

Macquarie Single Commodity (Non-USD) Indices

**Index Manual
January 2020**

IMPORTANT INFORMATION

BASIS OF PROVISION

This document (the **Index Manual**) sets out the rules for the Macquarie Single Commodity (Non-USD) Indices (each, an **Index**) and reflects the methodology for determining the composition and calculation of each Index (the **Methodology**). The Methodology and each Index derived from this Methodology are the exclusive property of Macquarie Bank Limited (the **Index Administrator**). The Index Administrator owns the copyright and all other rights to the Indices. They have been provided to you solely for your internal use and you may not, without the prior written consent of the Index Administrator, distribute, reproduce, in whole or in part, summarize, quote from or otherwise publicly refer to the contents of the Methodology or use it as the basis of any financial instrument.

For the purposes of the remainder of this document, each reference to the Index in singular form shall be interpreted as being applicable to each Index covered by this Index Manual.

SUITABILITY OF INDEX

The Index and any financial instruments based on the Index may not be suitable for all investors and any investor must make an independent assessment of the appropriateness of any transaction in light of their own objectives and circumstances including the potential risks and benefits of entering into such a transaction. If you are in any doubt about any of the contents of this document, you should obtain independent professional advice.

This Index Manual assumes the reader is a sophisticated financial market participant, with the knowledge and expertise to understand the financial mathematics and derived pricing formulae, as well as the trading concepts, described herein. Any financial instrument based on the Index is unsuitable for a retail or unsophisticated investor.

RISK FACTORS

See the risk factors relating to Macquarie indices in the document headed “Macquarie Indices – Risk Factors” provided to you with this Index Manual (the **Risk Factors**). Investors should note in particular the following sections of such document: Part 1 (*General Risk Factors*), Part 2.2 (*Commodity Indices*) and Part 2.3 (*Single Futures Indices*).

HISTORICAL DATA

The Index has been calculated since the Index Live Date but historical levels have been produced by a back-test process from the Index Start Date. For more information, see Section 7.3 (*Historical Values of the Index*).

CONFLICTS AND USE OF DISCRETION

For operational reasons the Index may, in limited circumstances, permit the exercise of discretion by the Index Calculation Agent (acting in good faith and in a commercially reasonable manner). For further information see Section 5.4 (*Discretion*).

For information on potential conflicts, see Section 6.3 (*Conflicts*).

CESSATION OR MODIFICATION OF THE INDEX

If you have been granted written consent by the Index Administrator to reference the Index in any contract or financial instrument, you should include in such contract or financial instrument robust fallback provisions to deal with cessation or material modification of the Index.

For information on corrections, changes and cessation of the Index, see Section 5 (*Corrections, Changes, Cessation and Discretion*).

DISCLAIMER OF LIABILITY

The Methodology is published for information purposes only and does not create any legally binding obligation on the part of the Index Administrator, the Index Calculation Agent and/or their affiliates. This document is intended to provide a summary of the Index it purports to describe. The Index Administrator expressly disclaims (to the fullest extent permitted by applicable law) all warranties (express, statutory or implied) regarding this document and the Methodology or the Index, including but not limited to, all warranties of merchantability, fitness for a particular purpose (including investment by regulated funds) and all warranties arising from course of performance, course of dealing or usage of trade and their equivalents under applicable laws of any jurisdiction. In particular, the Index Administrator and Index Calculation Agent do not warrant or guarantee the completeness or accuracy of the Index or timeliness of calculations of any Index Level and do not warrant or guarantee the availability of any Index Level on any particular date or at any particular time. The Index Administrator and the Index Calculation Agent shall have no liability to any person for delays, omissions or interruptions in the delivery of any Index, including as a result of the failure of prices to be published in respect of any Component, an underlying Contract or, as applicable, any other reference value or as a result of a Contract failing to trade for any reason. Although the Index Calculation Agent will obtain information concerning Components and or reference values from publicly available sources it believes to be reliable, it will not independently verify this information. Accordingly, no representation, warranty or undertaking (express or implied) is made by the Index Administrator or the Index Calculation Agent as to the accuracy and completeness of information concerning any Index.

In particular, the Index Administrator and the Index Calculation Agent shall not be liable (whether in contract, tort or otherwise) for any losses (including direct, indirect, special, punitive or other damages (including loss of profits)) resulting from (i) any determination that a Market Disruption Event, an Adjustment Event or an Error has occurred or has not occurred, (ii) the timing relating to the determination that a Market Disruption Event, an Adjustment Event or an Error has occurred, or (iii) any actions taken or not taken by the Index Calculation Agent or the Index Administrator as a result of a determination that a Market Disruption Event, an Adjustment Event or an Error has occurred.

TABLE OF CONTENTS

IMPORTANT INFORMATION	2
Basis of Provision	2
Suitability of Index.....	2
Risk Factors.....	2
Historical Data	2
Conflicts and Use of Discretion	3
Cessation or Modification of the Index	3
Disclaimer of Liability	3
SECTION 1: OVERVIEW	6
1.1 Introduction and Index Objective.....	6
1.2 Index Calculation	6
1.3 Index Specifications.....	7
1.4 Methodology	7
SECTION 2: INDEX METHODOLOGY	8
2.1 Roll Weights Calculation	8
2.2 Daily Index Calculation	10
SECTION 3: MARKET DISRUPTION EVENTS AND ADJUSTMENT EVENTS	12
3.1 Market Disruption Events.....	12
3.2 Roll Weight Calculation under Market Disruption Events	12
3.3 Adjustment Events.....	13
SECTION 4: DEFINITIONS	15
SECTION 5: CORRECTIONS, CHANGES, CESSATION AND DISCRETION	19
5.1 Corrections and Error Handling.....	19
5.2 Changes in Methodology.....	20
5.3 Cessation of Index.....	20
5.4 Discretion.....	20
SECTION 6: OVERSIGHT, ROLES, CONFLICTS AND REVIEWS	22
6.1 Index Governance	22
6.2 Index Administrator and Index Calculation Agent.....	22
6.3 Conflicts.....	23
6.4 Reviews.....	24
SECTION 7: GENERAL INFORMATION	25

