S&P Dow Jones Indices

A Division of S&P Global

# S&P 500 Net Zero 2050 Paris-Aligned Sustainability Screened Index *Methodology*

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# Introduction

**Index Objective**

The S&P 500 Net Zero 2050 Paris-Aligned Sustainability Screened Index measures the performance of eligible equity securities from an underlying parent index selected and weighted to be collectively compatible with a 1.5ºC global warming climate scenario[1] at the index level. The index applies exclusions based on companies' involvement in specific business activities, violation of the principles of the United Nations' Global Compact (UNGC), and involvement in relevant ESG controversies, all outlined in *Eligibility Criteria*.

**Highlights**

The index aims to meet the minimum standards for EU Paris-aligned Benchmarks (EU PABs) under Regulation (EU) 2019/2089 amending Regulation (EU) 2016/1011.[2] The law proposes the definitions of minimum standards for the methodology of any 'EU Paris-Aligned' benchmark indices that would be aligned with the objectives of the Paris Agreement[3], and addresses the risk of greenwashing. The index also incorporates factors that seek to manage transition risk and climate change opportunities in a way that aligns them with the recommendations of the Financial Stability Board's Task Force on Climate-related Financial Disclosures' (TCFD) 2017 *Final Report[4],* covering transition risk, climate change opportunities, stranded assets, and physical risk.

Should a material change to the methodology be required as a consequence of any change made by the EU to the minimum standards for EU PABs, S&P Dow Jones Indices will issue an announcement before the change is implemented (and in these circumstances, S&P Dow Jones Indices would not conduct a formal consultation). For clarity, any other methodology change will follow S&P Dow Jones Indices' standard processes, which may include a consultation.

The index's weighting aims to minimize the difference in constituent weights to the underlying parent index. In addition, the index incorporates a variety of specified decarbonization targets and align with certain specified criteria through the use of optimization with multiple model constraints, including:

- alignment to a 1.5ºC climate scenario using the S&P Trucost Limited (Trucost) Transition Pathway Model
- reduced overall greenhouse gas (GHG), expressed in $CO_2$ equivalents, emissions intensity compared to their respective underlying parent index by at least 50%
- minimum self-decarbonization rate of GHG emissions intensity in accordance with the trajectory implied by Intergovernmental Panel on Climate Change's (IPCC) most ambitious 1.5ºC scenario, equating to at least 7% GHG intensity reduction on average per annum
- increased exposure to companies with Science Based Targets from the Science Based Target Initiative (SBTI) that are credible and consistent with the above decarbonization trajectory
- improved S&P Global ESG Score (further defined further below) compared to the parent index

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[1] A climate scenario of 1.5ºC about preindustrial levels has been deemed important by the IPCC: Masson-Delmotte, V., Zhai, P., Pörtner, H. O., Roberts, D., Skea, J., Shukla, P. R. Waterfield, T. (2018). Global warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C. IPCC, available at https://www.ipcc.ch/sr15/.
[2] Pursuant to Articles 19(a)(2) and 19(b)(1) of Regulation (EU) 2019/2089, Commission Delegated Regulation (EU) 2020/1818 lays down the minimum standards for EU CTBs and EU PABs *https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32020R1818*.
[3] UNFCCC. (2015). The Paris Agreement: *https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement*.
[4] Financial Stability Board's Task Force on Climate-related Financial Disclosures' (TCFD). (2017). *Final Report: Recommendations of the Task Force on Climate-related Financial Disclosures,* available at *https://www.fsb-tcfd.org/wp-content/uploads/2017/06/FINAL-2017-TCFD-Report-11052018.pdf*.

- exposure to sectors with high impact on climate change at least equivalent to the parent index
- managed exposure to potential climate change opportunities through controlled green-to-brown revenue share in order to align with the recommendations of the TCFD
- capped exposure to non-disclosing carbon companies
- constituent-level weight capping to address liquidity and diversification
- reduced exposure to physical risks from climate change using Trucost's Physical Risk dataset
- improved exposure to potential climate change opportunities through substantially higher green-to-brown revenue share compared to the parent index
- reduced exposure to fossil fuel reserves compared to the parent index

The index also features the exclusion of companies from the underlying parent index with:

- involvement in specific business activities
- revenues from coal, oil, or natural gas exploration or processing activities or electricity generation using coal, petroleum, natural gas or biomass exceeding defined thresholds
- non-compliant violations of UNGC
- involvement in relevant ESG controversies

**Climate-Related Data**

**S&P Trucost Limited Transition Pathway Model**

The S&P Trucost Limited (Trucost) Transition Pathway approach is based on two models: the Sectoral Decarbonization Approach ("SDA") (Krabbe, et al., 2015)[5], and the Greenhouse Gas Emissions per unit of Value Added Approach ("GEVA") (Randers, 2012)[6], which are both recommended by the Science Based Targets Initiative (Science Based Targets Initiative, 2019).[7]

The approach allows for a forward-looking perspective on likely future GHG emissions and uses a carbon budget allocation method to allocate each company a total amount of carbon emissions per year. These allocations allow companies, as a collective, to be 1.5°C aligned provided their emissions remain within the allocation budgets.

The SDA approach is sector specific and is used for high emitting sectors.[8] The SDA uses carbon intensity based on sector specific measures of output. For example, the unit of output for iron and steel companies is "t$CO_2$ per ton crude steel". This allows an understanding of how carbon efficient companies are per unit of output. The SDA approach also sets carbon budgets for specific sectors as a whole, which allows some sectors to decarbonize more slowly where the opportunities for decarbonization are far lower. This is allowed by setting more aggressive targets for sectors with greater scope for decarbonization.

GEVA is applied to lower emitting or heterogeneous business activities. For GEVA, the unit of output used is gross profit. Companies have diverse business activities, most of which do not have distinct transition pathways defined in climate scenarios. For these companies, the methodology applies a contraction in carbon intensity principle under which a company should make emissions reductions. This

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[5] Krabbe, O., Linthorst, G., Blok, K., Crijns-Graus, W., van Vuuren, D., Höhne, N., Pineda, A. C. (2015). Aligning Corporate Greenhouse-Gas Emissions Targets with Climate Goals. Nature Climate Change.
[6] Randers, J. (2012). Greenhouse gas emissions per unit of value added ("GEVA") – A corporate guide to voluntary climate action. Journal Energy Policy.
[7] Science Based Targets Initiative. (2019, April). Science-Based Target Setting Manual, available at https://sciencebasedtargets.org/wp-content/uploads/2017/04/SBTi-manual.pdf.
[8] As referenced in section 5.7.2. of The EU Technical Expert Group on Sustainable Finance. (2019). *TEG Final Report on Climate Benchmarks and Benchmarks' ESG Disclosures,* available at https://ec.europa.eu/info/files/190930-sustainable-finance-teg-final-report-climate-benchmarks-and-disclosures_en.

is consistent with rates required for the overall economy, but from each company's unique base year emissions intensity.

### Trucost's Physical Risk Data

Trucost's Physical Risk dataset[9] allows users to understand the risk and sensitivity of company assets to the physical risks of climate change. Climate modelling datasets and hazard models are overlaid with the asset locations of companies. Sensitivity analysis is carried out for each asset, to assess whether the company's operations would be affected by each specific physical risk, based on the asset type.[10]

These climate modelling datasets and hazard models have been created for each specific physical risk. Physical risk is judged by a score ranging between 1 and 100. The physical risks covered include ; wildfire, cold wave, heatwave, water stress, sea level rise, flood, and hurricanes. The index methodology uses a composite physical risk score that is an average of all physical risk indicators, weighted for company specific sensitivity to each physical risk type.

**Other Trucost Data Used:** GHG emissions, Emissions Disclosure Levels, Green-to-Brown Share, Fossil Fuel Reserves, Power Generation, and Sector Revenues.

Any Trucost data with a financial year five years or more prior to the rebalancing reference date's year is considered as not covered.

