-at-Risk



Source: MSCI

Exhibit 4: Infrared imagery detailing facility based risk?



Source: Four Twenty Seven Climate Solutions

ACADEMIC RESEARCH PROVIDES EVIDENCE OF FINANCIAL MATERIALITY

Historically, challenges in determining financial materiality were rooted in the perception that ESG factors were simply not relevant to corporate profitability. However, several studies over the past decade — including a 2010 landmark study by the Harvard Business School and London Business School⁶ and later complemented by a landmark meta-study of 2,250 studies in 2018 — found that ESG factors had a direct and material link to corporate financial performance.⁷

In a study of 2,982 firms globally, the University of Edinburgh found that organizations with stronger environmental policies on average tended to exhibit stronger corporate performance,⁸ while a more recent study found that carbon emissions and financial performance have an inverse relationship, and that relative emissions within a peer group and their rate of change are more important than absolute levels of emissions.⁹ This indicates the significance of a nuanced approach to identifying not only the current “best actors” on climate change, but those that are making improvements in relation to their peers.

The “Materiality Map” — produced by the Sustainability Accounting Standards Board (SASB) in 2016 — was a landmark development for asset managers. The board’s research identified 26 indicators with a material linkage to corporate financial performance across ESG factors, with weightings applied based on significance for specific sectors. The six SASB indicators listed in Exhibit 5 are important in two ways. First, they give a clear starting point on indicators to consider based on a large pool of research. Second, they have been used to inform several important policy movements on corporate disclosures, such as the EU Taxonomy. This creates a virtuous cycle with more data becoming available, leading to further testing of financial materiality.

Exhibit 5: SASB’s Environmental Indicators

- Greenhouse gas emission
- Air quality
- Energy management
- Water and wastewater management
- Waste and hazardous materials management
- Ecological impacts

With mounting evidence of financial materiality, an increasingly robust data set and new technology tools, asset managers have the opportunity to incorporate this data in traditional evaluation processes that focus on maximizing risk-adjusted returns.

Applying Climate Data in Security Analysis

The ability of asset managers to assess climate risks and opportunities hinges on three determinations: financially material indicators, relevant data sources and the application to security valuation.

Exhibit 6:



The application of specific risks and opportunities in security valuation represents the next critical development in assessing the global impact of climate change. While investors previously assessed these risks from a qualitative standpoint, the ability to more precisely quantify the impact on a company’s financials is improving. Because this analysis is focused on the identification of risks and opportunities, it is well-positioned for the inclusion in traditional portfolio analysis which seeks to maximize risk-adjusted returns.

Progress differs on the ability to incorporate climate change information in practice, both from a regional and sector perspective. Investors focused on Europe will soon have the benefit of a mandated set of environmental disclosures across all publicly traded companies across the EU, as the EU Taxonomy was formally approved in June 2020 and is set to be enacted by year-end. On a global basis, investors focused on sectors, such as the oil and gas industry, will simply find more tangible, well-documented ways to quantify and link environmental risks related to stranded assets and regulatory changes. However, other sectors with less direct impact on climate change, such as consumer staples or technology, remain more difficult to assess.

⁶ Eccles, Robert, et al. *The Impact of Corporate Sustainability on Organizational Processes and Performance*. Harvard Business School and London Business School, 2010.

⁷ *Digging Deeper into the ESG-Corporate Financial-Performance Relationship*. DWS & Hamburg Institute, 2018.

⁸ Manrique, Sergio, and Carmen-Pilar Marti-Ballester. “Analyzing the Effect of Corporate Environmental Performance on Corporate Financial Performance in Developed and Developing Countries.” *MDPI Sustainability*, Vol. 9, No. 1957, 2017, www.mdpi.com/journal/sustainability.

⁹ Busch, Timo and Lewandowski, Stefan, *Corporate Carbon and Financial Performance: A Meta-Analysis (August 2018)*. *Journal of Industrial Ecology*, Vol. 22, Issue 4, pp. 745-759, 2018. Available at SSRN: <https://ssrn.com/abstract=3225953> or <http://dx.doi.org/10.1111/jiec.12591>

CASE STUDIES: CLIMATE CHANGE RISKS AND OPPORTUNITIES

Three case studies below show how these risks and opportunities can be qualitatively and quantitatively applied across companies in three sectors. As climate change is not expected to wane, we believe that each of the below cases reflect potential long-term risks and opportunities useful for analyst assessment.

