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Stepping Up to Carbon Transparency

EXECUTIVE SUMMARY

- To lead in carbon transparency, S&P Dow Jones Indices now publishes carbon metrics for all equity indices on its website, alongside standard financial metrics.
- Understanding the carbon data for standard indices is a key starting point for adopting low-carbon strategies.
- The low-carbon investment space is evolving to suit a variety of low-carbon goals, from carbon efficiency to fossil fuel divestment.
- Historically, low-carbon versions of the S&P 500® and S&P Global 1200 have outperformed their benchmarks over an annualized five-year period.

INTRODUCTION

Carbon is rapidly becoming a central theme in a sustainability-driven investment landscape.

Intensifying physical, regulatory, and reputational risks—with climate change now largely recognized as a global imperative—have elevated carbon considerations to the mainstream conversation. This expansion into the financial world follows the adoption of such concerns by corporations, building products, and services in the real economy.

In response to increasing interest in and demand for clear carbon exposure information, S&P Dow Jones Indices now publishes carbon metrics for all standard equity indices as a matter of course.[1] Carbon metrics are available for core headline indices such as the S&P Global LargeMidCap, S&P 500 Low Volatility Index, and the S&P Global 1200, as well as for more environmentally-focused indices, like the S&P 500 Carbon Efficient Index.

The current carbon metrics being published are: [2]

[1] Note: For those where sufficient data exists.

[2] Carbon metrics include both direct (operational) and first-tier indirect (supplier) emissions.

- Carbon Footprint, which looks at metric tons of CO_2e (carbon dioxide equivalent) per USD 1 million invested against a particular index;
- Carbon Efficiency, which shows metric tons of CO_2e per USD 1 million of a company's revenues; and
- Fossil Fuel Reserve Emissions, which are the greenhouse gas emissions that could be generated if the proven and probable fossil fuel reserves owned by constituents were burned.

UNDERSTANDING THE STARTING POSITION

As with most types of measurement and decisions to focus on a future goal, the first step is understanding one's current index portfolio.

It is for this reason that S&P Dow Jones Indices decided to publish carbon metrics for standard equity indices. Knowing that, for example, a USD 1 million investment in the S&P 500 equated to 87 metric tons of carbon dioxide (or equivalent) helps to create a new form of data benchmarking. It is also a useful point of comparison with other indices.

As a benchmark provider, S&P Dow Jones Indices is committed to providing index solutions that reflect these various low-carbon approaches.

Such transparency and knowledge may rapidly lead to questions as to what can be done to reduce a carbon footprint, or to change the mix of traditional versus future sectors, industries, and products. This is where low-carbon indices come in.

LOW-CARBON APPROACHES

As a benchmark provider, S&P Dow Jones Indices is committed to providing index solutions that reflect these various low-carbon approaches.

While low-carbon is now gathering traction in the passive investment space, S&P Dow Jones Indices has been involved since 2009, when the S&P 500 Carbon Efficient Select Index was launched using Trucost carbon data. It was the first environmentally focused U.S. index offered by an independent index provider.[3]

Since then, the low-carbon investment space has grown to suit a variety of preferences regarding low-carbon goals.

Indices may include all components of the underlying index and simply reweight them based on carbon intensity numbers, may optimize after excluding high emitters, or may exclude fossil fuel-related companies—or indeed may undertake a combination of these concepts. Exhibit 1 outlines different approaches offered by S&P Dow Jones Indices. Each box represents a different constituent of the S&P 500. The color gradient

[3] Mohan, Anne Marie. *S&P launches U.S. Carbon Efficient Index*. March 16, 2009. https://www.greenerpackage.com/metrics_standards/sp_launches_us_carbon_efficient_index

represents carbon intensity, with dark blue indicating lower carbon intensity portfolios and yellow indicating higher carbon intensity portfolios. The gray block represents companies that own fossil fuel reserves.

