

# INDEX GUIDELINE

*Solactive Paris Aware Global Government Bond  
Index Family*

*Version 2.2*

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## INTRODUCTION

This document (the “**GUIDELINE**”) is to be used as a guideline with regard to the composition, calculation and maintenance of the Solactive Paris Aware Global Government Bond Index Family (the “**INDEX**”). Any amendments to the rules made to the **GUIDELINE** are approved by the **OVERSIGHT COMMITTEE**. The **INDEX** is owned, calculated, administered and published by Solactive AG (“**SOLACTIVE**”) assuming the role as administrator (the “**INDEX ADMINISTRATOR**”) under the Regulation (EU) 2016/1011 (the “**BENCHMARK REGULATION**” or “**BMR**”). The name “Solactive” is trademarked.

*The text uses defined terms which are formatted with “SMALL CAPS”. Such Terms shall have the meaning assigned to them as specified in the Section Definitions.*

**The **GUIDELINE** and the policies and methodology documents referenced herein contain the underlying principles and rules regarding the structure and operation of the **INDEX**. **SOLACTIVE** does not offer any explicit or tacit guarantee or assurance, neither pertaining to the results from the use of the **INDEX** nor the level of the **INDEX** at any certain point in time nor in any other respect. **SOLACTIVE** strives to the best of its ability to ensure the correctness of the calculation. There is no obligation for **SOLACTIVE** – irrespective of possible obligations to **ISSUERS** – to advise third parties, including investors and/or financial intermediaries, of any errors in the **INDEX**. The publication of the **INDEX** by **SOLACTIVE** does not constitute a recommendation for capital investment and does not contain any assurance or opinion of **SOLACTIVE** regarding a possible investment in a financial instrument based on this **INDEX**.**

## 1. INDEX SPECIFICATIONS

### 1.1. SCOPE OF THE INDEX

The **INDEX** aims to track the performance of global local currency government bonds. The index includes government bonds issued by **INVESTMENT GRADE** rated countries. The **INDEX** provides a climate awareness portfolio, whose average **CO2 INTENSITY** is below the **BENCHMARK INDEX**’s **CO2 INTENSITY** and will fulfill a **SELF- DECARBONIZATION TRAJECTORY**. The **INDEX** duration matches the **BENCHMARK** duration.

- Only local currency government bonds are eligible
- The **INDEX** currency is Euro
- The minimum **EFFECTIVE TIME TO MATURITY** is 1 month, bonds will be excluded from the index before maturity

**CO2 INTENSITY** data is updated in January. Each January the most up-to-date data is retrieved from the **EDGAR** database.

As the **CO2 TARGET** of the index is both dependent on the current **BENCHMARK INDEX**’s **CO2 INTENSITY** as well as the self-decarbonization trajectory other factors beyond the **CO2 INTENSITY** per country are affecting the country weights in the **INDEX**. The most important factors are:

- FX Rates
- Bond Issuance



- Yield Level

These important dependencies as well as potential other factors influence the weight of a country within the index. If – due to changes in FX rates, bond issuance or yield shifts – the weight of heavy polluting countries would strongly increase this will have implications on the INDEX due to the inclusion of the relative weight constraint in the optimization. The increase in the BENCHMARK INDEX's country weights might lead to a breach of the relative weight constraint in the optimization as described in Section 2.2. To account for this the INDEX will have to increase the weight of a heavy polluting country compared to previous compositions of the INDEX.

## 1.2. IDENTIFIERS AND PUBLICATION

The INDEX is published under the following identifiers:

Name	ISIN	Currency	Type	Calculation Formula	RIC	BBG ticker
Solactive Paris Aware Global Government Bond Index	DE000SL0AY38	EUR	TR	Periodic	.SOLGOVPAB	-
Solactive Paris Aware Global Government GBP Index	DE000SL0DG94	GBP	TR	Periodic	.SOLGOGPAB	SOLGOPAB Index
Solactive Paris Aware Global Government USD Index	DE000SL0BTJ3	USD	TR	Periodic	.SOLGOUPAB	-
Solactive Paris Aware Global Government EUR Hedged Index	DE000SL0DG86	EUR	CH	Standard	.SOLGEUCH	-
Solactive Paris Aware Global Government GBP Hedged Index	DE000SL0DHA3	GBP	CH	Standard	.SOLGGBCH	-
Solactive Paris Aware Global Government USD Hedged Index	DE000SL0DHB1	USD	CH	Standard	.SOLGUSCH	-

\*The calculation formula refers to the index calculation's dependency on cash reinvestment, based on whether the cash reinvestment occurs on a daily/direct basis or periodically.

