

The Carbon Efficient Blueprint: Valuable Insights for Climate- Aligned Strategies

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Introduction

The impacts of climate change are becoming more evident every year, presenting a material systemic risk to the global economy.¹ Consequently, for market participants, this translates into a duty to manage climate-related risks and opportunities within their portfolios. In response, the investment landscape has evolved beyond simple negative screening of high-emitting stocks toward more sophisticated and customized strategies that are designed to incorporate more methodical ways to address exposure to carbon within portfolios. The S&P Global Carbon Efficient Index Series represents a foremost example of this evolution, offering a powerful, rules-based framework to exclude companies classified as high non-disclosing carbon emitters, all while maintaining broad market weight and incentivizing companies to improve their disclosure and emissions performance.

This paper explores the methodology and market impact of the S&P Global Carbon Efficient Index Series and paints a picture of how the methodology has stood the test of time. We will conduct a deep dive into the [S&P/JPX Carbon Efficient Index](#) and [S&P Global Ex-Japan LargeMidCap Carbon Efficient Index](#), using the high-profile adoption by Japan's Government Pension Investment Fund (GPIF) as a definitive case study. This analysis will illustrate how a well-designed

¹ World Economic Forum (2025). Global Risks Report 2025. Available at: <https://www.weforum.org/publications/global-risks-report-2025/>

index can serve as a powerful catalyst, not only helping market participants achieve their climate objectives but also fostering a market-wide improvement in corporate climate disclosure, performance and transparency.

The Carbon Efficient Mechanism: A Disciplined Approach

The core principle of the S&P Global Carbon Efficient Index Series is to systematically tilt the index toward more carbon-efficient companies, without resorting to broad exclusions that can narrow the investment universe and introduce unintended biases.

Methodology Deep Dive

The index series begins with a standard, broad-based benchmark index, which is weighted by free-float-adjusted market cap, e.g., the TOPIX for Japan. It then reweights each constituent company based on its carbon efficiency score, which is derived from S&P Global Trucost data measuring greenhouse gas emissions relative to revenue (metric tons of CO₂e / USD 1 million in revenue). This is achieved by applying a “Carbon Weight Adjustment Factor” to each company’s market-cap weight. This mechanism increases weights for companies that are more carbon-efficient and transparent relative to their industry peers, while reducing weights for higher-emitting or non-disclosing companies. The highest impact companies, i.e., the biggest emitters, which do not disclose their carbon emissions, are excluded from the index. The reweighting is performed on a sector-neutral basis—company weights are adjusted within Global Industry Classification Standard (GICS®) industry groups, with the objective of minimizing deviations from the benchmark’s industry group weightings. This discipline ensures that the index’s performance profile is driven by the specific selection of more efficient companies, not by unintended bets for or against certain sectors of the economy.²

Performance and Risk Profile

By avoiding broad business activity exclusions and maintaining sector neutrality, the methodology has seen historically low tracking error across all geographic variants of the index series. Historical analysis of these strategies in markets across Asia and globally has shown they can deliver a measurement of significant carbon reduction without sacrificing long-term performance.

² Please see the index methodology in full, available here: <https://www.spglobal.com/spdji/en/documents/methodologies/methodology-sp-global-carbon-efficient-index-series.pdf>

Exhibit 1: Key Index Performance Characteristics

Period	S&P Global Ex-Japan LargeMidCap (JPY) TR (%)	S&P Global Ex-Japan LargeMidCap Carbon Efficient Index (JPY) TR (%)	TOPIX (JPY) TR (%)	S&P/JPX Carbon Efficient Index (JPY) TR (%)
Calendar Year Performance				
2019	26.51	27.21	-	-
2020	11.18	10.24	7.39	7.70
2021	33.97	34.96	12.74	12.49
2022	-6.51	-5.99	-2.45	-3.04
2023	31.52	32.29	28.26	27.76
2024	32.45	31.03	20.45	20.87
2025	11.89	11.70	15.29	14.85
Annualized Performance				
1-Year	22.00	21.64	21.55	21.67
3-Year	24.85	24.91	22.52	22.31
5-Year	22.33	22.28	16.85	16.63
Tracking Error				
1-Year	-	0.71	-	0.71
3-Year	-	0.57	-	0.71
5-Year	-	0.57	-	0.73