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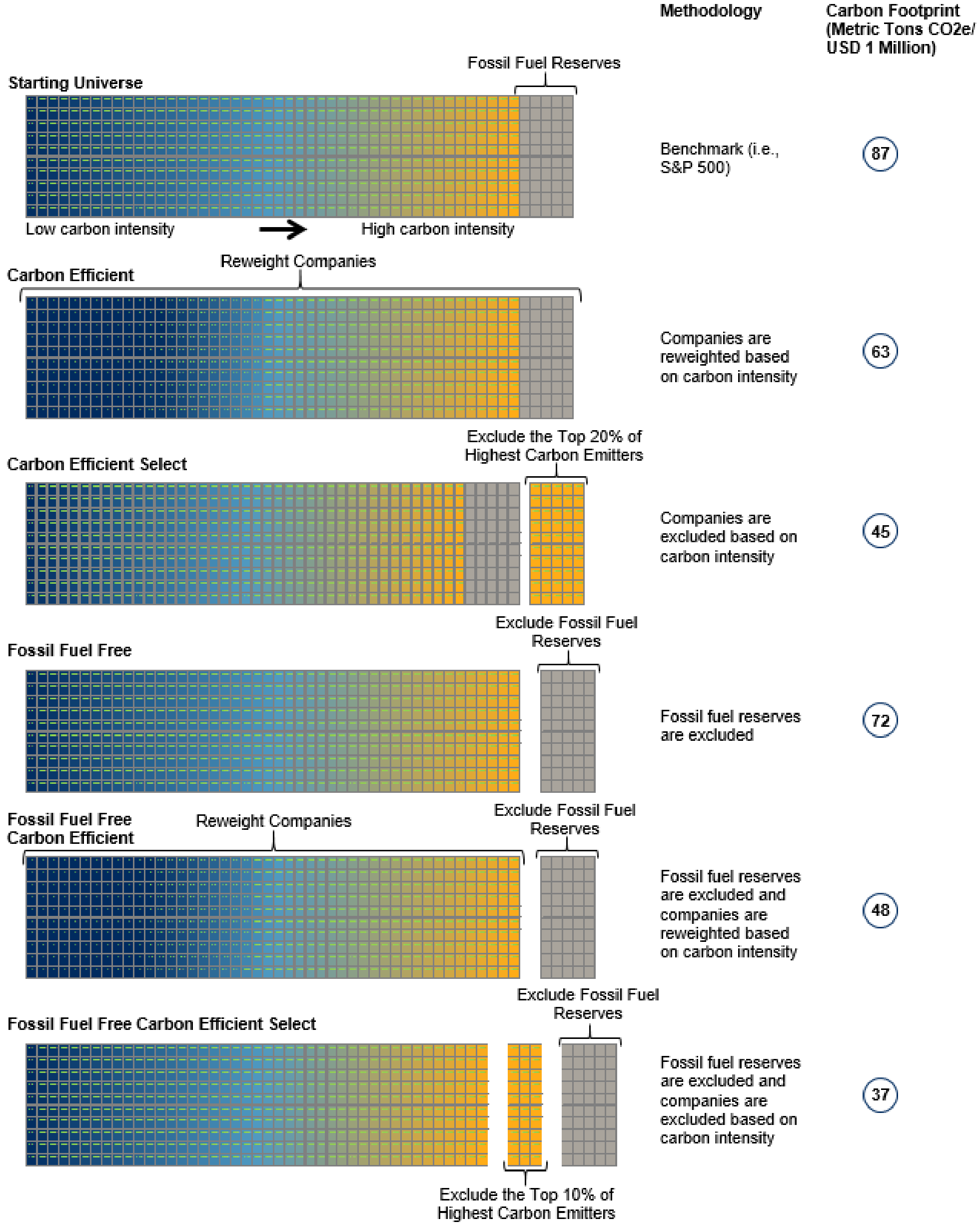
Exhibit 1: Methodological Differences



Source: S&P Down Jones Indices LLC. Data as of Sept. 30, 2017. Past performance is no guarantee of future results. Chart is provided for illustrative purposes and reflects hypothetical historical performance. Please see the Performance Disclosure at the end of this document for more information regarding the inherent limitations associated with back-tested performance. Carbon footprint is based on the S&P 500 indices.