*For information on Trucost's methodology, please refer here.*

### Science Based Target Initiative (SBTI)

The Science Based Targets initiative champions science-based target setting as a powerful way of boosting companies' competitive advantage in the transition to a low-carbon economy. The initiative is a collaboration between CDP, World Resources Institute (WRI), the World Wide Fund for Nature (WWF), and the UNGC.

Targets adopted by companies to reduce greenhouse gas (GHG) emissions are considered "science-based" if they are in line with what the latest climate science says is necessary to meet the goals of the Paris Agreement—to limit global warming to well-below 2°C above pre-industrial levels and pursue efforts to limit warming to 1.5°C.

*For more information on the initiative, please refer to https://sciencebasedtargets.org/.*

### S&P Global ESG Scores

S&P Global Sustainable1 calculates the S&P Global ESG Score and derives them from their 'Corporate Sustainability Assessment' (CSA). A company's CSA score is derived using either company-provided data, publicly available information, or a combination thereof..

*For more information on the CSA Process, please refer to https://www.spglobal.com/esg/csa/.*

*For more information on S&P Global ESG Scores, please refer here.*

For the purposes of ESG assessment, companies are assigned to industries defined by S&P Global, and the assessment is largely specific to each industry. S&P Global uses the Global Industry Classification Standard (GICS®) as its starting point for determining industry classification. At the industry group and sector levels, the S&P Global CSA Industries match the standard GICS classifications, but some non-standard aggregations are done at the industry level.

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[9] The 2050 High Climate Scenario is used.

[10] Lord. R, Bullock, S. Birt, M. (2019). 'Understanding Climate Risk at the Asset Level: The Interplay of Transition and Physical Risks'. *https://www.spglobal.com/marketintelligence/en/documents/sp-trucost-interplay-of-transition-and-physical-risk-report-05a.pdf*.

*For information on S&P Global CSA Industry-GICS Sub-Industry Mapping, please see here.*

### 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' Equity Indices Policies & Practices Methodology | Equity Indices Policies & Practices |
| S&P Dow Jones Indices' Index Mathematics Methodology | Index Mathematics Methodology |
| S&P Dow Jones Indices' Float Adjustment Methodology | Float Adjustment Methodology |
| S&P Dow Jones Indices' Global Industry Classification Standard (GICS) Methodology | GICS Methodology |

The methodology is created by S&P Dow Jones Indices to achieve the aforementioned objective of measuring the underlying interest of each index governed by this methodology document. 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.

The Benchmark Administrator for the indices under this methodology is S&P DJI Netherlands B.V.

# Eligibility Criteria

### Index Universe

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

| Index | Underlying Index |
|---|---|
| S&P 500 Net Zero 2050 Paris-Aligned Sustainability Screened Index | S&P 500 |

*For information on an underlying index, please refer to the respective index methodology, available at [www.spglobal.com/spdji/](www.spglobal.com/spdji/).*

### Eligibility Factors

**Carbon Emissions Coverage.** Companies must have GHG emissions data, as provided by Trucost.[11] Any Trucost data with a financial year five years or more prior to the rebalancing reference date's year is considered not covered.

### Exclusions Based on Business Activities

As of each rebalancing reference date, exclude the following:

- companies without coverage
- companies with the following specific business activities:

| S&P Global Business Involvement | S&P Global Category of Involvement and Description | S&P DJI Level of Involvement Threshold | S&P DJI Significant Ownership Threshold |
|---|---|---|---|
| Controversial Weapons | **Customized Weapons**: This screen covers companies involved in the manufacturing of the components of a weapon. These components are intended solely for use in the production and are essential for the functioning of Anti-Personnel Mines, Biological and Chemical Weapons, Blinding Laser Weapons, Cluster Munitions, Depleted Uranium, Incendiary Weapons and Nuclear Weapons. | >0% | ≥25% |
| | **Related Products and Services**: This screen covers companies that supply products and/or services such as stockpiling and transferring, and sales for Anti-Personnel Mines, Biological and Chemical Weapons, Blinding Laser Weapons, Cluster Munitions, Depleted Uranium, Incendiary Weapons and Nuclear Weapons. | >0% | ≥25% |
| Small Arms | **Production of Small Arms Weapons for Civilian Use**: This screen covers companies that are involved in the manufacturing of small arms weapon for civilian use. | >0% | N/A |
| | **Production of Small Arms Weapons for Non-Civilian Use**: This screen covers companies which are involved in the manufacturing of small arms weapon for non-civilian use. | >0% | N/A |
| | **Production of Key components**: This screen covers companies that are involved in the manufacturing of key components for assault weapons. | >0% | N/A |
| | **Retail and Distribution of Small Arms Weapons:** This screen covers companies which are involved in the retail or distribution of small arms weapons for civilian customers. | >0% | N/A |

[11] The data must include all Scope 1, Scope 2, and Scope 3 (upstream and downstream) emissions.

| S&P Global Business Involvement | S&P Global Category of Involvement and Description | S&P DJI Level of Involvement Threshold | S&P DJI Significant Ownership Threshold |
|---|---|---|---|
| Military Contracting | **Integral Military Weapons**: This screen covers companies which are involved in the manufacturing, assembling, sale and transportation of integral military weapons. | ≥5% | N/A |
| | **Weapon-related**: This screen covers companies which are involved in the manufacturing and sales of weapon-related products. | ≥5% | N/A |
| Oil Sands | **Extraction and/or Production**: This screen covers companies that are involved in the extraction and/or production of fossil fuels from oil sands/tar sands. | ≥5% | N/A |
| Shale Oil and Gas | **Extraction and/or Production**: This screen covers companies that are involved in the extraction and/or production of shale oil and gas. | ≥5% | N/A |
| Tobacco | **Production**: The screen covers companies that are involved in the manufacturing of tobacco. | >0% | ≥25% |
| | **Related Products and Services**: The screen covers companies that supply essential products/services for the tobacco industry. | ≥10% | N/A |
| | **Retail and Distribution**: The screen covers companies involved in the retail and/or distribution of tobacco as part of their offerings. | ≥10% | N/A |

Level of Involvement refers to the company's direct exposure to such products, while Significant Ownership indicates where the company has indirect involvement via some specified level of ownership of a subsidiary company with involvement.

*For more information on the S&P Global Business Involvement Screens data set, please refer here.*

### Exclusions Based on Sustainalytics' Global Standards Screening

Sustainalytics' Global Standards Screening (GSS) provides an assessment of a company's impact on stakeholders and the extent to which a company causes, contributes, or is linked to violations of international norms and standards. The basis of the GSS assessments is the United Nations (UN) Global Compact Principles. Information regarding related standards is also provided in the screening, including the Organization for Economic Co-operation and Development (OECD) Guidelines for Multinational Enterprises and the UN Guiding Principles on Business and Human Rights, as well as their underlying conventions.

- Non-Compliant: classification given to companies that do not act in accordance with the UNGC principles and its associated standards, conventions, and treaties.
- Watchlist: classification given to companies that are at risk of violating one or more principles, for which all dimensions for Non-Compliant status could not be established or confirmed.
- Compliant: classification given to companies that act in accordance with the UNGC principles and its associated standards, conventions, and treaties.

