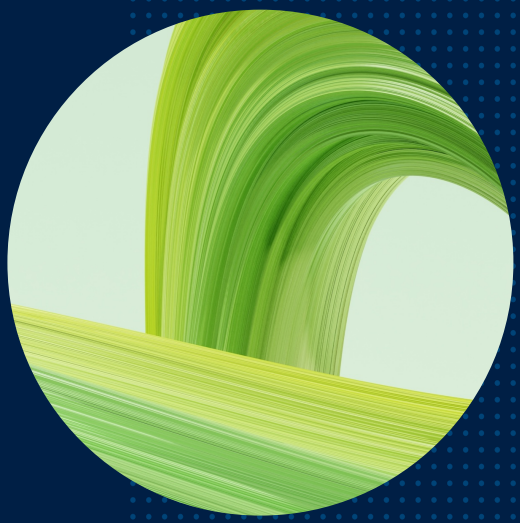
PGIM

PRICING THE TRANSITION

HOW RISK BUDGETS SHAPE CLIMATE OUTCOMES



How investors can align climate goals with return objectives through thoughtful risk-budget management

For most institutional investors, the overarching challenge is how far they can go in incorporating climate considerations without distorting core equity allocations. The concern is straightforward: reducing carbon intensity and increasing exposure to climate solutions sounds desirable in principle, but in practice it risks introducing tracking error, unintended factor tilts, and weaker diversification.

While this trade-off is real, it is also more manageable than previously thought. The key is not to treat climate as a separate allocation or an overlay, but to embed it directly into the portfolio construction process and calibrate the outcome against an explicit risk budget.

CLIMATE TRANSITION IS NOT A SINGLE SIGNAL

The starting point is recognising that climate transition introduces both risks and opportunities, and these do not neatly align.

On the risk side, the transition to a lower-carbon economy creates financial pressure through regulation, technology shifts, and changing demand. Carbon emissions are a practical proxy for this exposure, reflecting how vulnerable a company may be to policy tightening or decarbonisation costs.

On the opportunity side, the same transition is creating a set of secular growth drivers. Companies that produce goods and services linked to clean energy, resource efficiency, or climate adaptation can benefit from new demand drivers. Here, revenue alignment with selected Sustainable Development Goals is used as a way to quantify participation in these themes.

The complication is that these two dimensions do not overlap cleanly. A low emitter is not automatically a beneficiary of climate transition, and a company with meaningful climate-aligned revenues may still carry material operational risks. That makes single-metric approaches, whether carbon reduction or simple exclusions, structurally incomplete.

A MULTI-LAYERED FRAMEWORK

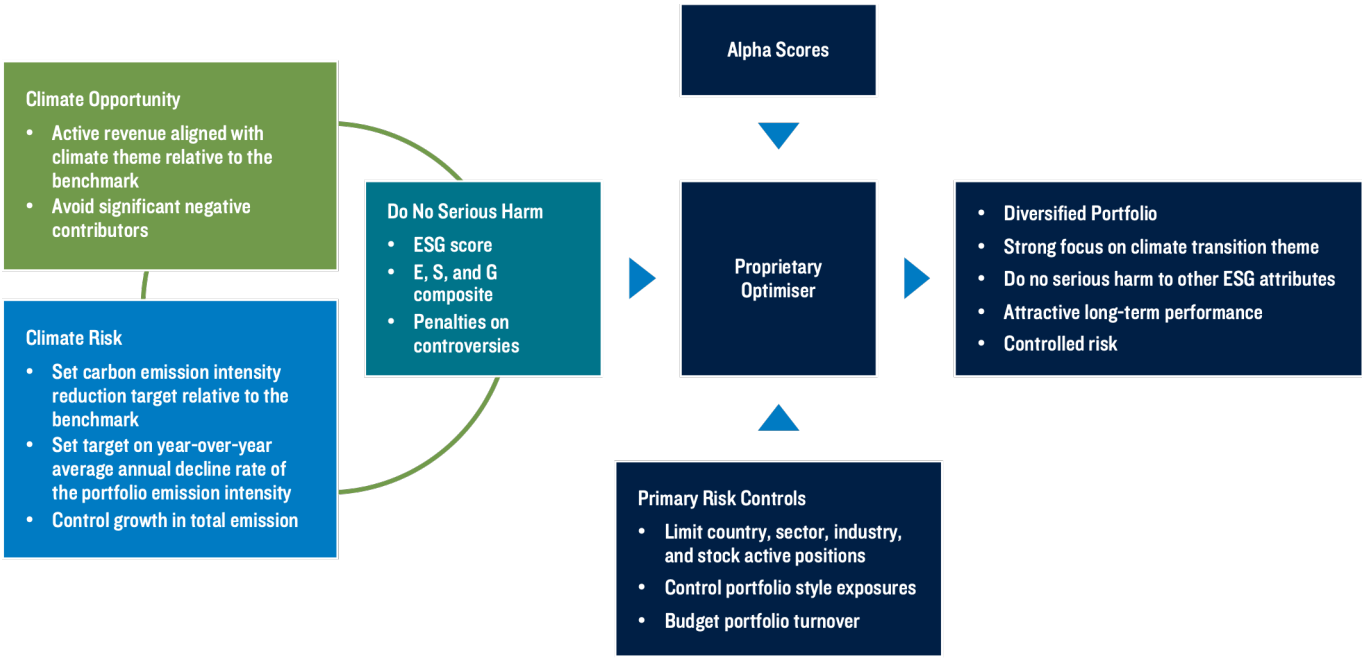
Addressing this requires combining three distinct lenses within a single process.