CARBON DATA FOR S&P DOW JONES INDICES

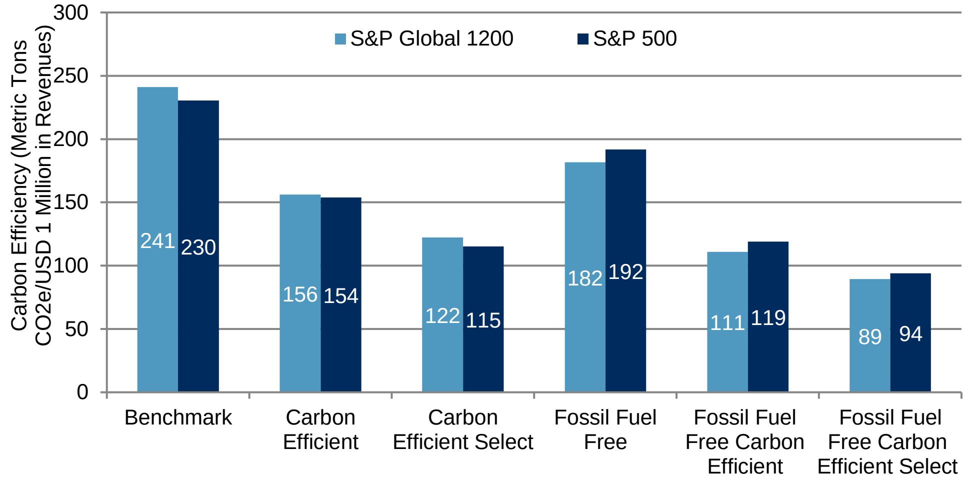
Today, climate change has been decisively recognized as a global issue requiring coordinated action. Through the 2015 Paris Agreement[4] and the U.N. Sustainable Development Goals,[5] policy makers have shown considerable progress in aligning themselves with what is necessary in order to limit global temperature increases to 1.5-2 degrees Celsius, via a shift to a low-carbon economy.

The recently formed Financial Stability Board's Taskforce on Climate-Related Financial Disclosures publishes annual recommendations that are meant to encourage greater corporate transparency on climate risks, strategic planning, and forward-looking scenario analysis.

This change has been further boosted by the focus from central banks and regulators. As an example, the recently formed Financial Stability Board's Taskforce on Climate-Related Financial Disclosures[6] publishes annual recommendations that are meant to encourage greater corporate transparency on climate risks, strategic planning, and forward-looking scenario analysis.

To examine the characteristics of the low-carbon marketplace further, we decided to look at the carbon efficiency breakdown of the S&P Global 1200 and the S&P 500 and their low-carbon counterparts (see Exhibit 2).

Exhibit 2: S&P Dow Jones Indices: Carbon Efficiency



Source: S&P Dow Jones Indices LLC. Data as of Sept. 30, 2017. Chart is provided for illustrative purposes.

The global benchmark, the S&P Global 1200, had the highest carbon efficiency number (241), while the S&P Global 1200 Fossil Fuel Free Carbon Efficient Select Index exhibited the lowest carbon efficiency (89)—a reduction of 63%. In some cases, the S&P 500 exhibited a higher carbon efficiency metric than the S&P Global 1200, which could indicate that the S&P Global 1200 may possess more operationally efficient companies.