7.1	Valuation and Calculations.....	25
7.2	Publication of Index Level.....	25
7.3	Historical Values of the Index.....	25
SECTION 8: NOTICES AND DISCLAIMERS		26
8.1	Regulatory Status.....	26
8.2	Not Research or an Offer.....	26
8.3	Third-Party Disclaimer	26
ANNEX A INDEX SPECIFICATIONS.....		27

SECTION 1: OVERVIEW

1.1 INTRODUCTION AND INDEX OBJECTIVE

Each Index aims to provide a return based on a notional investment in futures contracts (each, a **Component**) on an individual commodity (a **Commodity**). Physical commodities are not easily investable on a direct and replicable basis. However, futures contracts on commodities represent a widely utilized synthetic proxy for direct investment in commodities. For this reason, each Index is constituted of, and reflects the price performance of, a Component comprised of a notional exchange traded futures contract (a **Contract**) relating to a physical commodity. In order to ensure the continuity of each Index, when the Contract that underlies a Component of an Index approaches expiration, it will be replaced by an identical Contract with a later expiration (which process is referred to as the Index “rolling” from one Contract into the next Contract). Each Index thus synthetically tracks a sequence of Contracts relating to a Commodity (the universe of tradable calendar futures contracts on a Commodity, known as the “futures curve”). Accordingly, each Index will represent systematic and replicable benchmarks for investment in an individual Commodity.

Each Index replicates the returns obtained by holding a Component (or, during a Roll Period, more than one Component) that represents a specified Contract (or, during a Roll Period, more than one Contract) from one Index Business Day to the next. The Contract(s) associated with each Index will change through time, with Contracts being removed and added according to the Methodology described in Section 2 (*Index Methodology*).

The Indices are designed to be replicable and are calculated daily in an excess return format. To facilitate an understanding of the calculations, the Methodology contains certain worked examples which demonstrate the types of calculations needed to calculate the level of an Index on a particular date – See Section 2 (*Index Methodology*).

1.2 INDEX CALCULATION

The Indices are calculated and maintained by the Index Calculation Agent and supervised by the Index Administrator and the Index Oversight Committee, as described in Section 6 (*Oversight, Roles, Conflicts and Reviews*). All determinations with regard to the Indices are made following the rules set out in this document, without discretion by the Index Administrator or the Index Calculation Agent, other than in the limited circumstances set out in this document – see Section 5 (*Corrections, Changes, Cessation and Discretion*) for further information.

In respect of each Index, the Index Level as of the Index Start Date is equal to the Index Start Level specified in Section 4 (*Definitions*). Thereafter, each Index Level is calculated as set out in Section 2 (*Index Methodology*).

The Indices are not based upon submissions provided by third parties (or an affiliate of the Index Administrator or the Index Calculation Agent). The Indices are based upon actual transaction data sourced from regulated markets and exchanges.

1.3 INDEX SPECIFICATIONS

Each Index is differentiated by the Index Specifications corresponding to that Index. The Index Specifications set out (i) certain parameters specific to an Index (such as the Index Name, Bloomberg Ticker, the Index Calendar, the Index Start Date and the Index Start Level,), (ii) the Commodity on which such Index is based, (iii) the Index Currency and (iv) the parameters that determine the timing of rolling from one Contract into the next Contract (i.e. the Roll Start Date and the Roll Length), and (v) the calendar contracts that the Index will roll into (i.e. the Static Contract Roll Schedule). Accordingly, the Index Specifications determine exposure to a particular part of the futures curve of a commodity and the Index will reflect the performance of such point on the curve.

The Index Administrator may, at any time, commence calculation and publication of new Indices pursuant to the Methodology. In such circumstances the Index Administrator will publish a revised version of the Methodology, revised only to augment Annex A (*Index Specifications*) with the new Index Specifications relating to the new Indices.

1.4 METHODOLOGY

The Methodology for calculating the Index is described in the Section 2 (*Index Methodology*).

To facilitate an understanding of the calculations, the Methodology contains certain worked examples, which demonstrate the types of calculations needed to calculate the Index Level on a particular date – see Sections 2.1 and 2.2.

SECTION 2: INDEX METHODOLOGY

On a daily basis, each Index replicates the returns obtained by holding a Component (or, during a Roll Period, more than one Component) that represents a specified Contract (or, during a Roll Period, more than one Contract) from one Index Business Day to the next. The Contract(s) associated with each Index will change through time, with Contracts being removed and added according to a calendar month contract schedule that is part of the set of parameters specified in its Index Specification, as described in more detail in Section 2.1 (*Roll Weights Calculation*) below.

The following sections detail how the Index Calculation Agent will calculate the Index Level of each Index on each Index Business Day, based on the inputs set out in the relevant Index Specifications.

Section 2.1 (*Roll Weights Calculation*) describes how the weights of the new Contract and the expiring Contract are determined; and

Section 2.2 (*Daily Index Calculation*) describes the daily calculation of the Index Level.

2.1 ROLL WEIGHTS CALCULATION

Futures contracts have fixed expiry dates, after which trading comes to an end. In order to accurately reflect a financial investment in a physical commodity, futures contracts are removed from the basket which is tracked by the Index prior to their expiry in a process called “rolling” the futures contracts.

