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# Climate Investing Grows Up

Portfolio construction strategies for climate-related risk management and the transition to a low-carbon economy

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In early 2019 we noted that climate investing was moving from conversation to action<sup>1</sup> among institutional investors, driven both by regulatory pressure and by a growing desire for organizations to align their portfolios with broader priorities. For institutional investors ready to take action, there are a variety of possible approaches to addressing climate change in a portfolio. Investors can begin by asking themselves four core questions:

- 1 What are the risks and opportunities posed by climate change in my portfolio?
- 2 What data is available to quantify these risks and opportunities?
- 3 What portfolio design/construction approaches are available for investors integrating climate considerations?
- 4 What are the performance implications of building a climate-aware portfolio?

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## 1

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### What are the risks and opportunities posed by climate change in my portfolio?

Climate change poses multiple risks and opportunities to investment portfolios. The risks include **physical** and **transition** risk, while opportunities include investments in **green energy** and in companies that are building **climate resiliency** into their businesses.

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#### Risks

**Physical Risks** are tangible risks of climate change that could manifest through a rise in sea levels, droughts, flooding, extreme temperatures and increased frequency of extreme weather events. These phenomena could damage infrastructure, cause supply-chain disruption, result in raw materials scarcity or harm human health.

**Transition Risks** are risks to economic and business models that are associated with new carbon pricing or emissions trading schemes, as well as the risk that higher costs of carbon may lead to stranded assets. Transition risks include changing consumer habits and labor market shifts, as well as investment allocation decisions in companies and sectors better suited to a low-carbon economy.

**Green Energy** investments represent an opportunity to reposition toward “green” revenue sectors (e.g., energy generation, management and efficiency, as well as environmental infrastructure).

**Climate Resilient** investments represent an opportunity to benefit from the success of firms that are building in resiliency to the potential impacts of climate change. These companies are changing their business models, including how they deploy capital and where they grow their business lines, in response to climate change.

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## 2

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### What data is available to quantify these risks and opportunities?

An explosion of climate data in recent years has made it possible for robust investable solutions to be built around these themes. There are several different measures available to investors wishing to respond to these risks and opportunities in the portfolio. In practice, climate data can be incorporated into the investment process in order to achieve both climate and financial objectives.

Common ways that climate data is used as a lever to address risk include:

- **Fossil Fuel Sector Exposure** Investors manage ownership positions in the fossil fuel-based economy by removing exposure to energy, utility and material sectors, which may be disproportionately impacted by physical impacts of climate change.
- **Fossil Fuel Reserve Exposure** Investors reduce exposure to future assets that may become devalued or stranded as a result of the transition to a low-carbon economy.
- **Carbon Intensity** Investors reduce exposure across a portfolio to high-carbon-emitting sectors that may be impacted by carbon pricing, emissions trading schemes or other interventions.
- **Brown Revenue Exposure** Investors reduce exposure to companies that derive a significant portion of their revenue from high-carbon/fossil-fuel sources.

Two common ways that climate data is used as a lever to capitalize on opportunities are:

- **Green Revenue Exposure** Investors increase exposure to companies that derive a significant portion of their revenue from green goods, products and services.
- **Climate Resilience Exposure** Investors reposition toward companies that understand the strategic importance of adapting to climate change, and manifest this understanding through capital expenditures and new business lines.

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# 3

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## What portfolio design/construction approaches are available for investors integrating climate considerations?

A first step in addressing climate within a portfolio is to determine overall objectives — managing risk, taking advantage of opportunities or both, which can help determine which portfolio construction technique may be most appropriate. Below are three of the most common approaches and the ways in which we typically see them applied by clients.

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### Screens-Based Approach

A screens-based approach has historically been the most common way investors have incorporated environmental, social and governance (ESG) considerations into their portfolios. This entails removing exposure to specific high-carbon-emitting industries such as utilities or traditional fossil fuel related industries such as coal and petroleum producers. A client may pursue this approach with the goal of avoiding stranded-asset risk, or may view investments in specific industries as a drag on portfolio performance in the long run.

Screened strategies can be viewed as addressing both the physical and transition risk of climate change because they often involve removing exposure to the fossil fuel industry, which may be disproportionately impacted by those risks. These strategies are particularly favored by institutions with actively engaged beneficiaries or other stakeholders who seek to minimize involvement with major contributors to climate change.

