

Climate Transition in a Portfolio Context: What Matters and What to Measure

JULY 2020

Introduction

Climate change is an economic reality and a growing risk that investors, businesses and governments are learning to address. As the impacts of climate change mount, as shown in *Display 1*, it has become well understood that greenhouse gas emissions resulting from human activity are the primary cause of climate change, and must decrease dramatically in order to avoid the worst projected economic and environmental impacts.¹

Specifically, the global economy must limit average global temperature rise to 1.5°C above pre-industrial levels. By 2050, this will require reaching a “**net zero**” emissions state in which any emissions produced would be offset by removing others from the atmosphere.² However, the global economy is off-track. As shown in *Display 2*, global emissions are currently anticipated to increase over the next 10 years, instead of falling by half.³

Decarbonization, or the systematic effort of governments and companies to align themselves with a low-carbon economy through the reduction in **carbon emissions**, has moved to the forefront of business and investment conversations.^{4,5} We believe that this trend will continue to gain momentum and will impact corporate performance for decades to come. This, in turn, will give rise to compelling investment opportunities and affect the way that

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¹ A failure to contain carbon emissions and global average temperature rise will result in more intense and frequent extreme weather events and severe negative impacts on resources, ecosystems, biodiversity, food security, cities and tourism. See: Intergovernmental Panel on Climate Change (IPCC). https://www.ipcc.ch/site/assets/uploads/2018/02/AR5_SYR_FINAL_SPM.pdf

² IPCC https://www.ipcc.ch/site/assets/uploads/2018/02/AR5_SYR_FINAL_SPM.pdf

³ While these projections were made prior to the COVID-19 pandemic, there is not yet sufficient evidence to suggest that the economic impacts of the pandemic have fundamentally altered the underlying emissions profile of the economy. This will depend on how economic recovery efforts are pursued.

⁴ See “Investment Portfolios in a Carbon Constrained World,” UNEP FI and CDP, 2016. <https://www.unepfi.org/wordpress/wp-content/uploads/2016/11/PDCreport2016.pdf>

⁵ Throughout the remainder of this piece, “carbon” and “carbon emissions” should be interpreted as the carbon dioxide equivalent (CO₂e) of the six major greenhouse gases. Refer to *Key Terms* section for details.

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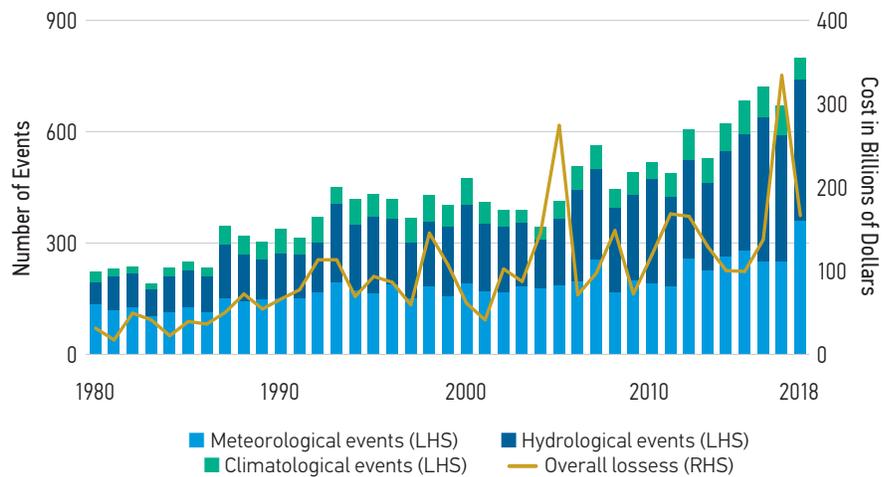
investors build and manage their portfolios in the short, medium and long term.

In our view, investors must employ a broad set of climate metrics alongside traditional measures of financial performance to be successful in a decarbonizing economy. In this paper we will describe several of these metrics, particularly those relevant to public equities, and discuss how they can be used to address key questions that investors are likely to face as they work to support decarbonization and protect investment performance from **climate transition risks**.⁶