\*TR means that the INDEX is calculated as Total Return index as described in the Bond Index Methodology, which is available on the SOLACTIVE website: <https://www.solactive.com/documents/bond-index-methodology/>

\*PR means that the INDEX is calculated as Price Return index as described in the Bond Index Methodology, which is available on the SOLACTIVE website: <https://www.solactive.com/documents/bond-index-methodology/>

\*CH means that the Index is calculated as Currency Hedge Index, as described in the Currency Hedged Index Methodology, which is available on the SOLACTIVE website: <https://www.solactive.com/documents/currency-hedged-general-methodology/>

The INDEX is published on the website of the INDEX ADMINISTRATOR ([www.solactive.com](http://www.solactive.com)) and is, in addition, available via the price marketing services of BÖRSE STUTTGART GMBH and may be distributed to all of its affiliated vendors. Each vendor decides on an individual basis as to whether it will distribute or display the INDEX via its information systems.



Any publication in relation to the INDEX (e.g. notices, amendments to the GUIDELINE) will be available at the website of the INDEX ADMINISTRATOR: <https://www.solactive.com/news/announcements/>.

### 1.3. INITIAL LEVEL OF THE INDEX

The initial levels of the Family INDICES on the LIVE DATE are recorded in the table below. Historical values from the LIVE DATE will be recorded in accordance with Article 8 of the BMR.

Index Name	Index RIC	Date	Initial Value
Solactive Paris Aware Global Government Index	.SOLGOVPAB	20.11.2020	1000
Solactive Paris Aware Global Government USD Index	.SOLGOUPAB	11.08.2022	1000
Solactive Paris Aware Global Government GBP Index	.SOLGOGPAB	30.06.2023	1000
Solactive Paris Aware Global Government EUR Hedged Index	.SOLGEUCH	05.07.2023	917.70

### 1.4. PRICES AND CALCULATION FREQUENCY

The INDEX is calculated and distributed once every BUSINESS DAY based on the LAST EVALUATED BID PRICE of the INDEX COMPONENTS. Bonds added in a rebalancing (see Section 3) are included the INDEX at the LAST EVALUATED ASK PRICE on the relevant REBALANCE DAY. Bonds which are excluded from the INDEX in a rebalance are reflected in the calculation of the level of the INDEX for the REBALANCE DAY at the LAST EVALUATED BID PRICE on the relevant REBALANCE DAY. INDEX analytical values are calculated each BUSINESS DAY using the LAST EVALUATED BID PRICE based on FIXING TIME. Prices of INDEX COMPONENTS not listed in the INDEX CURRENCY are converted using the 4 PM London Fixing quoted by Reuters.

Should there be no current 4 PM London Fixing available on Reuters the most recent 4 PM London Fixing on Reuters for the preceding BUSINESS DAY is used in the calculation.

The currency hedged indices are calculated based on TRADING PRICES on the EXCHANGES on which the UNDERLYING INDEX COMPONENTS are listed. TRADING PRICES of the UNDERLYING INDEX COMPONENTS not listed in the INDEX CURRENCY are converted using the current Intercontinental Exchange (ICE) spot foreign exchange rate. Should there be no current TRADING PRICE for an INDEX COMPONENT, the later of: (i) the most recent CLOSING PRICE; or (ii) the last available TRADING PRICE for the preceding TRADING DAY is used in the calculation.

In addition to the intraday calculation a closing level of the INDEX for each CALCULATION DAY is also calculated. This closing level is based on the CLOSING PRICES for the UNDERLYING INDEX and 4:00 PM London WM Spot and Forward Fixings quoted by Reuters. If there is no 4:00 PM London time WM Fixing for the relevant CALCULATION DAY, the last available 4:00 PM London time WM Fixing will be used for the closing level calculation.



