Bloomberg Electrification Metals Index Methodology

September, 2022

Bloomberg

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Section 1: Index Overview

The Bloomberg Electrification Metals Index aims to track the performance of holding a long position of precious metal commodities futures contracts. The Bloomberg Electrification Index tracks the return of a basket of metals key to the Energy transition: Aluminum, Copper, Nickel, Zinc, Cobalt, and Lithium. The index rebalances on the close of the 4th index business day each quarter, January, April, July, October, resetting each commodity to their target weight (as described in Section 2). The Total Return versions are calculated using the returns of the underlying excess return index and the return of cash collateral invested in the 3-Month T-Bill.

Table 1: Bloomberg Electrification Index

Index Names	Ticker	Currency	Index Commencement Date
Bloomberg Electrification Metals ER Index	BELEC	USD	9/7/2022
Bloomberg Electrification Metals TR Index	BELECTR	USD	9/7/2022

To maintain the long position of the basket, contracts are 'rolled' from the expiring futures contract to a new contract farther down the futures curve with a longer expiry date. All commodity futures positions will be rolled on the fifth through the ninth **Index business day** of each calendar month, with corresponding ER weights being adjusted in the calculation of the index from the sixth through the tenth **Index business day**. **Index Levels** are calculated on the days BCOM is.

The Bloomberg Electrification Index is denominated in U.S. dollars. The Electrification Index all have a **Base Date** of June 4th, 2021 with a **Base Index Level** of 100.

Section 2: Index Limitations

Though the Indices are designed to be representative of the markets they measure or otherwise align with their stated objective, they may not be representative in every case or achieve their stated objective in all instances. They are designed and calculated strictly to follow the rules of this Methodology, and any Index Level or other output is limited in its usefulness to such design and calculation.

Markets can be volatile, including those commodity market interests which the Indices intend to measure or upon which the Indices are dependent in order to achieve their stated objective. For example, trading in futures contracts on physical commodities, including trading in the Index components, is speculative and can be extremely volatile. Market prices of the Index components and the underlying physical commodities may fluctuate rapidly based on numerous factors, including changes in supply and demand relationships (whether actual, perceived, anticipated, unanticipated or unrealized); weather; agriculture; trade; fiscal, monetary and exchange control programs; domestic and foreign political and economic events and policies; disease; pestilence; technological developments; changes in interest rates, whether through government action or market movements; and monetary and other government policies, action and inaction.

The current or "spot" prices of the underlying physical commodities may also affect, in a volatile and inconsistent manner, the prices of futures contracts in respect to the relevant commodity. These factors may affect the value of the Indices in varying ways, and different factors may cause the prices of the Index components, and the volatilities of their prices, to move in inconsistent directions at inconsistent rates.

In addition, market trends and changes to market structure may render the objective of the Index unachievable or to become impractical to replicate by investors.

In particular, the Bloomberg Electrification Index aims to track the performance of holding a long position of precious metal commodities futures contracts. The Index are therefore subject to subject to risk of holding a commodity futures contract which may fluctuate rapidly and may be subject to temporary distortions or other market disruptions based on numerous factors, including changes in supply and demand relationships (whether actual, perceived, anticipated, unanticipated or unrealized), weather, agriculture, trade, fiscal, monetary and exchange control programmes, domestic and foreign political and economic events and policies, disease, pestilence, technological developments, changes in interest rates, whether through governmental action or market movements, and monetary and other governmental policies, action and inaction.

Historical Index Levels published prior to the Index launch date are considered hypothetical. Historical Index Levels should not be considered as an indication of future performance.

The Bloomberg Electrification Index is comprised of liquid commodity future contracts. If any commodity future contract is terminated or replaced in accordance with the rules of the Index methodology, a comparable commodity futures contract may be selected by BISL. The replacement of a commodity future contract may cause the level of the Index to change or be adjusted.

BISL may discontinue or suspend calculation or publication of the Indices defined in this methodology. If this happens, BISL shall use reasonable efforts to provide advance notice through an Index announcement made available via bloombergindices.com and on the Bloomberg Terminal via INP <GO>.