As of each rebalancing reference date, exclude the following:

- companies without coverage
- companies classified as Non-Compliant

*Please refer to www.sustainalytics.com for more information.*

### Exclusions Based on Revenue Thresholds in Fossil Fuel Operations and Power Generation

As of each rebalancing reference date, companies are excluded from the eligible universe if the sum of their revenues derived from the relevant Trucost sectors breach the following revenue thresholds:

| Exclusion Type | Trucost Revenue Sectors | Revenue Threshold |
|---|---|---|
| Coal Exploration or Processing | Bituminous Coal and Lignite Surface Mining<br>Bituminous Coal Underground Mining<br>All Other Petroleum and Coal Products Manufacturing | ≥ 1% |

| Exclusion Type | Trucost Revenue Sectors | Revenue Threshold |
|---|---|---|
| | Pipeline Transportation | |
| Oil Exploration or Processing | All Other Petroleum and Coal Products Manufacturing<br>Crude Petroleum and Natural Gas Extraction<br>Drilling Oil and Gas Wells<br>Support Activities for Oil and Gas Operations<br>Petroleum Lubricating Oil and Grease Manufacturing<br>Mining and Oil and Gas Field Machinery Manufacturing<br>Tar Sands Extraction<br>Petroleum Refineries<br>Petrochemical Manufacturing<br>Pipeline Transportation | ≥ 10% |
| Natural Gas Exploration or Processing | Crude Petroleum and Natural Gas Extraction<br>Drilling Oil and Gas Wells<br>Support Activities for Oil and Gas Operations<br>Mining and Oil and Gas Field Machinery Manufacturing<br>Natural Gas Liquid Extraction<br>Natural Gas Distribution<br>Industrial Gas Manufacturing<br>Pipeline Transportation | ≥ 50% |
| Power Generation | Coal Power Generation<br>Petroleum Power Generation<br>Natural Gas Power Generation<br>Biomass Power Generation | ≥ 50% |

These exclusions use a sector revenues dataset from Trucost.

**Controversies: Media and Stakeholder Analysis Overlay**

In addition to the above, S&P Global uses RepRisk for daily filtering, screening, and analysis of ESG risk incidents and controversial activities related to companies within the indices[12].

In cases where risks are presented, S&P Global releases a Media and Stakeholder Analysis (MSA), which includes a range of issues such as economic crime and corruption, fraud, illegal commercial practices, human rights issues, labor disputes, workplace safety, catastrophic accidents, and environmental disasters.

The Index Committee reviews constituents flagged by S&P Global's MSA to evaluate the potential impact of controversial company activities on the composition of the indices. If the Index Committee decides to remove a company in question, that company is ineligible for re-entry into the index for one full calendar year, beginning with the subsequent rebalancing.

*For more information on RepRisk, please refer to [www.reprisk.com](http://www.reprisk.com). This service is not considered a direct contribution to the index construction process.*

**Multiple Classes of Stock**

All publicly listed multiple share class lines are eligible for index inclusion subject to meeting the eligibility criteria. For more information regarding the treatment of multiple share classes, please refer to Approach A within the Multiple Share Classes section of the S&P Dow Jones Indices' Equity Indices Policies & Practices Methodology. All publicly listed multiple share class lines of a company are assigned and assessed using the same S&P Global ESG score.

[12] RepRisk, an ESG data science company, leverages the combination of AI and machine learning with human intelligence to systematically analyze public information in 23 languages and identify material ESG risks. With daily data updates across 100+ ESG risk factors, RepRisk provides consistent, timely, and actionable data for risk management and ESG integration across a company's operations, business relationships, and investments.

# Index Construction

### Constituent Selection

At each rebalancing, the eligible constituents of the underlying index are selected and form the index, subject to the optimization constraints below.

### Constituent Weighting

At each rebalancing reference date, weights are determined to minimize the sum of the squared difference between the parent weight for each constituent (*i*) and its optimized weight, divided by its parent weight, subject to constraints. The objective function is as follows:

$$\text{Minimize } \left(\frac{1}{n}\sum\left[\frac{(Optimized\ Weight_i - Parent\ Weight_i)^2}{Parent\ Weight_i}\right] + \frac{1}{k}\sum\left[\frac{(Optimized\ Sector\ Weight_i - Parent\ Sector\ Weight_i)^2}{Parent\ Sector\ Weight_i}\right] + \frac{1}{m}\sum\left[\frac{(Optimized\ Country\ Weight_i - Parent\ Country\ Weight_i)^2}{Parent\ Country\ Weight_i}\right]\right)$$

### Optimization Constraints

As of each rebalancing reference date, the optimizer will seek to minimize the above objective function while satisfying the criteria that index constituents will have an index weight of at least 0.01%, and all applicable combinations of the below transition risk, physical risk, climate opportunities, and index construction constraints.

### Transition Risk Constraints

| Constraint* | Index | Data Source |
|---|---|---|
| 1.5ºC Climate Scenario Transition Pathway Budget Index Alignment**** | ≤ 0 | Trucost |
| Weighted-average Carbon Intensity (WACI) Target | ≤ underlying WACI × 50% × Buffer** | Trucost |
| 7% Decarbonization Trajectory WACI Target | ≤ AnchorWACI*** × $\frac{(1-7\%)^{(q/4)}}{1+Inf}$ × Buffer**<br><br>where:<br>*q* = number of rebalances since index launch date<br>*Inf* = Enterprise Value Including Cash (EVIC) growth of parent index since index Anchor Date****. | Trucost |
| Weight of Eligible Science Based Targets Companies | ≥ 120% × weight of group in underlying index | Trucost / Science Based Targets Initiative |
| Weighted-average S&P Global ESG Score (waESG)***** | ≥ underlying index waESG after 20% of the lowest ESG scoring stocks by weight are removed and their weight redistributed****** | S&P Global |
| High Climate Impact Sectors Revenue Proportion (HCISRP)**** | ≥ HCISRP of underlying index | Trucost |
| Weight of Non-Disclosing Carbon Companies | ≤ 110% × weight in underlying index | Trucost |
| Fossil Fuel Reserves (FFR)**** | ≤ 20% × FFR of underlying index | Trucost |

* Constraints are defined in *Constraint-Related Definitions* below.
** Where Buffer = 95% to represent a 5% margin to allow for drift between targeted and realized WACI.
*** WACI of index on the index's Anchor Date.[12] Prior to launch date, the 7% Decarbonization Trajectory WACI Target was reset to the index Anchor Date. Prior to launch, the 7% decarbonization Trajectory WACI Target was calculated based on the index's First Value Date.

**** The ‘Anchor Date’ is the date of the reference index composition and base carbon intensity calculation used to determine the index’s decarbonization trajectory. It is the rebalancing reference date for the most recent index rebalancing prior to the index's launch date. Please see *Appendix II* for more details on the ‘Anchor Date’.
***** For details about treatment of companies without Transition Pathway Alignment, S&P Global ESG Score, Sector Revenues, or Fossil Fuel Reserves please see *Appendix III*.
****** Companies without an S&P Global ESG Score are excluded from the calculation.

### Physical Risk Constraints

| Constraint | Index | Data Source |
|---|---|---|
| Weighted-average Physical Risk Score (waPR)* | ≤ 90% × waPR of underlying index | Trucost |
| Physical Risk Max Company Weight | $\leq A_i * Parent\ Weight_i$<br>where:<br>$A_i = \rho * \frac{PR_i - 100}{PR_i - 10}$<br>$PR_i$ = Physical Risk score of the company $i$<br>$\rho = \frac{Physical\ Risk\ Score\ 95th\ percentile - 10}{Physical\ Risk\ Score\ 95th\ percentile - 100}$<br>See *Appendix I* for more details. (This constraint is only applied to companies with a PR such that $A_i \leq 4$. And a Physical Risk Score higher than 10) | Trucost |

* For details about treatment of companies without Physical Risk Score, please see *Appendix III*.

### Climate Opportunities Constraint

| Constraint | Index | Data Source |
|---|---|---|
| Green-to-Brown Revenue Share (GBR)* | ⩾ 4 × GBR of underlying index | Trucost |

* For details about treatment of companies without Physical Risk Score, please see *Appendix III*.

### Index Construction Constraints

| Constraint | Index |
|---|---|
| Diversification Relative Company Weight | ± 2% from underlying index company weight |
| Diversification Absolute Max Company Weight | ≤ 20 x company weight in underlying index |
| Liquidity Max Stock Weight | $\leq \frac{\text{Hypothetical Days to Buy/Sell} \times \text{Daily Participation} \times \text{Liquidity}_i}{\text{Notional Portfolio Size}}$<br>where*:*<br>Hypothetical Days to Buy/Sell = 5<br>Daily Participation = 10%<br>Liquidity = 3-month Median Daily Value Traded of constituent *i* in U.S. dollars<br>Notional Portfolio Size = 1bn in U.S. dollars |
| Minimum Stock Weight Lower Threshold | ≥ max(0.01%, min(0.05%, 0.5 x stock weight in underlying index)) for new constituents<br>≥ 0.01% for existing constituents[13] |

### Constraint Relaxation Hierarchy

- If the optimization fails to find a solution, the optimizer partially relaxes each 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

[13] Constraints relating to only existing constituents do not apply to the historical rebalance on the index ‘Anchor Date’. Please see *Appendix II* for more details on the ‘Anchor Date’.

