

# **S&P GSCI Climate Aware Indices** *Methodology*

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# Introduction

## Index Objective

The S&P GSCI Climate Aware Indices measure the performance, through futures, of long-only environmentally-aligned and climate-transition strategies across the constituents of an underlying index. The indices use an optimization approach to calculate constituent weights by seeking to reduce the environmental footprint of the index while minimizing weight and sector deviations from the underlying index. The optimized constituent weights are constrained to help maintain diversification as detailed under the *Eligibility Criteria and Index Construction* section.

## Index Family

The index family consists of the following:

- S&P GSCI Climate Aware
- S&P GSCI Light Energy Climate Aware

## Environmental Impact Data

The index uses the S&P Global Commodity Environmental Dataset in its construction. S&P Global Sustainable1 (S1) measures the weighted-average absolute and intensity-based physical environmental impact (across greenhouse gas emissions, water depletion, and land use) of individual commodity constituents using country-specific Life Cycle Impact Assessment (LCIA) factors and S&P GSCI world production volumes. Natural capital valuation metrics are applied to convert physical impact data into a single monetary value representing the combined environmental externalities of each issue. Natural capital valuation is normalized by production and annual contract value to provide a Commodity Valuation Intensity (CVI) for application to the S&P GSCI.

For more information on the data set, please refer [here](#).

## Commodity Valuation Intensity

The Commodity Valuation Intensity is the 'Total Commodity Valuation' (US\$), normalized by the annual contract value for each commodity. The Total Commodity Valuation is a natural capital valuation that represents the external environmental and social costs of the GHG emissions, water consumption and land use impacts associated with the commodity value chain within the boundary of the assessment. The annual contract value for each commodity is the product of the average contract price and the world production volume. Average contract prices mirror the average contract reference prices calculated in the S&P GSCI Methodology. For any annual observation period and with respect to a particular commodity contract, the average contract price is the average of the prices of the first nearby contract expiration on the last day of each month during that annual observation period on which such price is available. The annual observation period is the 12-month period ending on August 31<sup>st</sup> of the current calendar year of the dataset.

## Supporting Documents

This methodology is meant to be read in conjunction with supporting documents providing greater detail with respect to the policies, procedures and calculations described herein. References throughout the methodology direct the reader to the relevant supporting document for further information on a specific topic. The list of the main supplemental documents for this methodology and the hyperlinks to those documents is as follows:

Supporting Document	URL
S&P Dow Jones Indices' Commodities Indices Policies & Practices Methodology	<a href="#">Commodities Indices Policies &amp; Practices</a>
S&P Dow Jones Indices' Index Mathematics Methodology	<a href="#">Index Mathematics Methodology</a>

This methodology was created by S&P Dow Jones Indices (S&P DJI), with contributions from J.P. Morgan, to achieve the aforementioned objective of measuring the underlying interest of each index governed by this methodology document. The index is solely a product of SP DJI, it is not a product of J.P. Morgan, nor is the index sponsored or endorsed by J.P. Morgan. Any changes to or deviations from this methodology are made in the sole judgment and discretion of S&P Dow Jones Indices so that the index continues to achieve its objective.

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# Eligibility Criteria and Index Construction

## Index Universe

At each rebalancing, each index universe is all constituents of the underlying index:

Index	Underlying Index
S&P GSCI Climate Aware	S&P GSCI
S&P GSCI Light Energy Climate Aware	S&P GSCI Light Energy

The underlying index weights used are Reference Percentage Dollar Weights (RPDWs) for the corresponding rebalance of the underlying index.

For information on the underlying indices, please refer to the S&P GSCI Methodology available at [www.spglobal.com/spdji](http://www.spglobal.com/spdji).

## Constituent Weighting

At each rebalancing, each index selects all constituents of the respective underlying index. The index weights are determined through two separate processes.