Decarbonization in a Portfolio Context

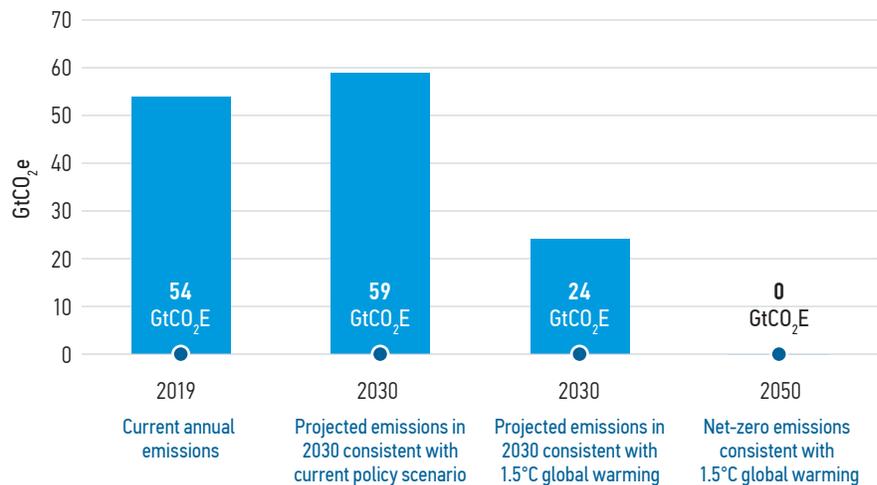
The first step that investors can take toward decarbonization is to determine the aggregate level of emissions currently generated by the companies within their portfolio in order to set the portfolio's emissions baseline (see *Box 1*). Investors can then use this figure as a benchmark to measure their progress toward achieving a "net zero" portfolio over time. However, the global economy will decarbonize over several decades and progress will not be uniform. During this multi-year process of decarbonization, most investors will need to dynamically adjust their holdings to manage risk and allocate to companies and sectors that they believe will be strong contributors to performance over various time horizons.

DISPLAY 1
Climate Disasters, and Related Financial Losses, Have Risen Sharply Over 40 Years



Source: NatCatSERVICE, Munich Re, March 2018

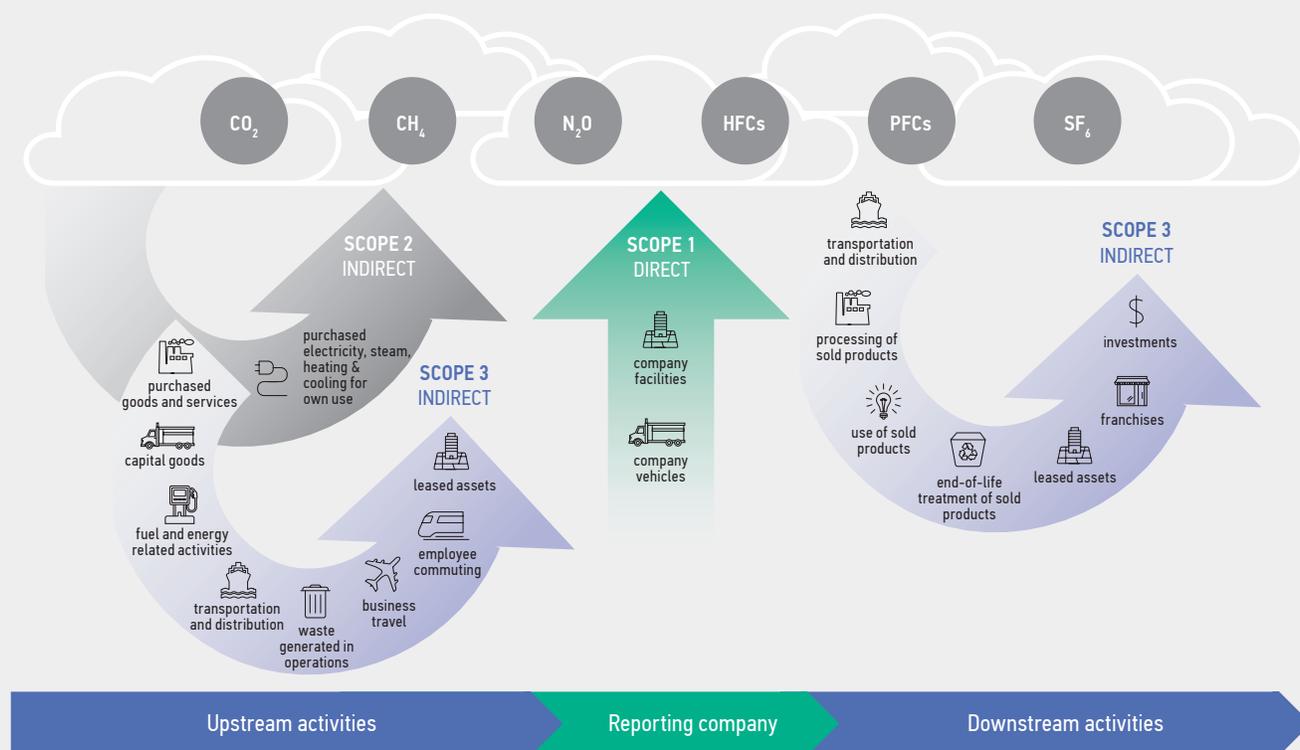
DISPLAY 2
Annual Global Carbon Emissions Are Off-Track from Global Climate Goals⁷



Source: UN Environmental Programme, Emissions Gap Report 2018.

⁶ Climate transition risks include the policy, technological and reputational risks associated with a transition to a low-carbon economy (e.g., the introduction of carbon pricing, energy storage advancements, and changing customer preferences for low-carbon products). A second type of climate risk, **physical risk**, includes extreme weather events (e.g., forest fires, floods, and heatwaves). This paper primarily addresses transition risk. For a fuller discussion of physical and transition risks, see "Climate Impact: Understanding Vulnerability as the Missing Piece in the Climate Risk Puzzle," Morgan Stanley Institute for Sustainable Investing, 2020.