Contracts are rolled on the close of each business day and over a series of business days (the **Roll Period**, as defined in Section 4 (*Definitions*)). Rolling entails adjusting the Contracts the Index references to reduce exposure to the Contract which is scheduled to expire (the **Contract Rolling Out**) and increase exposure to a further dated Contract (the **Contract Rolling In**). Thus, during the Roll Period the Index will reference more than one Contract, with the proportion of exposure to each Contract changing on the close of each business day. This is achieved by applying a weight (the **Roll Weight**) to each Contract, which will change throughout the Roll Period to reflect the changing composition of Contracts associated with the Index.

The Roll Weight allocates exposure between the Contract Rolling Out and the Contract Rolling In on each Index Business Day. The Roll Weight, RW_t , in respect of an Index Business Day, t , is calculated according to the following formula:

(A) If the Index Business Day, t , is outside a Roll Period:

$$RW_t = 1$$

(B) If the Index Business Day, t , is during a Roll Period:

$$RW_t = RW_{t-1} - RF$$

Where:

RF is the Roll Fraction and is defined in Section 4 (*Definitions*).

(C) If a Market Disruption Event occurs, each Contract will have its roll postponed, as described in Section 3.2 (*Roll Weight Calculation under Market Disruption Events*).

Worked Example of Roll Weights Calculation:

For example, the Macquarie Single Commodity UK Natural Gas (FN) ER Index has a Roll Period that starts 6 Index Business Days prior to the start of each month and has a Roll Length of fifteen (15) Index Business Days.

The Roll Weights calculations for December 2019 are then calculated as follows:

	Date	Business Day	Roll Weight	Contract Rolling Out	Contract Rolling In
	19-Nov-19	-8	1	FNF20	FNG20
	20-Nov-19	-7	1	FNF20	FNG20
Roll Period (Business Day -6 to 9)	21-Nov-19	-6	0.933333	FNF20	FNG20
	22-Nov-19	-5	0.866667	FNF20	FNG20
	25-Nov-19	-4	0.8	FNF20	FNG20
	26-Nov-19	-3	0.733333	FNF20	FNG20
	27-Nov-19	-2	0.666667	FNF20	FNG20
	29-Nov-19	-1	0.6	FNF20	FNG20
	02-Dec-19	1	0.533333	FNF20	FNG20
	03-Dec-19	2	0.466667	FNF20	FNG20
	04-Dec-19	3	0.4	FNF20	FNG20
	05-Dec-19	4	0.333333	FNF20	FNG20
	06-Dec-19	5	0.266667	FNF20	FNG20
	09-Dec-19	6	0.2	FNF20	FNG20
	10-Dec-19	7	0.133333	FNF20	FNG20
	11-Dec-19	8	0.066667	FNF20	FNG20
	12-Dec-19	9	0	FNF20	FNG20
	13-Dec-19	10	1	FNG20	FNH20
	16-Dec-19	11	1	FNG20	FNH20
	17-Dec-19	12	1	FNG20	FNH20
	18-Dec-19	13	1	FNG20	FNH20

Established market practice is that indices based on futures contracts are rolled over multiple days, generally starting on the fifth (5th) Index Business Day of each month and continuing over five (5) days. This convention may be changed in order to obtain exposure to specific market mechanics, for example rolling over more than five days in order to further lessen the exposure of the roll to market movements in any one particular day.

2.2 DAILY INDEX CALCULATION

The Index is available in an Excess Return format. The Excess Return Index represents the performance of a synthetic, unfunded exposure to the Contracts in an Index; that is, the Index tracks what an investor would receive if it purchased or sold the futures contracts underlying the Index without taking into consideration the cost of investment capital.

On an Index Business Day, t , the Excess Return level of the Index (the **Index Level**, I_t) is calculated (rounded to eight decimal points) based on the Index Level on the immediately preceding Index Business Day, I_{t-1} , and the Index Daily Return, IDR_t (as defined below), according to the following formula:

$$I_t = I_{t-1} \times (1 + IDR_t).$$

The **Index Daily Return**, IDR_t , is calculated according to the following formula (with the numerator and denominator rounded to eight decimal points respectively):

$$IDR_t = \frac{RW_{t-1} \times HRO_{t-1} \times PRO_t + (1 - RW_{t-1}) \times HRI_{t-1} \times PRI_t}{RW_{t-1} \times HRO_{t-1} \times PRO_{t-1} + (1 - RW_{t-1}) \times HRI_{t-1} \times PRI_{t-1}} - 1$$

Where:

RW_{t-1}	is the Roll Weight, in respect of the Index Business Day immediately preceding the Index Business Day, t , and is defined in Section 2.1 (<i>Roll Weights Calculation</i>);
HRO_{t-1}	is the Holding Rolling Out, in respect of the Index Business Day immediately preceding the Index Business Day, t , and is defined in Section 4 (<i>Definitions</i>);
HRI_{t-1}	is the Holding Rolling In, in respect of the Index Business Day immediately preceding the Index Business Day, t , and is defined in Section 4 (<i>Definitions</i>);
PRO_t	is the Contract Price of the Contract Rolling Out, in respect of the Index Business Day immediately preceding the Index Business Day, t , on the Index Business Day, t ;
PRI_t	is the Contract Price of the Contract Rolling In, in respect of the Index Business Day immediately preceding the Index Business Day, t , on the Index Business Day, t ;
PRO_{t-1}	is the Contract Price of the Contract Rolling Out, in respect of the Index Business Day immediately preceding the Index Business Day, t , on the Index Business Day immediately preceding the Index Business Day, t ; and
PRI_{t-1}	is the Contract Price of the Contract Rolling In, in respect of the Index Business Day immediately preceding the Index Business Day, t , on the Index Business Day immediately preceding the Index Business Day, t .

The Index Start Date of an Index as well as the Index Start Level, which is the Index Level in respect of the Index Start Date, are defined in Section 4 (*Definitions*).