[4] http://unfccc.int/paris_agreement/items/9485.php

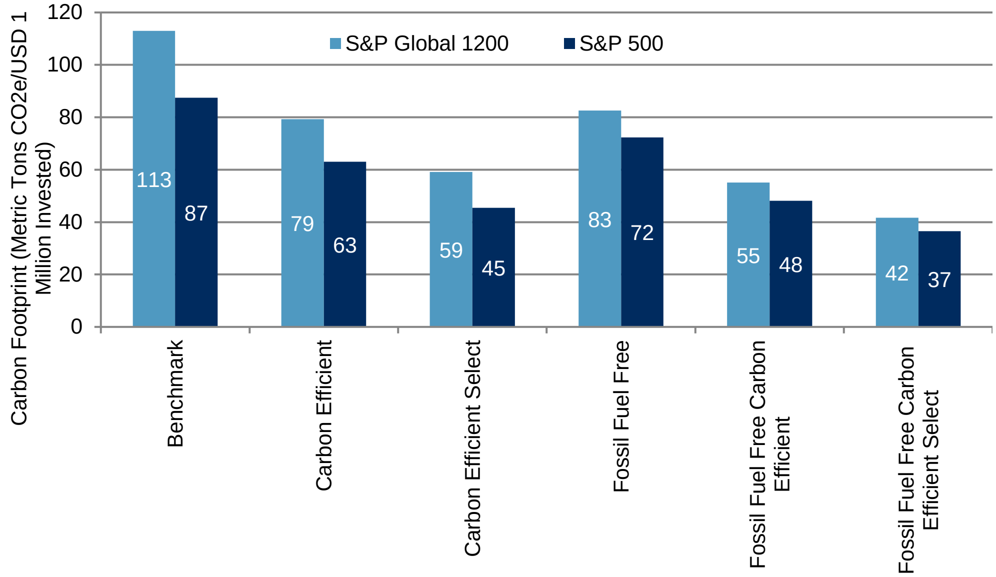
[5] https://sustainabledevelopment.un.org/?menu=1300

[6] https://www.fsb-tcfd.org/about/

The S&P 500 Fossil Fuel Free Carbon Efficient Select Index exhibited the smallest carbon footprint, with approximately 37 metrics tons of CO_2e emitted per every USD 1 million invested—a reduction of 58% from the S&P 500.

This may not be so surprising, given that the U.S.'s commitment to the Paris Agreement is no longer certain, although action hasn't stopped. California is continuing to push for auto emissions standards,[7] and some states have formed the U.S. Climate Alliance[8] to reduce greenhouse gas emissions. These actions are reflected positively in its carbon footprint; the S&P 500 and its low-carbon versions consistently exhibited lower carbon footprints than their S&P Global 1200 counterparts (see Exhibit 3).

Exhibit 3: S&P Dow Jones Indices Carbon Footprint



Source: S&P Dow Jones Indices LLC. Data as of Sept. 30, 2017. Chart is provided for illustrative purposes.

As expected, the S&P 500 exhibited the largest carbon footprint, while those with more focused carbon objectives exhibited smaller amounts.

The S&P 500 Fossil Fuel Free Carbon Efficient Select Index exhibited the smallest carbon footprint, with approximately 37 metrics tons of CO_2e emitted per every USD 1 million invested—a reduction of 58% from the S&P 500. However, a relatively simple reweighting scheme within sectors can also greatly reduce carbon emissions, as illustrated by the S&P 500 Carbon Efficient Index, which reduced carbon emissions by 30%.