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### Mitigation Approach

Mitigation sets an explicit objective to reduce the flow of heat-trapping greenhouse gases into the atmosphere and increase exposure to “green” companies. Clients seeking primarily to manage the economic impacts of climate change across their portfolio more commonly pursue mitigation.

Mitigation strategies can be viewed as addressing the same risks as screened strategies in a more targeted way (often with a targeted level of carbon reduction), with the option of also adding exposure to opportunities such as green revenue. Specifically, these portfolios allow investors to manage the transition risk of being exposed to high emitters during the shift to a low-carbon economy, including changes in the value of carbon-intensive assets or carbon-emitting activities due to regulation. This mitigation objective is accomplished by reducing carbon intensity and brown revenue exposure in a portfolio while increasing exposure to “green” businesses.

Because the mitigation approach may have multiple objectives and data inputs, more sophisticated portfolio construction approaches are often needed. Depending on how many metrics there are and whether an explicit target is required (e.g., a carbon-reduction target of 50%), rules-based approaches such as simple screening and tilted approaches may not be precise enough, and algorithms such as optimization-based approaches may be necessary.

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### Mitigation and Adaptation Approach

Mitigation and adaptation strategies allow investors to respond comprehensively across climate risks and opportunities by combining the benefits of a mitigation approach with exposure to both green revenue and climate-resilient businesses. This approach extends mitigation to include an explicit objective to increase exposure to companies adjusting to actual or expected future climate impacts. Similar to the mitigation approach, there are multiple objectives and data inputs in mitigation and adaptation strategies, and more sophisticated portfolio construction approaches involving quantitative algorithms are usually needed.

These three portfolio design/construction approaches are not mutually exclusive. It is possible, for example, to apply both screening and a mitigation approach to a portfolio.

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# 4

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## What are the performance impacts of building a climate-aware portfolio?

To illuminate the characteristics of portfolios which take these different approaches, we modeled six separate hypothetical climate portfolios using variations of the three portfolio approaches described above and compared their attributes and performance with the MSCI World Index benchmark.

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Screened

Case 1 **Approximate 30% Carbon Reduction Target** achieved by screening out the benchmark's worst 2.5% of polluters, measured by carbon intensity.

Case 2 **Approximate 50% Carbon Reduction Target** achieved by screening out the benchmark's worst 10% of polluters, measured by carbon intensity.

Case 3 **Exclusion of Energy, Materials and Utilities** sectors, which are the three highest carbon-emitting sectors.

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Mitigation

Case 4 **Explicit 30% Carbon Reduction Target** achieved by using mitigation to achieve the specified level of carbon intensity relative to the market-cap-weighted benchmark.

Case 5 **Explicit 50% Carbon Reduction Target** achieved by using mitigation to achieve the specified level of carbon intensity relative to the market-cap-weighted benchmark.

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Mitigation and  
Adaptation

Case 6 **Custom Target for Carbon Intensity Reduction** achieved by targeting a reduction in fossil fuels, a reduction in brown revenues, an improvement in green revenues and an improvement in climate adaptation.

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Key Observations

The performance summary of the six hypothetical cases (Figure 1) show that the alignment of climate concerns and investment objectives is possible with the portfolio construction tools at hand. Some key observations from our research include:

- **Low Tracking Error** is possible to achieve in climate-aware portfolios. For example, Case 5 achieves 50% reduction in carbon intensity with only 19 basis points of tracking error. In the same vein, Case 6, a portfolio that integrates climate metrics, shows that only 32 basis points of tracking error are needed to achieve substantive improvements in green revenue exposure and climate risk adaptation alongside reductions in carbon intensity, fossil fuels reserves exposure and brown revenue exposure.
- **Active Returns** for all six portfolios are small, in line with low targeted levels of tracking error, but positive. Sharpe Ratios are equivalent to the market-cap-weighted benchmark, and Information Ratios are positive. While returns are usually not the primary focus of climate-oriented investors, the results are comforting in that climate goals can be achieved without substantial loss of performance and potentially even better performance.

