

# INDEX GUIDELINE

Solactive Dynamic Uptrend US Index

Version 1.0

12 July 2019



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# INDEX GUIDELINE

Introduction

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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 Index. Any changes made to the Guideline are initiated by the Committee specified in Section 1.6. The Index is calculated and published by Solactive AG. The name "Solactive" is trademarked.

It contains the underlying principles and rules regarding the structure and operation of the Solactive Dynamic Uptrend US Index (the "Index"). Solactive AG shall make every effort to implement the applicable regulations. Solactive AG does not offer any explicit or tacit guarantee or assurance, neither pertaining to the results from the use of the Index nor the Index value at any certain point in time nor in any other respect. The Index is merely calculated and published by Solactive AG and it strives to the best of its ability to ensure the correctness of the calculation. There is no obligation for Solactive AG – 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 AG does not constitute a recommendation for capital investment and does not contain any assurance or opinion of Solactive AG regarding a possible investment in a financial instrument based on this Index.



# INDEX GUIDELINE

Index Specifications



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# 1 INDEX SPECIFICATIONS

- > The Solactive Dynamic Uptrend US Index (the "Index") is an Index of Solactive AG and is calculated and distributed by Solactive AG.
- > The Index intends to track the price movements of 100 stocks listed in the United States, a portfolio which is designed to achieve high upside volatility (via optimization, considering only positive returns) while respecting a set of constraints such as a portfolio-level dividend yield target, min/max index member weight caps, and sector exposure constraints.
- > The Index comes in four versions: Gross Total Return, Net Total Return, Price Return, and Adjusted Return.
- > The Index is published in USD.

## 1.1 SHORT NAME AND ISIN

Name	Return Type	ISIN	Bloomberg Ticker
Solactive Dynamic Uptrend US Index	Gross Total Return	DE000SLA8F34	SOLDUUG Index
	Net Total Return	DE000SLA8F26	-
	Price Return	DE000SLA8F18	SOLDUUP Index
	Adjusted Return	DE000SLA8J55	SOLDUUA Index

- > The Adjusted Return version is calculated as the Gross Total Return version whose performance is synthetically dragged by 2.15% per annum, deducted on a daily basis.

## 1.2 INITIAL VALUE

The Index is based on 1000 at the close of trading on the start date, November 5<sup>th</sup>, 2003.

## 1.3 DISTRIBUTION

The Index is published via the price marketing services of Boerse Stuttgart GmbH and is distributed to all affiliated vendors. Each vendor decides on an individual basis as to whether it will distribute/display the Index via its information systems.

## 1.4 PRICES AND CALCULATION FREQUENCY

The price of the Index is calculated on each Business Day based on the prices on the respective Exchanges on which the Index Components are listed. The most recent prices of all Index Components are used. Prices of Index Components not listed in the Index Currency are translated using spot foreign exchange rates



quoted by Reuters. Should there be no current price available on Reuters, the most recent price or the Trading Price on Reuters for the preceding Trading Day is used in the calculation. The daily index closing value is calculated using Reuters/WMCO closing spot rates as at 4pm London time.

The Index is calculated every Business Day from 9:00 a.m. to 10:50 p.m., CET. In the event that data cannot be provided to Reuters or to the pricing services of Boerse Stuttgart GmbH, the Index cannot be distributed.

## 1.5 WEIGHTING

On each Selection Day, the optimizer does not only select the new Index Components, but also determines their weights, such that upside volatility is maximized subject to various constraints:

- Minimum weight per stock is 0.25%
- Maximum weight per stock is the minimum of the following values:
  - o 5%
  - o  $10 \times$  the weight of the respective stock in the starting universe (Solactive US Large Cap Index), with the stocks weighted by market capitalization
  - o  $10 \times$  the weight of the respective stock in the starting universe, with the stocks weighted by 6-month average daily value traded
- Relative sector exposure cap calculated as the minimum of the following:
  - o  $10\% +$  the sector weight within the starting universe
  - o  $3 \times$  the sector weight within the starting universe
- In addition, the weights of the index members are also influenced by the minimum portfolio-level dividend yield target, which is set at 3%.

If the optimizer does not find a solution, all weight constraints mentioned above – with the exception of the 0.25% minimum weight and the 5% maximum weight per stock – are automatically relaxed in increments of 10% of the original constraint and the optimizer tries again. As an example, for clarification, if an index member is initially capped at 1% by the algorithm with no solution, the next try will be capped at 1.1%, and so on (in increments of 10% of the initial value of the constraint), until the hard cap of 5% per stock is reached. The optimizer will keep relaxing the constraints until a solution is found.