Source: S&P Dow Jones Indices LLC, TOPIX data published by TSE. Data from Sept. 30, 2019, to as of Sept. 30, 2025. Past performance is no guarantee of future results. Table is provided for illustrative purposes.

The Dual Impact: Decarbonization and Enhanced Disclosure

The S&P Global Carbon Efficient Index Series' effectiveness stems from its dual impact on both the index composition and the behavior of the underlying companies.

Driving Decarbonization

The reweighting mechanism is effective because of the significant **dispersion** in carbon intensity that exists within every industry. For example, two automotive manufacturers may have vastly different carbon footprints due to one's focus on electric vehicles and renewable-powered factories versus another's reliance on traditional combustion engines and legacy

power sources. The index series capitalizes on this dispersion, rewarding the more efficient operator with a larger weight.³

Creating a Powerful Incentive for Disclosure

The methodology directly addresses the challenge of incomplete corporate emissions data. Companies that fail to disclose their emissions are not ignored; instead, they are assigned an estimated carbon intensity score.⁴ This score is calculated based on their specific industry peer group, often with a penalty applied, making it disadvantageous not to disclose. This creates a clear incentive for companies to measure and report their own data to ensure a more accurate—and likely more favorable—assessment. This type of disclosure is critical for the broader market and companies' stakeholders.

The Catalyst Effect: GPIF Case Study and TCFD Alignment

Key features of the index include historically low tracking error, minimal stock exclusions and a systematic approach to reducing carbon intensity.

The “GPIF Effect”

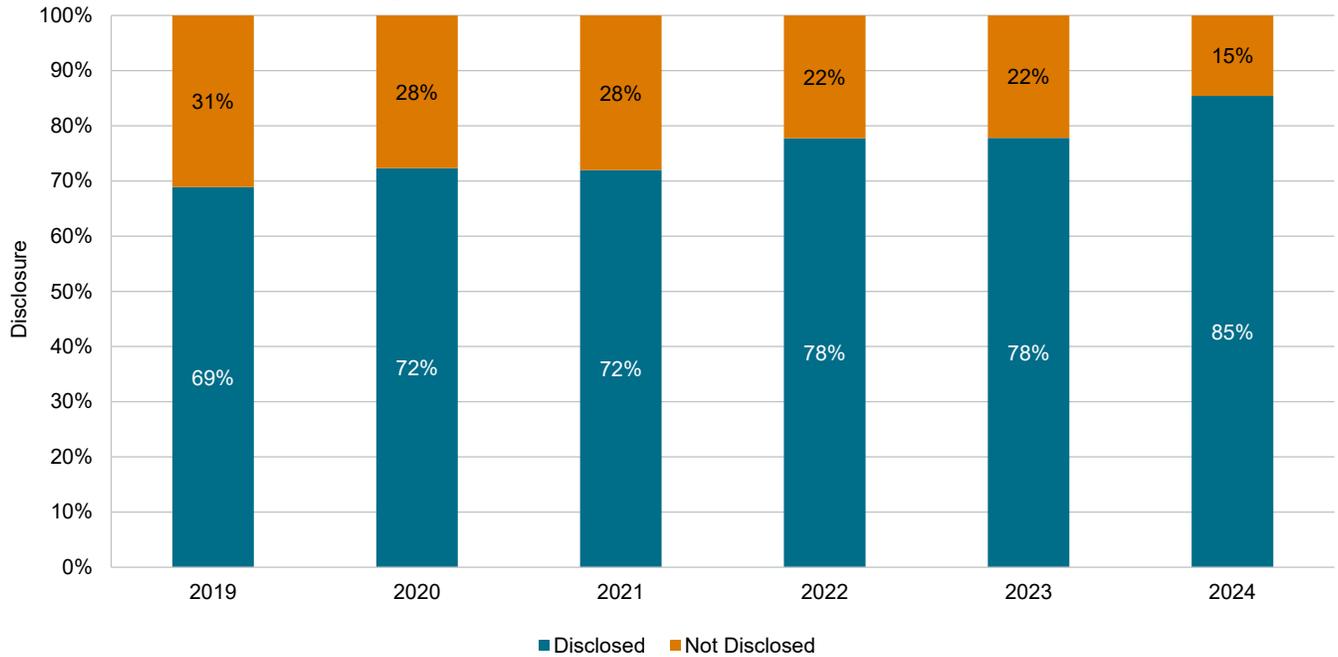
When the GPIF, one of the world's largest pension funds,⁵ selected the S&P/JPX Carbon Efficient Index as a benchmark for its ESG strategy in 2018, the decision reiterated that climate performance and disclosure are key consideration factors. Before this landmark implementation, carbon disclosure among Japanese companies was not typically seen this way. In the years following adoption, there has been a significant increase in the number of TOPIX constituents reporting their emissions data. This trend has strengthened the quality of the index and overall corporate engagement with climate reporting. This illustrates how an index-led strategy can serve as a tool for engagement on a market-wide scale, especially when associated with various ETFs that have been introduced alongside the GPIF mandate, employing the same index strategy.