- Weighted-average S&P Global ESG Score
- Weighted-average Physical Risk Score
- Weight of Non-Disclosing Carbon Companies
- Diversification Absolute Max Stock Weight
- Diversification Relative Stock Weight
- Liquidity Max Stock Weight
- Fossil Fuel Reserves
- Physical Risk Max Stock Weight
- Green-to-Brown Revenue Share
- 1.5ºC Climate Scenario Transition Pathway Budget Index Alignment

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

- Weighted-average Carbon Intensity (WACI) Target
- 7% Decarbonization Trajectory WACI Target
- High Climate Impact Sectors Revenue Proportion
- Weight of Eligible Science Based Targets Companies

**Constraint-Related Definitions**

**1.5ºC Climate Scenario Transition Pathway Budget Index Alignment**

The alignment of the index[14] is calculated as follows:

$$\sum \mathrm{w_i} \times \frac{\mathrm{Winsorized\ TPBA}_i}{\mathrm{EVIC_i}}$$

where:

| | |
|---|---|
| $w_i$ | = Weight of the company $i$ in the index |
| $EVIC_i$ | = Enterprise value including cash of the company $i$ |

The Transition Pathway Budget Alignment (TPBA) of each company *i* is calculated as the sum of the difference between a company's carbon budget and emissions (either realized or predicted) both using history and future projections. A TPBA of 0 would be compatible with a 1.5ºC climate scenario, a budget below 0 would be compatible with better than a 1.5ºC climate scenario and a budget above 0 would not be compatible with a 1.5ºC climate scenario.

This metric is calculated using the GHG emissions dataset and the 1.5ºC Climate Transition Pathway Model Scenario dataset provided by Trucost.

**Weighted-Average Carbon Intensity (WACI)**

$$\sum \mathrm{w_i} \times \frac{\mathrm{GHG1_i + GHG2_i + GHG3_i}}{\mathrm{EVIC_i}}$$

[14] For history prior to May 2020, only the realized GHG data available at that point-in-time was used in the calculation of the Transition Pathway Budget Alignment (i.e., Predicted GHG was included from June 2020 onwards).

where:

$w_i$ = Weight of the company $i$ in the index

$GHG1_i$ = Scope 1 GHG emissions in $tCO_2e$ for the company $i$

$GHG2_i$ = Scope 2 GHG emissions in $tCO_2e$ for the company $i$

$GHG3_i$ = Scope 3 (upstream and downstream) GHG emissions in $tCO_2e$ for the company $i$[15]

$EVIC_i$ = Enterprise value including cash of the company $i$

This metric is calculated using the GHG emissions dataset provided by Trucost.

**Eligible Science Based Targets**

Eligible Science Based Targets Companies are those companies with publicly disclosed near-term targets from the Science Based Targets Initiative (SBTI), subject to the following conditions:

1. The target is publicly disclosed and is 1.5ºC aligned
2. The targets set include all Scope 1, Scope 2 and Scope 3 (upstream and downstream) emissions
3. The company discloses their Scope 1, Scope 2 and Scope 3 emissions sufficiently
4. Companies must show a 7% decarbonization year-on-year, for the past 3 years
5. Companies' targets must represent an annualized decarbonization rate of 7% when accounting for Scopes 1, 2, and 3 (upstream and downstream) targets assuming the companies' current composition of emissions.

This metric is calculated using the GHG emissions dataset and the 1.5ºC Climate Transition Pathway Model Scenario dataset provided by Trucost, and the register of approved science-based company targets from the SBTI.

**High Climate Impact Sectors Revenue Proportion (HCISRP)**

$$\frac{\sum w_i \times \frac{HCISR_i}{EVIC_i}}{\sum w_i \times \frac{TR_i}{EVIC_i}}$$

where:

$w_i$ = Weight of the company $i$ in the index

$HCISR_i$ = Revenue of the company $i$ derived from High Climate Impact Sectors

$TR_i$ = Total revenue of the company $i$

$EVIC_i$ = Enterprise value including cash of the company $i$

High Climate Impact Sectors are defined by the follow NACE sections:

- Agriculture, Forestry and Fishing
- Mining and Quarrying
- Manufacturing
- Electricity, Gas, Steam and Air Conditioning Supply
- Water Supply; Sewerage, Waste Management and Remediation Activities

[15] Prior to the anchor date only Scope 1 and Scope 2 data was used in this calculation.

- Construction
- Wholesale and Retail Trade; Repair of Motor Vehicles and Motorcycles
- Transportation and Storage
- Real Estate Activities

NACE sections have been mapped to Trucost Sectors. This metric is calculated using the sector revenues dataset provided by Trucost.

*For more information on High Climate Impact Sectors, including the classification of Trucost revenue sectors as either 'high' or 'low' climate impact sectors, please refer to the Trucost Climate Impact Sectors Classification.*

**Non-Disclosing Carbon Companies**

Non-disclosing carbon companies are those companies identified by Trucost as having insufficiently disclosed their GHG emissions (expressed in $CO_2$ equivalents). A 'Disclosed' status is achieved when Trucost identifies companies as having full or partial disclosure in its largest GHG emissions scope in absolute emissions terms (between scope 1 and 2).

This metric is calculated using the GHG emissions disclosure level dataset provided by Trucost.

**Fossil Fuel Reserves (FFR)**

$$\sum \mathrm{w_i} \times \frac{\text{Fossil Fuel Reserves}_\mathrm{i}}{\mathrm{EVIC_i}}$$

where:

| | |
|---|---|
| $w_i$ | = Weight of the company $i$ in the index |
| $Fossil\ Fuel\ Reserves_i$ | = The embedded emissions ($tCO_2$) within the fossil fuel reserves owned by company $i$ |
| $EVIC_i$ | = Enterprise value including cash of the company $i$ |

This metric is calculated using the fossil fuel reserves dataset provided by Trucost.

**Green-to-Brown Revenue Share (GBR)**

$$\frac{\sum w_i \times \frac{GR_i}{EVIC_i}}{\sum w_i \times \frac{BR_i}{EVIC_i}}$$

where:

$w_i$ = Weight of the company $i$ in the index

$GR_i$ = Revenue of the company $i$ derived from Green Sectors

$BR_i$ = Revenue of the company $i$ derived from Brown Sectors

$EVIC_i$ = Enterprise value including cash of the company $i$

S&P DJI defines Green Sectors as the following Trucost Sectors:

- Nuclear Electric Power Generation
- Biomass Power Generation

- Geothermal Power Generation
- Hydroelectric Power Generation
- Solar Power Generation
- Wave & Tidal Power Generation
- Wind Power Generation

S&P DJI defines Brown Sectors as the following Trucost Sectors:

- Coal Power Generation
- Petroleum Power Generation
- Natural Gas Power Generation

This metric is calculated using the sector revenues dataset provided by Trucost.

*For information on Trucost's methodology, please refer here.*

**Index Calculations**

The index calculates by means of the divisor methodology used in all S&P Dow Jones Indices' equity indices.

*For more information on the index calculation methodology, please refer to the Non-Market Capitalization Weighted Indices and Capped Market Capitalization Weighted Indices sections, respectively, of S&P Dow Jones Indices' Index Mathematics Methodology.*

# Index Maintenance

**Rebalancing**

The index rebalances quarterly, effective after the close of the third Friday of March, June, September, and December. The rebalancing reference date for each rebalance is the third Friday of the prior month.

As part of the rebalancing process, constituent stock weights are updated. Weights calculated as a result of the reference date data are implemented in the index using closing prices seven business days prior to the rebalancing effective date.