## 1.6 OVERSIGHT

A Committee composed of staff from Solactive AG (the “Committee” or the “Index Committee”) is responsible for decisions regarding the composition of the Index as well as any amendments to the rules.

Members of the Committee can recommend changes to the Guideline and submit them to the Committee for approval.

## 1.7 PUBLICATION

All specifications and information relevant for calculating the Index are made available on the <http://www.solactive.com> web page and sub-pages.

## 1.8 HISTORICAL DATA

Historical data will be maintained from the launch of the Index on July 8<sup>th</sup>, 2019.

## 1.9 LICENSING

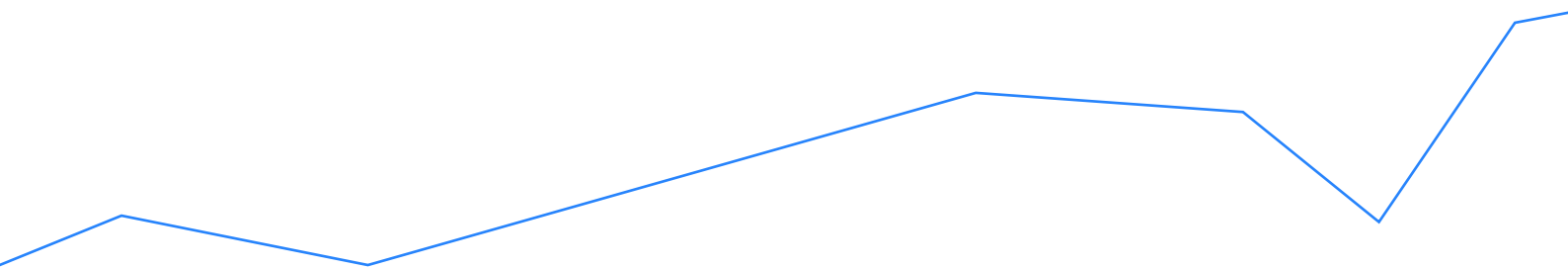
Licenses to use the Index as the underlying value for derivative instruments are issued to stock exchanges, banks, financial services providers and investment houses by Solactive AG.





# INDEX GUIDELINE

Composition of the Index



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## 2 COMPOSITION OF THE INDEX

### 2.1 SELECTION OF THE INDEX COMPONENTS

The initial composition of the Index as well as any ongoing adjustment are based on the following non-discretionary rules.

On the Selection Days, Solactive defines the Index Universe as outlined in Section 4. From this Index Universe, the selection (and the weighting) of the 100 Index Components is determined by a Mixed Integer Quadratic Programming algorithm, such that portfolio-level upside volatility is maximized subject to various constraints.

In order to maximize upside volatility, the algorithm optimizes the semi-covariance matrix defined as:

$$\sum ij = \frac{1}{T-1} \cdot \sum_{t=1}^T [\max(R_{it}, 0) \cdot \max(R_{jt}, 0)]$$

given two assets  $i$  and  $j$ , where  $T$  is the number of observations, and  $\max(R_{it}, 0)$  is the maximum between zero and the return of asset  $i$  at time  $t$  (equivalent to replacing negative returns with zeroes).

To find the weights that maximize the portfolio's upside volatility, we solve the following optimization problem:

$$\max (\omega' \cdot \Sigma \cdot \omega)$$

*Equation (3)*

where  $\omega$  is the vector of weights outputted by the optimizer,  $\omega'$  is the same vector but transposed.

The lookback period  $T$  used for the semi-covariance matrix is 252 business days.

The optimization is solved subject to a set of constraints:

1. First, the sum of the weights of all index members must be equal to one:

$$\sum_{i=1}^N \omega_i = 1$$

*Equation (4)*

2. We introduce a minimum weight and a maximum weight for all individual stocks:

$$\omega_i^{\min} \leq \omega_i \leq \omega_i^{\max}, \quad i = 1, \dots, n$$

3. We also introduce a portfolio level dividend yield floor at every selection:

$$\sum_{i=1}^N \omega_i \cdot div_i \geq Div^{\min}$$



Equation (6)

where  $div_i$  is the trailing dividend yield for stock  $i$ , and  $Div^{min}$  is the portfolio-level dividend yield floor.

