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# *SHAPING SUSTAINABLE INVESTING: THE CARBON EFFICIENCY INDEX OF THE WORLD*

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## INTRODUCTION

Sustainable investing gained traction at the end of the 20th century, buoyed by increasing awareness around environmental issues, social justice and corporate governance practices. Environmental, Social, and Governance (ESG) Investing arose from ethical or socially responsible investing movements in the 1960s and 1970s. It was during this period that investors began to avoid those businesses that hadinvolvement in tobacco, weapons, or South African apartheid. The early 2000s (Krantz, 2024): During the early 21st century sustainable investment was primarily about incorporating environmental social and governance (ESG) factors into traditional financial analysis. It argued that these elements might affect organizations' performance in the long-run drastically.

The shift was hastened by growing evidence that companies with strong ESG scores were often better managed, less risky and positioned to benefit from long-term trends like constrained resources and regulatory changes. (Fu & Li, 2023). One of the most significant shifts in this asset class during its prominence over the last ten years is a repositioning towards incorporating Environmental, Social, and Governance (ESG) factors when making investment decisions strategies historically evaluated only financial measurements such as profitability, growth, and risk. The increased focus on sustainability in investment is part of a wider global push to tackle the essential issues related to climate change, social inequality and corporate governance failings. (Whelan, 2020).Sustainability investing, commonly called responsible or ESG (environmental, social, and governance) investing, goes beyond the nitty-gritty of financial results. This process combines environmental, social, and governance factors (ESG) into investment procedures to attain economic and societal benefits. That way of functioning signals a company-centric form that presumes societal benefit and environmental sustainability. Companies that do well are generally the same companies which perform outstandingly when it comes to managing risks on social unrest, enforcement of environmental laws and governance failures. Companies, for instance,

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that have a high priority on carbon reduction or energy efficiency will suffer less from imminent restrictions as well as consumer preferences tomorrow of products with lower environmental impact. Companies who create a work environment without fear and invest in the community goodwill also benefit on the flip side by attracting/recruiting talent, that is less conflict-prone &devoted brand loyal customers as well. Good governance decreases the risk of fraud, corruption, and mismanagement, which partially explains its importance in improving shareholder value. (Baratta & Cimino, 2023)

**Focus on Carbon Efficiency: The Role of Indices**

Among the various dimensions of ESG investing, carbon efficiency has gained particular attention due to its critical role in mitigating climate change. Carbon efficiency refers to the ability of companies to minimize their carbon emissions relative to their revenue. Indices such as the S&P Global Carbon Efficient Index and the S&P BSE Carbonex have been developed to capture this dynamic. These indices not only track the performance of companies based on their carbon efficiency but also influence investment flows towards more sustainable businesses.Investors are becoming more conscious of the dangers that carbon-intensive companies face, such as shifting customer preferences toward more sustainable goods and services, legislative changes, and carbon taxes. Because of these dangers, a company's financial performance may suffer, so carbon efficiency must be considered when making investments.(Wang & Wu, 2022).On the other hand, businesses that achieve high levels of carbon efficiency are frequently in a better position to take advantage of the opportunities presented by the shift to a low-carbon economy. These businesses see cost savings due to reduced energy use, higher brand recognition, and more adaptability to changes in the market and regulations. Investors can find businesses that are not only lessening their environmental effects but also setting themselves up for long-term success in a world that is changing quickly by concentrating on carbon efficiency.(Saraji & Streimikiene, 2023).A Carbon Efficiency Index is essential for directing business behavior and investment strategies towards improving sustainability. These indices prioritize carbon efficiency, reduce climate change risks, and enable a more sustainable and resilient global economy.