1. First, calculate the relative fixed weight proportions for the 'Energy' S&P GSCI sector and 'Food Supply' economic sector (see *Appendix A* for sector definitions).
2. Second, employ an optimization process to determine the final index weights by minimizing an objective function subject to satisfying a series of constraints.

To calculate the relative fixed weight proportions for the 'Energy' S&P GSCI sector and 'Food Supply' economic sector, perform the following steps separately for each sector group:

1. For all commodities in the sector group, compute a z-score ( $Z_i$ ) from the reciprocal of the total CVI per unit of production (based on tons of oil equivalent for the Energy sector and tons for the Food Supply sector) by subtracting the mean and dividing by the standard deviation.
2. For all commodities in step 1, compute a tilt score ( $S_i$ ) by transforming the z-score as follows:
  - If  $Z_i > 0$ ,  $S_i = 1 + \lambda Z_i$
  - If  $Z_i < 0$ ,  $S_i = 1/(1 - \lambda Z_i)$
  - If  $Z_i = 0$ ,  $S_i = 1$

where  $\lambda$  is a tilt scaling factor equal to 0.25.

3. For each commodity in step 2, compute the tilted weight within its group from the underlying index weight within its group as follows:

$$Tilted\ Weight_i = \frac{Underlying\ Index\ Weight_i \times S_i}{\sum_{j \in Group} Underlying\ Index\ Weight_j \times S_j}$$

Find the optimized portfolio weights ( $w_i^*$ ) by minimizing the sum of squared differences between the underlying index weight ( $w_i$ ) and the optimized weight, divided by the underlying index weight, plus a sector penalty, subject to constraints. The objective function is as follows:

$$\min \left( \left( \frac{1}{n} \sum_i \frac{(\text{Underlying Index Weight}_i - \text{Optimized Weight}_i)^2}{\text{Underlying Index}_i} \right) + \left( \frac{1}{k} \sum_j \frac{(\text{Underlying Index Sector Weight}_j - \text{Optimized Sector Weight}_j)^2}{\text{Underlying Index Sector Weight}_j} \right) \right)$$

- The sectors used in the objective function sector penalty are the economic sectors defined in *Appendix A*.
- $n$  is the number of constituents.
- $k$  is the number of sectors.

Optimization constraints:

Constraint	Details	Data Source
Weighted-Average Total CVI per Dollar Invested	$\sum_i w_i^* \times TCVI_i \leq 0.75 \times \sum_i w_i \times TCVI_i$	Trucost
Weighted-Average GHG CVI per Dollar Invested	$\sum_i w_i^* \times GHG\ CVI_i \leq 0.75 \times \sum_i w_i \times GHG\ CVI_i$	Trucost
5% Decarbonization Trajectory Target	$\sum_i w_i^* \times GHG\ CVI_i \leq \text{Anchor GHG CVI} \times 0.75 \times \frac{(1 - 5\%)^n}{1 + inf}$ <p>where:</p> <ul style="list-style-type: none"> <li>• <math>inf</math> = annual contract value growth of parent index since index Anchor Date.</li> <li>• <math>\text{Anchor GHG CVI}</math> = weighted-average GHG CVI per Dollar Invested on the S&amp;P GSCI on the anchor date. The anchor date is the January 2023 S&amp;P GSCI rebalancing date.</li> <li>• <math>n</math> is the number of rebalancings after the anchor date.</li> </ul>	Trucost
Weighted-Average Water CVI per Dollar Invested	$\sum_i w_i^* \times \text{Water CVI}_i \leq \sum_i w_i \times \text{Water CVI}_i$	Trucost
Weighted-Average Land CVI per Dollar Invested	$\sum_i w_i^* \times \text{Land CVI}_i \leq \sum_i w_i \times \text{Land CVI}_i$	Trucost
Food Supply Output per Dollar Invested	$\sum_{i \in \text{Food Supply}} w_i^* \times \frac{\text{Total Production Volume}_i}{\text{Annual Contract Value}_i} \geq \sum_{i \in \text{Food Supply}} w_i \times \frac{\text{Total Production Volume}_i}{\text{Annual Contract Value}_i}$	Trucost
Liquidity Cap/Floor	<ul style="list-style-type: none"> <li>• Constituents are capped/floored at 5x/0.2x the underlying index weight.</li> <li>• If the optimizer cannot find a feasible solution, these constraints are incrementally relaxed to 10x/0.1x the underlying index weight.</li> </ul>	-
Concentration Caps	<p>Apply concentration caps to the commodity components<sup>1</sup> as follows:</p> <ul style="list-style-type: none"> <li>• The largest weight is capped at 32%.</li> <li>• The second largest weight is capped at 17%.</li> <li>• All excess weight is proportionally redistributed to existing components until both caps are satisfied.</li> </ul>	-
Energy Sector Relative Fixed Weight Proportions	<p>For all commodities in the 'Energy' S&amp;P GSCI sector, the relative proportions of each commodity's optimized weight are set equal to the relative proportions of the tilted weights:</p> $\frac{\text{Optimized Weight}_i}{\sum_j \text{Optimized Weight}_j} = \frac{\text{Tilted Weight}_i}{\sum_j \text{Tilted Weight}_j}$	-