4. We include a sector constraint:

$$\sum_{i=1}^{n_j} \omega_i \leq SW_j^{max}$$

Equation (7)

where  $n_j$  is the number of stocks in sector  $j$ , and  $SW_j^{max}$  is the maximum weight allocation to sector  $j$ .

For clarification, all constraints are restated and summarized below:

- Minimum weight per stock is 0.25%
- Maximum weight per stock is the minimum of the following three potential values:
  - o 5%
  - o  $10 \times$  the weight of the respective stock in the starting universe, with the stocks weighted by market capitalization
  - o  $10 \times$  the weight of the respective stock in the starting universe, with the stocks weighted by 6-month average daily value traded
- Portfolio-level dividend yield floor of 3%
  - o where the dividend yield is calculated as all cash dividend payments that occurred over the previous 12 months relative to each Selection Day, divided by the share price as of the Selection Day.
- Relative sector exposure cap calculated as the minimum of the following:
  - o  $10\% +$  the sector weight within the starting universe
  - o  $3 \times$  the sector weight within the starting universe

As aforementioned, if the optimizer does not find a solution, all constraints are automatically relaxed in increments of 10% of the initial value of the constraint – with the exception of the 0.25% minimum weight and 5% maximum weight per stock, which are never relaxed. After relaxing the constraints, the optimizer tries again. The optimizer will keep relaxing the constraints until a solution is found.



## 2.2 ORDINARY ADJUSTMENT

The composition of the Index is adjusted quarterly. The composition of the Index is reviewed on the Selection Day and necessary changes are announced.

The first adjustment will be made in August 2019, based on the Trading Prices of the Index Components on the Adjustment Day.

Solactive AG shall publish any changes made to the Index composition on the Selection Day and consequently with sufficient notice before the Adjustment Day.

## 2.3 EXTRAORDINARY ADJUSTMENT

An extraordinary adjustment, if applicable, is triggered and applied in compliance with the rules set forth in the [Solactive Guideline for Extraordinary Corporate Actions](#).



# INDEX GUIDELINE

Calculation of the Index



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## 3 CALCULATION OF THE INDEX

### 3.1 INDEX FORMULA

The Index Value on a Business Day at the relevant time is calculated in accordance with the following formula:

$$Index_t = \sum_{i=1}^n x_{i,t} * p_{i,t}$$

With:

$x_{i,t}$  = Number of Shares of the Index Component  $i$  on Trading Day  $t$

$p_{i,t}$  = Price of Index Component  $i$  on Trading Day  $t$  in Index Currency

### 3.2 ACCURACY

- > The value of the Index will be rounded to 2 decimal places.
- > The Number of Shares of the Index Components will be rounded to six decimal places.

### 3.3 ADJUSTMENTS

Indices need to be adjusted for systematic changes in prices once these become effective. This requires the new Number of Index Shares of the affected Index Component.

Following the Committee's decision, the Index is adjusted for distributions, capital increases and stock splits.

This procedure ensures that the first ex quote can be properly reflected in the calculation of the Index. This ex-ante procedure assumes the general acceptance of the Index calculation formula as well as open access to the parameter values used. The calculation parameters are provided by the Index Calculator.

### 3.4 DIVIDENDS AND OTHER DISTRIBUTIONS

Dividend payments and other distributions are included in the Index. They cause an adjustment of the Number of Shares. The new Number of Shares is calculated as follows:

$$x_{i,t} = x_{i,t-1} * \frac{p_{i,t-1}}{p_{i,t-1} - D_{i,t}}$$



with:

$x_{i,t}$  = Number of Shares of the Index Component i on Trading Day t

$D_{i,t}$  = Payment on Trading Day t multiplied by the Dividend Correction Factor of the respective country

## 3.5 CORPORATE ACTIONS

### 3.5.1 Principles

Following the announcement by an issuer of Index Components of the terms and conditions of a corporate action, the Index Calculator determines whether such corporate action has a dilutive, concentrative or similar effect on the price of the respective Index Component.

If this should be the case, the Index Calculator shall make the necessary adjustments that are deemed appropriate in order to take into account the dilutive, concentrative or similar effect and shall determine the date on which this adjustment shall come into effect.

Amongst other things, the Index Calculator can take into account the adjustment made by an Affiliated Exchange as a result of the corporate action with regard to option and futures contracts on the respective share traded on this Affiliated Exchange.