Worked Example of Daily Index Calculation:

For example, for the Macquarie Single Commodity UK Natural Gas (FN) ER Index, the Daily Index Calculation in respect of December 3rd, 2019 is as follows:

- The immediately preceding Index Business Day is December 2nd
- The Contract Rolling out is the January 2020 UK Natural Gas contract
- The Contract Rolling in is the February 2020 UK Natural Gas contract
- The Roll Weight in respect of December 2nd, is 0.533333333
- The Holding Rolling Out and Holding Rolling In are equal to 1
- The Index Level in respect of December 2nd is 0.11268636
- The prices for the Contract Rolling Out and the contract Rolling In are as follows:

	Contract Rolling Out	Contract Rolling In
2 nd December 2019	41.27	42.03
3 rd December 2019	41.17	41.83

- The calculation of the Index Daily Return is therefore:

$$\frac{41.17 \times 1 \times 0.533333333 + 41.83 \times 1 \times 0.466666667}{41.27 \times 1 \times 0.533333333 + 42.03 \times 1 \times 0.466666667} - 1 = 0.996476448259846 - 1$$

The Excess Return Index Level in respect of December 3rd is therefore, 0.11228930.

SECTION 3: MARKET DISRUPTION EVENTS AND ADJUSTMENT EVENTS

Each Macquarie Single Commodity Index is comprised of one or more Contracts on a particular Commodity. On any given Index Business Day, disruptions can occur that prevent these Contracts from being traded. When this happens, it is necessary for the calculations of the affected Index to be adjusted, so that it remains replicable by market participants, i.e. adjustments must be made to the Index calculations to ensure that the Index Levels reflect Contract prices that were attainable in the market at the times they would need to be traded in order to replicate the performance of the Index.

During a Roll Period, this is generally achieved by delaying any changes to the composition of each affected Index. On any other Index Business Day, given replication of an Index does not require trading of Contracts on such days, in the event that a price is not available for a Contract, a price will be appropriately substituted in order for the calculations in respect of a particular Index Business Day to take place.

3.1 MARKET DISRUPTION EVENTS

With respect to the daily calculation of an Index, a “**Market Disruption Event**” means the occurrence of one or more of the following events, as determined by the Index Calculation Agent:

- (i) a material limitation, suspension, or disruption of trading in one (or more) of the Contracts underlying the Index which results in a failure by the relevant Trading Facility to report or announce a settlement price for such Contract on the day on which such event occurs or any succeeding day on which it continues to occur;
- (ii) the settlement price published by the relevant Trading Facility for one (or more) Contract underlying the Index is a “limit price”, which typically means that the Trading Facility published settlement price for such Contract for a trading day has increased or decreased from the previous trading day’s settlement price by the maximum amount permitted under applicable rules of the Trading Facility; and
- (iii) any other event, if the Index Calculation Agent reasonably determines that the event materially interferes with the ability of market participants to hedge the Index.

3.2 ROLL WEIGHT CALCULATION UNDER MARKET DISRUPTION EVENTS

When a Market Disruption Event occurs during a Roll Period, the approach taken by the Index Calculation Agent is to delay changes to the Index composition until the Market Disruption Event affecting the Index has concluded, provided that in the event that a Market Disruption Event continues for multiple days, the Index Calculation Agent will make a good faith determination in respect of the market price to be attributed to the affected Contracts.

If, on an Index Business Day during a Roll Period, t, a Market Disruption Event occurs, then one (or more) underlying Contract affected by the Market Disruption Event will have its roll postponed according to the following methodology:

- (i) For each Commodity i not affected by the Market Disruption Event, the Roll Weight, $RW_{i,t}$ is defined in the usual course, as in Section 2.
- (ii) For each Commodity i affected by the Market Disruption Event, the Roll Weight, $RW_{i,t}$, will be set equal its previous value, i.e., $RW_{i,t} = RW_{i,t-1}$.
- (iii) The Roll Weight on subsequent Index Business Days not affected by a Market Disruption Event will be determined without taking into account the Index Business Days on which a Market Disruption Event occurred or was continuing.

In the event that the Roll Period ends without the Roll Weight being fully redistributed into the Contract Rolling In, then the Roll Period is extended until there is no Market Disruption Event, provided that if the Roll Period is extended by five (5) days and the Market Disruption Event is still continuing on the fifth day, then on such fifth day the Index Calculation Agent will determine in its sole discretion subject to the approval of the Index Oversight Committee its good faith estimate of the Contract Price in order to effect that portion of the roll. It is anticipated, however, that the Index Calculation Agent will only need to make such determination under extraordinary circumstances.

3.3 ADJUSTMENT EVENTS

If an Adjustment Event occurs, the Index Calculation Agent may, but shall not be obliged to, take one or more of the following steps, with the approval of the Index Oversight Committee:

- (a) substitute the Component, if applicable, affected by the Adjustment Event with an asset which has similar characteristics and make such adjustments to the Index as are necessary, if any, in order to account for the substitution;
- (b) make such adjustments to the Index (including to any of the weights or values of the Component or to the Index Level) and/or alter the methodology or specifications of the Index, in such a way as to ensure that the Index accurately represents a financial investment in the relevant Commodity; or
- (c) if no such adjustment or alteration could be made to preserve the objective of the Index, discontinue the Index.

Adjustment Event means a Replicability Event or a Component Change Event.

Replicability Event means that on or after the Index Live Date (a) due to the adoption of or any change in any applicable law or regulation, or (b) due to the promulgation of or any change in the interpretation by any court, tribunal or regulatory authority with competent jurisdiction of any applicable law or regulation, the Index Oversight Committee determines that it has become illegal or impractical (or where there is a reasonable likelihood that, within the next 30 Index Publication Days, it will become illegal or impractical) for one or more Dealers to hold, acquire, short sell or dispose of:

- (i) one or more Components;
- (ii) any instrument or security on which the value of a Component depends; or
- (iii) any instrument or security which is required to replicate the calculation methodology of the Index (including, but not limited to, interest rates and FX rates, if applicable).