<sup>1</sup> The commodity components are defined as follows: Wheat (Kansas Wheat and Chicago Wheat), Petroleum (WTI Crude Oil, Brent Crude Oil, Gas Oil, Heating Oil, and Unleaded Gasoline), and Cattle (Live Cattle and Feeder Cattle). All remaining constituents are treated as individual components.

Constraint	Details	Data Source
Food Supply Sector Relative Fixed Weight Proportions	As above for the 'Food Supply' economic sector.	-

**Relaxation Hierarchy**

If the optimization fails to find a solution, the optimizer first incrementally relaxes the Liquidity Cap/Floor constraint as described in the above constraints table, and then partially relaxes each subsequent constraint in the order listed below, and repeats, if necessary, until a solution is found. In each attempt at optimization the constraints are further relaxed in the stated order; however, the Index Committee may revise the order of relaxation hierarchy if a particular constraint prevents the optimizer from finding a solution.

- Weighted-Average Total CVI per Dollar Invested
- 5% Decarbonization Trajectory Target
- Weighted-Average GHG CVI per Dollar Invested
- Weighted-Average Water CVI per Dollar Invested
- Weighted-Average Land CVI per Dollar Invested

The following constraints are considered hard constraints and will not be relaxed:

- Food Supply Output per Dollar Invested
- Concentration Caps
- Energy Sector Relative Fixed Weight Proportions
- Food Supply Sector Relative Fixed Weight Proportions

**Monthly Capping Check**

On the S&P GSCI business day before each monthly roll date, excluding the January roll date, index weights are examined and capped if necessary, using the following procedure:

1. If the weight of the largest component exceeds 34%, its weight is capped at 32%. All excess weight is distributed proportionally among the remaining components.
2. If the weight of the second largest component exceeds 19%, all component weights are capped at 17%, except for the largest component weight from step 1. All excess weight is distributed proportionally among the remaining components, excluding the component from step 1.

**Rebalancing**

The indices rebalance during the January S&P GSCI roll period.

# Index Governance

## Index Committee

An S&P Dow Jones Indices Index Committee maintains the indices. The Committee is comprised of full-time professional members of S&P Dow Jones Indices staff. At each meeting, the Committee reviews any issues that may affect index constituents, statistics comparing the composition of the indices to the market, commodities that are being considered as candidates for addition to an index, and any significant market events. In addition, the Index Committee may revise index policy covering rules for selecting commodities, or other matters.

S&P Dow Jones Indices considers information about changes to its indices and related matters to be potentially market moving and material. Therefore, all Index Committee discussions are confidential.

All references to methodology-related decisions made by S&P Dow Jones Indices in this document represent decisions made by the Index Committee.