### 3.5.2 Capital increases

In the case of capital increases (from the company's own resources or through cash contributions) the new Numbers of Shares are calculated as follows:

$$x_{i,t} = x_{i,t-1} * \frac{p_{i,t-1}}{p_{i,t-1} - rB_{i,t-1}} \quad \text{with:} \quad rB_{i,t-1} = \frac{p_{i,t-1} - B - N}{BV + 1}$$

with:

$x_{i,t}$  = Number of Shares of Index Component i on the day of the distribution

$x_{i,t-1}$  = Number of Shares of Index Component i on the day prior to the distribution

$p_{i,t-1}$  = Closing price on the day prior to ex-date

$rB_{i,t-1}$  = Calculated value of rights issue

$B$  = Price of rights issue

$N$  = Dividend disadvantage

$BV$  = Subscription ratio

$B = 0$  if capital is increased from the company's own resources.



The last dividend paid or the announced dividend proposal is applied as the dividend disadvantage. 3.5.3  
Capital reductions

In the case of capital reductions, the new Number of Shares is determined as follows:

$$x_{i,t} = x_{i,t-1} * \frac{1}{H_{i,t}}$$

with:

$H_{i,t}$  = Reduction ratio of the company on day t

$x_{i,t}$  = Number of Shares of the affected Index Component on the day of the distribution

$x_{i,t-1}$  = Number of Shares of the affected Index Component on the day prior to the distribution

### 3.5.4 Share splits and par value conversions

In the case of share splits and par value conversions it is assumed that the prices change in ratio to the number of shares or to the par values. The new Number of Shares is calculated as follows:

$$x_{i,t} = x_{i,t-1} * \frac{N_{i,t-1}}{N_{i,t}}$$

with:

$N_{i,t-1}$  = Former par value of security class i (or new number of shares)

$N_{i,t}$  = New par value of security class i (or former number of shares)

$x_{i,t}$  = Number of Shares of the affected Index Component on the day of the distribution

$x_{i,t-1}$  = Number of Shares of the affected Index Component on the day prior to the distribution

## 3.6 MISCELLANEOUS

### 3.6.1 Recalculation

Solactive AG makes the greatest possible efforts to accurately calculate and maintain its indices. However, the occurrence of errors in the index determination process cannot be ruled out. In such cases Solactive AG adheres to its publicly available [Correction Policy](#).





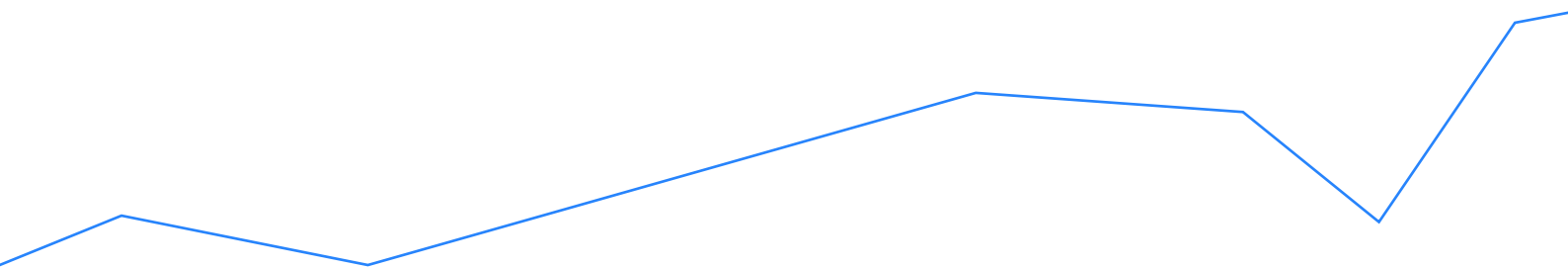
### 3.6.2 Market Disruption

In periods of market stress Solactive AG calculates its indices following predefined and exhaustive arrangements set out in its publicly available [Disruption Policy](#).



# INDEX GUIDELINE

## Definitions



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## 4 DEFINITIONS

The "**Index Universe**" in respect of a Selection Day are companies that fulfill the following criteria:

1. Member of the latest selection of the Solactive US Large Cap Index.
2. Display a minimum 6-month average daily value traded of at least USD 30 mil.
3. The stock is traded for at least 252 business days prior to the Selection Date.

The "**Index Component**" is each share currently included in the Index.

The "Number of **Shares**" are in respect of an Index Component and any given Business Day the number or fraction of shares included in the Index. It is calculated for any Index Component as the ratio of (A) the Percentage Weight of an Index Component multiplied by the Index value and (B) its Trading Price (converted into the Index Currency according to the principles laid out in Section 1.4 of this document).