**1. Benchmarking Carbon Efficiency**

¢ Performance Measurement and Standard Setting: Carbon Efficiency Indices serve as a standard for assessing and contrasting the carbon performance of companies within a specific market or sector. These indices identify companies proficiently managing their carbon footprint by emphasizing carbon emissions about revenue. They establish criteria for carbon efficiency, motivating companies to enhance their practices to qualify for or excel within the index. (Trinksa & Muldera, 2020)

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**2. Guiding Investment Decisions**

F Risk Management and Sustainable Investing: Investors use Carbon Efficiency Indices to manage carbon-related risks in their portfolios. Companies with lower carbon intensity are less exposed to regulatory, reputational, and market risks associated with carbon emissions. These indices help investors align their portfolios with their sustainability goals. By investing in funds or products that track carbon efficiency indicators, investors can support companies leading in carbon management, thus promoting a transition to a low-carbon economy. ( Benz & Paulus, 2020)

**3. Influencing Corporate Behavior**

F Incentivizing Carbon Management and Enhancing Transparency The presence of a Carbon Efficiency Index creates an incentive for companies to reduce their carbon emissions. Companies aiming to include these indices or improve their weighting are motivated to adopt more efficient and sustainable practices. Companies seeking inclusion in Carbon Efficiency Indices are encouraged to improve the quality and transparency of their carbon reporting. This, in turn, leads to better data availability for investors and other stakeholders. (Safdie, 2024)

**4. Promoting Long-Term Value Creation**

F Linking Sustainability to Financial Performance and Catalyzing Market Trends

Carbon Efficiency Indices indicate a link between environmental performance and financial performance. Organizations with superior carbon efficiency are typically more strategically positioned for sustained success, as they exhibit more resilience to environmental hazards and align more effectively with forthcoming policy and market dynamics. These indices impact more significant market trends by prioritizing carbon efficiency, which promotes a change in investment decisions toward more environmentally friendly businesses. This promotes the expansion of the green industry and encourages innovation in carbon-reducing technology and approaches. (Trinksa & Muldera, 2020)

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**Evolution of the Global Carbon Efficiency Index**

| Year | Evolution stage | Description |
|---|---|---|
| Early 2000 | Early development | Focus on basic carbon management practices and emissions reductions. Initial benchmarks for sustainability. |
| 2010 | Enhanced criteria and methodology | Introduction of more detailed metrics like carbon intensity and broader environmental performance indicators. |
| 2015 | Integration of advanced technology | Incorporation of real-time data and advanced emissions tracking. Evaluation of innovative technologies like renewable energy and carbon capture. |
| 2017 | Expansion and global standardization | Inclusion of a broader range of industries and regions. Efforts to harmonize methodologies and reporting standards for global consistency. |
| 2020 | Emphasis on Transparency and Reporting | Increased focus on comprehensive disclosures regarding carbon emissions, reduction targets, and sustainability practices. |
| 2023 | Alignment with Global Climate Goals | Alignment with international climate targets, such as the Paris Agreement. Metrics reflect progress towards net-zero emissions and a low-carbon economy. |

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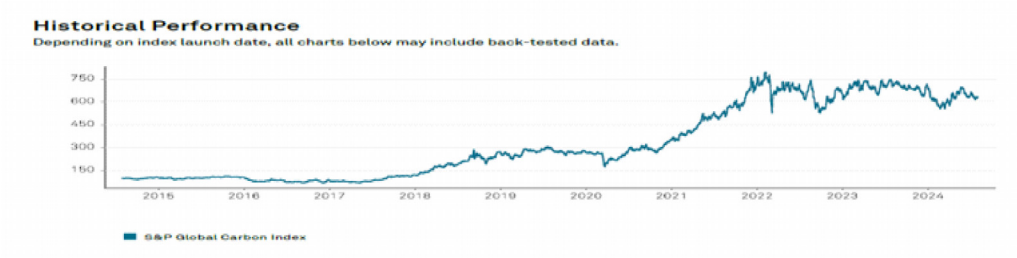
**Examples of Leading Global Carbon Indices**

F **S&P Global Carbon Efficient Index:** This index seeks firms within the S&P Global LargeMidCap Index, explicitly identifying those with minimal carbon emissions per revenue unit. The index aims to sustain a diversified portfolio while minimizing the carbon footprint relative to existing indices. Emphasizing carbon efficiency attracts investors who are anxious about climate change yet desire extensive market exposure. The S&P Global Carbon Efficient Index was created in support of ecologically objective and cutting CO2 globally. Recognizing the financial risks associated with carbon intense enterprises, investors increasingly demanded benchmarks to guide their investment choices in race towards sustainability.

