CHIEF INVESTMENT OFFICE

Investment Insights

Investing in a Low Carbon Economy

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By seeking out more environmentally efficient operators, investors can help offset carbon risk and potentially improve risk-adjusted returns.

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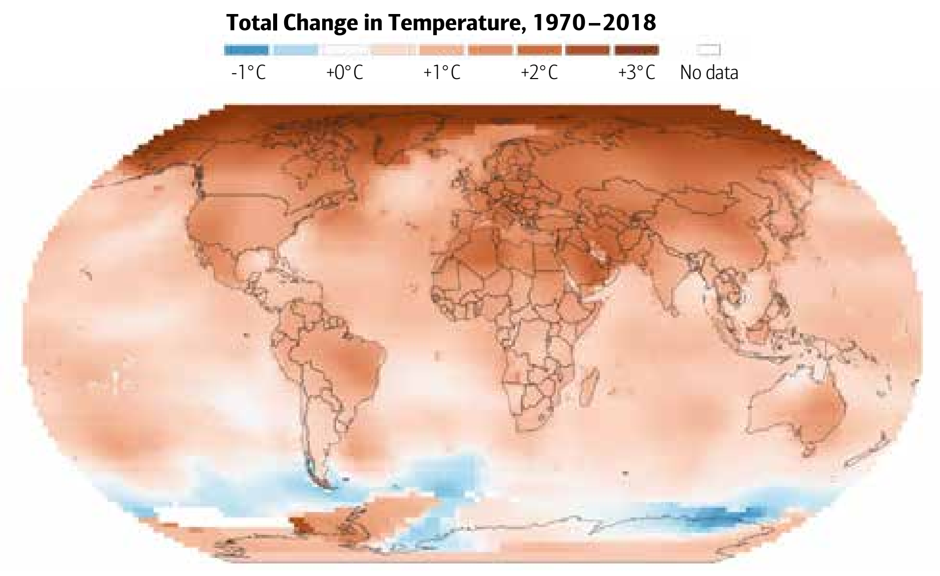
The Buzz Around Carbon

There is no shortage of controversy currently surrounding global warming and climate change. With the current administration rolling back or reversing previous environmental regulations and announcing the U.S. withdrawal from the 2015 Paris Agreement on climate change, there is a policy vacuum that jeopardizes the efforts to reduce global greenhouse gas emissions. Many investors are contemplating the implications climate issues could have on their personal well-being and financial stability, along with broader humanitarian consequences. While there are differing views on the severity, timing and potential effects of climate change, there is considerable discussion among both institutional and individual investors about reallocating capital away from fossil fuel-centric companies toward more sustainable operators, including those investing in clean energy technologies and infrastructure. As companies continue to disclose more reliable data pertaining to their carbon footprint and overall environmental impact, investors will gain a clearer picture of leaders and laggards and have the ability to make better-informed decisions.

Exhibit 1: Relatively Sudden Rise in Temperatures.



Source: National Aeronautics and Space Administration (NASA) and National Oceanic and Atmospheric Administration (NOAA) 2018.

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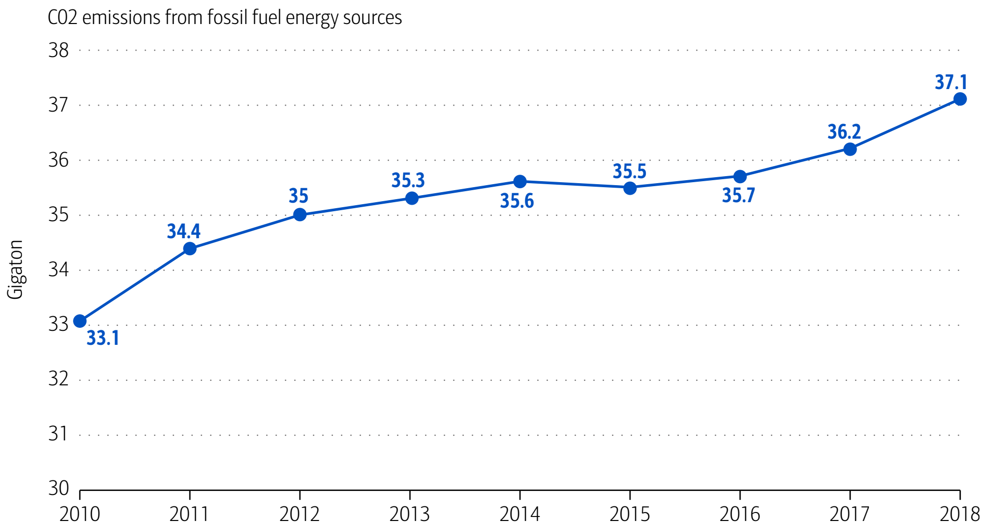
Climate Science & Environmental Impact

There is consensus in the scientific community that rising levels of carbon in the atmosphere is one of the leading contributors to global warming. Data has shown that temperatures have risen consistently over the past few decades, 2016 being the warmest year since 1880, when temperatures were first recorded (Exhibit 1).