## 2. INDEX SELECTION

On each SELECTION DAY, all bonds which meet the INDEX COMPONENT REQUIREMENTS are eligible for inclusion in the INDEX and will be added as INDEX COMPONENT on the REBALANCE DAY. Additionally, on each SELECTION DAY, it will be evaluated whether all current INDEX COMPONENTS still meet the INDEX COMPONENT REQUIREMENTS. Each INDEX COMPONENT that does not meet the INDEX COMPONENT REQUIREMENTS will be removed from the INDEX on the next REBALANCE DAY.

### 2.1. SELECTION OF THE INDEX COMPONENTS

The initial composition of each INDEX, as well as any selection for a rebalance (as specified in Section 3) is determined using the following rules:

- A price from the PRICING PROVIDER must be available for each INDEX COMPONENT on each SELECTION DAY
- INDEX COMPONENTS must be a member of one of the following indices:
  - Solactive Broad Global Developed Government Bond TR IG EUR Index
  - Solactive Developed Government Bond 0-1 Year Index
  - Solactive China Government Bond TR CNY Index
  - Solactive LCY EM Government TR Index
  - Solactive LCY EM Government 0-1 Year TR Index
- All issuing countries must be rated INVESTMENT GRADE. For the avoidance of doubt if a country is rated as INVESTMENT GRADE by at least one of the rating agencies (Moody's Investors Service or S&P Global Ratings) the country is eligible for the index.
- INDEX COMPONENTS should not mature while being an index member

The determination of the INDEX COMPONENTS is fully rule-based and the INDEX ADMINISTRATOR has no discretion.

#### 2.1.1 SELECTION OF THE INDEX CURRENCY COMPONENTS

Based on the INDEX CURRENCY UNIVERSE, the initial composition of the INDEX as well as any selection for an ordinary rebalance is determined on the SELECTION DAY in accordance with the following rules (the "INDEX CURRENCY COMPONENT REQUIREMENTS"):

- All of the currencies from the INDEX CURRENCY UNIVERSE



## 2.2. WEIGHTING OF THE INDEX COMPONENTS

On each SELECTION DAY each INDEX COMPONENT is weighted using the following mechanism:

The overall aim of the INDEX is to create a global government portfolio which is aligned with a self-decarbonization trajectory as well as a minimum reduction in Carbon Intensity versus the market cap weighted BENCHMARK INDEX. The following optimization routine sets the final country weights:

$$\min_{w_c, tpw_c} \sum_{c=1}^c (w_c - tpw_c)^2$$

subject to the following constraints:

$$CO2_{Target} - \sum_{c=1}^c (w_c * CO2_c) = 0$$

$$1 - \sum_{c=1}^c w_c = 0$$

$$(mvw_c * relative\ deviation_{pos}) - w_c \geq 0$$

$$w_c - (mvw_c * relative\ deviation_{neg}) \geq 0$$

where:

$w_c$  = weight of country  $c$

$mvw_c$  = market cap weight of country  $c$

$tpw_c$  = weight of country  $c$  in target portfolio

$CO2_{Target}$  = CO2 target set by decarbonization trajectory or minimum reduction vs. benchmark index

$relative\ deviation_{pos}$

= maximum relative deviation by which a optimized country weight can exceed the market cap weight of country  $c$ . Initially this set to 5

$relative\ deviation_{neg}$

= maximum relative deviation by which a optimized country weight can trail the market cap weight of country  $c$ . Initially this set to 0.2

In case no feasible solution can be found using the above mentioned algorithm, the index committee will decide on the most suitable solution for the further maintenance of the index.



The target portfolio is an unconstrained proportionally weighted portfolio which is aligned with the CO2 INTENSITY target. The country weights of the target portfolio are computed as follows:

$$\begin{aligned} \text{Country Weight Target Portfolio}_c &= \text{Market Cap Weight}_c * \text{Tilting Factor}_c \\ \text{Tilting Factor}_c &= (0.5 + \text{Percentile CO2 Intensity Rank}_c)^x \end{aligned}$$

Where the exponent x is determined in a numerical procedure which ensures the weighted CO2 INTENSITY is equal to the CO2 TARGET.