The first is transition risk, captured through emissions and other indicators of exposure to decarbonisation pressures. The second is climate opportunity, measured through the extent to which company revenues are linked to climate-related solutions. The third is a broad ESG framework, used to assess operational risks across environmental, social and governance dimensions.

The ESG component functions as a control layer. A company contributing to climate solutions may still exhibit risks linked to water usage, biodiversity impact, labour practices or governance quality. The "do no serious harm" framework explicitly accounts for this by integrating a wide set of environmental, social and governance indicators into a single composite view.

The result is a more balanced signal set. Instead of maximising one dimension—carbon reduction or green revenue exposure—the process aims to reduce high-risk exposures, increase participation in transition opportunities, and avoid unintended risks elsewhere in the portfolio.

Climate Transition Portfolio Construction



Source: PGIM Quant

PORTFOLIO CONSTRUCTION IS KEY

Where most climate strategies break down is in implementation. The requirement for institutional investors is clear: the portfolio must still behave like core equity. This is addressed by integrating climate signals into a standard multi-factor framework. Value, growth and quality are not replaced but repurposed to support the transition objective.

Value acts as a safeguard against overpaying for perceived climate winners. Growth identifies companies where expectations for sustainable products are improving. Quality filters out businesses that may be overstretching balance sheets as they invest in decarbonisation or new technologies.

This interaction matters. Without it, portfolios can quickly become concentrated in a narrow set of names that look attractive on climate metrics but are expensive or operationally fragile. With it, the portfolio retains diversification and more stable factor exposures.

Risk controls reinforce this. Explicit limits are placed on country, sector, industry and stock-level deviations, while style exposures and turnover are carefully managed. These controls are what anchor the portfolio to its benchmark and prevent climate integration from becoming a source of unintended risk.

The key question is how these constraints translate into performance and tracking error as the simulations presented vary three main parameters: the level of carbon emission reduction relative to the benchmark, the degree of exposure to climate-aligned revenues, and the overall active risk budget.

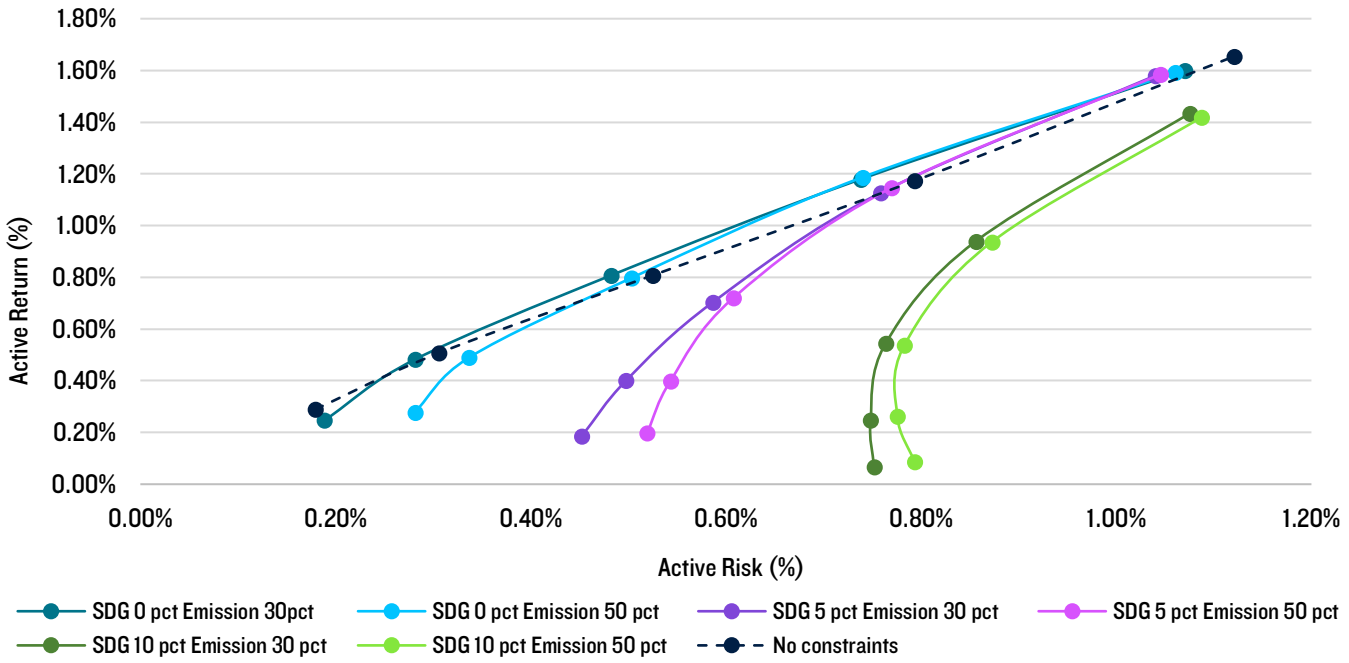
At very low levels of tracking error, the trade-off is visible. Introducing carbon constraints or increasing exposure to climate solutions can reduce diversification efficiency and lead to slightly higher active risk, with marginally lower returns than unconstrained portfolios. But this effect is not stable across different risk budgets.

