



BNP PARIBAS
CORPORATE & INSTITUTIONAL BANKING

BNP PARIBAS INDICES
INDEX METHODOLOGY SUPPLEMENT
Optimized Roll Energy EUR-Hedged Total Return
Index

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This document (the “**BNP Paribas Index Methodology Supplement**”) supplements, forms a part of and is subject to the BNP Paribas Index Handbook (the “**Handbook**”), as may be amended, supplemented, replaced or superseded from time to time. The current version of the Handbook and all supplements thereto are available at <https://indx.bnpparibas.com/>.

The Handbook and this BNP Paribas Index Methodology Supplement together comprise the “**BNP Paribas Index Rules**” for each BNP Paribas Index described herein. In the event of an inconsistency, the following order of precedence will prevail for the purposes of each BNP Paribas Index described herein: (i) this BNP Paribas Index Methodology Supplement, (ii) a supplement, Technical Annex or other document that does not form part of the Handbook, but is incorporated by reference and by its terms applies to certain features of each BNP Paribas Index described herein, and (iii) the terms used herein, but not defined, bear the meaning set forth in the Handbook, any supplement thereto, or in any applicable Technical Annex.

The BNP Paribas Index Rules will be made available upon request and, if applicable, subject to confidentiality or other agreements between BNP Paribas and the relevant party. Any information provided with respect to a BNP Paribas Index or the BNP Paribas Index Rules is provided on a confidential basis and solely for information purposes. By accepting a copy of the BNP Paribas Index Rules, you agree that you will not disclose, reproduce, redistribute or transmit, in whole or in part, the BNP Paribas Index Rules without the written consent of the Index Sponsor.

BNP Paribas reserves the right to amend, supplement, replace or supersede the BNP Paribas Index Rules from time to time and shall have no liability for any such amendment or adjustment. The BNP Paribas Index Rules are subject to change at any time. Any subsequent version of the BNP Paribas Index Rules will supersede all previous versions.

Nothing contained in the BNP Paribas Index Rules should be construed as an offer or solicitation of any transaction.

Objective of the BNP Paribas Index Methodology

The objective of the Optimized Roll Energy EUR-Hedged Total Return Index (the “**BNP Paribas Index**”) and the strategy and methodology related thereto (the “**BNP Paribas Index Methodology**”) is to provide total return FX-hedged exposure in EUR to the Optimized Roll Energy Excess Return Index (the “**Index Component**”).

a Currency Conversion Mechanism is applied to provide exposure in the BNP Paribas Index Currency, to the performance of the Index Component measured in the Index Component Currency, while minimizing the impact of the fluctuations of the level of the exchange rate between the Index Component Currency and the BNP Paribas Index Currency.

The Currency Conversion Mechanism involves the use of Spot FX transactions.

Calculation of the BNP Paribas Index Level

On each BNP Paribas Index Level Calculation Date, the Index Calculation Agent calculates the BNP Paribas Index Level for the BNP Paribas Index in accordance with the provisions of the BNP Paribas Index Rules and as described below.

On each BNP Paribas Index Level Calculation Date, the BNP Paribas Index Level for the BNP Paribas Index is equal to the product of the BNP Paribas Index Level from the immediately preceding BNP Paribas Index Level Calculation Date, multiplied by the performance of the Excess Return FX-Hedged Index Level (as calculated in accordance with the provisions of Section 2 (*Calculation of the Excess Return FX-Hedged Index Level*) of Annex 1), to which overnight interest, calculated using Reference Rate 1, is added.

On each BNP Paribas Index Level Calculation Date, the Excess Return FX-Hedged Index Level is equal to the product of 1/ the Excess Return FX-Hedged Index Level as of the immediately

preceding BNP Paribas Index Level Calculation Date, 2/ the sum of a/ the performance of the Index Component observed from the immediately preceding BNP Paribas Index Level Calculation Date, expressed in the BNP Paribas Index Currency, and b/ one.