S&P Dow Jones Indices monitors UNGC compliance on best effort basis until the initial announcement of the rebalancing results. If a company's UNGC compliance status changes any time prior to the rebalancing results announcement and no longer qualifies for the index S&P Dow Jones Indices may, at its discretion, exclude the company in conjunction with the rebalancing.

**Ongoing Maintenance**

Index constituents are drawn from the underlying index. Specific changes to index constituents, such as share changes, Investable Weight Factor (IWF) changes, dividend distributions, and price adjustments, follow the policies of the underlying index.

*For more information on Share Updates, Float Adjustment, and IWFs, please refer to S&P Dow Jones Indices' Equity Indices Policies & Practices Methodology and S&P Dow Jones Indices' Float Adjustment Methodology.*

The index is reviewed on an ongoing basis to account for corporate events such as mergers, takeovers, delistings, suspensions, spin-offs/demergers, or bankruptcies. Changes to index composition and related weight adjustments are made as soon as they are effective. These changes are typically announced prior to the implementation date.

**Quarterly Updates**

Changes to a constituent's shares and IWF as a result of the quarterly updates are effective after the close on the third Friday in March, June, September, and December.

**Additions and Deletions**

**Additions.** Except for spin-offs, no stocks are added to the index between rebalance dates.

**Spin-offs.** Spin-offs are added to the index where the parent security is a constituent at a zero price at the market close of the day before the ex-date (with no divisor adjustment) and are removed after at least one day of regular way trading (with a divisor adjustment).

**Deletions.** If a stock is dropped from the underlying index, it is also removed from the index simultaneously. Between rebalancings, a stock can be deleted from the index due to corporate events such as mergers, takeovers, delistings, suspensions, spin-offs/demergers, or bankruptcies.

In addition, at the discretion of the Index Committee, a deletion may occur if an MSA is raised.

**Corporate Actions**

For more information on Corporate Actions, please refer to the S&P Dow Jones Indices' Equity Indices Policies & Practices Methodology.

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

The index is calculated in euros and U.S. dollars.

WMR foreign exchange rates are taken daily at 4:00 PM London Time and used in the calculation of the indices. These mid-market fixings are calculated by WMR based on LSEG data and appear on LSEG pages.

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 the *S&P DJI Methodology & Regulatory Status Database*.

*For information on various index calculations, 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/.*

**Base Dates and History Availability**

Index history availability, base dates, and base values are shown in the table below.

| Index | Launch Date | First Value Date | Base Date | Base Value |
|---|---|---|---|---|
| S&P 500 Net Zero 2050 Paris-Aligned Sustainability Screened Index | 03/08/2021 | 12/31/2016 | 12/31/2016 | 1000 |

# Index Data

**Calculation Return Types**

S&P Dow Jones Indices calculates multiple return types which vary based on the treatment of regular cash dividends. The classification of regular cash dividends is determined by S&P Dow Jones Indices.

- Price Return (PR) versions are calculated without adjustments for regular cash dividends.
- Gross Total Return (TR) versions reinvest regular cash dividends at the close on the ex-date without consideration for withholding taxes.
- Net Total Return (NTR) versions, if available, reinvest regular cash dividends at the close on the ex-date after the deduction of applicable withholding taxes.

In the event there are no regular cash dividends on the ex-date, the daily performance of all three indices will be identical.

For a complete list of indices available, please refer to the daily index levels file (".SDL").

*For more information on the classification of regular versus special cash dividends as well as the tax rates used in the calculation of net return, please refer to S&P Dow Jones Indices' Equity Indices Policies & Practices Methodology*.

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

# Index Governance

**Index Committee**

An Index Committee manages the indices. The Index Committee meets regularly. At each meeting, the Index Committee reviews pending corporate actions that may affect index constituents, statistics comparing the composition of the index to the market, companies that are being considered as candidates for addition to the index, and any significant market events. In addition, the Index Committee may revise index policy covering rules for selecting companies, treatment of dividends, share counts 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.

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' Equity Indices Policies & Practices Methodology*.

# Index Policy

**Announcements**

All index constituents are evaluated daily for data needed to calculate index levels and returns. All events affecting the daily index calculation are typically announced in advance via the Index Corporate Events report (.SDE), delivered daily to all clients. Any unusual treatment of a corporate action or short notice of an event may be communicated via email to clients.

**Pro-forma Files**

In addition to the corporate events file (.SDE), S&P Dow Jones Indices provides constituent pro-forma files each time the indices rebalance. The pro-forma file is typically provided daily in advance of the rebalancing date and contains all constituents as well as their corresponding weights and index shares effective for the upcoming rebalancing.

*Please visit www.spglobal.com/spdji/ for a complete schedule of rebalancing timelines and pro-forma delivery times.*

**Holiday Schedule**

The index is calculated daily, throughout the calendar year. The only days an index is not calculated are on days when all exchanges where an index's constituents are listed are officially closed or if WMR exchange rates services are not published.

A complete holiday schedule for the year is available at *www.spglobal.com/spdji/*.

**Rebalancing**

The Index Committee may change the date of a given rebalancing for reasons including market holidays occurring on or around the scheduled rebalancing date. Any such change will be announced with proper advance notice where possible.

**Unexpected Exchange Closures**

For information on Unexpected Exchange Closures, please refer to S&P Dow Jones Indices' Equity Indices Policies & Practices Methodology.

**Recalculation Policy**

For information on the recalculation policy, please refer to S&P Dow Jones Indices' Equity Indices Policies & Practices Methodology.

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

**Contact Information**

For any questions regarding an index, please contact: index_services@spglobal.com.

# Index Dissemination

Index levels are available through S&P Dow Jones Indices' Web site at [www.spglobal.com/spdji/](www.spglobal.com/spdji/), major quote vendors (see codes below), 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 | Return Type | BBG | RIC |
|---|---|---|---|
| S&P 500 Net Zero 2050 Paris-Aligned Sustainability Screened Index (EUR) | Price Return<br>Total Return<br>Net Total Return | SPPACSEP<br>SPPACSET<br>SPPACSEN | .SPPACSEP<br>.SPPACSET<br>.SPPACSEN |
| S&P 500 Net Zero 2050 Paris-Aligned Sustainability Screened Index (USD) | Price Return<br>Total Return<br>Net Total Return | SPPACSUP<br>SPPACSUT<br>SPPACSUN | .SPPACSUP<br>.SPPACSUT<br>.SPPACSUN |

### Index Data

Daily constituent and index level data are available via subscription.

*For product information, please contact S&P Dow Jones Indices, www.spglobal.com/spdji/en/contact-us.*

### Website

*For further information, please refer to S&P Dow Jones Indices' Web site at www.spglobal.com/spdji/.*

# Appendix I

**Physical Risk Max Stock Weight Constraint**

This constraint is designed to avoid excessively overweighting companies with high physical risk score. The constraint is applied in proportion to the weight in the parent index.

$$Strategy\ Weight_i \leq A_i * Parent\ Weight_i$$

where:

$$A_i = \rho * \frac{Physical\ Risk\ Score_i - 100}{Physical\ Risk\ Score_i - 10},$$

and $\rho = \frac{Physical\ Risk\ Score\ 95th\ percentile - 10}{Physical\ Risk\ Score\ 95th\ percentile - 100}$

where $Physical\ Risk\ Score\ 95th\ percentile$ is the Physical Risk Score value greater than that of 95% of the parent index.

This constraint is only applied to companies that have a Physical Risk Score higher than 10 and such that $A_i \leq 4$.

Any stock with Physical Risk value greater than $Physical\ Risk\ Score\ 95th\ percentile$ cannot have a weight greater than its parent index weight ($A_i \leq 1$). If the Physical Risk score is 100, $A_i$ will be zero.

For example, for the indices where the 95th percentile Physical risk value for the stocks in the universe is 40, if a company has a Physical Score of 30 and a weight in the parent of 2%, the maximal allowed weight in the index is 2%*1.75 = 3.5%. If instead its Physical Risk Score were 70 the maximum allowed weight would be 2%*0.25 = 0.5%.