Once optimal country weights have been determined, it is ensured that the duration of the INDEX is equal to the duration of a market-cap weighted benchmark index rounded to two decimals. This is achieved in a two-step process. In a first step it is determined for which countries the duration contribution has to be increased or lowered. In a second step bond weights within each country are adjusted.

For the duration adjustment the index is split into two parts: Countries whose duration contribution will stay stable, and countries whose duration contribution will be adjusted.

If the duration of the optimized index is higher than the market-cap weighted duration, duration contributions of polluting countries (whose CO2 INTENSITY is larger than the CO2 TARGET) is reduced ( $\text{Duration}_{\text{Adjusted Countries}}$ ). The duration contribution of all other countries stays the same ( $\text{Duration}_{\text{Stable Countries}}$ ).

If the duration of the optimized index is lower than the market-cap weighted duration, duration contribution of less polluting countries (whose CO2 INTENSITY is smaller than the CO2 TARGET) is increased ( $\text{Duration}_{\text{Adjusted Countries}}$ ). The duration contribution of all other countries stays the same ( $\text{Duration}_{\text{Stable Countries}}$ ).

The adjustment of country durations is done via an adjustment factor.

$$\text{Adjustment Factor} = \frac{(\text{Target Duration} - \text{Duration}_{\text{Stable Countries}})}{\text{Duration}_{\text{Adjusted Countries}}}$$

For each country where a duration adjustment is made, the new target country duration is computed as follows:

$$\text{Country Duration}_{\text{Target}} = \text{Country Duration}_{\text{Optimized}} * \text{Adjustment Factor}$$

To achieve the desired duration contribution per country the following mechanism is implemented on a bond level: In case  $\text{Country Duration}_{\text{Target}} < \text{Country Duration}_{\text{Optimized}}$  weights from the longest bond is shifted into the shortest maturing bond. With the restriction bonds cannot have negative weights. This process is iterated until  $\text{Country Duration}_{\text{Target}} = \text{Country Duration}_{\text{Optimized}}$

In the case of  $\text{Country Duration}_{\text{Target}} > \text{Country Duration}_{\text{Optimized}}$  the opposite iteration takes place.





### 2.2.1 WEIGHTING OF THE INDEX CURRENCY COMPONENTS

On each SELECTION DAY, the weight of each INDEX CURRENCY COMPONENT is assigned according to the aggregated weights of all the UNDERLYING INDEX COMPONENTS quoted in the respective currency.

## 3. ORDINARY REBALANCE

In order to reflect the new selection of the INDEX COMPONENTS determined on the SELECTION DAY (in accordance with Section 2.1) the INDEX is adjusted on the REBALANCE DAY after CLOSE OF BUSINESS.

For more information on the rebalance procedure please refer to the Bond Index Methodology, which is incorporated by reference and available on the SOLACTIVE website: <https://www.solactive.com/documents/bond-index-methodology/>.

SOLACTIVE will publish any changes made to the INDEX COMPONENTS with sufficient notice before the REBALANCE DAY on the SOLACTIVE webpage.

## 4. CORPORATE ACTIONS

As part of the INDEX maintenance SOLACTIVE will consider various events – also referred to as corporate actions – which result in an adjustment to the INDEX between two regular REBALANCE DAYS. Such events have a material impact on the price, weighting or overall integrity of INDEX COMPONENTS. Therefore, they need to be accounted for in the calculation of the INDEX. Adjustments to the INDEX to account for corporate actions will be made in compliance with the Bond Index Methodology.

## 5. DEFINITIONS

“**BENCHMARK INDEX**” is the Solactive Global Government Bond Index (SOLGGIG)

“**BENCHMARK REGULATION**” shall have the meaning as defined in Section “Introduction”.

“**BMR**” shall have the meaning as defined in Section “Introduction”.

“**BUSINESS DAY**” in relation to the index is each day, Monday to Friday, except banking holidays as defined by the New York Stock Exchange (NYSE), SIFMA, European Banking Holidays and the 24<sup>th</sup> and 31<sup>st</sup> of December.