Section 3: Index Calculation

The Bloomberg Electrification Index aims to track the performance of holding a long position of a basket of commodities reflective of the energy transition theme. The index rebalances on the close of the 4th index business day quarterly, in January, April, July and October, resetting each commodity to their target weight. Target weights will be rounded to 8 decimal places. The composition and weights were determined by BISL in consultation with BNEF, based on projected supply and demand of each commodity. The composition and weights will be reviewed on an annual basis. The annual updates will be implemented each January.

Commodity	Ticker	Target Weight
Copper	HG	25%
Aluminum	LA	20%
Nickel	LN	25%
Zinc	LX	15%
Cobalt	CVT	10%
Lithium	LFA	5%

Index Rebalancing

The Indices are rebalanced quarterly after the close of business on the fourth index business day in each month. The annual target weights are applied to the index by calculating index units call Commodity Index Multipliers (CIMs). The Index Base Date CIM and the ongoing CIMs are used maintain continuity in the Index.

CIM's are calculated using the following formulas:

Base Date CIM Calculation:

$$CIM = \frac{PMTW_i * 100}{NCSP_t}$$

Where:

CIM is the Commodity Index Multiplier used to apply the Target Weight of the individual commodity futures contract, rounded to 8 decimal places.

$PMTW_i$ is the Electrification Annual Target Weight of commodity futures contract i.

$NCSP_t$ is the **Next Contract Settlement Price** on Index business day t, using price conversion.

Monthly CIM Calculation

$$CIM = \frac{PMTW_i * 100}{NCSP_t} * AF$$

Where:

CIM is the Commodity Index Multiplier used to apply the Target Weight of the individual commodity futures contract, rounded to 8 decimal places.

$PMTW_i$ is the Electrification Target Weight of commodity futures contract i for each Rebalancing Day.

$NCSP_t$ is the Next Contract Settlement Price on Index business day t.

AF is the Adjustment Factor.

$$AF = \frac{\sum_i CIM_r * NCSP}{100}$$

Where:

CIM_r is the previous Commodity Index Multiplier.

$NCSP$ is the Next Contract Settlement Price on Index business day t.

Index Rolling

The Index hold a long positions in commodity futures. To maintain a long position, contracts are 'rolled' from the expiring futures contract to a new contract farther down the futures curve with a longer expiry date. The calculation of the Electrification Index follows the roll schedule based on the commodity contract calendar listed in Table 3. The mapping for the contract letters and months are defined in Table 2.

Table 2: Contract Month Codes

Contract Code	Month
F	January
G	February
H	March
J	April
K	May
M	June
N	July
Q	August
U	September
V	October
X	November
Z	December

The Contract Calendar Table (Table 3) represents the **Lead Contract** on the first Index business day of each month.

Table 3: Contract Calendar

Commodity	Exchange	Bloomberg Code	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Aluminum	LME	LA	H	H	K	K	N	N	U	U	X	X	F	F*
Copper	CME	HG	H	H	K	K	N	N	U	U	Z	Z	Z	H*
Nickel	LME	LN	H	H	K	K	N	N	U	U	X	X	F	F*
Zinc	LME	LX	H	H	K	K	N	N	U	U	X	X	F	F*
Cobalt	CME	CVT	H	H	K	K	N	N	U	U	X	X	F	F*
Lithium	CME	LFA	H	H	K	K	N	N	U	U	X	X	F	F*

The Indices will roll from the Lead Contract to the Next Contract from the sixth to tenth Index business day of each month at 20% (1/5) each Index business day. If a Market Disruption Event ("MDE") occurs during the roll period (Index business days 5 through 9), the roll weight will be "held". The roll weight will catch up on the next Index business day when a MDE is not present. Table 3 is an example of the rolling process during the March Roll Period of 2010.

Index Calculation

Index Levels are determined on a day on which BCOM is open for business. If a commodity futures contract **Settlement Price** is unavailable on an Index business day when BCOM is open, the last available official Settlement Price will be used for the calculation of the Index. The official Index Level precision is eight decimal places.