The following table shows the values of the multiplier $A$ for each Physical Risk Score rounded to the third decimal point, for when the 95th percentile Physical risk value for the stocks in the universe is 40.

| Physical Risk Score | $A$ | Physical Risk Score | $A$ | Physical Risk Score | $A$ | Physical Risk Score | $A$ |
|---|---|---|---|---|---|---|---|
| 20 | 4.000 | 40 | 1.000 | 60 | 0.400 | 80 | 0.143 |
| 21 | 3.591 | 41 | 0.952 | 61 | 0.382 | 81 | 0.134 |
| 22 | 3.250 | 42 | 0.906 | 62 | 0.365 | 82 | 0.125 |
| 23 | 2.962 | 43 | 0.864 | 63 | 0.349 | 83 | 0.116 |
| 24 | 2.714 | 44 | 0.824 | 64 | 0.333 | 84 | 0.108 |
| 25 | 2.500 | 45 | 0.786 | 65 | 0.318 | 85 | 0.100 |
| 26 | 2.313 | 46 | 0.750 | 66 | 0.304 | 86 | 0.092 |
| 27 | 2.147 | 47 | 0.716 | 67 | 0.289 | 87 | 0.084 |
| 28 | 2.000 | 48 | 0.684 | 68 | 0.276 | 88 | 0.077 |
| 29 | 1.868 | 49 | 0.654 | 69 | 0.263 | 89 | 0.070 |
| 30 | 1.750 | 50 | 0.625 | 70 | 0.250 | 90 | 0.063 |
| 31 | 1.643 | 51 | 0.598 | 71 | 0.238 | 91 | 0.056 |
| 32 | 1.545 | 52 | 0.571 | 72 | 0.226 | 92 | 0.049 |

| Physical Risk Score | *A* | Physical Risk Score | *A* | Physical Risk Score | *A* | Physical Risk Score | *A* |
|---|---|---|---|---|---|---|---|
| 33 | 1.457 | 53 | 0.547 | 73 | 0.214 | 93 | 0.042 |
| 34 | 1.375 | 54 | 0.523 | 74 | 0.203 | 94 | 0.036 |
| 35 | 1.300 | 55 | 0.500 | 75 | 0.192 | 95 | 0.029 |
| 36 | 1.231 | 56 | 0.478 | 76 | 0.182 | 96 | 0.023 |
| 37 | 1.167 | 57 | 0.457 | 77 | 0.172 | 97 | 0.017 |
| 38 | 1.107 | 58 | 0.438 | 78 | 0.162 | 98 | 0.011 |
| 39 | 1.052 | 59 | 0.418 | 79 | 0.152 | 99 | 0.006 |
| | | | | | | 100 | 0.000 |

# Appendix II

**Index Anchor Date of Decarbonization Trajectory**

The index ‘Anchor Date’ is the date of the reference index composition and base carbon intensity calculation used to determine the index’s decarbonization trajectory. It is the rebalancing reference date for the most recent index rebalancing prior to the index's launch date.

Prior to the index ‘Anchor Date’ the index ‘First Value Date’ is used to determine the index’s decarbonization trajectory.

| Index | First Value Date | Anchor Date | Launch Date |
|---|---|---|---|
| S&P 500 Net Zero 2050 Paris-Aligned Sustainability Screened Index | 12/31/2016 | 11/30/2020 | 03/08/2021 |

# Appendix III

**Data Coverage Treatment**

For companies without coverage for the data points described below, values are assigned according to the following table:

| Data | Value Assigned |
|---|---|
| Transition Pathway | The index's 1.5ºC Climate Scenario Transition Pathway Budget Index Alignment |
| Physical Risk | The underlying index's Weighted-average Physical Risk Score |
| Green-to-Brown Share | 0 |
| Fossil Fuel Reserves | 0 |
| Sector Revenues | 0 |
| S&P Global ESG Score | The underlying index’s waESG after excluding companies without an S&P Global ESG Score from the calculation |

# Appendix IV

### Methodology Changes

Methodology changes since March 8, 2021, are as follows:

| Change | Effective Date (After Close) | Methodology Previous | Updated |
|---|---|---|---|
| Exclusions Based on Business Activities:<br><br>Data Provider | 06/21/2024 | Sustainalytics provides the data for exclusions based on business activities. | S&P Global provides the data for exclusions based on business activities. |
| ESG Score Data | 06/21/2024 | The index uses S&P DJI ESG Scores as part of the constituent selection process. | The index uses S&P Global ESG Scores as part of the constituent selection process. |
| Eligibility Factors:<br><br>Carbon Emissions Coverage | 03/15/2024 | -- | Carbon Emissions Coverage: Must have GHG emissions data, as provided by Trucost . Any Trucost data with a financial year five years or more prior to the rebalancing reference date's year is considered not covered. |
| Rebalancing | 09/15/2023 | The indices rebalance quarterly, effective after the close of the last business day of March, June, September, and December. The rebalancing reference date for each rebalance is the last trading day of the prior month | The indices rebalance quarterly, effective after the close of the third Friday of March, June, September, and December. The rebalancing reference date for each rebalance is the third Friday of the prior month. |
| Exclusions based on Business Activities | 06/30/2023 | Tobacco: Significant Ownership (related products/services): ≥25% Ownership of Company;<br>Tobacco: Significant Ownership (retail): ≥25% Ownership of Company;<br>Small Arms: Level of Involvement Threshold (Military/Law Enforcement Customers): N/A;<br>Military Contracting: Level of Involvement Threshold (Weapons): N/A;<br>Military Contracting: Level of Involvement Threshold (Weapon Related Products/Services): N/A. | Tobacco: Significant Ownership (related products/services): N/A;<br>Tobacco: Significant Ownership (retail): N/A;<br>Small Arms: Level of Involvement Threshold (Military/Law Enforcement Customers): >0%;<br>Military Contracting: Level of Involvement Threshold (Weapons): ≥5% Revenues;<br>Military Contracting: Level of Involvement Threshold (Weapon Related Products/Services): ≥5% Revenues. |
| Transition Risk Constraints - Weighted-average S&P DJI ESG Score (waESG) | 06/30/2023 | Weighted-average S&P DJI Environmental Score (waE) $\geqslant$ of eligible waE + (20% × (max E score in eligible – eligible waE)). | ≥ underlying index waESG after 20% of the lowest ESG scoring stocks by weight are removed and their weight redistributed. |
| Diversification Relative Stock Weight | 03/31/2022 | ± 2% from underlying index **stock** weight | ± 2% from underlying index **company** weight |
| Diversification Absolute Max Stock Weight | 03/31/2022 | ≤ 20 x **stock** weight in underlying index | ≤ 20 x company weight in underlying index |
| Physical Risk Constraint: | 03/31/2022 | $\rho = -0.5$<br>Constraint is applied at the **stock** level | $\rho = \frac{Physical\ Risk\ Score\ 95th\ percentile - 10}{Physical\ Risk\ Score\ 95th\ percentile - 100}$<br>Constraint is applied at the **company** level |

| Change | Effective Date (After Close) | Methodology: Previous | Methodology: Updated |
|---|---|---|---|
| Objective Function | 03/31/2022 | $\text{Minimize}\left(\sum\frac{(Parent\ Weight_i - Optimized\ Weight_i)^2}{Parent\ Weight_i}\right)$ | $\text{Minimize}\left(\frac{1}{n}\sum\left[\frac{(Optimized\ Weight_i - Parent\ Weight_i)^2}{Parent\ Weight_i}\right] + \frac{1}{k}\sum\left[\frac{(Optimized\ Sector\ Weight_i - Parent\ Sector\ Weight_i)^2}{Parent\ Sector\ Weight_i}\right] + \frac{1}{m}\sum\left[\frac{(Optimized\ Country\ Weight_i - Parent\ Country\ Weight_i)^2}{Parent\ Country\ Weight_i}\right]\right)$ |
| Index Name:<br><br>S&P 500 Net Zero 2050 Paris-Aligned Sustainability Screened Index | 06/26/2021 | The index name is S&P 500 Paris-Aligned Climate Sustainability Screened Index. | The index name is S&P 500 Net Zero 2050 Paris-Aligned Sustainability Screened Index. |

# Appendix V

**Indices in this Methodology Employing Backward Data Assumption**

S&P 500 Net Zero 2050 Paris-Aligned Sustainability Screened Index

**Backward Data Assumption**

The index employs 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.

| Data Provider | Designated Dataset | Live Data Reference Date | Live Data Effective Date |
|---|---|---|---|
| Trucost | Physical Risk | 2/28/2020 | 3/31/2020 |
| Sustainalytics | Business Activity Exclusions | 2/28/2020 | 3/31/2020 |

The Live Data Reference Date refers to the first rebalancing reference date from which only actual live data is used.