⁷ UNEP (2018). The Emissions Gap Report 2018. United Nations Environment Programme, Nairobi

Box 1: Breaking Down Emissions

Source: Greenhouse Gas Protocol

Every company is responsible for three types of carbon emissions:⁸

- **Scope 1 Emissions:** *Direct* emissions from owned or controlled sources
- **Scope 2 Emissions:** *Indirect* emissions from the generation of purchased energy
- **Scope 3 Emissions:** *Indirect* emissions (not included in Scope 2) that occur in the value chain of the reporting company, including both upstream and downstream emissions.

⁸ See 'Key Terms' section for a complete definition of carbon emissions used in this paper. Source: Greenhouse Gas Protocol, "Technical Guidance for Calculating Scope 3 Emissions (Version 1.0)," https://ghgprotocol.org/sites/default/files/standards/Scope3_Calculation_Guidance_0.pdf and "FAQ," https://ghgprotocol.org/sites/default/files/standards_supporting/FAQ.pdf.

In our view, a broader set of climate metrics can enable a more holistic understanding of the risks and opportunities that the decarbonization pathway presents and potentially help avoid unintended biases or tilts in equity portfolios. We describe five key climate metrics in *Display 3*.

Much as they would for alpha, sector, style and geography, equity investors should consider and articulate a clear set

of decarbonization preferences to inform appropriate portfolio construction. Once these are established, certain combinations of climate metrics may warrant greater emphasis than others.

For example, some investors may prioritize limiting exposure to high-emitting companies or sectors as a means to mitigate future downside risk. Here, carbon emissions, carbon intensity or industry sector may be the most salient

metrics. Other investors may prioritize investments proactively contributing to decarbonizing the real economy. In this case, closer attention may be placed on climate change revenues and strong emissions reduction targets.⁹ For investors taking a holistic approach to ESG integration, emissions reduction targets or carbon earnings at risk may factor into analysis where most material to certain industry sectors.

DISPLAY 3
Key Climate Metrics for Investors

METRIC	UNITS	DESCRIPTION	KEY INSIGHTS
Carbon Emissions	Tons CO ₂ e	A measure of carbon emissions from a company's activities, also referred to as <i>absolute emissions</i> . (See <i>Box 1</i> above for more detail). Note: this paper relies on analysis of Scope 1 and Scope 2 emissions, due to limited availability and quality of Scope 3 data.	<ul style="list-style-type: none"> • Backward-looking, point-in-time snapshot due to tracking and reporting methods • Inclusion of appropriate Scope 3 emissions (still only disclosed by a minority of companies) would give a true indication of the total carbon impact of a company's business
Carbon Intensity	Tons CO ₂ e/ Revenue	A normalized measure of carbon emissions, using revenue to account for differences in company size. It can be interpreted as a measure of <i>efficiency</i> with respect to emissions. Note: this paper relies on analysis of Scope 1 and Scope 2 emissions, due to limited availability and quality of Scope 3 data.	<ul style="list-style-type: none"> • Backward-looking, point-in-time snapshot due to tracking and reporting methods • Normalization by revenue allows for comparison across holdings and portfolios of different sizes, distinct from <i>absolute</i> emissions • Avoids double-counting associated with absolute carbon emissions (e.g., one company's direct emissions counting toward another's indirect emissions) at the portfolio level
Emissions Reduction Target	Yes/No (<i>may be further scored or qualitatively assessed</i>)	A baseline indicator for whether a company has made a public commitment to reduce its emissions. Methodologies are evolving to further assess the strength of targets based on breadth, quality and associated plans to achieve them.	<ul style="list-style-type: none"> • Forward-looking indicator of a company's approach to emissions reduction, akin to earnings guidance • More meaningful for high-emitting companies and sectors • Quality, specificity and time horizon of targets currently vary
Carbon Earnings at Risk ("CEaR")	% of EBITDA	The estimated present value of future earnings loss based on a company's current Scope 1 & 2 emissions and the projected price path of carbon emissions, determined based on the required energy mix to achieve a given global warming scenario.	<ul style="list-style-type: none"> • Forward-looking scenario analysis, akin to Value at Risk (VaR), blending climate and financial information • Accounts for level, sector and geography of Scope 1 & 2 emissions, while holding current earnings and emissions constant • Most relevant at this stage to pricing of climate transition risk rather than physical risk
Climate Change Revenues	1-10 Score, based on type and % of Revenue	A score based on the percent of current revenue tied to products and services mapped to activities addressing (or aggravating) the root causes of climate change. Score is also influenced by the strength of the link between underlying products and services and climate change impacts.	<ul style="list-style-type: none"> • Point-in-time revenue tied to <i>positive</i> climate impacts may indicate future upside potential • Point-in-time revenue tied to <i>negative</i> climate impacts may serve as a proxy for Scope 3 (downstream) emissions, among other risks

⁹ Thematic private markets investments and labeled green or sustainable bonds can also be considered beyond the public equities context.