“**CLOSE OF BUSINESS**” is a time stamp when an INDEX is calculated.

“**CO2 Intensity**” is a metric which normalized the CO2 emissions of each country by the country’s capita. This data is taken from the EDGAR database, more information can be found here: <https://edgar.jrc.ec.europa.eu/>

“**CO2 TARGET**” is the average CO2 INTENSITY, the index should achieve on each SELECTION DAY. The CO2 Target is the minimum between a 14% reduction versus the BENCHMARK INDEX or an annual self-decarbonization according to the SELF-DECARBONIZATION TRAJECTORY



“**CURRENCY HEDGE INDEX**” represent the return resulting from the sum of an underlying index performance and the performance of the hedge of this index using currency forward contracts.

“**EFFECTIVE TIME TO MATURITY**” is the minimum of the next call or put date and the final maturity date.

“**FIXING TIME**” is the time when the prices for the INDEX COMPONENTS are fixed for index calculation. [This is specified in the Bond Index Methodology, which is available on the SOLACTIVE website: <https://www.solactive.com/documents/bond-index-methodology/>].

“**GUIDELINE**” shall have the meaning as defined in Section “Introduction”.

“**INDEX**” shall have the meaning as defined in Section “Introduction”.

“**INDEX ADMINISTRATOR**” shall have the meaning as defined in Section “Introduction”.

“**INDEX CALCULATOR**” is SOLACTIVE or any other appropriately appointed successor in this function.

“**INDEX COMPONENT**” is each bond reflected in the INDEX.

“**INDEX COMPONENT REQUIREMENTS**” shall have the meaning as defined in Section 2.1.

“**INDEX CURRENCY**” is the currency specified in the column “Currency” in the table in Section 1.2.

“**ISSUER**” is the issuing entity of the respective bond.

“**OVERSIGHT COMMITTEE**” shall have the meaning as defined in the Bond Index Methodology.

“**PRICING PROVIDER**” is available under <https://www.solactive.com/documents/bond-pricing-provider/>.

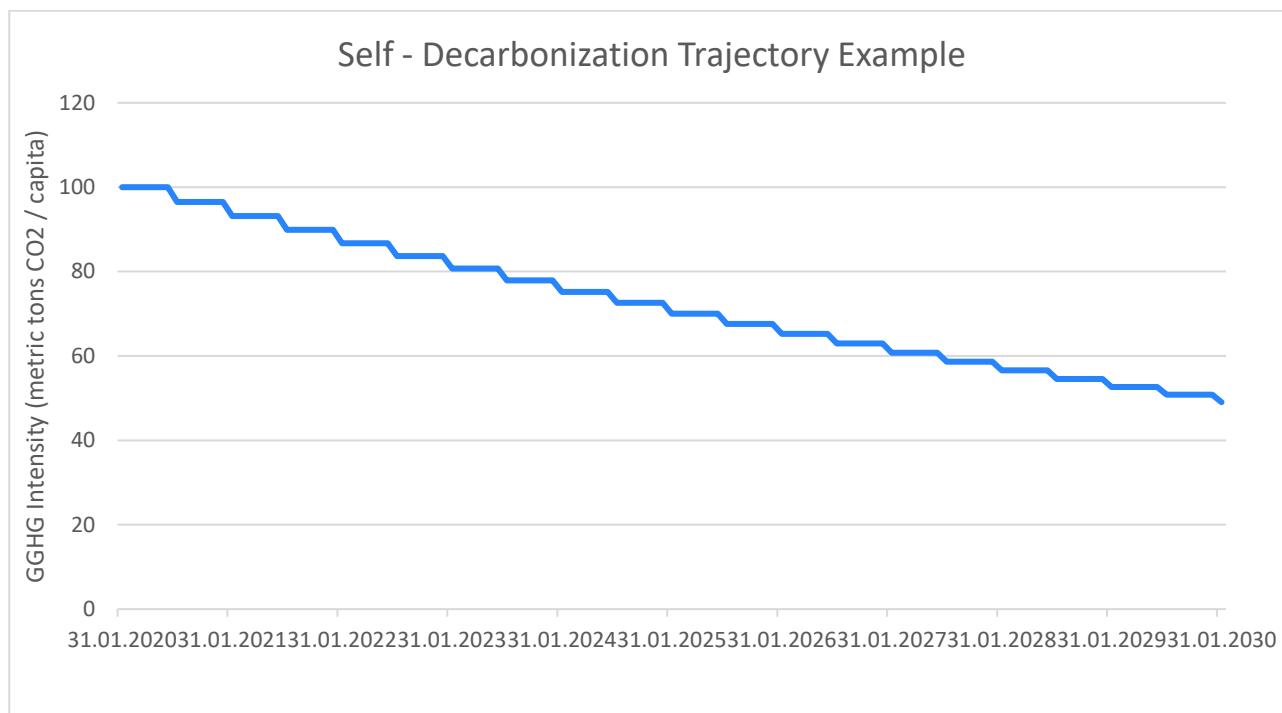
“**REBALANCE DAY**” is the last BUSINESS DAY of the month.