- **Screening** can be used to meaningfully reduce carbon intensity but generally results in higher levels of tracking error for the same amount of carbon intensity, compared to optimization-based approaches. To achieve 50% carbon intensity reduction, screening as represented in Case 2 requires 43 basis points of tracking error, compared to Case 5 which only requires 19 basis points of tracking error. Moreover, screening out industries as opposed to individual stocks ranked on carbon intensity can lead to higher levels of tracking error without a commensurate reduction in carbon intensity. This is exhibited by Case 3, where the exclusion of companies in the energy, materials, and utilities sectors results in a tracking error of 138 basis points with only a modest incremental reduction in carbon intensity.

Thus, the amounts of carbon reduction targeted in Cases 1 and 2 can be achieved at a lower tracking error with the **mitigation approach** used for Cases 4 and 5.

Screening-based approaches result in a **loss of exposure to green revenues**. This is because the materials and utilities sectors, which have a higher concentration of green companies, are excluded.

Overall, the results show that the way climate is integrated should reflect the chosen investing criteria and desired performance measures. Moreover, any specific set of climate goals can be achieved in a variety of different ways.

Figure 1  
**Performance Summary  
of Hypothetical Cases**

	Ref MSCI World Index	Screening			Mitigation		Mitigation and Adaptation
		Case 1 30% Carbon Reduction	Case 2 50% Carbon Reduction	Case 3 Exclude E/M/U	Case 4 30% Carbon Reduction	Case 5 50% Carbon Reduction	Case 6 Custom Strategy
Annual Return (%)	9.94	9.99	10.25	11.09	10.05	10.07	10.30
Annual Volume (%)	11.46	11.55	11.51	11.54	11.44	11.42	11.43
Sharpe Ratio	0.87	0.86	0.89	0.96	0.88	0.88	0.90
Active Return (%)	–	0.05	0.31	1.15	0.11	0.13	0.36
Tracking Error (%)	–	0.19	0.43	1.38	0.14	0.19	0.32
Information Ratio	–	0.26	0.72	0.84	0.78	0.70	1.15
Maximum Drawdown (%)	-13.31	-13.52	-13.43	-13.16	-13.28	-13.16	-13.13
Beta	–	1.01	1.00	1.00	1.00	1.00	1.00
Number of Stocks (avg)	1636	1595	1473	1326	1078	1030	928
Effective No. of Stocks (avg)	350	341	313	282	347	336	325
<b>Climate Summary (% Improvement versus MSCI World)</b>							
Carbon Intensity	–	32.2	55.3	65.0	30.0	50.0	50.0
Fossil Fuel Reserves	–	-1.2	26.8	99.2	-3.7	-4.2	50.0
Brown Revenues	–	9.5	36.9	97.5	11.2	21.1	50.0
Green Revenues	–	-6.9	-27.1	-34.3	1.5	-7.6	100.1
Adaptation Score	–	-0.1	0.0	0.7	0.0	-0.5	10.0

Source: State Street Global Advisors, as of December 2019. Academic research for illustrative purposes only. The returns shown above are hypothetical and gross of fees. Please see back page for further important information around these results.

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## Conclusion

For investors ready to take action on climate change, the appropriate solution depends on your organization's overall objectives — both as they relate to climate change, and beyond. At State Street Global Advisors, we aim to serve as a trusted partner to our clients, helping them reach these objectives. Our climate strategies span equity and fixed income, and include screened, mitigation, and combined mitigation and adaptation approaches.

We encourage you to reach out to your State Street Global Advisors relationship manager to learn more about our offerings and how we can support you in addressing climate change in your portfolio.

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## Endnotes

- 1 *Climate Investing: Moving from Conversation to Action*, State Street Global Advisors, February 2019.

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## About State Street Global Advisors

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- Start with rigor
- Build from breadth
- Invest as stewards
- Invent the future

For four decades, these principles have helped us be the quiet power in a tumultuous investing world. Helping millions of people secure their financial futures. This takes each of our employees in 27 offices around the world, and a firm-wide conviction that we can always do it better. As a result, we are the world's third-largest asset manager with US \$3.12 trillion\* under our care.

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\* AUM reflects approximately \$43.72 billion USD (as of December 31, 2019), with respect to which State Street Global Advisors Funds Distributors, LLC (SSGA FD) serves as marketing agent; SSGA FD and State Street Global Advisors are affiliated.

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