The Index Components:

The BNP Paribas Index is comprised of a synthetic portfolio of assets. There is no actual portfolio of assets to which any person is entitled or has any ownership interest. The BNP Paribas Index does not entail the actual execution of any transactions with respect to the Index Components.

The Index Component of the BNP Paribas Index is the Optimized Roll Energy Excess Return Index, as sponsored by BNP Paribas and calculated by S&P Dow Jones Indices LLC. The objective of the Index Component is to provide a broad and diversified commodity exposure, tracking the performance of a basket of commodities.

Additional information in respect of the Index Component is contained within the Index Component rules, a copy of which is available on request from the Index Sponsor on request.

Index Fees:

The BNP Paribas Index does not incorporate any charges, costs, expenses or fees (the “**Index Fees**”).

BNP Paribas Index Definitions

BNP Paribas Index:	Optimized Roll Energy EUR-Hedged Total Return Index, as published on Bloomberg page <EBCIENEU Index>.
BNP Paribas Index Launch Date	20 Oct 2020
BNP Paribas Index Start Date	15 May 2001
Index Calculation Agent:	S&P Dow Jones Indices LLC
Weighting Determination Agent:	Not Applicable
BNP Paribas Index Status:	Public Index
Benchmark Family:	Commodity Indices
BNP Paribas Index Currency:	EUR
BNP Paribas Index Features	
Return Type:	Total Return
Rebalancing:	Not Applicable
Weighting Determination Dates:	Not Applicable
Index Fees:	Not Applicable
Currency Conversion Mechanism:	Applicable. See Annex 1
Volatility Control Mechanism:	Not Applicable
Calculation and Publication of the BNP Paribas Index Level:	
Initial BNP Paribas Index Level:	100 as of the BNP Paribas Index Start Date.
Frequency of calculation of BNP Paribas Index Level:	Each BNP Paribas Index Level Calculation Date

BNP Paribas Index Publication Date:	The Business Day following each BNP Paribas Index Level Calculation Date t
BNP Paribas Index Publication Page:	Bloomberg page: EBCIENEU <Index>
Website where current composition of the BNP Paribas Index is published:	indx.bnpparibas.com

Price Disrupted Days:

Section 4.3 of the Handbook (*Price Disrupted Days*) will be deleted in its entirety and replaced with the following:

“4.3 Price Disrupted Days

“If any Scheduled BNP Paribas Index Business Day is a Price Disrupted Day in respect of one or more BNP Paribas Index Components (each an “**affected BNP Paribas Index Component**”), then the Index Calculation Agent will postpone calculation of the BNP Paribas Index Level to the next Scheduled BNP Paribas Index Business Day which is not a Price Disrupted Day, for a period not exceeding the Maximum Days of Disruption;

provided that if each subsequent Scheduled BNP Paribas Index Business Day is also a Price Disrupted Day up to and including the Maximum Number of Days of Price Disruption, the Index Calculation Agent will contact the Index Sponsor, who will determine whether or not the circumstances causing the Price Source Disruption constitute a BNP Paribas Index Adjustment Event, and:

- (i) if a BNP Paribas Index Adjustment Event has occurred, the Index Sponsor will determine the consequence of the BNP Paribas Index Adjustment Event in accordance with the provisions of Section 5.2 (*Consequences of a BNP Paribas Index Adjustment Event*); or
- (ii) if a BNP Paribas Index Adjustment Event has not occurred, the Index Calculation Agent shall resume regular calculation and publication of the BNP Paribas Index Level and rebalancing of BNP Paribas Index Level and rebalancing of the BNP Paribas Index using the last value which was available for the affected BNP Paribas Index Component(s), or if the Index Sponsor determines that the use of the last value for the affected BNP Paribas Index Component(s) would result in a BNP Paribas Index Level that is not consistent with the strategy and objective of the BNP Paribas Index, use its good faith estimate of the value that would prevail on such day but for the occurrence of the Price Disrupted Day and calculate and publish the BNP Paribas Index Level and rebalance the BNP Paribas Index accordingly.”