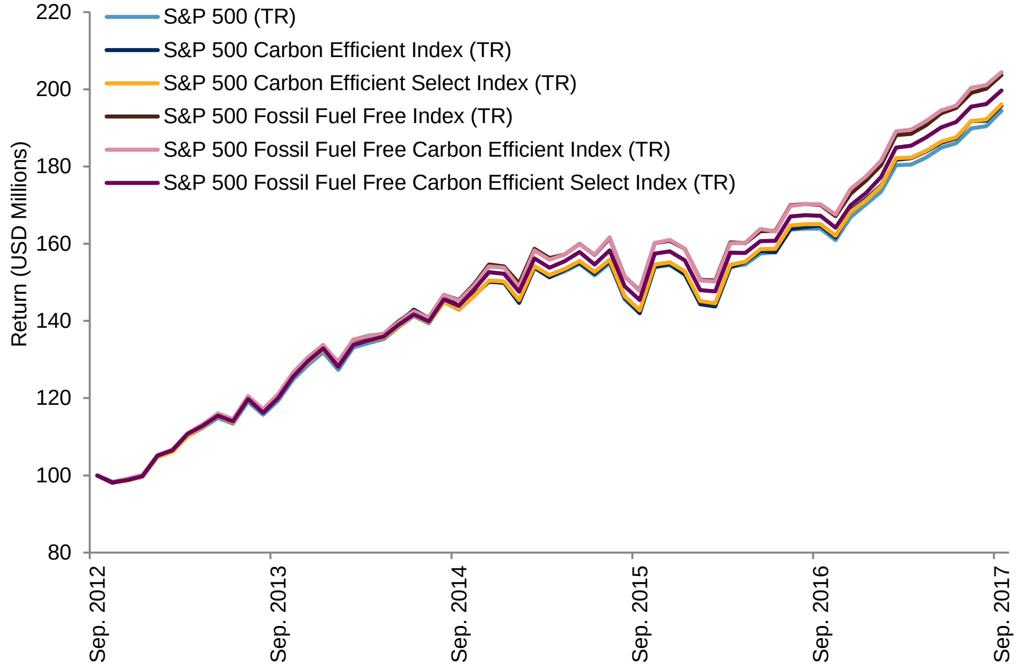
RISK/RETURN COMPARISONS

Historically, there has been much concern that incorporating environmental considerations into an index may hurt performance. Exhibits 4 and 5 compare the S&P 500 with its environmentally focused counterparts. Interestingly, the low-carbon versions of the S&P 500 actually outperformed the benchmark over the five-year period.

[7] Tabuchi, Hiroko. *U.S. Climate Change Policy: Made in California*. September 27, 2017. https://www.nytimes.com/2017/09/27/climate/california-climate-change.html

[8] https://www.usclimatealliance.org/

Exhibit 4: S&P 500 Low-Carbon Indices Return



Source: S&P Dow Jones Indices LLC. Data as of Sept. 30, 2017. Past performance is no guarantee of future results. Chart is provided for illustrative purposes and reflects hypothetical historical performance. Please see the Performance Disclosure at the end of this document for more information regarding the inherent limitations associated with back-tested performance.

The low-carbon versions of the S&P 500 actually outperformed the benchmark over the five-year period.