³ For more information on this analysis of dispersion, please see: <https://www.indexologyblog.com/2019/12/19/the-effects-of-dispersion-in-carbon-intensity-scores-on-carbon-efficient-portfolio-construction>.

⁴ High impact non-disclosing companies are excluded from the index, but non-high impact companies are still eligible for inclusion even if they do not disclose.

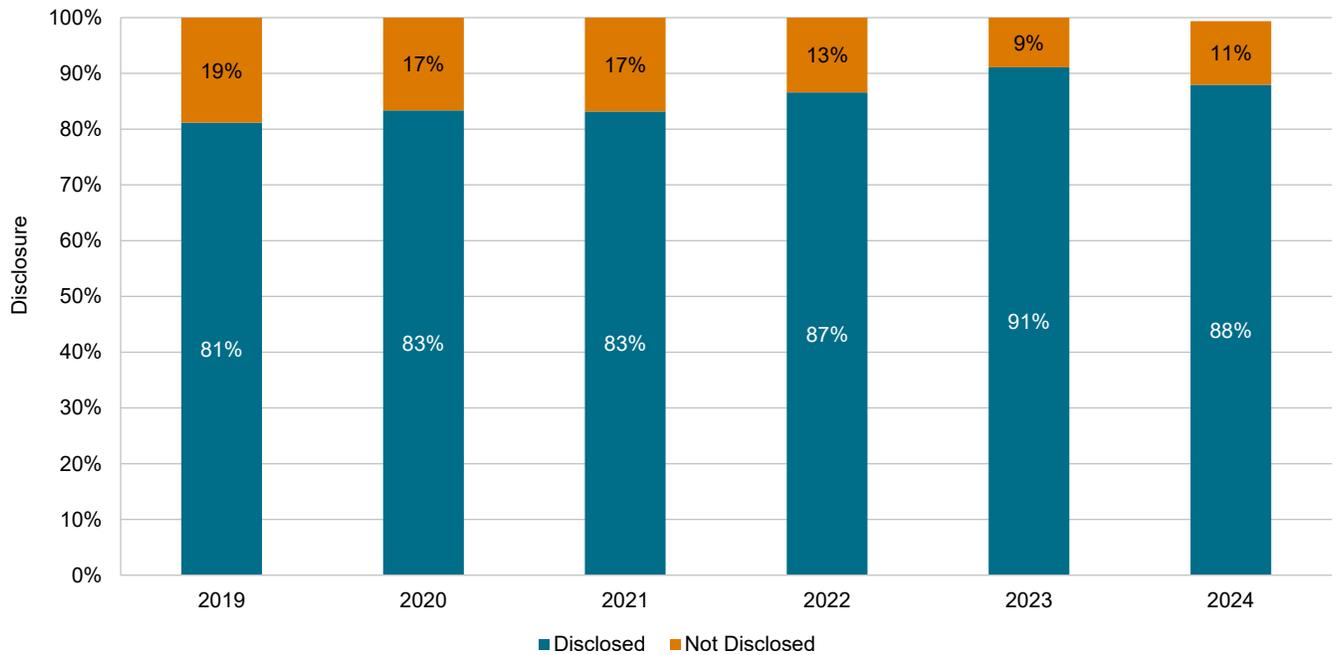
⁵ WTW (2025). Top pension funds reach all-time global record. Available at: <https://www.wtwco.com/en-us/news/2025/09/top-pension-funds-reach-all-time-global-record>