Climate experts seem to have identified a strong correlation between rising temperatures and an increase in carbon dioxide (CO2) concentration in the atmosphere. In the last decade, more CO2 emissions have been released into the atmosphere than any other decade in history. After a four-year period of relatively muted gains, total carbon dioxide emissions rose by 1.4% in 2017 and 2.5% in 2018 to 37.1 gigaton* (Exhibit 2).

Exhibit 2: Carbon Dioxide Emissions Back on the Rise.



* Gigaton (unit of mass) is equal to 1,000,000,000 metric tons. Source: Global Carbon Project as of 2018.

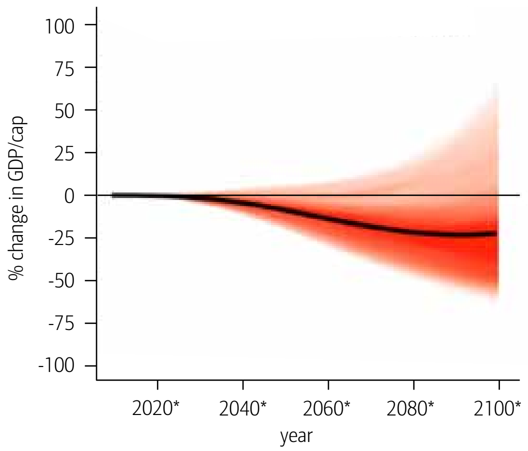
The environmental effects of global warming include extreme weather events such as heat waves, frigid cold, droughts, wildfires, floods and hurricanes. We may already be feeling the effects of long-term global warming:

- During 2018, Europe had its second-warmest July since continental records began in 1910; record warm temperatures were observed in Scandinavia, northwestern Africa, southern Asia, and southwestern United States.[1]
- 2018 saw some of the most devastating fires in recent history for California and Colorado.[2]
- Weather stations across the globe reported 430 all-time high temperatures, but only 40 all-time lows. This ratio is unprecedented as a global climate in balance should have an equal number of new highs and lows.[3]
- Record rainfall across the Midwest United States caused widespread flooding during 2019, severely hampering farmers' ability to sow crops during the limited planting window.[4]
- Alaska smashed heat records in March 2019 with temperatures averaging 11 degrees Celsius above normal, causing the Bering sea to open up three months sooner than usual.[5]

[1] National Centers for Environmental Information, July 2018.
[2] World Resources Institute, March 7, 2019.
[3] New Scientist "Environment", January 30, 2019.
[4] National Geographic, June 3, 2019.
[5] Union of Concerned Scientists, April 12, 2019.

While these events may cause only temporary disruption, geographical changes such as melting polar ice caps, rising sea levels and warming ocean temperatures pose a permanent threat to our planet. Essentials like food, water and medicine are commodities that may be abundant today but whose supplies could be strained in the not-too-distant future due to global warming. And there are also significant economic implications as societies wrestle with relocating coastal population centers, rebuilding infrastructure, responding to negative effects on health, and securing adequate fresh water and food supplies. University of California, Berkeley scientists estimated that three degrees of global warming would cost the median American county 4% of its gross domestic product (GDP) and this figure would likely rise to a loss of 6% or more with five degrees of warming (Exhibit 3).

Exhibit 3: Economic Impact of Climate Change on the U.S.



Likelihood climate change will reduce the World's GDP per capita by

- more than 0%: **71%**
- more than 10%: **63%**
- more than 20%: **51%**
- more than 50%: **12%**

* Estimated. **Past performance does not guarantee future results.** Source: The Economist, March 2019.

Investor Risks & Opportunities

There is a compelling investment case that companies that are environmentally efficient (i.e., using fewer natural resources and generating less waste in the production process) have an economic advantage over their peers. Research suggests these leaders may enjoy a cost advantage, greater flexibility and efficiency in their supply chains, increased productivity, less regulatory risk, and fewer instances of costly fines, recalls or mitigation requirements.

Recent studies found that the stocks of companies with better environmental performance historically demonstrated less risk. These leading stocks generally experienced both steadier overall performance and less downside capture than the stocks of firms with poor environmental performance. This effect, not surprisingly, was more pronounced in manufacturing and resource-intensive industries.

Investors may have differing views on how to best position a portfolio for the transition to a low-carbon economy. A key decision is whether to fully divest from carbon-intensive market sectors such as energy and fossil fuel-burning utilities or to invest in companies from all market sectors, which are best positioned for this transition. Some investors believe that divesting entirely from fossil fuel companies is the “right” thing to do. One can argue that starving fossil fuel development projects of capital will raise the cost of extraction and further level the playing field with renewable energy sources.

Investors also see the power in a public statement around divestment as a key driver of policy action. On the other hand, the energy sector (which is still dominated by integrated oil companies) can serve as an effective hedge and diversification tool in a portfolio.