DISPLAY 4**Aligning Key Climate Metrics with Decarbonization Objectives**

Primary Climate Objective	DECARBONIZING A PORTFOLIO		DECARBONIZING THE REAL ECONOMY	
	Minimizing exposure to carbon-intense sectors through a risk-focused lens		Contributing to positive climate impacts through a risk and opportunity lens	
Approach to Sustainable Investing	Restriction Screening	ESG Integration	Thematic & Impact Investing	Company Engagement
Key Climate Metrics	<ul style="list-style-type: none"> Carbon emissions Carbon intensity Industry sector 	<ul style="list-style-type: none"> Carbon earnings at risk Emissions reduction targets 	<ul style="list-style-type: none"> Climate change revenues Industry sector 	<ul style="list-style-type: none"> Carbon emissions Carbon intensity Emissions reduction targets
Illustrative Strategy	Intentionally avoiding investments in issuers or sectors at high risk of negative impact from climate transition risks, as assessed by carbon emissions, carbon intensity or industry sector	Considering climate related criteria, such as carbon earnings at risk and emissions reduction targets, alongside financial analysis to identify risks and opportunities throughout the investment process	Tilting investments toward issuers or sectors positioned to deliver solutions for a low-carbon economy, as assessed by climate change revenues or industry sector	Seeking to drive improvement on climate change activities and outcomes—such as carbon emissions, carbon intensity or emissions reduction targets—through proxy voting and/or active dialogue with invested companies

In *Display 4*, we seek to demonstrate how investors can use these metrics in support of their specific decarbonization objectives.

While not an exhaustive list, we believe these climate metrics can equip

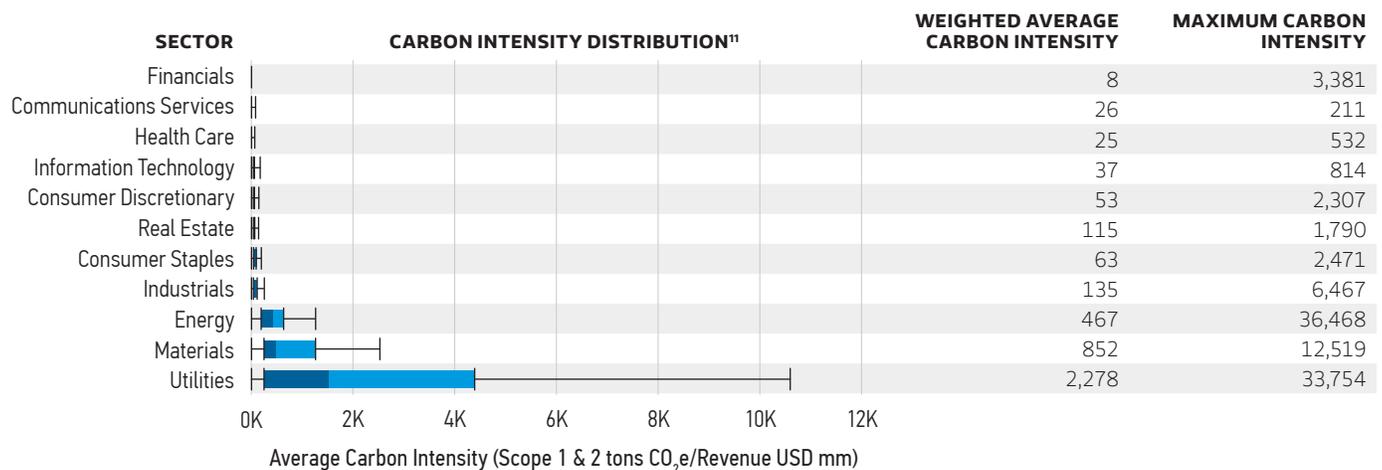
investors to address four important and interconnected questions that are likely to arise as they seek to align their portfolios with a decarbonizing economy in accordance with their overall performance goals.

QUESTION 1:**How Do Sector and Security Selection Decisions Impact Carbon Intensity at the Portfolio Level?**

Much like traditional performance attribution, carbon intensity can be driven by a combination of sector and

DISPLAY 5**Scope 1 & 2 Carbon Emissions Vary Significantly by Sector¹⁰**

MSCI ACWI Universe as of 12/31/2019



¹⁰ Sources: S&P Trucost, MSCI Index, Morgan Stanley analysis.

¹¹ For each sector, shaded boxes represent the interquartile range (25th to 75th percentile) of carbon intensity, while the whiskers extend to 1.5 times the interquartile range.

security selection. In a portfolio context, relative allocations to high-emitting sectors, such as energy and utilities, or low-emitting sectors, such as financials and communication services, can have an outsized impact. By the same token, sectors with a wide range of emissions intensities, such as industrials or consumer discretionary, present a significant opportunity to optimize the carbon profile through individual security selection.