Component Change Event means:

- (i) The specifications of a Contract are altered by the relevant Trading Facility in such a way as to materially affect the ability of the Index to represent a financial investment in the relevant Commodity; or
- (ii) Contracts referencing the relevant Commodity are no longer traded on the relevant Trading Facility.

SECTION 4: DEFINITIONS

Adjustment Event is defined in Section 3.3 (*Adjustment Events*).

Affected Index Level is defined in Section 5.1.1 (*Errors*).

Bloomberg Ticker, in respect of an Index, is the ticker under which the relevant Index Level will be published, as specified in the relevant Index Specifications.

Calculation Error is defined in Section 5.1.1 (*Errors*).

Commodity, in respect of an Index, is the physical commodity that underlies the Contract referenced by the Index, as specified in the relevant Index Specifications.

Component, in respect of an Index, means each Contract.

Component Change Event is defined in Section 3.3 (*Adjustment Events*).

Contract, in respect of an Index, is a futures contract traded on the Trading Facility of such Index and having a Commodity as underlying.

Contract Prices, in respect of an Index Business Day, are the prices of the Contract Rolling In and the Contract Rolling Out, published by the relevant Trading Facility and referred to by the Trading Facility as the settlement price for that particular Contract. If the Index Business Day is not a trading day of the relevant Trading Facility, then the Settlement Price of that particular Contract will be the most recent available price on the most recent Index Business Day.

Contract Rolling In, in respect of a Commodity on an Index Business Day, is the Contract specified in the Static Contract Schedule Table of the Index Specification for the calendar month immediately following — with January following December — the calendar month with which the upcoming Roll Period (relative to that particular Index Business Day) is associated. The Contract Rolling In represents the Contract to which the Index is exposed during and subsequent to the Roll Period in which the Index rolls its exposure from the Contract Rolling Out to the Contract Rolling In.

Contract Rolling Out, in respect of a Commodity on an Index Business Day, is the Contract specified in the Static Contract Schedule Table of the Index Specification for the calendar month with which the upcoming Roll Period (relative to that particular Index Business Day) is associated. The Contract Rolling Out represents the Contract to which the Index is exposed prior to and during the Roll Period in which the Index rolls its exposure from the Contract Rolling Out to the Contract Rolling In.

Error is defined in Section 5.1.1 (*Errors*).

Holding Rolling In, in respect of an Index and an Index Business Day, is a multiplier used in calculating the Index Level, and is defined as equal to 1. The Holding Rolling In represents the exposure of the Index to the Contract Rolling In.

Holding Rolling Out, in respect of an Index and an Index Business Day, is a multiplier used in calculating the Index Level, and is defined as equal to 1. The Holding Rolling Out represents the exposure of the Index to the Contract Rolling Out.

Index is defined in the section entitled “Important Information”.

Index Administrator is defined in the section entitled “Important Information”.

Index Business Days, in respect of an Index, are the days in the Index Calendar.

Index Calculation Agent is defined in Section 6.2.2 (*Index Calculation Agent*).

Index Calendar, in respect of an Index, is the calendar of days in respect of which an Index Level will be published, as specified in the relevant Index Specification.

Index Currency, in respect of an Index, is the currency in which the Index is quoted and is specified in the relevant Index Specification.

Input Error is defined in Section 5.1.1 (*Errors*).

Index Level, in respect of an Index and an Index Business Day, is defined in Section 2.3 (*Daily Index Calculation*) and is the level of such Index as calculated and published by the Index Calculation Agent.

Index Live Date, in respect of an Index, is the Index Business Day from which the Index is calculated on a live basis, as specified in the Index Specification.

Index Manual is defined in the section entitled “Important Information”.

Index Name, in respect of an Index, is the name that identifies such Index, as specified in the relevant Index Specifications.

Index Oversight Committee is defined in Section 8.1 (*Oversight, Roles and Conflicts*).

Index Publication Days, in respect of an Index, are the days that are in the Index Calendar.

Index Specifications is a set of variables peculiar to a particular Index, as set out in the Index Specifications table for that Index in Annex A (*Index Specifications*) hereto.

Index Start Date, in respect of an Index, is the first Index Business Day on which the Index Calculation Agent will calculate and publish an Index Level for such Index, and is specified in the relevant Index Specifications. The Index Calculation Agent may calculate, but not publish, the Index Level in respect of Index Business Days preceding the Index Start Date if that is required for calculating the Index Level of the Index on the Start Date or on following days.

Index Start Level, in respect of an Index, is the Index Level of such Index on the Index Start Date, and is 100.

Market Disruption Event is defined in Section 3.1 (*Market Disruption Events*).

Material Error is defined in Section 5.1.1 (*Errors*).

Methodology is as defined in the section entitled “Important Information”.

Publication Time is defined in Section 7.2 (*Publication of Index Level*).

Replicability Event is defined in Section 3.3 (*Adjustment Events*).

Roll Fraction, in respect of an Index, means the fraction of exposure rolled out of the Contract Rolling Out and rolled into the Contract Rolling In on each Index Business Day of the Roll Period. The Roll Fraction is equal to the inverse of the Roll Length of such Index.

Roll Length, in respect of an Index, is the number of the Index Business Days required to periodically move the exposure from the Contract Rolling Out into the Contract Rolling In. The Roll Length is specified in the relevant Index Specifications.

Roll Period, in respect of an Index and a calendar month, is the set of Index Business Days consisting of the period starting from, and including, the Roll Start Date, in respect of such Index and such calendar month, and lasting for the number of Index Business Days represented by the Roll Length, in respect of such Index.