Exhibit 2a: Increasing Climate Disclosure of Corporates – S&P/JPX Carbon Efficient Index Disclosure Status by Market Cap



Source: S&P Dow Jones Indices LLC. Data as of Sept. 30, 2025. Chart is provided for illustrative purposes.

Exhibit 2b: Increasing Climate Disclosure of Corporates – S&P Global Ex-Japan LargeMidCap Carbon Efficient Index, Disclosure Status by Market Cap



Source: S&P Dow Jones Indices LLC. Data as of Sept. 30, 2025. Chart is provided for illustrative purposes.

A Practical Tool for TCFD Implementation

The index methodology is also aligned with the principles of the Task Force on Climate-related Financial Disclosures (TCFD). In 2023, an additional element was added to the design of the index series to boost the weighting of companies that have incorporated TCFD reporting into their annual reporting. This enhancement in the methodology systematically reduces weight in carbon-intensive firms, directly addressing transition risk and providing a practical mechanism for market participants to act on the TCFD's recommendations for risk management. Finally, by rewarding transparency, it supports the TCFD's core goal of improving the flow of climate-related information between companies and market participants.

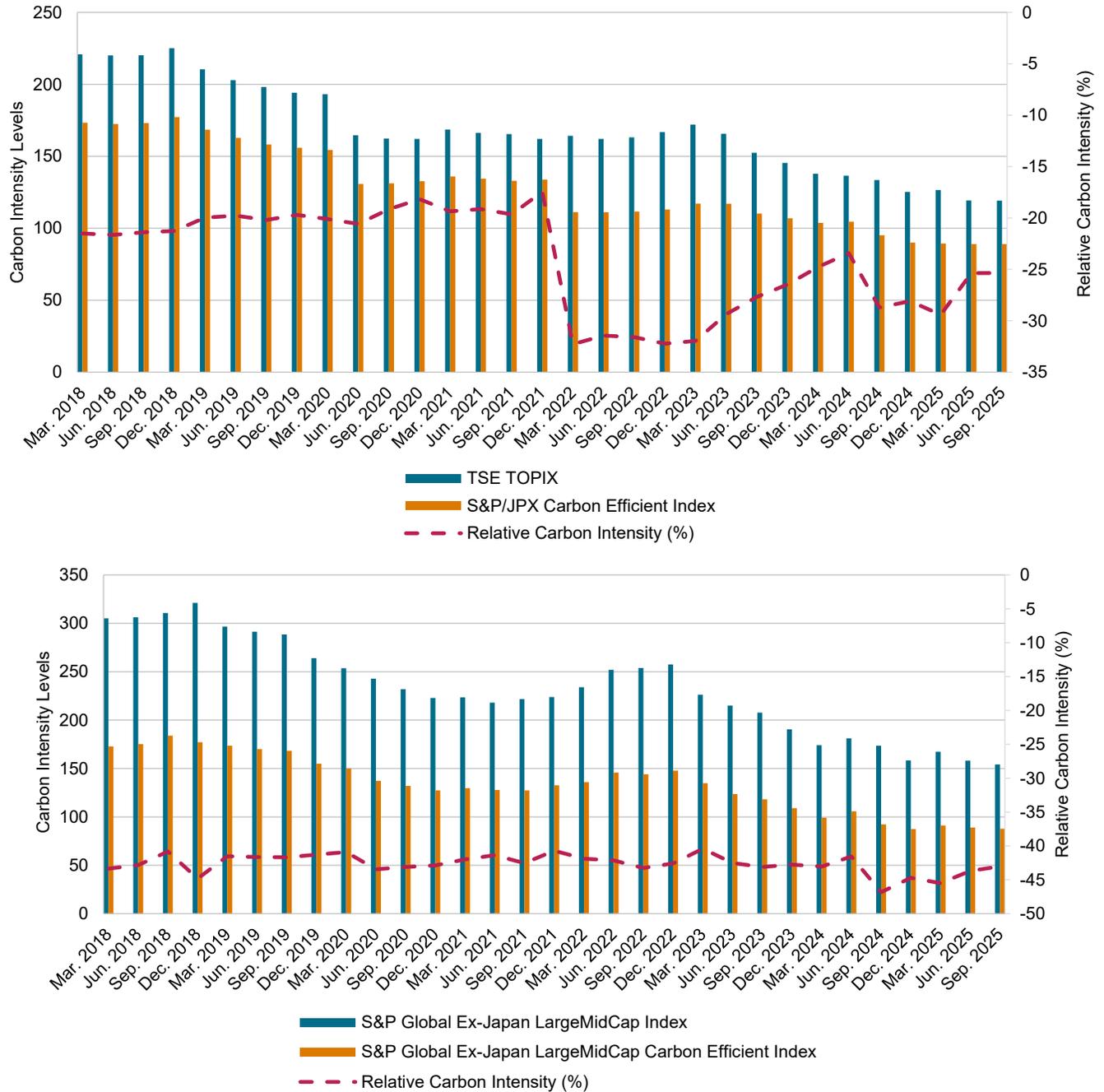
Forging a Virtuous Cycle: The Broader Market Impact

The S&P Global Carbon Efficient Index Series is more than an enabler of climate-driven investment strategy; it is a key component in a positive feedback loop that drives market-wide progress against climate-related objectives.

This **virtuous cycle** works as follows.