Display 5 shows the weighted average and range of carbon intensity for sectors of the MSCI ACWI universe as an example. This type of analysis can complement other efforts to manage sector exposures across a portfolio in relation to a given benchmark.

**QUESTION 2:
How Can We Determine if a Company is Headed in the Right Direction?**

As backward-looking and point-in-time metrics, carbon emissions and carbon intensity cannot assess whether a company is committed to achieving carbon neutrality. However, akin to earnings guidance, many companies have begun to set public targets for reducing their emissions.¹² As shown in *Display 6*, approximately 4 in 10 global companies—across sectors—have a confirmed emissions target today.

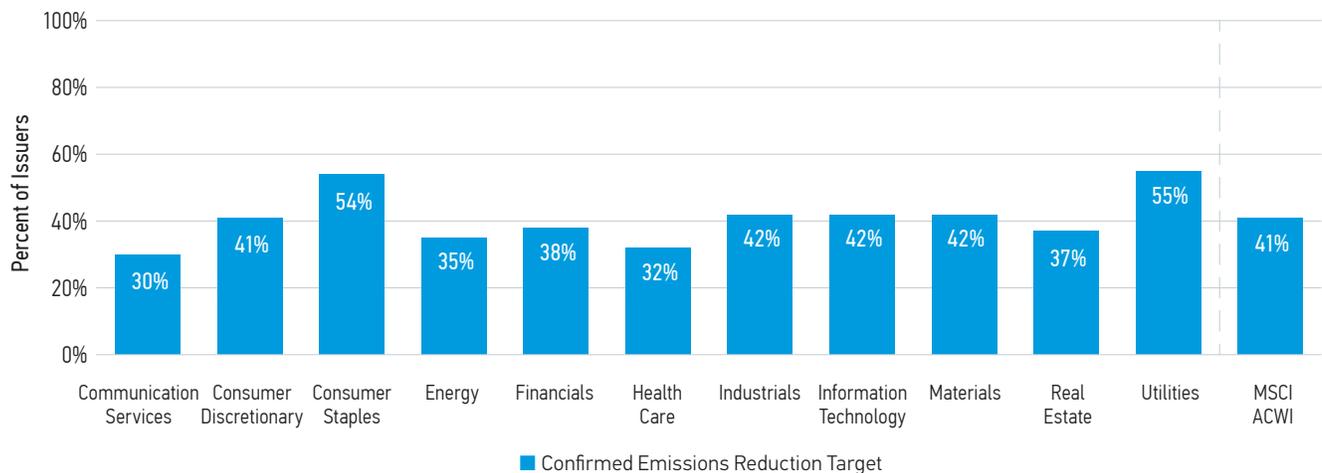
As a baseline, a clear emissions target coupled with evidence of action toward achieving the target signals a positive “direction of travel” on decarbonization efforts, beyond what a company’s current

emissions levels would suggest. While these targets are not binding and come in several forms, scrutiny has been growing from investors, regulators and consumers—including whether targets are based on absolute emissions or intensity, whether companies set interim targets, and whether companies go on to meet those milestones. Given the recent proliferation of public targets, there is also growing recognition of the need to use robust methodologies to assess the relative strength and decarbonization ambitions represented by such targets, particularly when aimed at a distant future date (e.g., 2050). As companies set, refine and make progress toward these goals, their related decarbonization investments may translate into valuation over time—particularly in high-emitting sectors.

DISPLAY 6

Approximately 4 in 10 Global Companies Today Have a Confirmed Emissions Reduction Target¹³

MSCI ACWI Universe as of 12/31/2019



¹² Ideally, companies who set an emissions reduction target will also commit to reporting on progress.

¹³ Sources: ISS-ESG, MSCI Index, Morgan Stanley analysis.

QUESTION 3: How Will the Cost of Carbon Emissions Impact Corporate Earnings?

A more comparable forward-looking climate metric, akin to Value at Risk, is Carbon Earnings at Risk (“CEaR”). While partially a function of current Scope 1 and Scope 2 carbon intensity, CEaR estimates the present value of future earnings lost, over a given time horizon, based on the projected price path of carbon emissions under different

scenarios. Such scenarios are developed based on projected shifts in energy generation mix (e.g., from fossil fuels to cleaner and renewable sources) required to keep global temperature rise under a certain threshold.¹⁴