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

**Historical Coverage Assessment per Designated Dataset**

**Trucost Physical Risk Coverage** (with respect to underlying index universe)**:**

S&P 500 Net Zero 2050 Paris-Aligned Sustainability Screened Index

| Rebalancing | Underlying Index | Point-in-Time Data | | After Using the Data Assumption | |
|---|---|---|---|---|---|
| Date | Stock Count | Stock Count | Index Weight | Stock Count | Index Weight |
| 2016 | 505 | 0 | 0% | 502 | 99.7% |
| 2017 | 505 | 0 | 0% | 504 | 99.9% |
| 2018 | 505 | 0 | 0% | 504 | 99.9% |
| 2019 | 505 | 0 | 0% | 504 | 99.9% |
| 2020 | 505 | 500 | 99.7% | n/a | n/a |

**Sustainalytics Business Activity Exclusions Coverage** (with respect to underlying index universe)**:**

S&P 500 Net Zero 2050 Paris-Aligned Sustainability Screened Index

| Rebalancing Date | Underlying Index Stock Count | Point-in-Time Data | | After Using the Data Assumption | |
|---|---|---|---|---|---|
| | | Stock Count | Index Weight | Stock Count | Index Weight |
| 2016 | 505 | 504 | 100% | 505 | 100% |
| 2017 | 505 | 504 | 100% | 505 | 100% |
| 2018 | 505 | 504 | 100% | 505 | 100% |
| 2019 | 505 | 505 | 100% | 505 | 100% |
| 2020 | 505 | 505 | 100% | n/a | n/a |

Coverage for each Sustainalytics Category of Involvement may differ due to the initiation of coverage for each sub-dataset. Actual live data coverage for each sub-dataset is therefore zero before its respective Coverage Initiation Date provided below:

| Sustainalytics Category of Involvement | Coverage Initiation Date |
|---|---|
| Controversial Weapons: Tailor-made and Essential | 12/31/2012 |
| Controversial Weapons: Non Tailor-made or Non-Essential | 12/31/2012 |
| Controversial Weapons: Significant ownership (Tailor-made and Essential) | 12/31/2018 |
| Controversial Weapons: Significant ownership (Non Tailor-made and Non-Essential) | 12/31/2018 |
| Tobacco: Production | 12/31/2012 |
| Tobacco: Related Products/Services | 12/31/2012 |
| Tobacco: Retail | 12/31/2012 |
| Tobacco: Significant ownership (production) | 12/31/2018 |
| Tobacco: Significant ownership (related products/services) | 12/31/2018 |
| Tobacco: Significant ownership (retail) | 12/31/2018 |
| Oil Sands: Extraction | 12/31/2016 |
| Shale Energy: Extraction | 12/31/2016 |
| Small Arms: Civilian customers (Assault weapons) | 12/31/2012 |
| Small Arms: Civilian customers (Non-assault weapons) | 12/31/2018 |
| Small Arms: Key components | 12/31/2015 |
| Small Arms: Retail/distribution (Assault weapons) | 12/31/2013 |
| Small Arms: Retail/distribution (Non-assault weapons) | 12/31/2018 |

# Appendix VI

### ESG Disclosures

<table>
<tr><th colspan="5">EXPLANATION OF HOW ENVIRONMENTAL, SOCIAL & GOVERNANCE (ESG) FACTORS ARE REFLECTED IN THE KEY ELEMENTS OF THE BENCHMARK METHODOLOGY[16]</th></tr>
<tr><td>1.</td><td>Name of the benchmark administrator.</td><td colspan="3">S&P DJI Netherlands B.V.</td></tr>
<tr><td>2.</td><td>Underlying asset class of the ESG benchmark.[17]</td><td colspan="3">Equity</td></tr>
<tr><td>3.</td><td>Name of the S&P Dow Jones Indices benchmark or family of benchmarks.</td><td colspan="3">S&P Paris-Aligned & Climate Transition (PACT) Index Family Benchmark Statement</td></tr>
<tr><td>4.</td><td>Do any of the indices maintained by this methodology take into account ESG factors?</td><td colspan="3">Yes</td></tr>
<tr><td>5.</td><td>If the response to (4) is “Yes,” the indices stated here take into account ESG factors.</td><td colspan="3">For a list of the benchmarks within this family that take in account ESG factors, please refer to the S&P DJI Methodology & Regulatory Database.</td></tr>
<tr><td>6.</td><td colspan="4">Where the response to (4) is ‘Yes’, the section below lists those ESG factors that are taken into account by the ESG indices governed by the methodology, including those ESG factors listed in Annex II to Delegated Regulation (EU) 2020/1816.</td></tr>
<tr><td colspan="2" rowspan="3">6.a<br>List of environmental factors considered</td><td><u>ESG Factor[18]</u></td><td><u>S&P DJI ESG Factor</u></td><td><u>Comment</u></td></tr>
<tr><td>Exposure of the benchmark portfolio to climate-related physical risks, measuring the effects of extreme weather events on companies’ operations and production or on the different stages of the supply chain (based on issuer exposure) (voluntary).</td><td>Physical Risk Constraint: Weighted-average Physical Risk Score; Physical Risk Max Stock Weight</td><td>Weighting. For more information, please refer to the ‘Index Construction’ section of the methodology.</td></tr>
<tr><td>Weighted average ESG rating of the benchmark (voluntary).</td><td>Transition Risk Constraints: Weighted-average S&Global ESG Score</td><td>Weighting. For more information, please refer to the ‘Index</td></tr>
</table>

[16] 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].

[17] 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.

[18] ‘ESG factors’ are defined in Annex II of 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.

| EXPLANATION OF HOW ENVIRONMENTAL, SOCIAL & GOVERNANCE (ESG) FACTORS ARE REFLECTED IN THE KEY ELEMENTS OF THE BENCHMARK METHODOLOGY[16] | | | |
|---|---|---|---|
| | | | *Construction'* section of the methodology. |
| | Degree of exposure of the portfolio to the sectors listed in Sections A to H and Section L of Annex I to Regulation (EC) No 1893/2006 of the European Parliament and of the Council as a percentage of the total weight in the portfolio. | Transition Risk Constraints: *High Climate Impact Sectors Revenue Proportion (HCISRP)* | Weighting. For more information, please refer to the *'Index Construction'* section of the methodology. |
| | Greenhouse gas (GHG) intensity of the benchmark. | Transition Risk Constraints: *Weighted-average Carbon Intensity (WACI) Target; 7% Decarbonization Trajectory WACI Target* | Weighting. For more information, please refer to the *'Index Construction'* section of the methodology. |
| | Percentage of GHG emissions reported versus estimated. | Transition Risk Constraints: *Weight of Non-Disclosing Carbon Companies* | Weighting. For more information, please refer to the *'Index Construction'* section of the methodology. |
| | N/A | Transition Risk Constraints: *Fossil Fuel Reserves* | Weighting. For more information, please refer to the *'Index Construction'* section of the methodology. |
| | N/A | Transition Risk Constraints: *1.5°C Climate Scenario Transition Pathway Budget Index Alignment* | Weighting. For more information, please refer to the *'Index Construction'* section of the methodology. |
| | N/A | Transition Risk Constraints: *Eligible Science Based Targets Companies* | Weighting. For more information, please refer to the *'Index Construction'* section of the methodology. |
| | N/A | Climate Opportunities Constraints: *Green-to-Brown Revenue Share (GBR)* | Weighting. For more information, please refer to the *'Index Construction'* section of the methodology. |
| | N/A | Fossil Fuel Operations and Power Generation | Exclusion. For more information, please refer to the *'Eligibility Criteria'* section of the methodology. |
| | N/A | Business Activities: *Oil Sands* | Exclusion. For more information, please refer to the *'Eligibility Criteria'* section of the methodology. |
| | N/A | Business Activities: *Shale Oil and Gas* | Exclusion. For more information, please refer to the *'Eligibility Criteria'* section of the methodology. |
| | N/A | Controversies Monitoring: Media and Stakeholder Analysis | Exclusion. For more information, please refer to the *'Eligibility* |