**Growth of the S&P Global Carbon Efficient Index:**




Source -S& P Global Carbon Efficient index

Table - 1

| Risk and Return Characteristics | |
|---|---|
| Period | S&P Global Carbon Efficient Index |
| **Return (Annualized%)** | |
| 1 year | 91.72 |
| 3 year | 10.19 |
| 5 year | 14.47 |
| **Risk (Annualized %)** | |
| 3 year | 24.86 |
| 5 year | 21.03 |
| **Annualized Risk-adjusted Returns** | |
| 3 year | 0.410 |
| 5 year | 0.688 |

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**Source -S&P Global LargeMidCap Carbon Efficient Index Factbook**

**Performance:** The S&P Global Carbon Efficient Index is another strong performer, having achieved an exceptionally positive return for the past year. Nevertheless, returns are more modest on an extended basis with growth rates climbing consistently over the three and five-year periods. Risk-Adjusted Return.Over the past five years, risk-adjusted returns have revealed that this index has provided an equivalent return for a given measure of risk.

F **MSCI Global Low Carbon Leaders Index**

This index is highly concentrated on companies with low carbon intensity and little exposure to potential future carbon releases from fossil fuel reserves. The MSCI Global Low Carbon Leaders Index is one of a series of indices designed by global index provider MSCI, to allow investors to manage carbon exposure and target environmental objectives in their portfolios. The index tracks carbon-efficient companies globally and this evolution of it builds on the global standard for low-carbon indexes, including large-and mid-cap stocks across 27 emerging-markets countries plus 23 developed markets. The MSCI Global Low Carbon Leaders Index addresses this challenge by downgrading and excluding companies with the largest fossil fuel reserves or highest carbon emission intensity. In practice, this allows the index to cut carbon exposure but offers significant diversification across sectors and geographies.


Source - MSCI Global Low Carbon Index

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Table - 2

Risk and Return Characteristics of the MSCI Global Low Carbon Leaders Index

| Risk and Return Characteristics | |
|---|---|
| Period | MSCI Global Low Carbon Leaders Index |
| **Return (Annualized%)** | |
| 1 year | 20.38 |
| 3 year | 7.03 |
| 5 year | 12.21 |
| **Risk (Annualized %)** | |
| 3 year | 17.23 |
| 5 year | 17.84 |

*Source - MSCI Global low Carbon Index factbook*

Over many time frames, the MSCI Global Low Carbon Leaders Index has delivered exemplary returns. The 1-year annualized return of the index, which reflects a stable performance with some positive news changes occurred during this time frame as all companies are highly effective in managing their carbon emissions. The 3-year annualized return at 7.03% indicates modest growth, reliability and consistent performance. As evidence of the power to create significant long-term gains, the index had an annualized 5year return from a source coming in at 12.21%. In terms of risk, the benchmark had an annualized standard deviation of 17.23% over the last three years and 17.84% over the past five years, illustrating a moderate level of volatility that has remained consistent through time. This consistent risk profile is magnified by substantial profits.

### F The Dow Jones Sustainability World Index

The Dow Jones Sustainability World Index captures the top 10% of the largest 2,500 companies in the S&P Global Broad Market Index based on long-term environmental, social and governance criteria. DJSI World-Carbon Focused: includes companies that have excellent carbon management and climate-related initiatives. The index is an indicator of corporate power over carbon emissions by global corporations, focusing on transparency and climate strategy. The business is rated for disclosure, which spans emissions reporting and alignment with international climate benchmarks - such as those set out by the Paris