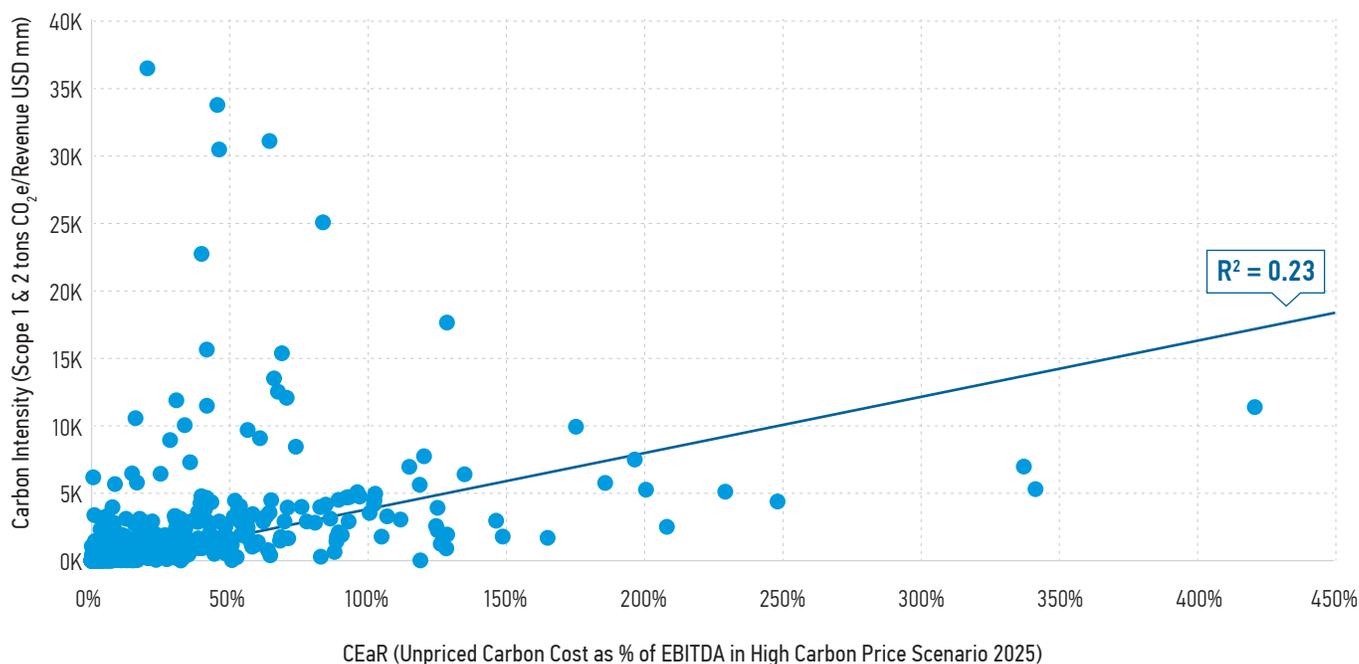
In *Display 7*, we compare carbon intensity and CEaR, based on estimated carbon prices in 2025, and demonstrate that there is not a perfectly linear relationship between the two. Geographic and

sector exposure, for example, are also significant determinants of CEaR.¹⁵ Holding emissions constant, companies already exposed to high carbon prices or operating in regions or sectors with lower expected carbon prices in the future will have a lower CEaR. For example, lower carbon pricing is generally expected throughout emerging economies, relative to developed economies, to account for global growth expectations and achievement of universal energy access.¹⁶

DISPLAY 7

Carbon Intensity is Only One Driver of Carbon Earnings at Risk¹⁷

MSCI ACWI Universe as of 12/31/2019



¹⁴ For purposes of analysis in *Display 7*, we rely on a scenario assuming 2025 carbon prices in line with “the implementation of policies that are considered sufficient to reduce greenhouse gas emissions in line with the goal of limiting climate change to 2°C above pre-industrial levels by 2100” (a “high carbon price scenario”) based on research by the OECD and IEA. Source: S&P Trucost.

¹⁵ The extent to which companies can pass on higher carbon prices to their consumers due to inelasticity of demand or other factors is not explicitly estimated within the CEaR calculation but will be a determinant in the ultimate level of earnings at risk. Further, it is important to note that due to the limitations of Scope 3 emissions reporting, CEaR cannot currently account for the impact of carbon pricing on a company’s inputs (from upstream emissions) or customers (from downstream emissions generated by product use).

¹⁶ See, for example, the Report of the High-Level Commission on Carbon Prices co-chaired by Nobel Laureate Joseph Stiglitz and Lord Nicholas Stern, <https://www.carbonpricingleadership.org/report-of-the-highlevel-commission-on-carbon-prices>. “The implementation of carbon pricing would need to take into account the non-climate benefits of carbon pricing (such as the use of revenues derived from it), the local context, and the political economy (including the policy environment, adjustment costs, distributional impacts, and political and social acceptability of the carbon price)... Further, in a realistic context where domestic and international compensatory transfers are limited, imperfect, and costly, it is impossible to disregard distributional and ethical considerations when designing climate policies. In view of this, the appropriate carbon-price levels will vary across countries. In lower-income countries they may actually be lower than the ranges proposed [in this report], partly because complementary actions may be less costly and the distributional and ethical issues may be more complex.”

¹⁷ Sources: S&P Trucost, MSCI Index, Morgan Stanley analysis.