Exhibit 7:

<ul style="list-style-type: none"> • Company profile: Soft drinks • Indicator: Water and wastewater management • Data source: Company disclosures, ESG rating on water stress; satellite imagery of drought potential on company operations • Potential risk: Increased risk of disrupted global supply chain in drought-exposed areas can erode revenue generation year-over-year; past global supply chain shocks can be used as potentially quantifiable effects. • Potential opportunity: Water management efficiency improvements and diversified global supply chain can directly lower the cost of goods sold (COGS). 	<ul style="list-style-type: none"> • Company profile: Global e-commerce • Indicator: Greenhouse gas emissions • Data source: Company disclosures, ESG rating on carbon emissions; carbon pricing forecasts via climate value-at-risk (VaR) analysis; infrared technology on emissions footprint from company operations • Potential risk: Increased cost and reduced margins from high carbon emissions footprint; carbon tax forecast models can be used to assign direct quantifiable impact. • Potential opportunity: Companies with superior renewable energy generation to fuel operations may have an incremental margin advantage vs. carbon emitting peers. 	<ul style="list-style-type: none"> • Company profile: Oil and gas • Indicator: Waste and hazardous materials management; energy management; ecological impacts • Data source: Company disclosures, ESG rating on carbon emissions; carbon pricing forecasts via climate VaR analysis; infrared technology on emissions footprint by company site • Potential risk: Increased liability to balance sheet from the risk of a hazardous material spill or ecological impact; historical events and liability costs can be used to quantify. Increased stranded asset risk creates liability risk to balance sheet. • Potential opportunity: Smoother revenue growth for companies with robust capital investment plans for energy transition.
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MARKETS RESPOND TO CORPORATE ENVIRONMENTAL POLICIES

While these case studies represent hypothetical examples of how climate risks and opportunities can be applied, there are a growing number of real cases to note as well. In early 2020, both Amazon and Microsoft announced ambitious, carbon-reduction programs — the latter rewarded in the market for its pledge and the former punished for not being strong enough. Meanwhile, Pacific Gas and Electric Company (PG&E) filed for bankruptcy following the California wildfires, while ExxonMobil faced a highly publicized shareholder activism movement and negative stock reaction caused by its lack of climate-related policies. Since March 2020, COVID-19 has diverted attention from environmental factors, as investors have placed additional scrutiny on how corporations deal with human capital across their

organizations. However, despite reporting the lowest global carbon emissions in decades as a result of reduced business activity, climate change - and the risks and opportunities it represents for companies going forward - is not going away. Direct, applicable market case studies like these are only likely to increase, causing more corporations and investors to take notice.

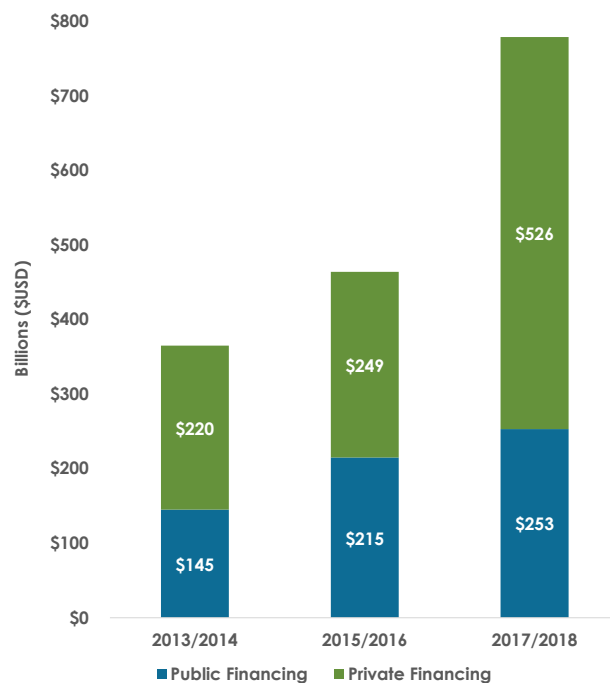
The climate Change funding gap: \$1 trillion to \$2 trillion annually

This piece has largely focused on the financial materiality of climate change related risks and opportunities. But applying capital to climate-related considerations can also provide societal benefits. The Organisation for Economic Co-operation and Development (OECD) and Morgan Stanley estimate that nearly \$1.6 trillion to \$2.5

trillion in capital is needed annually through 2050 for the world to stay at or below a 1.5 degree Celsius rise in temperature as set out by the Paris Agreement in 2016^{10,11}. This temperature change reflects a threshold under which scientific evidence suggests that the most dangerous effects of climate change from a mortality, biodiversity and GDP standpoint can be limited¹². While government funding and private market funding have risen to nearly \$600 billion annually, the remaining capital gap is significant: \$1 trillion to \$2 trillion per year through 2050. Moreover, government actions like that of the U.S. to pull out of the Paris Accord have only served to show the need to diversify from government funding as the primary solution.