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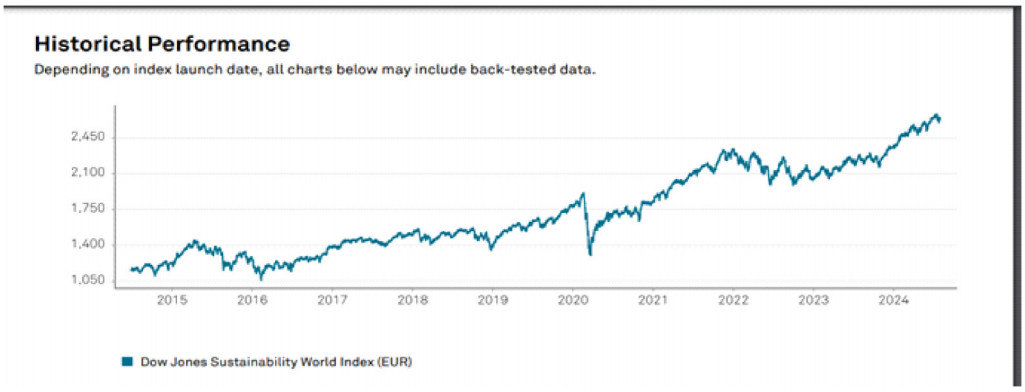
Agreement; performance on carbon intensity or CO2 emitted per unit of revenue. In line with its carbon-negative intentions




Source-Dow Jones Sustainability World Index

Table - 3

Risk and Return Characteristics of the Dow Jones Sustainability World Index

| Risk and Return Characteristics | |
|---|---|
| Period | Dow Jones Sustainability World Index |
| **Return (Annualized%)** | |
| 1 year | 15.83 |
| 3 year | 7.62 |
| 5 year | 9.97 |
| **Risk (Annualized %)** | |
| 3 year | 12.39 |
| 5 year | 13.6 |
| **Annualized Risk-adjusted Returns** | |
| 3 year | 0.61 |
| 5 year | 0.73 |

Source-Dow Jones Sustainability World Index factbook

Carbon Focused has displayed a unique performance profile over different periods. Given that performance, the 15.83% annualized return of the index measured over a single

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year importantly demonstrates both how well it has taken advantage of the best market conditions for carbon-efficient companies and unusually strong recent short-term performance. On an extremely basic level, a 7.62% annualized return over three years would show us that the company performed reasonably well with reasonable runway and you can grow it in the medium-term too. In addition, the re-investing of dividends and compound interest over time is illustrated in its 5-year annualized return rate at an impressive 9.97%. Risk: The index is moderately volatile (risk) as indicated by annualized standard deviation of returns 13.6% over five years and 12.39% over three

**The Influence of Carbon Efficiency Indices on Corporate Carbon Management: Technological Advancements, Reporting Improvements, and Strategic Shifts**

**Impact of Corporate Carbon Management Practices**

Carbon Efficiency Indices have significantly impacted businesses' adoption and use of cutting-edge technologies to lower carbon emissions and increase overall carbon efficiency. These indexes provide businesses with tremendous incentives to invest in cutting-edge technology that improves their environmental effect by establishing strict standards for carbon performance. Here is an examination, using concrete instances, of how these indexes have influenced technological progress. for example, has committed to run all of its data centers and operations entirely on renewable energy, reducing its carbon emissions by a significant amount through solar and wind power.Similarly, IKEA has significantly invested in massive solar arrays in its warehouses and retail locations to lower its carbon footprint. To achieve its aim of becoming carbon-negative by 2030, Green roofs, energy-efficient HVAC systems, and sustainable materials have been incorporated into Microsoft's new data centers and office structures. This focus on carbon efficiency has driven technologies that advance even faster in the building space. Similarly, the incorporation of a circular economy ideology - expressed through Unilever´s investment in waste reduction programmes and recycling technologies. This all points to a stronger shift towards mitigation environmental harm by eradicating waste output but also carbon emissions. Together, these technical enhancements underpin the ongoing importance of carbon efficiency metrics in guiding business sustainability actions( Fu & Li, 2023)

**Influence on Investment Strategies**

The impact of Carbon Efficiency Indices becomes much broader than only a technology improvement, and shifts towards sustainability reporting and strategic decision-making. These indexes have had a significant impact on the way firms address environmental transparency and embed carbon management in their overall corporate strategy. (Fu & Li, 2023).The Carbon Efficiency Indices The significance of improvements in the carbon