As the level of allowable tracking error increases, the trade-off weakens. With more flexibility, portfolios can meet carbon reduction and revenue alignment targets while maintaining similar levels of active return. The simulations consistently show that, beyond a certain point, the gap between constrained and unconstrained portfolios narrows significantly.

Different objectives also have different costs. Increasing SDG-aligned revenue exposure or tightening carbon reduction targets—such as moving from a 30 percent to 50 percent reduction—generally requires more active risk, particularly in low tracking-error frameworks.

However, this relationship is not linear. With sufficient risk budget, both higher carbon reduction and greater climate opportunity exposure can be achieved without materially affecting returns. Another important observation is how alpha behaves. As active risk increases, the difference in active alpha exposure between constrained and unconstrained portfolios declines. In effect, the "cost" of climate constraints diminishes as more flexibility is introduced.

Frontier Analysis - Understanding the Convergence of the Performance with Active Alpha Exposure



From 1/1/2017 to 9/30/2025. Inception date 1/1/2017.Benchmark: MSCI ACWI (Gross) Index.
Source: PGIM Quant, MSCI, FactSet, Refinitiv, Impact Cubed*.
The time period reflects the availability of the underlying SDG data (Impact Cubed SDG data available from December 31, 2018, backfilled to December 31, 2016 for back testing purposes).

LOW TRACKING ERROR

For many investors, the relevant question is what can be done within tight tracking-error limits. A simulated portfolio targeting around 50 basis points of tracking error provides a useful reference. In this configuration, it is possible to reduce carbon intensity by roughly 30 percent relative to the benchmark while also improving exposure to climate-aligned revenues. At the same time, the portfolio delivers gross active returns of around 40 basis points[1].

The objective is to preserve the role of the portfolio within a broader asset allocation while embedding climate considerations in a measurable way. Additional constraints, such as requiring a steady decline in carbon intensity over time, appear to have only a modest impact on performance, though they can increase active risk slightly.

This reinforces the broader point: multiple climate objectives can be layered into the portfolio, but each needs to be calibrated against the available risk budget.

The evidence here does not suggest that climate integration is costless. While the trade-off between climate outcomes, return and tracking error is not binary, it can be moderated. At very low tracking error, there is a constraint, and trade-offs become visible but at higher levels, it becomes much less binding.

This reframes the decision for institutional investors. The question is not whether climate objectives will compromise returns, but how much tracking error is available to support them, and how those objectives are prioritised.

In that sense, climate integration becomes a portfolio construction problem rather than a thematic allocation decision. With a disciplined process—combining risk reduction, opportunity capture, ESG controls and traditional factor signals—it is possible to reduce exposure to transition risks, participate in structural growth opportunities, and remain anchored to a benchmark.

[1] Based on PGIM Quant Frontier Analysis comparing active return and active risk before and after adding a 7% annual decline rate constraint. Analysis retained internally and available upon request.

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The simulated performance included in this paper is intended to illustrate the return profile of a PGIM Quant SDG 5% Improvement / 30% Emissions Reduction strategy for the period from January 1, 2017, through September 30, 2025. The portfolio was simulated using a monthly rebalancing frequency, with the MSCI ACWI serving as the benchmark. The simulated portfolio targets a 5% improvement in SDG scores and a 30% reduction in carbon emissions intensity, while maintaining an ESG score, as well as E, S, and G pillar scores, that are higher than those of the benchmark. The annual decline rate in the portfolio's carbon emissions intensity is at least 7% or matches the benchmark's decline rate, whichever is greater. The simulation was conducted with individual stock constraints relative to the benchmark of ±60 bps (±75 bps grandfathered), sector and industry active exposure limits of ±3%, country/region active exposure limits of ±2%, and a size exposure limit of ±5% (based on market-cap bins). The PQS transaction cost model was used to estimate trading costs, and the reported performance is shown net of estimated trading costs.

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The MSCI ACWI captures large and mid cap representation across 23 Developed Markets (DM) and 24 Emerging Markets (EM) countries. With 2,461 constituents, the index covers approximately 85% of the global investable equity opportunity set.

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