The ER Index Level is calculated as follows:

$$IndexER_t = IndexER_{t-1} * (1 + DER)$$

Where:

$IndexER_t$	is the ER Index Level on Index business day t, rounded to 8 decimal places.
$IndexER_{t-1}$	is the ER Index Level on the Index business day immediately preceding Index business day t.
DER	is the Daily ER of the commodity futures contracts.

The Daily ER is calculated as:

$$DER = \left(\frac{\mathrm{WAV}}{PWAV} - 1\right)$$

Total Return Index Level (leveraged, and inverse indices) is calculated as follows:

$$IndexTR_t \ = IndexTR_{t-1} \times (\frac{IndexER_t}{IndexER_{t-1}} + \ IR\ _t)$$

Where:

$IndexTR_t$	is the Total Return Index Level on Index business day t, rounded to 8 decimal places.
$IndexTR_{t-1}$	is the Total Return Index Level on the Index business day immediately preceding Index business day t.
$IndexER_t$	is the ER Index Level on Index business day t.
$IndexER_{t-1}$	is the ER Index Level on the Index business day immediately preceding Index business day t.

IR_t is the Treasury Bill Daily Return, calculated as

$$IR_t = \left[\frac{1}{1 - \frac{91}{360} \times TBR_{t-1}}\right]^{\frac{D}{91}} - 1$$

Where:

TBR_{t-1} is the 13-week (3 -month) US Treasury Bill ("T-Bill") Rate, the rate used is the most recent weekly auctioned high discount rate (ticker: USB3MTA Index).

D is the number of calendar days between Index business day t, and the previous Index business day (i.e. 3 for weekend)

Weighted Average Value ("WAV") on Index business day t is calculated as:

$$WAV = \sum_i CIM1 * YLRW * \frac{LCSP_t}{L} + CIM2 * YNRW * \frac{NCSP_t}{L}$$

Where:

$CIM1$ is the Commodity Index Multiplier for Lead Contract.

$YLRW$ is the Yesterday Lead Roll Weight, i.e., the roll weight of commodity futures contract i on the Index business day immediately preceding Index business day t.

$LCSP_t$ is the Lead Contract settlement price on Index business day t.

$CIM2$ is the Commodity Index Multiplier for Next Contract.

$YNRW$ is the Yesterday Next Roll Weight, i.e., the roll weight of commodity futures contract i on the Index business day immediately preceding Index business day t.

$NCSP_t$ is the Next Contract settlement price on Index business day t.

L is the lot size of the futures contract.

i designates each individual commodity

Previous Weighted Average Value ("$PWAV$") on Index business day t is calculated as:

$$PWAV = \sum_{i} CIM1_{t-1} * YLRW * \frac{LCSP_{t-1}}{L} + CIM2_{t-1} * YNRW * \frac{NCSP_{t-1}}{L}$$

Where:

$CIM1_{t-1}$	is the Commodity Index Multiplier for Lead Contract on the Index business day immediately preceding Index business day t.
$YLRW$	is the Yesterday Lead Roll Weight, i.e., the roll weight of commodity futures contract i on the Index business day immediately preceding Index business day t.
$LCSP_{t-1}$	is the Lead Contract settlement price on the Index business day immediately preceding Index business day t using price conversion.
$CIM2_{t-1}$	is the Commodity Index Multiplier for Lead Contract on the Index business day immediately preceding Index business day t.
$YNRW$	is the Yesterday Next Roll Weight, i.e., the roll weight of commodity futures contract i on the Index business day immediately preceding Index business day t.
$NCSP_{t-1}$	is the Next Contract settlement price on the Index business day immediately preceding Index business day t.
L	is the lot size.
i	designates each individual commodity

Section 4: Market Disruption Events

Market Disruption Events (MDE) can occur to commodity futures for several reasons:

a) The termination or suspension of, or material limitation or disruption in, the trading of any future contract used in the calculation of the Index on that day
b) The settlement price of any such contract reflect the maximum permitted price change from the previous day's settlement price, based on limits set by commodity exchanges
c) The failure of an exchange to publish settlement prices.

If a MDE occurs with respect to the Electrification Index family during the "Roll Period" for either the lead or next contract, the daily roll of the relevant futures contract will be held for that Index business day. On the following Index business day on which a Market Disruption Event does not occur, the roll weight will account for the current days roll weight and the previous Index business day (MDE's) roll weight.