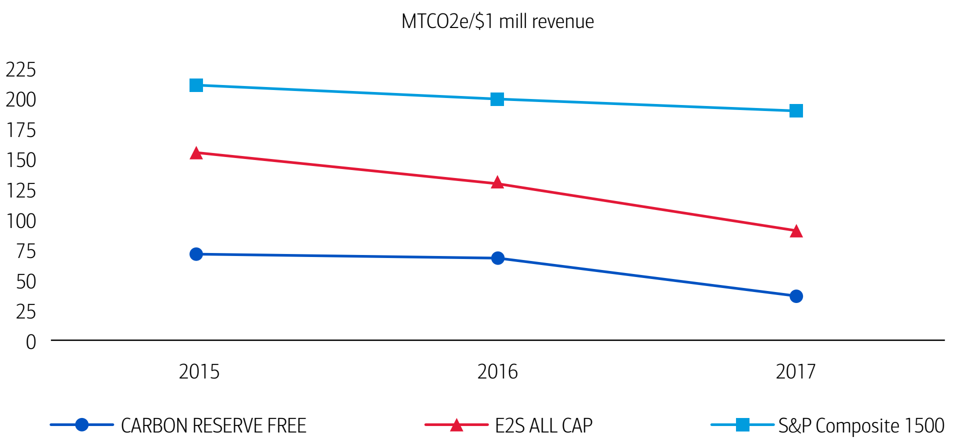
A less restrictive approach involves avoiding more carbon-intensive fuels like coal or oil from tar sands, while looking for companies with a positive trend toward reducing carbon intensity. This method allows investors to maintain energy exposure but with an environmental focus. For example, businesses providing renewable energy infrastructure, clean technology and resource efficiency tools are likely to thrive in a carbon-regulated environment. In addition to solving environmental challenges, investing in these companies may lead to better operational and resource efficiency, potentially improving the bottom line and driving long-term growth. Some investors choose to retain exposure to energy companies in order to play an activist role, lobbying for greater disclosure, carbon policy development and risk mitigation strategies.

Environmental Stewardship & Sustainability (E2S) & Carbon Reserve Free (CRF) Portfolios

Our Chief Investment Office (CIO) Socially Innovative Investing (S2I) offers two internally managed investment strategies with an environmental focus, Environmental Stewardship & Sustainability (E2S) and Carbon Reserve Free (CRF). Both strategies seek to identify companies within the S&P 1500 universe with leading environmental policies and practices compared to their industry peers. The two-part due diligence framework examines corporate disclosure of policies relating to the environment and considers a company's track record and performance on quantifiable factors to ensure that policy decisions produce the intended outcomes. While this "scoring" process takes into account a variety of environment, social and governance (ESG) factors, environmental metrics have a more significant contribution to the overall company assessment. The E2S portfolio seeks to invest in the top-performing companies in each economic sector, even those industries with a poor reputation for environmental performance. Companies that provide "green" solutions are often looked at favorably within the context of the S2I framework; however, it is unlikely that a speculative renewable energy company will qualify for inclusion, due to size, maturity or other fundamental factors.

For investors who choose to divest from fossil fuels, the CRF portfolio uses the same rigorous stock selection methodology while removing energy and fossil fuel-burning utility companies. In order to avoid adding unintended risk, the resulting portfolio is "optimized" to reduce tracking error to the benchmark. This final step aligns the portfolio to the overall market, with the exception that its environmental performance may be considered superior, allowing the potential for more favorable risk-adjusted returns over the long term. As shown in Exhibit 4, both strategies offer substantial improvements over the carbon intensity of the market as a whole and also demonstrate greater improvements in reducing the amount of carbon emitted per unit of sales over the past two years.

Exhibit 4: Carbon Intensity.



Sources: Chief Investment Office and MSCI Company as of May 2019. **Past performance is no guarantee of future results.** Short-term performance shown to illustrate more recent trend.

Conclusion

Today's investors have many choices when it comes to applying an environmental lens to their portfolio. More-sophisticated portfolio construction techniques make it possible to adhere to an "environmentally friendly" investment mandate without adding significant risk. In fact, given the recent evidence supporting the case for investing in environmental leaders, potential risk-adjusted returns may be attractive indeed. Even with the heightened scrutiny around carbon intensity and climate change, evaluating your investment portfolio for environmental and economic risk will likely be an ongoing process. There is no one "right" solution, and your implementation strategy may evolve over time. But given the direction of the global economy and development of institutional class investment strategies, now is a great time to get started.

ABOUT THE CIO SOCALLY INNOVATIVE INVESTING TEAM

The CIO Socially Innovative Investing (S2I) team manages a suite of internally managed equity portfolios that invest in industry leaders with respect to environmental stewardship, human capital engagement, and corporate citizenship and governance. The CIO S2I strategies are based on a growing awareness that strong corporate financial performance and social responsibility are not mutually exclusive; rather, they are mutually beneficial qualities.

To learn more about investment opportunities and the Chief Investment Office Socially Innovative Investing, E2S or CRF portfolios, please contact the Socially Innovative Investing Team at dg.s2i_portfolio@bankofamerica.com.

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