The "**Percentage Weight**" of an Index Component is the ratio of its Trading Price multiplied by its Number of Shares divided by the Index value.

The "**Dividend Correction Factor**" is calculated as 1 minus the applicable withholding tax rate and/or other applicable tax rate currently prevalent in the respective country.

In particular, an "**Extraordinary Event**" is

- > a Merger
- > a Takeover Bid
- > a Delisting
- > the Nationalization of a company
- > Insolvency.

An Index Component is "**delisted**" if the Exchange announces pursuant to the Exchange regulations that the listing of, the trading in, or the issuing of public quotes on the Index Component at the Exchange has ceased immediately or will cease at a later date, for whatever reason (provided the Delisting is not because of a Merger or a Takeover Bid), and the Index Component is not immediately listed, traded or quoted again on an exchange, trading or listing system, acceptable to the Index Calculator.

"**Insolvency**" occurs with regard to an Index Component if (A) all shares of the respective issuer must be transferred to a trustee, liquidator, insolvency administrator or a similar public officer as result of voluntary or compulsory liquidation, insolvency or winding-up proceedings or comparable proceedings affecting the issuer of the Index Components or (B) the holders of the shares of this issuer are legally enjoined from transferring the shares.

A "**Takeover Bid**" is a bid to acquire, an exchange offer, or any other offer or act of a legal person that results in the related legal person acquiring as part of an exchange or otherwise more than 10% and less than 100% of the voting shares in circulation from the issuer of the Index Component or the right to acquire these shares, as determined by the Index Calculator based on notices submitted to public or self-regulatory authorities or other information considered by the Index Calculator to be relevant.



With regard to an Index Component, a "**Merger**" is

- (i) a change in the security class or a conversion of this share class that results in a transfer or an ultimate definite obligation to transfer all the shares in circulation to another legal person,
- (ii) a merger (either by acquisition or through forming a new structure) or a binding obligation on the part of the issuer to exchange shares with another legal person (except in a merger or share exchange under which the issuer of this Index Component is the acquiring or remaining company and which does not involve a change in security class or a conversion of all the shares in circulation),
- (iii) a takeover offer, exchange offer, other offer or another act of a legal person for the purposes of acquiring or otherwise obtaining from the issuer 100% of the shares issued that entails a transfer or the irrevocable obligation to transfer all shares (with the exception of shares that are held and controlled by the legal person), or
- (iv) a merger (either by acquisition or through forming a new structure) or a binding obligation on the part of the issuer of the share or its subsidiaries to exchange shares with another legal person, whereby the issuer of the share is the acquiring or remaining company and it does not involve a change in the class or a conversion of the all shares issued, but the shares in circulation directly prior to such an event (except for shares held and controlled by the legal person) represent in total less than 50% of the shares in circulation directly subsequent to such an event.

The "**Merger Date**" is the date on which a Merger is concluded or the date specified by the Index Calculator if such a date cannot be determined under the law applicable to the Merger.

"**Nationalization**" is a process whereby all shares or the majority of the assets of the issuer of the shares are nationalized or are expropriated or otherwise must be transferred to public bodies, authorities or institutions.

The "**Exchange**" is, in respect of the Index and every Index Component, the respective primary exchange where the Index Component has its primary listing. The Committee may decide to declare a different stock exchange the "Exchange" for trading reasons, even if the company is only listed there via a Stock Substitute.

A "**Stock Substitute**" includes in particular, American Depository Receipts (ADR) and Global Depository Receipts (GDR).

With regard to an Index Component (subject to the provisions given above under "Extraordinary Events") the "**Trading Price**" in respect of a Trading Day is the closing price on this Trading Day determined in accordance with the Exchange regulations. If the Exchange has no closing price for an Index Component, the Index Calculator shall determine the Trading Price and the time of the quote for the share in question in a manner that appears reasonable to it.

A "**Trading Day**" is in relation to the Index or an Index Component a Trading Day on the Exchange (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 normal Exchange closing time. The Index Calculator is ultimately responsible as to whether a certain day is a Trading Day with regard to the Index or an Index Component or in any other connection relating to this document.



The "**Index Calculator**" is Solactive AG or any other appropriately appointed successor in this function.

The "**Index Currency**" is USD.

The "**Market Capitalisation**" is with regard to each of the securities in the Index on a Selection Day the share class-specific Market Capitalisation for any security in the Index Universe. It is calculated as the multiplication of the shares outstanding (as sourced from data vendors) with the Trading Price of the share class as of the respective Selection Day.