If a MDE persists for four consecutive Index business days immediately following the original Index business day on which a MDE occurs, then the Index Administrator shall determine what further actions it may reasonably take.

If, on any Index business day, a MDE occurs or is occurring that the Index Administrator determines, in its sole discretion, materially affects the Index, the Index Administrator may defer or suspend the calculation and publication of the Index Value and any other information relating to the Index until the next Index business day on which such disruption event is not continuing.

Section 5: Benchmark Governance and Review

Data Providers and Data Extrapolation

The Indices are rules-based, and their construction is designed to consistently produce Index Levels without the exercise of discretion. The Indices are produced without the interpolation or extrapolation of input data. As further discussed below, the Indices use exchange settlement prices or the previous index business day's exchange settlement prices if unavailable, rather than interpolation or extrapolation, but the Index Administrator will update this Methodology and its internal procedures should either become necessary.

In addition, the Index Administrator seeks to avoid contributions of input data that may be subject to the discretion of the source of such data and instead seeks to use input data that is readily available and/or distributed for a number of non-index or benchmark creation purposes. Accordingly, the Indices require no 'contributors' to produce and no codes of conduct with any such sources are required.

Benchmark Governance, Audit and Review Structure

BISL uses two primary committees to provide overall governance and effective oversight of its benchmark administration activities:

- The Product, Risk & Operations Committee (**"PROC"**) provides direct governance and is responsible for the first line of controls over the creation, design, production and dissemination of benchmark indices, strategy indices and fixings administered by BISL, including the Indices.
- The oversight function is provided by Bloomberg's Benchmark Oversight Committee (**"BOC"**). The BOC is independent of the PROC and is responsible for reviewing and challenging the activities carried out by the PROC. In carrying out its oversight duties, the BOC receives reports of management information both from the PROC as well as Bloomberg Legal & Compliance members engaged in second level controls.

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On a quarterly basis, the PROC reports to the BOC on governance matters, including but not limited to client complaints, the launch of new benchmarks, operational incidents (including errors & restatements), major announcements and material changes concerning the benchmarks, the results of any reviews of the benchmarks (internal or external) and material stakeholder engagements.

Internal and External Reviews

BISL's Index administration is also subject to Bloomberg's Compliance function which periodically reviews various aspects of its businesses in order to determine whether it is adhering to applicable policies and procedures, and assess whether applicable controls are functioning properly. In addition, Bloomberg may from time to time appoint an independent external auditor with appropriate experience and capability to review adherence to benchmark regulation. The frequency of such external reviews will depend on the size and complexity of the operations and the breadth and depth of the Index use by stakeholders.

Index and Data Reviews

The Index Administrator will review the Indices (both the rules of construction and data inputs) on a periodic basis, not less frequently than annually, to determine whether they continue to reasonably measure the intended underlying market interest, the economic reality or otherwise align with their stated objective. More frequent reviews may result from extreme market events and/or material changes to the applicable underlying market interests.

Criteria for data inputs include reliable delivery and active underlying markets. Whether an applicable market is active depends on whether there are sufficient numbers of transactions (or other indications of price, such as indicative quotes) in the applicable constituents (or similar underlying constituent elements) that a price (or other value, as applicable) may be supplied for such constituent(s).

Other than as set forth in this Methodology, there are no minimum liquidity requirements for Index constituents and/or minimum requirements or standards for the quantity or quality of the input data.

The review will be conducted by product managers of the Indices in connection with the periodic rebalancing of the Indices or as otherwise appropriate.

Any resulting change to the Methodology deemed to be material (discussed below) will be subject to the review of the PROC (defined below) under the oversight of the BOC (defined below), each of which committees shall be provided all relevant information and materials it requests relating to the change. Details regarding the PROC and BOC are described in Section 5 - Benchmark Governance.

Material changes will be reflected and tracked in updated versions of this Methodology.

BISL's Index administration is also subject to Bloomberg's Compliance function which periodically reviews various aspects of its businesses in order to determine whether it is adhering to applicable policies and procedures, and assess whether applicable controls are functioning properly.