S&P Dow Jones Indices' Index Committees reserve the right to make exceptions when applying the methodology if the need arises. In any scenario where the treatment differs from the general rules stated in this document or supplemental documents, clients will receive sufficient notice, whenever possible.

In addition to the daily governance of indices and maintenance of index methodologies, at least once within any 12-month period, the Index Committee reviews the methodology to ensure the indices continue to achieve the stated objectives, and that the data and methodology remain effective. In certain instances, S&P Dow Jones Indices may publish a consultation inviting comments from external parties.

*For information on Quality Assurance and Internal Reviews of Methodology, please refer to S&P Dow Jones Indices' Commodities Indices Policies & Practices Methodology.*



# Index Policy

## **Announcements**

Announcements of the daily index values are made after the futures market close each day.

Announcements of the new futures contract months to be rolled into are made following the close of business on the third business day of each month.

*For information on Calculations and Pricing Disruptions, Expert Judgment, Data Hierarchy and Unexpected Exchange Closures, please refer to S&P Dow Jones Indices' Commodities Indices Policies & Practices Methodology.*

## **Currency of Calculation and Additional Index Return Series**

In addition to the indices detailed in this methodology, additional return series versions of the indices may be available, including, but not limited to the following: currency, currency hedged, decrement, fair value, inverse, leveraged, and risk control versions. For a list of available indices, please refer to [S&P DJI Methodology & Regulatory Status Database](#).

*For information on the calculation of different types of indices, please refer to S&P Dow Jones Indices' Index Mathematics Methodology.*

*For the inputs necessary to calculate certain types of indices, including decrement, dynamic hedged, fair value, and risk control indices, please refer to the Parameters documents available at [www.spglobal.com/spdji](http://www.spglobal.com/spdji).*

## **Contact Information**

For questions regarding an index, please contact: [index\\_services@spglobal.com](mailto:index_services@spglobal.com).

# Index Dissemination

Index levels are available through S&P Dow Jones Indices' Web site at [www.spglobal.com/spdji](http://www.spglobal.com/spdji), major quote vendors, numerous investment-oriented Web sites, and various print and electronic media.

## Tickers

The table below lists headline indices covered by this document. All versions of the below indices that may exist are also covered by this document. Please refer to the [S&P DJI Methodology & Regulatory Status Database](#) for a complete list of indices covered by this document.

Index Name	Base Date	Base Value	Launch Date	Index Code	BBG	RIC
S&P GSCI Climate Aware (USD)	01/31/2011	100	02/21/2023	GSCICA	SPGCLAU	.SPGCLAU
S&P GSCI Climate Aware (USD) ER	01/31/2011	100	02/21/2023	GSCICAE	SPGCLAUP	.SPGCLAUP
S&P GSCI Climate Aware (USD) TR	01/31/2011	100	02/21/2023	GSCICAT	SPGCLAUT	.SPGCLAUT
S&P GSCI Light Energy Climate Aware (USD)	01/31/2011	100	06/20/2023	SPGLCAU	SPGLCAU	.SPGLCAU
S&P GSCI Light Energy Climate Aware (USD) ER	01/31/2011	100	06/20/2023	SPGLCAUP	SPGLCAUP	.SPGLCAUP
S&P GSCI Light Energy Climate Aware (USD) TR	01/31/2011	100	06/20/2023	SPGLCAUT	SPGLCAUT	.SPGLCAUT

## Index Data

Daily index level data is available via on subscription.

For product information, please contact S&P Dow Jones Indices, [www.spglobal.com/spdji/en/contact-us](http://www.spglobal.com/spdji/en/contact-us).

## Web site

For further information, please refer to S&P Dow Jones Indices' Web site at [www.spglobal.com/spdji](http://www.spglobal.com/spdji).