“**SELECTION DAY**” day for the selection of the INDEX COMPONENTS is specified in the Guidelines of the sub-indices. Selection Day for the INDEX is 4 BUSINESS DAYS before the scheduled REBALANCE DAY.

*For currency hedged indices, the selection day is equal to the rebalance day and rebalancing frequency is monthly.*

“**SELF-DECARBONIZATION-TRAJECTORY**” : The INDEX follows a self-decarbonization trajectory of at least 7% annually. The decarbonization trajectory is defined by an annual minimum GHG Intensity reduction of 7% compared to the GHG INTENSITY of the INDEX on the BASE DATE in a geometric progression. The 7% annual reduction is split into two 3.5% semi-annual reductions which become effective in the end of January and end of July.

In the following chart you can see an hypothetical self-decarbonization trajectory for an Paris-aligned index with GROSS GHG EMISSIONS of 100 at the BASE DATE 31.01.2020 . To be compliant with the self-decarbonization trajectory the Gross GHG Emissions of the hypothetical index must always on or below the self-decarbonization trajectory.



“**SOLACTIVE**” shall have the meaning as defined in Section “Introduction”.

“**SPOT**” is the spot foreign exchange rate to convert the currency of the INDEX COMPONENT into the denomination of the INDEX CURRENCY.

“**TARGET GHG INTENSITY**” is the average GHG INTENSITY level required to fulfill the optimization constraint. Until the first self-decarbonization this is a 50% reduction versus the BENCHMARK INDEX. Otherwise this is the minimum between the SELF-DECARBONIZATION TRAJECTORY and a 50% reduction versus the BENCHMARK INDEX.

“**TRADING DAY**” is with respect to an INDEX COMPONENT included in the INDEX at the REBALANCE DAY and every INDEX COMPONENT included in the INDEX at the CALCULATION DAY immediately following the REBALANCE DAY (for clarification: this provision is intended to capture the TRADING DAYS for the securities to be included in the INDEX as new INDEX COMPONENTS with close of trading on the relevant EXCHANGE on the REBALANCE DAY) a day on which the relevant EXCHANGE is open for trading (or a day that would have been such a day if a market disruption had not occurred), excluding days on which trading may be ceased prior to the scheduled EXCHANGE closing time and days on which the EXCHANGE is open for a scheduled shortened period. The INDEX ADMINISTRATOR is ultimately responsible as to whether a certain day is a TRADING DAY.

“**TRADING PRICE**” in respect of an INDEX COMPONENT and a TRADING DAY is the most recent published price at which the INDEX COMPONENT was traded on the respective EXCHANGE.

“**UNDERLYING INDEX COMPONENT**” is each security reflected in the composition of the UNDERLYING INDEX.

**Please note that the definitions included in the Bond Index Methodology apply to this guideline. In case of a discrepancy, the definition presented in the guidelines should prevail.**



## 6. HISTORY OF INDEX CHANGES

Version*	Date	Description
2.0*	23 June 2021	Introducing the optimized weighting scheme for the selection
2.1	27 July 2023	Adding currency version (GBP)
2.2	17 June 2024	New Family Guidelines Format

*\*Versions prior to the first entry are historical.*

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