Material changes related to the Indices will be made available in advance to affected stakeholders whose input will be solicited. The stakeholder engagement will set forth the rationale for any proposed changes as well as the timeframe and process for responses. The Index Administrator will endeavor to provide at least two weeks for review prior to any material change going into effect. In the event of exigent market circumstances, this period may be shorter. Subject to obligations of confidentiality, stakeholder feedback and the Index Administrator's responses will be made accessible upon request. Because the Indices are strategy indices and not widely-available benchmark indices, this stakeholder engagement will be conducted on a bespoke basis with the Index Owner, rather than a more open and public consultation that might be more appropriate for benchmark indices.

In determining whether a change to an Index is material, the following factors shall be taken into account:

- The economic and financial impact of the change;
- Whether the change affects the original purpose of the Index; and/or
- Whether the change is consistent with the overall objective of the Index and the underlying market interest it seeks to measure

Exchange Settlement Price Delays

In the event an exchange delays the pricing of future settlements pertaining to the Bloomberg Electrification Index Indices, BISL will delay the publication of Index Levels to vendors and delivery of index data files.

Error Corrections/Restatement Policy

BISL strives to provide accurate calculation of its indices. However, to the extent a material error in index levels is uncovered following publication and dissemination, a notification will be sent to licensed index users alerting them of such error and the expected date of a revised publication, if warranted.

BISL considers the following factors to determine whether to restate. Not all conditions need to be present to warrant a restatement, and certain factors may be more determinative that others depending on the circumstances of the given error.

- The relative importance of the data field impacted by the error;
- When the error occurred and when it was discovered;
- The number of indices and sub-indices affected;
- Whether the impacted indices are linked to tradable products;
- The magnitude of the error;
- The burden of restatement on client re-processing relative to the impact of the error;

- The impact of the restatement on analytical tools.

Exchange Settlement Price Amendments

On the occasion when an exchange amends the Settlement Price of a contract used in the Bloomberg Electrification Index Indices prior to 7 PM EST, BISL will send an index announcement following the discovery to inform all clients of the correction. BISL will then recalculate, republish, and redistribute end-of day files.

Real-time Distribution

Real-time index levels are considered indicative only. BISL strives to provide accurate real-time calculation of its indices, however the following circumstances may occur during real-time dissemination hours.

- Incorrect index levels can be disseminated.
- Indices may stop disseminating.
- Indices may disseminate stale prices.

Expert Judgment

The Indices are rules-based, and their construction is designed to consistently produce values without the exercise of expert judgment or discretion. Nevertheless, BISL may use expert judgment or discretion with regards to the following:

- Index restatements
- Extraordinary circumstances during a market emergency
- Data interruptions, issues, and closures

When expert judgment or discretion is required, BISL undertakes to be consistent in its application, with recourse to written procedures outlined in the methodology of the Indices and internal procedures manuals. In certain circumstances exercises of expert judgment or discretion are reviewed by senior members of BISL management and Bloomberg Compliance teams, and are reported to the Product, Risk & Operations Committee (PROC), BISL's governance committee, which operates under the supervision of BISL's oversight function, the Benchmark Oversight Committee (BOC). BISL also maintains and enforces a code of ethics to prevent conflicts of interest from inappropriately influencing index construction, production, and distribution, including the use of expert judgment or discretion.

Reinvestment of Dividends and Coupons

Dividends and coupon payments play no direct role in this Index Methodology Handbook, and are therefore not accounted for by the Index.

Section 6: Index Terms

"Base Index Level" means the starting Index Level of 100 for each of the Indices.

"BISL" means Bloomberg Index Services Limited.

"BOC" means the Benchmark Oversight Committee.

"Index business day" means any day on which BCOM is open for business.

"**Commodity Index Multiplier (CIM)"** means the value of one as described in Section 3.

"Index Administrator" means BISL.

"Index Base Date" means the first date of the Index history as described in Section 1.

"Index Commencement Date" means the date each of the Indices is first made available on the relevant Bloomberg Page, i.e., April 15th, 2022.