# Appendix A

## Sector Classifications

The sector classifications are as follows:

S&P GSCI Constituent	S&P GSCI Sector	Economic Sector
Natural Gas	Energy	Energy Systems
Brent Crude Oil	Energy	Energy Systems
Gasoil	Energy	Energy Systems
Gasoline	Energy	Energy Systems
Heating Oil	Energy	Energy Systems
WTI Crude Oil	Energy	Energy Systems
Sugar	Agriculture	Energy Systems
Copper	Industrial Metals	Energy Systems
Aluminum	Industrial Metals	Energy Systems
Nickel	Industrial Metals	Energy Systems
Zinc	Industrial Metals	Energy Systems
Silver	Precious Metals	Energy Systems
Feeder Cattle	Livestock	Food Supply
Live Cattle	Livestock	Food Supply
Lean Hogs	Livestock	Food Supply
Corn	Agriculture	Food Supply
Chicago Wheat	Agriculture	Food Supply
Kansas Wheat	Agriculture	Food Supply
Soybeans	Agriculture	Food Supply
Cocoa	Agriculture	Agriculture
Coffee	Agriculture	Agriculture
Cotton	Agriculture	Agriculture
Lead	Industrial Metals	Industrial Metals
Gold	Precious Metals	Precious Metals

The Economic Sectors reflect a commodity's role in the economy as either an Energy Systems commodity, Food Supply commodity, or Other commodity (where Other is broken down into the S&P GSCI Sector). The Index Committee reserves the right to review and edit the Economic Sector definitions as required.

For further information, please refer to the publication [Incorporating Environmental Considerations into Commodity Indices](#).

# Appendix B

## ESG Disclosures

<b>EXPLANATION OF HOW ENVIRONMENTAL, SOCIAL &amp; GOVERNANCE (ESG) FACTORS ARE REFLECTED IN THE KEY ELEMENTS OF THE BENCHMARK METHODOLOGY<sup>2</sup></b>	
<b>1.</b>	<b>Name of the benchmark administrator.</b> S&P Dow Jones Indices LLC.
<b>2.</b>	<b>Underlying asset class of the ESG benchmark.<sup>3</sup></b> N/A
<b>3.</b>	<b>Name of the S&amp;P Dow Jones Indices benchmark or family of benchmarks.</b> <a href="#">S&amp;P DJI Futures Indices Benchmark Statement</a>
<b>4.</b>	<b>Do any of the indices maintained by this methodology take into account ESG factors?</b> Yes
<b>Appendix latest update:</b> January 2023	
<b>Appendix first publication:</b> January 2023	

<sup>2</sup> The information contained in this Appendix is intended to meet the requirements of the European Union Commission Delegated Regulation (EU) 2020/1817 supplementing Regulation (EU) 2016/1011 of the European Parliament and of the Council as regards the minimum content of the explanation of how environmental, social and governance factors are reflected in the benchmark methodology and the retained EU law in the UK [The Benchmarks (amendment and Transitional Provision) (EU Exit) Regulations 2019].

<sup>3</sup> The 'underlying assets' are defined in European Union Commission Delegated Regulation (EU) 2020/1816 supplementing Regulation (EU) 2016/1011 of the European Parliament and of the Council as regards the explanation in the benchmark statement of how environmental, social and governance factors are reflected in each benchmark provided and published.

# Appendix C

## Backward Data Assumption

The indices employ a “Backward Data Assumption” method for some datapoints used in the derivation of historical index membership prior to the Live Data Effective Date (defined below). The “Backward Data Assumption” method involves applying the earliest available actual live data point for an index constituent to all prior, historical instances of that constituent in the index universe.

Backward Data Assumption affects only the historical, hypothetical constituents of any index back-test. Only actual live data is ever used in live index rebalancings and in the historical rebalancing calculation of an index after its Live Data Effective Date.

*For more information on S&P DJI’s principles and processes for using Backward Data Assumption, please refer to the [FAQ](#).*

## Designated Datasets Subject to Backward Data Assumption

The Backward Data Assumption within the historical back-test, with respect to the indices identified above, applies only to designated datasets and associated time horizons as defined below. For each designated dataset, all historical rebalancing events prior to the Live Data Reference Date listed below are subject to use of the Backward Data Assumption.