1. **Market Participant Demand:** Growing demand from market participants for climate-aligned solutions prompts the creation of indices such as the S&P Global Carbon Efficient Index Series.
2. **Capital Management:** As assets track these indices, resources are implicitly directed toward more carbon-efficient companies.
3. **Corporate Response:** This creates a clear financial incentive for all companies to improve their operational efficiency and, critically, to enhance their climate disclosure to ensure they are assessed accurately.
4. **Improved Data:** This corporate response leads to better, more comprehensive data for the entire market.
5. **Informed Investors:** This improved data then feeds back to investors, allowing for the adoption of and increased support for more refined and effective climate-oriented strategies.

Exhibit 3a: Carbon Intensity Reductions across the S&P/JPX Carbon Efficient Index and the S&P Global Ex-Japan LargeMidCap Carbon Efficient Index



Source: S&P Dow Jones Indices LLC. TOPIX data published by TSE. Data as of Sept. 30, 2025. Chart is provided for illustrative purposes.

Conclusion

In conclusion, the S&P Global Carbon Efficient Index Series provides a sophisticated, effective and scalable blueprint for climate-aware strategies. It shows that thoughtful index design can simultaneously preserve diversification while meeting advanced climate objectives. As the GPIF case study powerfully demonstrates, such indices also serve as powerful catalysts, transforming passive capital into an active force for change and helping to accelerate the transition to a more sustainable and transparent-forward global economy.

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