A "**Business Day**" is any weekday from Monday through Friday.

The "**Adjustment Day**" is the close of the first Wednesday in February, May, August, and November

The "**Selection Day**" is the Business Day 10 Business Days before the Adjustment Day.

A "**Market Disruption Event**" occurs if

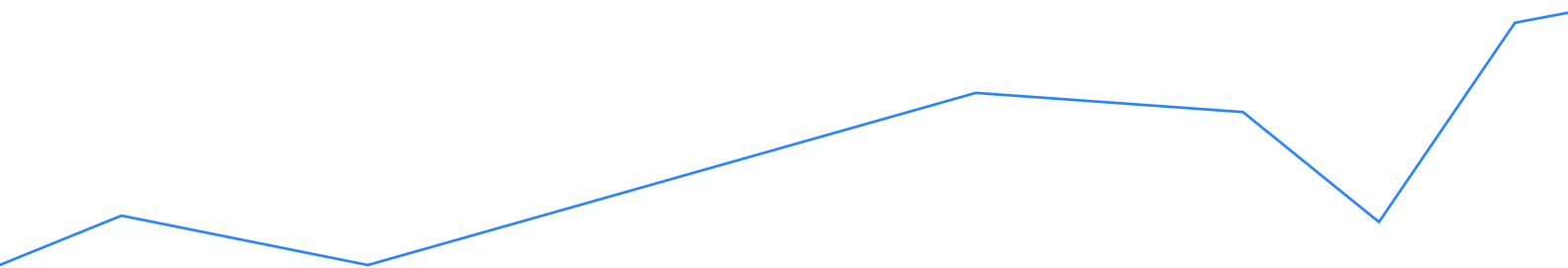
1. one of the following events occurs or exists on a Trading Day prior to the opening quotation time for an Index Component:
  - A) trading is suspended or restricted (due to price movements that exceed the limits allowed by the Exchange or an Affiliated Exchange, or for other reasons):
    - 1.1. across the whole Exchange; or
    - 1.2. in options or futures contracts on or with regard to an Index Component or an Index Component that is quoted on an Affiliated Exchange; or
    - 1.3. on an Exchange or in a trading or quotation system (as determined by the Index Calculator) in which an Index Component is listed or quoted; or
  - B) an event that (in the assessment of the Index Calculator) generally disrupts and affects the opportunities of market participants to execute on the Exchange transactions in respect of a share included in the Index or to determine market values for a share included in the Index or to execute on an Affiliated Exchange transaction with regard to options and futures contracts on these shares or to determine market values for such options or futures contracts.
2. trading on the Exchange or an Affiliated Exchange is ceased prior to the "**Normal Exchange Closing Time**", which is the time at which the Exchange or an Affiliated Exchange is normally closed on working days without taking into account after-hours trading or other trading activities carried out outside the normal trading hours. An exception to this classification as a Market Disruption Event is where the early cessation of trading is announced by the Exchange or Affiliated Exchange on this Trading Day at least one hour before
  - 2.1. the actual closing time for normal trading on the Exchange or Affiliated Exchange on the Trading Day in question or, if earlier.
  - 2.2. the closing time (if given) of the Exchange or Affiliated Exchange for the execution of orders at the time the quote is given.
3. a general moratorium is imposed on banking transactions in the country in which the Exchange is resident if the above-mentioned events are material in the assessment of the Index Calculator,



whereby the Index Calculator makes its decision based on those circumstances that it considers reasonable and appropriate.

# INDEX GUIDELINE

## Appendix



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# 5 APPENDIX

## 5.1 CONTACT DATA

### **Solactive AG**

### **German Index Engineering**

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Fax: +49 (0) 69 719 160 25

Email: [info@solactive.com](mailto:info@solactive.com)

## 5.2 CHANGES IN CALCULATION METHOD

The application by the Index Calculator of the method described in this document is final and binding. The Index Calculator shall apply the method described above for the composition and calculation of the Index. However, it cannot be excluded that the market environment, supervisory, legal, financial or tax reasons may require changes to be made to this method. The Index Calculator may also make changes to the terms and conditions of the Index and the method applied to calculate the Index that it deems to be necessary and desirable in order to prevent obvious or demonstrable error or to remedy, correct or supplement incorrect terms and conditions. The Index Calculator is not obliged to provide information on any such modifications or changes. Despite the modifications and changes, the Index Calculator will take the appropriate steps to ensure a calculation method is applied that is consistent with the method described above.