<b>Data Provider</b>	<b>Designated Dataset</b>	<b>Live Data Effective Date</b>
Sustainable1	S&P Global Commodity Environmental Dataset	January 2023

The Live Data Effective Date refers to the first date from which index constituents are determined solely on actual live data.

# Disclaimer

## Performance Disclosure/Back-Tested Data

Where applicable, S&P Dow Jones Indices and its index-related affiliates (“S&P DJI”) defines various dates to assist our clients by 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 to a fixed value for calculation purposes. The Launch Date designates the date when 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 DJI 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 data feed 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.

Please refer to the methodology for the Index 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.

Information presented prior to an index’s launch date is hypothetical back-tested performance, not actual performance, and is based on the index methodology in effect on the launch date. However, when creating back-tested history for periods of market anomalies or other periods that do not reflect the general current market environment, index methodology rules may be relaxed to capture a large enough universe of securities to simulate the target market the index is designed to measure or strategy the index is designed to capture. For example, market capitalization and liquidity thresholds may be reduced. In addition, forks have not been factored into the back-test data with respect to the S&P Cryptocurrency Indices. For the S&P Cryptocurrency Top 5 & 10 Equal Weight Indices, the custody element of the methodology was not considered; the back-test history is based on the index constituents that meet the custody element as of the Launch Date. Also, the treatment of corporate actions in back-tested performance may differ from treatment for live indices due to limitations in replicating index management decisions. Back-tested performance reflects application of an index methodology and selection of index constituents with the benefit of hindsight and knowledge of factors that may have positively affected its performance, cannot account for all financial risk that may affect results and may be considered to reflect survivor/look ahead bias. Actual returns may differ significantly from, and be lower than, back-tested returns. Past performance is not an indication or guarantee of future results.

Typically, when S&P DJI creates back-tested index data, S&P DJI uses actual historical constituent-level data (e.g., historical price, market capitalization, and corporate action data) in its calculations. As ESG investing is still in early stages of development, certain datapoints used to calculate certain ESG indices may not be available for the entire desired period of back-tested history. The same data availability issue could be true for other indices as well. In cases when actual data is not available for all relevant historical periods, S&P DJI may employ a process of using “Backward Data Assumption” (or pulling back) of ESG data for the calculation of back-tested historical performance. “Backward Data Assumption” is a process that applies the earliest actual live data point available for an index constituent company to all prior historical instances in the index performance. For example, Backward Data Assumption inherently assumes that companies currently not involved in a specific business activity (also known as “product involvement”) were never involved historically and similarly also assumes that companies currently involved in a specific business activity were involved historically too. The Backward Data Assumption allows the hypothetical back-test to be extended over more historical years than would be feasible using only actual data. For more information on “Backward Data Assumption” please refer to the FAQ. The methodology and factsheets of any index that employs backward assumption in the back-tested history

will explicitly state so. The methodology will include an Appendix with a table setting forth the specific data points and relevant time period for which backward projected data was used. Index returns shown do not represent the results of actual trading of investable assets/securities. S&P DJI maintains the index and calculates the index levels and performance shown or discussed but does not manage any assets.

Index returns do not reflect payment of any sales charges or fees an investor may pay to purchase the securities underlying the Index or investment funds that are intended to track the performance of the Index. The imposition of these fees and charges would cause actual and back-tested performance of the securities/fund to be lower than the Index performance shown. As a simple example, if an index returned 10% on a US \$100,000 investment for a 12-month period (or US \$10,000) and an actual asset-based fee of 1.5% was imposed at the end of the period on the investment plus accrued interest (or US \$1,650), the net return would be 8.35% (or US \$8,350) for the year. Over a three-year period, an annual 1.5% fee taken at year end with an assumed 10% return per year would result in a cumulative gross return of 33.10%, a total fee of US \$5,375, and a cumulative net return of 27.2% (or US \$27,200).

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