| EXPLANATION OF HOW ENVIRONMENTAL, SOCIAL & GOVERNANCE (ESG) FACTORS ARE REFLECTED IN THE KEY ELEMENTS OF THE BENCHMARK METHODOLOGY[16] | | | |
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| | | | *Criteria'* section of the methodology. |
| | International treaties and conventions, United Nations principles or, where applicable, national law used in order to determine what constitutes a 'controversial weapon'. | Business Activities: *Controversial Weapons* | Exclusion. For more information, please refer to the *'Eligibility Criteria'* section of the methodology. |
| | Weighted average percentage of benchmark constituents in the controversial weapons sector. | Business Activities: *Controversial Weapons* | Exclusion. For more information, please refer to the *'Eligibility Criteria'* section of the methodology. |
| | Weighted average percentage of benchmark constituents in the tobacco sector. | Business Activities: *Tobacco* | Exclusion. For more information, please refer to the *'Eligibility Criteria'* section of the methodology. |
| **6.b**<br>**List of social factors considered.** | Number of benchmark constituents subject to social violations (absolute number and relative divided by all benchmark constituents), as referred to in international treaties and conventions, United Nations principles and, where applicable, national law. | UNGG Non-Compliant Companies | Exclusion. For more information, please refer to the *'Eligibility Criteria'* section of the methodology. |
| | N/A | Business Activities: *Small Arms* | Exclusion. For more information, please refer to the *'Eligibility Criteria'* section of the methodology. |
| | N/A | Business Activities: *Military Contracting* | Exclusion. For more information, please refer to the *'Eligibility Criteria'* section of the methodology. |
| | N/A | Controversies Monitoring: Media and Stakeholder Analysis | Exclusion. For more information, please refer to the *'Eligibility Criteria'* section of the methodology. |
| **6.c**<br>**List of governance factors considered.** | N/A | Controversies Monitoring: Media and Stakeholder Analysis | Exclusion. For more information, please refer to the *'Eligibility Criteria'* section of the methodology. |
| **7.** | **Data and standards used.** | | |
| **7.a** | **Data sources, verification and quality of data.** | The datasets are defined as either:<br>- <u>Reported</u>: All data in the dataset are provided as disclosed by companies, or as stated in the public domain.<br>- <u>Modeled</u>: All data are derived using a proprietary modelling process with only proxies used in the creation of the dataset.<br>- <u>Reported and Modeled:</u> The dataset is either a mix of reported and Modeled data or is derived by the vendor using reported data/information in a proprietary scoring or determination process. | |

<table>
<tr><th colspan="3">EXPLANATION OF HOW ENVIRONMENTAL, SOCIAL & GOVERNANCE (ESG) FACTORS ARE REFLECTED IN THE KEY ELEMENTS OF THE BENCHMARK METHODOLOGY[16]</th></tr>
<tr><td></td><td></td><td>The index methodology uses the following ESG datasets.</td></tr>
<tr><td></td><td><u>Data Source.</u></td><td><u>Dataset.</u></td></tr>
<tr><td></td><td>S&P Trucost Limited (external data source)</td><td>This methodology uses several datasets provided by S&P Trucost Limited:<br>• Transition pathway model (Reported and Modeled)<br>• Physical risk scores dataset (Reported and Modeled)<br>• Greenhouse gas emissions and emissions disclosure dataset (Reported and Modeled)<br>• Green-to-brown share dataset (Reported and Modeled)<br>• Fossil fuel reserves (Reported and Modeled)<br>• Trucost sector revenues dataset (Reported and Modeled)<br><br>For more information on Trucost, please refer <u>here</u>.</td></tr>
<tr><td></td><td>S&P Global (external data source)</td><td>Media & Stakeholder Analysis (Reported and Modeled) – S&P Global uses RepRisk, a leading provider of business intelligence on environmental, social, and governance risks, for daily filtering, screening, and analysis of controversies related to companies within the indices. In cases where risks are presented, S&P Global releases a Media and Stakeholder Analysis (MSA) which includes a range of issues such as economic crime and corruption, fraud, illegal commercial practices, human rights issues, labor disputes, workplace safety, catastrophic accidents, and environmental disasters. The Index Committee reviews constituents flagged by S&P Global's MSA to evaluate the potential impact of controversial company activities on the composition of the indices. If a company is removed due to an MSA, that company is ineligible for re-entry into the index for one full calendar year, beginning with the subsequent rebalancing.<br>For more information about S&P Global's Media and Stakeholder Analysis, please refer to the MSA Methodology Guidebook, available via <u>https://www.spglobal.com/esg/csa/csa-resources/csa-methodology</u>.<br><br>S&P Global Business Involvement Screens (Reported and Modeled) – The dataset tracks the business activities, products and services that companies are involved in. The S&P Global Business Involvement Screens provide detailed assessments of common areas of investor concern pinpointing the precise level of involvement, from production to operations and distribution, to inform values-based investment strategies.<br><br>For more information about S&P Global's Business Involvement Screens, please refer to <u>https://www.spglobal.com/esg/solutions/portfolio-analytics-businessinvolvement-analytics</u><br><br>ESG Score (Reported and Modeled) – S&P Global Sustainable1 calculates the S&P Global ESG scores and derives them from their 'Corporate Sustainability Assessment' (CSA). A company's CSA score is derived using either company-provided data, publicly available information, or a combination thereof..<br><br>For more information about the S&P Global ESG scores please refer <u>here</u> and <u>https://www.spglobal.com/spdji/en/landing/investment-themes/esg-scores/</u></td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td></td><td>Sustainalytics (external data source)</td><td>This methodology uses the following datasets provided by Sustainalytics, a global leader in sustainability research and analytics:<br>• Global Standards Screening (Reported and Modeled)<br><br>For more information, please refer to <u>http://www.sustainalytics.com/</u>.</td></tr>
<tr><td>7.b</td><td>Verification and quality of data.</td><td>The data quality process involves regular reviews of new data received, and includes comparison with previous data, outlier and error checks and escalation of suspect data to data vendors. S&P DJI also holds regular feedback sessions with data partners and vendors to share any quality concerns and to remedy any issues that are observed during data validations performed by the Global Data Management Team. In addition, all users of third-party data perform their own review of data used in the maintenance of indices. Many of the third-party data used by S&P DJI is reviewed against secondary and tertiary data sources for cross comparison and validation. Some more thematic or specific datasets may not have a comparable data source that can be</td></tr>
</table>

| EXPLANATION OF HOW ENVIRONMENTAL, SOCIAL & GOVERNANCE (ESG) FACTORS ARE REFLECTED IN THE KEY ELEMENTS OF THE BENCHMARK METHODOLOGY[16] | | |
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| | | used for comparison, but these datasets are still reviewed for internal consistency and self-comparison over time. |
| **7.c** | **Reference standards.** | Data is sourced from Trucost, which uses the following standards:<br>• *Scopes 1 and 2*: the GHG Protocol Corporate Standard.<br>• *Scope 3 (upstream & downstream)*: The Corporate Value Chain Standard, which is a supplement to the GHG Protocol specific to Scope 3. |
| **Appendix latest update:** | | March 2024 – Changes to reflect methodology updates effective June 2024 |
| **Appendix updates:** | | August 2023 – Added section 7c.<br>February 2023 – Added new exclusions. |
| **Appendix first publication:** | | March 2021 |

# 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.

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