Based on an investor’s time horizon and outlook on carbon pricing, CEaR should be considered dynamically, in addition to carbon intensity, for a more comprehensive evaluation of climate risk—especially in high-emitting sectors.

QUESTION 4:
What Can a Company’s Revenues Tell Us About Their Ability to Succeed as Decarbonization Occurs?

The transition to a low-carbon economy will be driven by technological innovation, shifting consumer preferences for low-

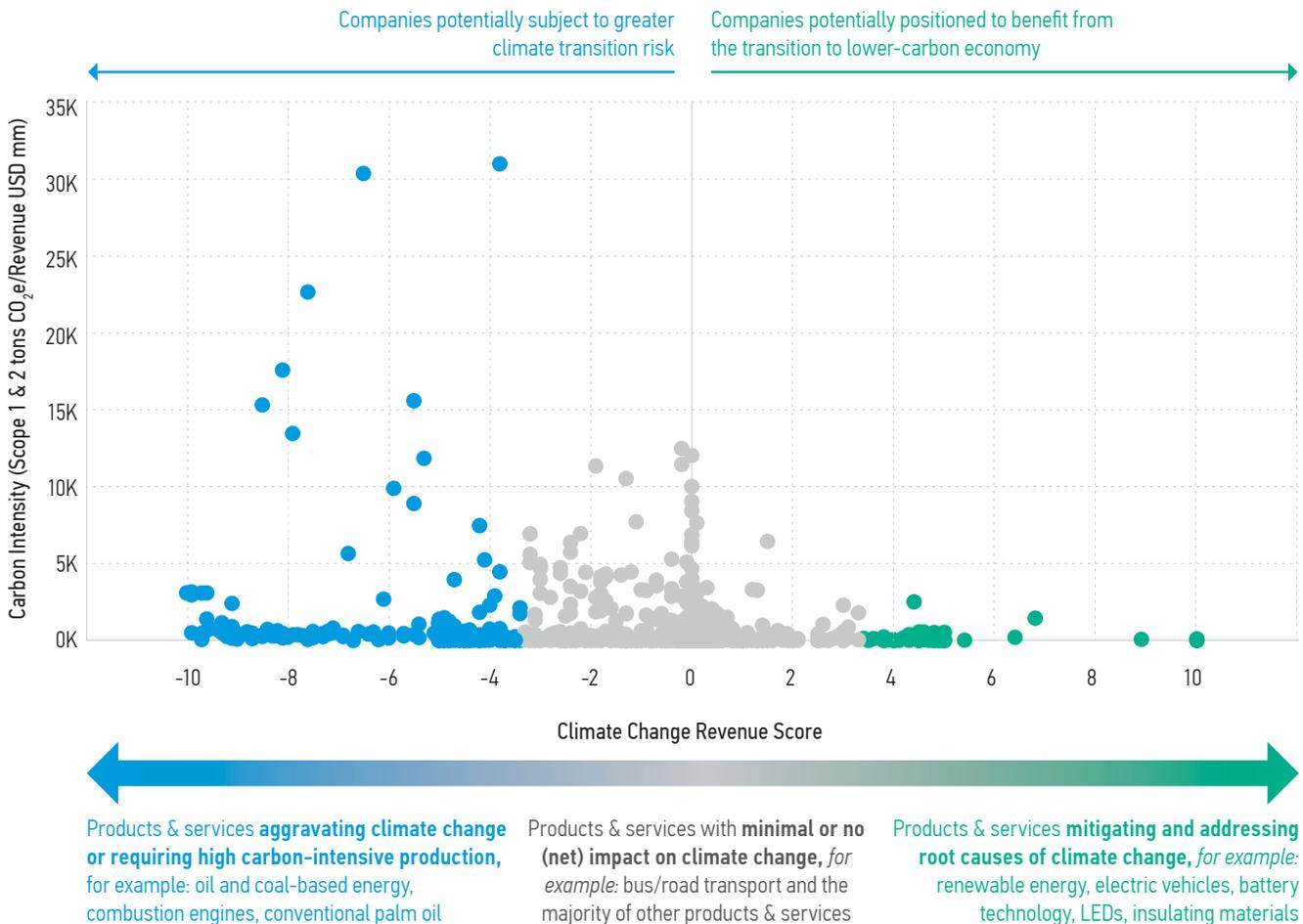
carbon products, changes in market prices and new policies. Individually and combined, these drivers will significantly impact revenues. A close analysis of a company’s sources of revenue, therefore, can help investors assess whether a company is positioned to succeed as the decarbonization trend progresses.