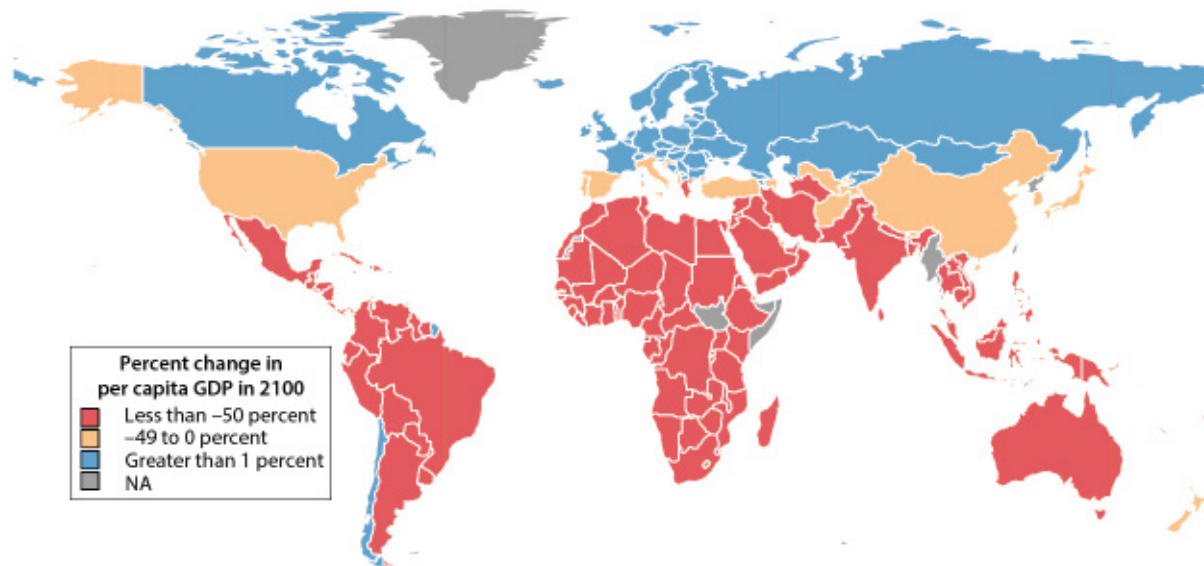
Public capital markets, including public equity and fixed income investments, represent \$74 trillion of liquid capital that could contribute to reducing this gap if efforts to incorporate environmental factors into investment analysis continue.¹³ Increased scrutiny and quantification of corporate environmental risks could increase the cost of capital, decrease valuation projections and collectively result in less capital going to companies with poor environmental practices, in effect limiting some of the projected impacts of climate change seen in Exhibits 9 and 10.

Exhibit 8: Global Climate Finance Flows: 2013-2018



Sources: Glenmede Research and Carbon Policy Initiative

Exhibit 9: Climate Change Effect on per Capita GDP in 2100 by Country



Source: Burke, Hsiang, and Miguel (2015); authors' calculations. Country-level estimates for GDP per capita in 2100. Figure assumes RCP 8.5, which corresponds to roughly 3.2°C to 5.4°C of warming. GDP loss is associated with the warming from a baseline of 1980–2010 average temperatures. As explained in Burke, Hsiang, and Miguel (2015), estimates include growth-rate effects over the period through 2100.

Author's Note: "Less than -50 percent equates to a drop in GDP by a greater magnitude than -50 percent (i.e. 51%, 52%). The percent change in per capita GDP forecasts depicted here are projected against a baseline GDP through 2100 (including projected growth rates) assuming no temperature rise through 2100."