Roll Start Date, in respect of an Index and a calendar month, is the Index Business Day on which the Index exposure periodically starts to move from the Contract Rolling Out into the Contract Rolling In. The Roll Start Date is specified in the relevant Index Specifications and is represented by a number denoting the Index Business Day that is the Roll Start Date in respect of such month. If the Roll Start Date is represented by a negative number, then the Roll Start Date is the Index Business Day that falls the specified number of Index Business Days prior to the first Index Business Day of such month. For example, if the Roll Start Date specified in respect of an Index is 5, then the Roll Start Date for that Index will be the 5th Index Business Day of each month; or if the Roll Start Date is -1, then the Roll Start Date for that Index will be the last Index Business Day of the preceding month, etc.

Roll Weight, in respect of an Index and an Index Business Day, allocates exposure between the Contract Rolling Out and the Contract Rolling In on such Index Business Day, and is defined in Section 2.1 (*Roll Weight Calculation*).

Static Contract Roll Schedule, in respect of an Index, denotes the expiring Contract of such Index that will be removed from the Index over the Roll Period of each month, starting with January and ending with December, as specified in the relevant Index Specifications. The Contract that is removed each month will be replaced with the Contract that is scheduled to be removed the following month. If a “+” sign is included next to a letter, the futures contract indicated is the one associated with the corresponding month of the year following the month in respect of which this Contract is selected. The letters translate to months according to the following table:

Month	Letter
January	F
February	G
March	H
April	J
May	K
June	M
July	N
August	Q
September	U
October	V

November	X
December	Z

On certain occasions the expiry of a contract may fall outside the month with which it is associated. In all situations the schedule will denote the month with which a futures contract is associated in its corresponding Trading Facility.

Trading Facility, in respect of an Index, is the regulated futures exchange, facility or platform on or through which the Contracts underlying such Index are traded, as specified in the relevant Index Specifications.

SECTION 5: CORRECTIONS, CHANGES, CESSATION AND DISCRETION

5.1 CORRECTIONS AND ERROR HANDLING

5.1.1 Errors

Where the Index Administrator or the Index Calculation Agent becomes aware of an Input Error or a Calculation Error (an **Error**), the cause of such error will be investigated and steps taken, to the extent practicable and within the control of the Index Calculation Agent, to prevent such errors from recurring.

If an Error is not corrected by 11.59pm, New York time, on the Index Publication Day following the occurrence of the Error, the Index Calculation Agent shall determine whether such Error affects any published Index Level (such Error, a **Material Error** and each affected Index Level, an **Affected Index Level**).

Input Error means any error in input data that is detected by, or notified to, the Index Calculation Agent.

Calculation Error means any error in the implementation of the Methodology or arising in the Index calculation and dissemination process that is detected by or notified to the Index Calculation Agent.

5.1.2 Notification of Errors

The Index Calculation Agent shall publish an announcement regarding the occurrence of any Material Error and any change to the Methodology (see Section 5.2 (*Changes in Methodology*)).

5.1.3 Restatement of Index Levels

The Index Calculation Agent will restate any Affected Index Level resulting from a Material Error in the following circumstances:

- (1) in respect of a Material Error that is an Input Error:
 - (i) if the Index Calculation Agent becomes aware of such Input Error within 2 Index Publication Days of publication of the relevant Affected Index Level; or
 - (ii) otherwise, as determined by the Index Oversight Committee.
- (2) In respect of a Material Error that is a Calculation Error:
 - (i) if the Index Calculation Agent becomes aware of such Calculation Error prior within 30 calendar days following the Index Publication Day on which the first Affected Index Level was published; or
 - (ii) otherwise, as determined by the Index Oversight Committee.

5.2 CHANGES IN METHODOLOGY

Various factors, including external factors beyond the control of the Index Administrator, might necessitate material changes to an Index. The Index Manual contains information as of the date appearing on its cover, and such information may change from time to time. No assurance can be given that the Methodology reflects information subsequent to this date.

The Index Administrator may amend the Methodology at any time if the change is (i) of a formal, minor or technical nature, (ii) to correct any manifest or proven error or (iii) where the Index Calculation Agent determines that such change is not materially prejudicial to investors in financial products (in respect of which the Index Administrator has given consent to refer to the Index).

In any other case, a change to the Methodology will be considered to be a material change and may only be made subject to the approval of the Index Oversight Committee. The Index Oversight Committee shall determine the implementation timeline for such change and the timing for notification of such change to investors (which shall generally be at least 30 calendar days prior to implementation, but may be shorter if the Index Oversight Committee so determines), which the Index Administrator will communicate to investors by email.

5.3 CESSATION OF INDEX

The Index Administrator may withdraw the Index, at any time and without notice, if no financial instruments (in respect of which Macquarie Bank Limited has given consent to refer to the Index) are outstanding. The Index Administrator may, in any case (subject to the approval of the Index Oversight Committee), withdraw an Index, without reason, provided that either (i) it notifies all investors in financial instruments (in respect of which Macquarie Bank Limited has given consent to refer to the Index) of its intention to do so by email at least 30 calendar days prior to cessation of calculation and publication of the Index or (ii) all investors in financial instruments (in respect of which Macquarie Bank Limited has given consent to refer to the Index) have agreed to the cessation of the Index and the date of such cessation.

5.4 DISCRETION

In order to ensure continuity, the methodology of this Index permits the exercise of discretion or expert judgement in certain limited circumstances as set out in this Index Manual - see the following sections:

- Section 3 (*Market Disruption Events and Adjustment Events*); and
- Section 5 (*Corrections, Changes, Cessation and Discretion*).