Exhibit 5: Performance of the S&P 500 Low-Carbon Indices

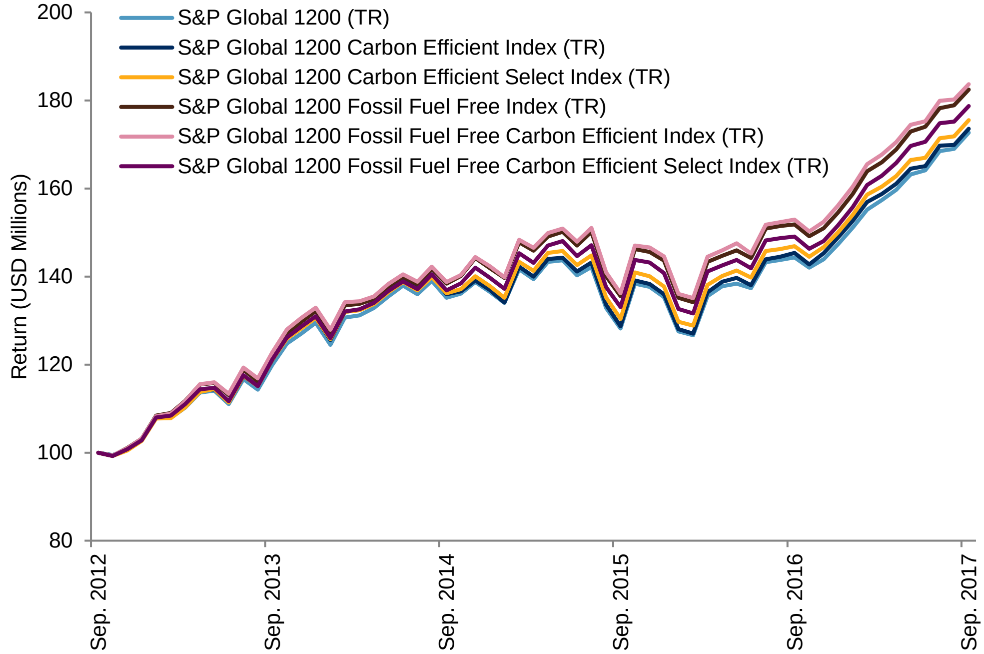
INDEX	S&P 500	S&P 500 CARBON EFFICIENT INDEX	S&P 500 CARBON EFFICIENT SELECT INDEX	S&P 500 FOSSIL FUEL FREE INDEX	S&P 500 FOSSIL FUEL FREE CARBON EFFICIENT INDEX	S&P 500 FOSSIL FUEL FREE CARBON EFFICIENT SELECT INDEX
ANNUALIZED RETURNS (%)						
1-Year	18.61	18.89	18.82	19.77	20.09	19.41
3-Year	10.81	10.81	11.08	11.90	12.06	11.52
5-Year	14.22	14.38	14.42	15.29	15.38	14.83
ANNUALIZED RISK (%)						
3-Year	10.07	10.42	10.22	10.19	10.42	10.15
5-Year	9.55	9.85	9.65	9.60	9.76	9.60
TRACKING ERROR						
1-Year	-	0.87	0.55	0.72	0.76	0.75
3-Year	-	0.91	0.52	0.96	1.03	0.67
5-Year	-	0.81	0.50	0.84	0.88	0.57

Source: S&P Dow Jones Indices LLC. Data as of Sept. 30, 2017. Index performance based on total return in USD. Past performance is no guarantee of future results. Table is provided for illustrative purposes and reflects hypothetical historical performance. Please see the Performance Disclosure at the end of this document for more information regarding the inherent limitations associated with back-tested performance.

Additionally, the indices all demonstrated low tracking error versus the S&P 500 (almost all periods were within 1% of the S&P 500), and they displayed significantly reduced carbon numbers (see Exhibit 1), together with slight outperformance.

The performance of the S&P Global 1200 is illustrated in Exhibits 6 and 7.

Exhibit 6: S&P 1200 Low-Carbon Indices Return



Source: S&P Dow Jones Indices LLC. Data as of Sept. 30, 2017. Past performance is no guarantee of future results. Chart is provided for illustrative purposes and reflects hypothetical historical performance. Please see the Performance Disclosure at the end of this document for more information regarding the inherent limitations associated with back-tested performance.

The global benchmark, the S&P Global 1200, had the highest carbon efficiency number (241), while the S&P Global 1200 Fossil Fuel Free Carbon Efficient Select Index exhibited the lowest carbon efficiency (89)—a reduction of 63%.

Exhibit 7: Performance of the S&P Global 1200 Indices

INDEX	S&P GLOBAL 1200 (TR)	S&P GLOBAL 1200 CARBON EFFICIENT INDEX (TR)	S&P GLOBAL 1200 CARBON EFFICIENT SELECT INDEX (TR)	S&P GLOBAL 1200 FOSSIL FUEL FREE INDEX (TR)	S&P GLOBAL 1200 FOSSIL FUEL FREE CARBON EFFICIENT INDEX (TR)	S&P GLOBAL 1200 FOSSIL FUEL FREE CARBON EFFICIENT SELECT INDEX (TR)
ANNUALIZED RETURNS (%)						
1-Year	19.65	19.37	19.47	20.18	20.13	19.86
3-Year	8.51	8.47	8.83	9.65	9.81	9.31
5-Year	11.55	11.66	11.91	12.78	12.93	12.32
ANNUALIZED RISK (%)						
3-Year	10.36	10.67	10.58	10.41	10.52	10.54
5-Year	9.78	10.05	9.94	9.77	9.87	9.91
TRACKING ERROR						
1-Year	-	0.68	0.53	0.78	0.68	0.77
3-Year	-	0.65	0.57	1.21	1.24	0.97
5-Year	-	0.59	0.52	1.09	1.08	0.83

Source: S&P Dow Jones Indices LLC. Data as of Sept. 30, 2017. Past performance is no guarantee of future results. Table is provided for illustrative purposes and reflects hypothetical historical performance. Please see the Performance Disclosure at the end of this document for more information regarding the inherent limitations associated with back-tested performance.