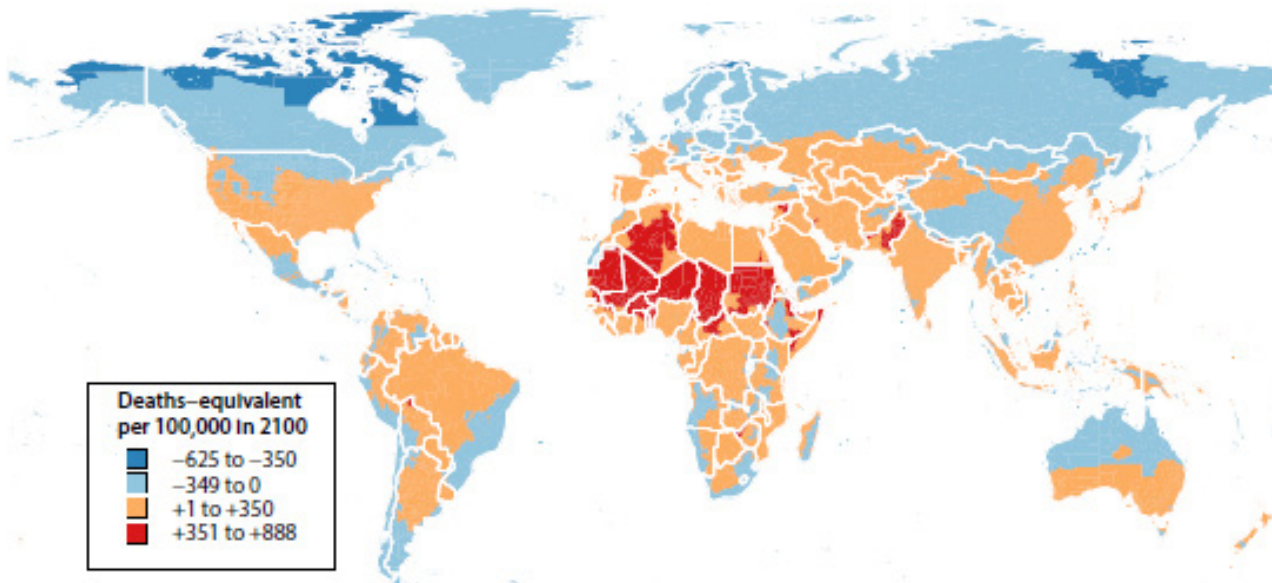
¹⁰ Financing Climate Futures. OECD/The World Bank/UN Environment, 2018.

¹¹ "Decarbonization: The Race to Zero Emissions." Morgan Stanley, 2019, www.morganstanley.com/ideas/investing-in-decarbonization.

¹² Nunn, Ryan. Ten Facts About the Economics of Climate Change and Climate Policy. The Hamilton Project, 2019.

¹³ Asset & Wealth Management Revolution: Embracing Exponential Change. 2017. www.pwc.com/gx/en/asset-management/asset-management-insights/assets/awm-revolution-full-report-final.pdf.

Exhibit 10: Mortality Impacts from Climate Change in 2100 by Region



Source: Carleton et al. 2018; authors' calculations. Contained in research from *The Hamilton Project*, a series of 2019 reports issued by *The Stanford Institute for Economic Policy Research* and the *Brookings Institute*

The map shows impact-region estimates for mortality rates in 2100. Figure assumes the mean estimate under RCP 8.5, which corresponds to roughly 3.2°C to 5.4°C of warming. Negative values refer to lives saved from climate change (e.g., fewer deaths as a result of fewer dangerously cold days).

Conclusion

The incorporation of climate-related risks and opportunities in financial analysis may not have the same immediate impact on climate change that government funding or private market capital can. However, at scale, the investment management industry's increasing recognition of the materiality and impact of these risks on long-term performance may accelerate change in corporate policies and actions. The push for regulatory action, improved technology and data availability, and the increased ability to determine materiality, may all contribute to this progress. Analysis may ultimately penalize companies with poor climate-related footprints and policies, and place a premium on organizations that lead toward solutions. Finally, by targeting risk mitigation and opportunity assessment, climate change analysis can be consistent with active asset management's goal of producing superior risk-adjusted returns.

Author's Note

As of this writing in August 2020, COVID-19 dominates the world's attention. Government balance sheets are stretched thin and re-prioritized away from environmental programs in favor of the more urgent, real-time economic and human toll caused by the virus. At the same time, investors in both private and public markets weather volatility and focus additional ESG-related scrutiny on long-overlooked social issues, such as employee treatment. Ironically, the lone silverlining from this period is that our skies are the clearest they have been in decades, with carbon emissions down 17% compared to 2019¹⁴. But when a vaccine is developed, human life returns to normal and markets stabilize, so, too, will emissions. Climate change has no single solution — rather, it will require harnessing all of the funding resources of governments, private markets, and the public capital markets, for us to build the solution together.

¹⁴ Spektor, Brandon. "Global Carbon Emissions Dropped an Unprecedented 17% during the Coronavirus Lockdown - and It Changes Nothing." *LiveScience*, Purch, 20 May 2020, www.livescience.com/carbon-dioxide-reduction-coronavirus-lockdown.html.

Authors



Mark Hays

Director of Sustainable and Impact Investing,
The Glenmede Trust Company



Amy T. Wilson, CFA

Director of ESG Investing,
Glenmede Investment Management

GLENMEDE

CONTACT

Mark Hays, Director of Sustainable and Impact Investing at mark.hays@glenmede.com

Amy T. Wilson, CFA, Director of ESG Investing, (Glenmede Investment Management) at amy.wilson@glenmede.com

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