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efficiency indices lies in their tendency to reinforce practices that require accurate understanding and transparent reporting of sustainability metrics. This means more it holds under corporations to come clean on disclosure of their carbon emissions and goals for reduction and betterment in sustainability.All firms in these indices generally provide an integrated annual sustainability report, detailing their progress and carbon footprint as well as mitigation programs.For example, corporations such as Microsoft provide detailed environmental sustainability reports outlining actions it initiates to reduce carbon emission and aims become carbon negative by 2030. And, Unilever has strengthened its sustainability communications by including more carbon related achievements and strategy in the annual report. (Liu & Zhou, 2023)

**Strategic Shifts**

Companies have changed strategies due to the demand to reduce carbon emissions and integrate sustainability into their primary business plans. Businesses pay more attention to their carbon footprints and look for ways to reduce them in coordination with their business operation. As for example- Google has included environment as a part of its business model by aiming to use renewable energy only and making the data centers achieve zero carbon emissions. Unilever has also produced better sustainability disclosures by making detailed information on its carbon management successes and strategies available in the company's annual report. As indexes are now scrutinized more closely, data generated has become stronger and of a much higher quality compared to the past, enabling stakeholders to better evaluate businesses' environmental commitments and impacts against one another.The large-scale changes in strategic orientation that the focus on carbon intensity has driven have now brought sustainability into the heart of company's overall business strategies. A far more comprehensive and urgent approach is that of decarbonising the everyday economy, by which means businesses are becoming increasingly serious about reducing their carbon footprints, matching these with line-of-horizon plans for how they intend to operate.For instance, Google has incorporated sustainability into its business model by pledging to run its operations entirely on renewable energy and establishing a goal to run its data centers with zero carbon emissions.( Morgan, 2023) This strategic approach positions Google as a leader in environmental responsibility while also meeting the requirements of carbon efficiency indices.

**Implications of the Carbon Efficiency Index for future investment trends and policy development.**

The increasing prominence of carbon efficiency indexes is changing the investment landscape by directing money toward businesses that exhibit excellent environmental

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stewardship and efficient carbon management. High carbon efficiency companies are increasingly valued by investors, which indicates a trend toward sustainable investing methods that aim to achieve environmental and financial objectives. Stricter emissions laws and carbon pricing schemes are two policies that governments and regulatory agencies are likely to strengthen to encourage or require better carbon management practices. These policies will aid the overarching objectives of lowering greenhouse gas emissions and meeting climate targets, such as those mentioned in the Paris Agreement.(Sitompul, 2023). The Carbon Efficiency Index is vital in encouraging the transition to a low-carbon economy, advancing global climate targets, and promoting sustainable economic growth since it influences investment decisions and regulatory frameworks. As carbon efficiency metrics and indices continue to advance, a significant shift in how corporations behave and make investments will strengthen their will to combat climate change and promote long-term environmental sustainability.( Baratta & Cimino, 2023)

**Conclusion**

The impact of carbon efficiency indicators on business operations and governmental regulations shows a revolutionary change toward greater environmental responsibility and sustainability. These indices have prompted the implementation of cutting-edge technologies, improved carbon management procedures, and the integration of sustainability into main company strategies. Significant technological advances include carbon capture, sustainable manufacturing, integration of renewable energy sources, and energy-efficient systems. Governments have implemented strong responses through strict emissions limits, carbon pricing schemes, and incentives for renewable energy. This worldwide commitment includes laws like China's climate targets, Canada's carbon price, and the EU Emissions Trading System. Initiatives to advance electric vehicles and enhance the energy efficiency of buildings further highlight the coordinated effort to lower carbon footprints. When taken as a whole, these initiatives influence investment patterns, encourage corporate transparency, and assist with strategic transitions toward sustainability. Carbon Efficiency Indices will be crucial in shaping future policy and investment choices as they develop, supporting the worldwide effort to mitigate climate change and promote sustainable economic growth effectively.

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