The Index Calculation Agent or the Index Oversight Committee may also exercise discretion in the administration of the Index if an event or circumstance arises in respect of which there is no fallback provided for in the methodology of this Index and which the Index Calculation Agent or Index Oversight Committee determines prevents the Index Calculation Agent from determining the Index in the normal manner, constitutes a market disruption under the relevant Index Manual or the exercise of expert judgement or discretion is otherwise appropriate in the circumstances.

The Index Calculation Agent or the Index Oversight Committee may exercise any such discretion or expert judgement acting in good faith and in a commercially reasonable manner. Any exercise of discretion or expert judgement that the Index Calculation Agent determines will have a material effect on the Index

shall be subject to the approval of the Index Oversight Committee.

SECTION 6: OVERSIGHT, ROLES, CONFLICTS AND REVIEWS

6.1 INDEX GOVERNANCE

The Index Administrator has established an independent oversight committee (the **Index Oversight Committee**) to review and oversee management of the Index and resolve any issues that arise. As of the date of this document, the Index Oversight Committee is comprised of the following designees, each an employee of Macquarie Bank Limited:

- A Managing Director in the Quantitative Investment Strategies team of the Commodities and Global Markets division;
- A Director from the Legal and Governance group;
- A representative from the Index Calculation Agent;
- A representative from the Risk division of the Risk Management Group;
- A representative from the Compliance division of the Risk Management Group; and
- A representative from the Business Operational Risk Management department within the Central division of the Commodities and Global Markets group.

Each member of the Index Oversight Committee is sufficiently knowledgeable about algorithmic indices and is required to act in good faith and in a commercially reasonable manner, provided that the Managing Director from the Commodities and Global Markets group will not be a voting member of the Committee, but shall act in an advisory capacity only. In giving approval to any adjustments made to the Index in accordance with this Index Manual, the Index Oversight Committee shall give due consideration to any equivalent decisions and actions taken by relevant trading venues or trade bodies.

The Index Oversight Committee has considered the features of the Index, the intended, expected or known usage of the Index and the materiality of existing or potential conflicts of interest and, taking these into account, has approved the Methodology and this Index Manual. The Index Oversight Committee is also charged with overseeing the daily management and operations of the Index. It will be available on an ad hoc basis for the consideration or approval of any relevant Errors, exercises of discretion, changes to the Methodology, any contemplated cancellation of the Index and the resolution of any other issues which arise in relation to the Index.

6.2 INDEX ADMINISTRATOR AND INDEX CALCULATION AGENT

6.2.1 Index Administrator

Macquarie Bank Limited is the Index Administrator. Notwithstanding anything to the contrary, the Index Administrator will maintain all ownership rights, expressed or otherwise, with respect to the Index, including the ability to license, sell or transfer any or all of its ownership rights with respect to the Index, including but not limited to terminating and appointing any successor Index Calculation Agent.

6.2.2 Index Calculation Agent

The Index Calculation Agent is appointed by the Index Administrator to calculate and maintain each Index from and until such time that the Index Administrator terminates its relationship with the current Index Calculation Agent and appoints a successor index calculation agent. Any such termination or appointment of a successor will be subject to the approval of the Index Oversight Committee.

The Index Calculation Team within the Commodities and Global Markets division of Macquarie Bank Limited acts as index calculation agent (the **Index Calculation Agent**) in respect of the Index as of the date of this Manual. The methodology employed by the Index Calculation Agent in determining the composition and calculation of the Index is set out in the calculations and procedures described in this document.

6.2.3 Relationship of the Index Administrator and the Index Calculation Agent

The Index Calculation Agent is appointed by the Index Administrator, subject to the approval of the Index Oversight Committee. While, as of the date of publication of these rules, both the Index Administrator and the Index Calculation Agent form part of Macquarie Bank Limited, they are independent teams within the bank and the employees discharging the obligations of the Index Calculation Agent have separate lines of reporting and accountability from the employees performing the functions of the Index Administrator.

6.2.4 Not acting as a fiduciary

Neither the Index Administrator nor the Index Calculation Agent owes any duty of care or acts as agent of another person in respect of its respective obligations in relation to the Index as set out in this Index Manual.

6.3 CONFLICTS

The Index is based on underlying assets, as described in the Methodology. The Index Administrator and/or its affiliates actively trade these underlying assets and options on these underlying assets. The Index Administrator and/or its affiliates also actively enter into or trade and market securities, swaps, options, derivatives, and related instruments which are linked to the performance of these underlying assets or are linked to the performance of an Index. The Index Administrator and/or its affiliates may underwrite or issue other securities or financial instruments indexed to an Index, and the Index Administrator or its affiliates may license an Index for publication or for use by unaffiliated third parties. These activities could present conflicts of interest and could affect the value of an Index. The Index Administrator trades or may trade as principal in instruments (or related derivatives) linked to an index described in this document and may have proprietary positions in the instruments (or related derivatives). The Index Administrator may make a market in such instruments (or related derivatives), which may in extreme circumstances affect the levels of the Index described.

The Index Administrator, the Index Calculation Agent and the business unit which creates instruments linked to the Index are all businesses or entities of Macquarie. Steps have been taken to manage and mitigate the inherent conflicts of interest which result, including the establishment of separate reporting lines for the respective roles, establishment of an independent Index Oversight Committee and the implementation and enforcement of policies and procedures to ensure that appropriate controls are in place.

Certain activities conducted by the Index Administrator may conflict with interests of investors in the Index. Such activities could include (but are not limited to) providing or participating in competing products (such as financial instruments linked to the Index, a Component or a similar index or component) and hedging its exposure to the Index. The Index Administrator could receive substantial returns in respect of such activities, which will not be passed on to any investors in products linked to the Index; whereas the value of investments linked to the Index may decline. Any such activities conducted by the Index Administrator around the time of a rebalancing could adversely impact the performance of the Index and therefore the level of a concurrent rebalancing.