For example, companies with significant portions of revenue dedicated to mitigating the root causes of climate change (such as revenue from renewable energy and battery storage) may be well

positioned for future upside potential. Conversely, companies with significant revenue from products and services contributing to climate change (e.g., fossil fuel-based energy sources and combustion engines), may be exposed to greater risk in the transition to a low-carbon economy. One way to interpret “negative” climate revenues is as a proxy for Scope 3 (downstream) emissions. Further, companies with significant revenue tied to fossil fuel activities—through production, extraction and services—may face a greater risk of

DISPLAY 8
Climate Change Revenues Offer another Lens to Assess Climate Impact¹⁸

MSCI ACWI Universe as of 12/31/2019



¹⁸ Sources: S&P Trucost, ISS-ESG, MSCI Index, Morgan Stanley analysis. Note: mapping of corporate revenues to climate change impacts is based on ISS assessment.

stranded assets or write-downs, over time, as the global energy mix transitions away from fossil fuels to renewable sources.¹⁹

As illustrated in *Display 8*, climate change revenues are not perfectly correlated with emissions, and can provide another lens through which to select and evaluate companies, particularly in a thematic investment context where an investor seeks to ‘align’ a portfolio with certain real economy decarbonization outcomes.

A Fifth Question ...

An important question that we allude to, but do not fully address in this paper, is that of timing. At what point is the market likely to reward or penalize

companies for their decarbonization efforts? A framework for addressing this question would equip investors to make more thoughtful strategic and tactical asset allocation decisions. We hope to explore this topic in future papers.

Over time, we also expect an evolution in climate data itself, bringing with it new methods and precision with which investors can position portfolios with respect to decarbonization. Much like the global economy’s transition to a low-carbon future, advancements in climate data may not be uniform and will require calibration alongside traditional financial performance indicators for investors.

Further Reading

- Morgan Stanley Institute for Sustainable Investing, *Climate Impact: Understanding Vulnerability as the Missing Piece in the Climate Risk Puzzle* (2020)
- Morgan Stanley Investment Management, *Five Sectors That Cannot Escape Climate Change* (2020)
- Morgan Stanley Investment Management, *Six Climate Investing Myths Debunked* (2019)
- Morgan Stanley Institute for Sustainable Investing and Morgan Stanley Investment Management, *Weathering the Storm: Integrating Climate Resilience Into Real Assets Investing* (2018)

Key Terms

- **CARBON EMISSIONS:** For purposes of this piece, carbon emissions refer to the carbon dioxide equivalent (CO₂e) of the six major greenhouse gases (see below).
- **DECARBONIZATION:** A systematic effort of companies and governments to align themselves with a low-carbon economy through the reduction in carbon emissions.
- **GREENHOUSE GASES:** As defined by the 1997 Kyoto Protocol, the six greenhouse gases contributing most to climate change are Carbon dioxide (CO₂), Methane (CH₄), Nitrous oxide (N₂O), Hydrofluorocarbons (HFCs), Perfluorocarbons (PFCs), and Sulphur hexafluoride (SF₆).
- **NET ZERO (EMISSIONS):** A state in which any carbon emissions produced are offset by removing carbon from the atmosphere. Reaching net zero emissions by the year 2050 is critical to limiting average global temperature rise to 1.5°C above pre-industrial levels.
- **SCOPE 1 EMISSIONS:** Direct emissions from owned or controlled sources.
- **SCOPE 2 EMISSIONS:** Indirect emissions from the generation of purchased energy.
- **SCOPE 3 EMISSIONS:** Indirect emissions (not included in Scope 2) that occur in the value chain of the reporting company, including both upstream and downstream emissions. Note: Scope 3 data is not reflected in analyses above, due to limited data quality and coverage.
- **PHYSICAL RISK:** Acute physical risk refers to the harms created by single events such as extreme weather events like cyclones, wildfires and floods, while chronic physical risk refers to the changes in natural cycles and climate patterns over longer time periods.
- **TRANSITION RISK:** Risks encompassing the policy and legal, technology, market and reputational changes to organizations stemming from the transition to a low-carbon economy.

¹⁹ S&P Trucost

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There is no assurance that a portfolio will achieve its investment objective. Portfolios are subject to market risk, which is the possibility that the market values of securities owned by the portfolio will decline and that the value of portfolio shares may therefore be less than what you paid for them. Market values can change daily due to economic and other events (e.g. natural disasters, health crises, terrorism, conflicts and social unrest) that affect markets, countries, companies or governments. It is difficult to predict the timing, duration, and potential adverse effects (e.g. portfolio liquidity) of events. Accordingly, you can lose money investing in a portfolio.

In general, **equity securities**' values also fluctuate in response to activities specific to a company. Investments in **foreign markets** entail special risks such as currency, political, economic, and market risks. The risks of investing in **emerging market countries** are greater than risks associated with investments in foreign developed countries. **Fixed income securities** are subject to the ability of an issuer to make timely principal and interest payments (credit risk), changes in interest rates (interest-rate risk), the creditworthiness of the issuer and general market liquidity (market risk). In a rising interest-rate environment, bond prices may fall and may result in periods of volatility and increased portfolio redemptions. In a declining interest-rate environment, the portfolio may generate less income. **Longer-term securities** may be more sensitive to interest rate changes. **Real estate investments**, including real estate investment trusts, are subject to risks similar to those associated with the direct ownership of real estate.

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