Over the five-year period, all low-carbon versions outperformed the benchmark.

CONCLUSION

Significant changes are underway in the understanding and incorporation of carbon data by market participants. Historically, there has been a concern that low-carbon investment might lead to financial sacrifice, but new research, climate events, and technological developments suggest that carbon integration is important for understanding risks and opportunities.

There has been a concern that low-carbon investment might lead to financial sacrifice, but new research, climate events, and technological developments suggest that carbon integration is important for understanding risks and opportunities.

The finance sector is quickly responding to the increasing external interest from governments, regulators, asset owners, institutional, and retail investors. As a first step, many market participants will likely look critically at their current positions and consider other available options. Leaders in the space are already innovating and identifying more holistic approaches.

Over time, it is expected that progressively more sophisticated strategies will be employed, including ones that look more deeply into the industry shifts occurring in support of a low-carbon future, as well as alignment with ‘two-degree’ goals.

PERFORMANCE DISCLOSURE

The S&P 500 Carbon Efficient Index and S&P Global 1200 Carbon Efficient Index were launched on August 20, 2015. The S&P 500 Fossil Fuel Free Index, S&P Global 1200 Carbon Efficient Select Index, and S&P Global 1200 Fossil Fuel Free Index were launched on August 28, 2015. The S&P 500 Fossil Fuel Free Carbon Efficient Index and S&P Global 1200 Fossil Fuel Free Carbon Efficient Index were launched on November 16, 2015. The S&P 500 Fossil Fuel Free Carbon Efficient Select Index and S&P Global 1200 Fossil Fuel Free Carbon Efficient Select Index were launched on January 11, 2016. All information presented prior to an index's Launch Date is hypothetical (back-tested), not actual performance. The back-test calculations are based on the same methodology that was in effect on the index Launch Date. Complete index methodology details are available at www.spdji.com.

S&P Dow Jones Indices defines various dates to assist our clients in providing transparency. The First Value Date is the first day for which there is a calculated value (either live or back-tested) for a given index. The Base Date is the date at which the Index is set at a fixed value for calculation purposes. The Launch Date designates the date upon which the values of an index are first considered live: index values provided for any date or time period prior to the index's Launch Date are considered back-tested. S&P Dow Jones Indices defines the Launch Date as the date by which the values of an index are known to have been released to the public, for example via the company's public website or its datafeed to external parties. For Dow Jones-branded indices introduced prior to May 31, 2013, the Launch Date (which prior to May 31, 2013, was termed "Date of introduction") is set at a date upon which no further changes were permitted to be made to the index methodology, but that may have been prior to the Index's public release date.

Past performance of the Index is not an indication of future results. Prospective application of the methodology used to construct the Index may not result in performance commensurate with the back-test returns shown. The back-test period does not necessarily correspond to the entire available history of the Index. Please refer to the methodology paper for the Index, available at www.spdji.com for more details about the index, including the manner in which it is rebalanced, the timing of such rebalancing, criteria for additions and deletions, as well as all index calculations.

Another limitation of using back-tested information is that the back-tested calculation is generally prepared with the benefit of hindsight. Back-tested information reflects the application of the index methodology and selection of index constituents in hindsight. No hypothetical record can completely account for the impact of financial risk in actual trading. For example, there are numerous factors related to the equities, fixed income, or commodities markets in general which cannot be, and have not been accounted for in the preparation of the index information set forth, all of which can affect actual performance.

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