The Index Administrator may have access to information relating to the Index, a Component or investments linked to a Component. The Index Administrator is not obliged to use that information for the benefit of any person entering into products linked to the Index.

6.4 REVIEWS

The Index Administrator has procedures in place to review a sample of its Indices (which may not include these Indices) on an annual basis (or more frequently, if it determines appropriate). In determining the sample of Indices to review, the Index Administrator may consider any factors, which may include a particularly negative performance as compared with expectation or a high volume of errors or restatements. The Index Administrator shall submit a report on its reviews to the Index Oversight Committee. If the Index Administrator determines that changes are required to a methodology, the Index Oversight Committee shall review the changes the reasons therefor. Any such changes approved by the Index Oversight Committee shall be implemented in accordance with Section 5.2 (*Changes in Methodology*).

SECTION 7: GENERAL INFORMATION

7.1 VALUATION AND CALCULATIONS

The Index Calculation Agent shall, unless stated otherwise, perform all calculations in this Index Manual. It shall perform such calculations in its sole and absolute discretion, acting in good faith and in a commercially reasonable manner. All such calculations shall be subject to the Index Calculation Agent's policies and procedures and will (in the absence of manifest error) be final, conclusive and binding. Neither the Index Calculation Agent nor the Index Administrator shall have any liability for errors or omissions made in good faith.

7.2 PUBLICATION OF INDEX LEVEL

The publication of the Index Level by the Index Calculation Agent for an Index Publication Day follows a publication cycle which ends at the Publication Time for such day. Any Index Level published before the Publication Time in respect of a day is indicative and may be restated up to and including the Publication Time.

In respect of an Index Publication Day, the Index Level as published by the Index Calculation Agent on the Bloomberg Ticker at the Publication Time for such day shall be the official Index Level and shall be final and binding (save for changes made pursuant to Section 5 (*Corrections, Changes, Cessation and Discretion*)). See Section 5.1.2 regarding the publication of Material Errors.

Publication Time means, in respect of an Index Publication Day, 23:59:59 (New York Time) on the Index Publication Day immediately following such Publication Business Day.

7.3 HISTORICAL VALUES OF THE INDEX

Hypothetical back-tested historical values of the Index are not indicative of future performance. The Index Administrator makes no representation as to the accuracy or appropriateness of, and shall have no liability to you or any other entity for any loss or damage, direct or indirect, arising from the use of the historical values.

SECTION 8: NOTICES AND DISCLAIMERS

8.1 REGULATORY STATUS

This material is prepared and distributed in the UK by Macquarie Bank Limited, London Branch (MBLLB) and in the EEA member states (other than the UK) by Macquarie Bank International Limited (MBIL) where required. It is intended only for professional clients and eligible counterparties as defined in the rules of the Financial Conduct Authority. MBLLB is registered in England and Wales (Branch No: BR002678, Company No: FC018220, Firm Reference No: 170934). MBIL is incorporated and registered in England and Wales (Company No. 06309906, Firm Reference No. 471080). The registered office for MBLLB and MBIL is Ropemaker Place, 28 Ropemaker Street, London, EC2Y 9HD. MBLLB is authorized and regulated by the Australian Prudential Regulation Authority. Authorised by the Prudential Regulation Authority and subject to regulation by the Financial Conduct Authority and limited regulation by the Prudential Regulation Authority. Details about the extent of our regulation by the Prudential Regulation Authority are available from us on request. MBIL is authorized by the Prudential Regulation Authority and regulated by the Financial Conduct Authority and the Prudential Regulation Authority.

8.2 NOT RESEARCH OR AN OFFER

This document is not a personal recommendation as defined by the Financial Conduct Authority and you should consider whether you can rely upon any opinion or statement contained in this document without seeking further advice tailored for your own circumstances. It is also not investment research, and has not been prepared in accordance with legal requirements designed to promote the independence of such. Any opinions expressed herein may differ from the opinions expressed in other departments including the research department. Nor have the contents of this document been reviewed by any regulatory authority, and the distribution of this document and availability of related financial instruments in certain jurisdictions may be restricted by law.

This document does not constitute a prospectus, offer, invitation or solicitation to buy or sell financial instruments and is not intended to provide the sole basis for any evaluation of the securities or any other financial instruments which may be discussed within, referred to or based upon the] Index. Any offering or potential transaction that may be related to [an]/[the] Index will be made separately and subject to distinct documentation and in such case the information contained herein may be superseded in its entirety by such documentation in final form.

8.3 THIRD-PARTY DISCLAIMER

The Index is not endorsed, sponsored or promoted by the issuer or sponsor of any Component of underlying asset of any Component.

ANNEX A INDEX SPECIFICATIONS

Annex A may be supplemented from time to time by the addition of new Index Specifications tables.

Bloomberg Ticker	Index Name	Commodity	Trading Facility	Static Contract Schedule	Roll Start Date	Roll Length	Index Start Level	Index Start Date	Index Calendar	Index Live Date	Index Currency
MQSCTZTE	Macquarie Single Commodity TTF Natural Gas (TZT) ER Index	TTF Natural Gas (TZT)	EDX	GHJKMNQUVXZF+	-6	15	100	08-Oct-13	New York Mercantile Exchange	24-Jan-20	EUR
MQSCFNER	Macquarie Single Commodity UK Natural Gas (FN) ER Index	UK Natural Gas (FN)	ICE	GHJKMNQUVXZF+	-6	15	100	04-Jan-00	New York Mercantile Exchange	24-Jan-20	GBP
MQSDMOER	Macquarie Single Commodity EUA Emissions (MO) ER Index	EUA Emissions (MO)	ICE	ZZZZZZZZZZZ+	-6	15	100	02-Apr-08	New York Mercantile Exchange	24-Jan-20	EUR