The definition of “*Price Disrupted Day*” in the Handbook shall be deleted in its entirety and replaced with the following:

“Price Disrupted Day” means any relevant Scheduled Trading Day on which a Price Source Disruption has occurred or is continuing in respect of a BNP Paribas Index Component.”

Amended definitions and provisions applicable to the BNP Paribas Index:

The defined terms in the Master Definitions Annex of the Handbook below shall be replaced as follows:

“Scheduled Trading Day” means each London and New York Business Day.

Bespoke definitions and provisions applicable to the BNP Paribas Index:

The following new definition shall be added to the Handbook:

“London and New York Business Day” means a day (other than a Saturday or Sunday) on which commercial banks are open for general business (including dealings in foreign exchange and foreign currency deposits) in London and in New York City.

Date offsets:

For any BNP Paribas Index Level Calculation Date t , and for any integer value j , $t + j$ (respectively $t - j$) refers to the BNP Paribas Index Level Calculation Date that is j BNP Paribas Index Level Calculation Dates following (respectively preceding) BNP Paribas Index Level Calculation Date t . For example, $t - 1$ refers to the BNP Paribas Index Level Calculation Date immediately preceding BNP Paribas Index Level Calculation Date t , and $t - 2$ refers to the BNP Paribas Index Level Calculation Date immediately preceding BNP Paribas Index Level Calculation Date $t - 1$.

Annex 1

The BNP Paribas Index Methodology for the Optimized Roll Energy EUR-Hedged Total Return Index:

On each BNP Paribas Index Level Calculation Date, the following calculations and determinations will be made by the Index Calculation Agent for the BNP Paribas Index:

1. Calculation of the BNP Paribas Index Level

On each BNP Paribas Index Level Calculation Date t , the BNP Paribas Index Level shall be determined in accordance with the following formulae:

$$IDX_{t_0} = 100$$

And

$$IDX_t = IDX_{t-1} \times \left(\frac{ERFX_t}{ERFX_{t-1}} + rate_{t-1} \times \frac{ACT(t, t-1)}{360} \right)$$

Where:

- t_0 means the BNP Paribas Index Start Date;
- $ERFX_t$ is the Excess Return FX-Hedged Index Level on BNP Paribas Index Level Calculation Date t , calculated in accordance with the provisions of Section 2 (*Calculation of the Excess Return FX-Hedged Index Level*); and
- $rate_{t-1}$ means Reference Rate 1, as published on BNP Paribas Index Level Calculation Date $t - 1$.

2. Calculation of the Excess Return FX-Hedged Index Level

On each BNP Paribas Index Level Calculation Date t , the Excess Return FX-Hedged Index Level shall be determined in accordance with the following formulae:

$$ERFX_{t_0} = 100$$

And

$$ERFX_t = ERFX_{t-1} \times \left(1 + \frac{FXS_t}{FXS_{t-1}} \times \left(\frac{IC_t}{IC_{t-1}} - 1 \right) \right)$$

Where:

- t_0 means the BNP Paribas Index Start Date;
- FXS_t is the Settlement Price of Reference Rate 2 on BNP Paribas Index Level Calculation Date t ; and
- IC_t is the Settlement Price for the Index Component on BNP Paribas Index Level Calculation Date t .

Annex 2

Table 1 – Index Components

i	Index Component	Type	Pricing Page	Index Component Currency	/ Price Source
1	Optimized Roll Energy Excess Return Index	Commodity index	Bloomberg : EBCIENER Index	USD	BNP Paribas

Table 2 – Reference Rates

i=	Reference Rate	Designated Maturity / Settlement Price	Currency	Price Source	Pricing Page
1	ESTR	Overnight	EUR	European Money Markets Institute	BBG: ESTRON Index
2	Spot Rate for currency conversion	The rate appearing at 4:00pm London Time under “USD Closing Prices” opposite the Currency’s code in the “Mid” column	EUR to USD	Refinitiv Benchmark Services (UK) Limited	Bloomberg Screenpage WMCO