"Index Level" means, in respect of the Index and a Index business day, the value of the Index on such Index business day, calculated in accordance with the methodology described in Section 3.

"PROC" means the Product, Risk and Operations Committee.

"Lead Contract" means the rolling out commodity futures contract as defined in Table 5.

"Lead Contract Settlement Price" means the official settlement prices provided by the exchange of the rolling out commodity futures contract defined in Table 5.

"Market Disruption Event (MDE)" has the meaning given to such term in Section 4.

"Next Contract" means the rolling in commodity futures contract as defined in Table 5.

"Next Contract Settlement Price" means the official settlement prices provided by the exchange of the rolling in commodity futures contract as defined in Table 5.

"Rolling" means the commodity futures contracts are 'rolled' during the Roll Period from the expiring futures contract (Lead Contract) to a new contract farther down the futures curve with a longer expiry date (Next Contract). After the Roll Period, the former Next Contract becomes the new Lead Contract.

"Roll Period" means the sixth to tenth Index business day of each month, at 20% (1/5) each Index business day

"Settlement Price" means the official settlement prices provided by an exchange.

"Treasury Bill Daily Return" means the return of cash collateral invested in the 3-Month T-Bill.

Annex 1

TEMPLATE FOR EXPLAINING HOW THE KEY ELEMENTS OF THE BENCHMARK METHODOLOGY REFLECT ENVIRONMENTAL, SOCIAL AND GOVERNANCE (ESG) FACTORS

EXPLANATION OF HOW ESG FACTORS ARE REFLECTED IN THE KEY ELEMENTS OF THE BENCHMARK METHODOLOGY	
Item 1. Name of the benchmark administrator.	Bloomberg Index Services Limited
Item 2. Type of benchmark or family of benchmarks.	Commodities
Item 3. Name of the benchmark or family of benchmarks.	Electrification Metals Index
Item 4. Does the benchmark methodology for the benchmark or family of benchmarks take into account ESG factors?	No
Item 5. Where the response to Item 4 is positive, please list below, for each family of benchmarks, those ESG factors that are taken into account in the benchmark methodology, taking into account the ESG factors listed in Annex II to Delegated Regulation (EU) 2020/1816. Please explain how those ESG factors are used for the selection, weighting or exclusion of underlying assets. The ESG factors shall be disclosed at an aggregated weighted average value at the level of the family of benchmarks.	
(a) List of environmental factors considered:	Selection, weighting or exclusion:
(b) List of social factors considered:	Selection, weighting or exclusion:
(c) List of governance factors considered:	Selection, weighting or exclusion:
Item 6. Where the response to Item 4 is positive, please list below, for each benchmark, those ESG factors that are taken into account in the benchmark methodology, taking into account the ESG factors listed in Annex II to Delegated Regulation (EU) 2020/1816, depending on the relevant underlying asset concerned. Please explain how those ESG factors are used for the selection, weighting or exclusion of underlying assets. The ESG factors shall not be disclosed for each constituent of the benchmark, but shall be disclosed at an aggregated weighted average value of the benchmark. Alternatively, all of this information may be provided in the form of a hyperlink to a website of the benchmark administrator included in this explanation. The information on the website shall be easily available and accessible. Benchmark administrators shall ensure that information published on their website remains available for five years.	
(a) List of environmental factors considered:	Selection, weighting or exclusion:
(b) List of social factors considered:	Selection, weighting or exclusion:
(c) List of governance factors considered:	Selection, weighting or exclusion:
Hyperlink to the information on ESG factors for each benchmark:	
Item 7. Data and standards used	
(a) Data input.	N/A

(i) *Describe whether the data are reported, modelled or sourced internally or externally.* (ii) *Where the data are reported, modelled or sourced externally, please name the third party data provider.*	
(b) Verification and quality of data. *Describe how data are verified and how the quality of those data is ensured.*	N/A
(c) Reference standards *Describe the international standards used in the benchmark methodology.*	N/A
Date on which information has been last updated and reason for the update:	7th September 2022, initial publication

Disclaimer

Take the next step.

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email indexhelp@bloomberg.net
or press the <HELP> key twice
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