CRU

CRU Price Assessment Methodology

Battery Materials

Independent *expert* intelligence

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Battery Materials

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Price Methodology

Scope

This Methodology and Definitions Guide covers prices for physically traded Battery Materials in all geographical markets and should be read in conjunction with the CRU Group Compliance Framework and Methodology Guide (Group Compliance Framework). It details commodity-specific methodologies which have precedence, with all other aspects covered by the Group Compliance Framework.

Methodology

Rationale

This methodology was developed in consultation with the industry (including through our annual Underlying Market Conditions Review), allowing CRU to capture market liquidity and establish prices that are reliable and representative of the market. Specification definitions such as price assessment frequency, incoterms, currencies, size/volumes, units and others are aligned with the relevant market requirements and industry conventions.

The methodology blends strict adherence to methodological rules with limited but necessary application of expert judgement, detailed below, in order to produce a price that benefits from rigour, Price Assessor expertise and discretion.

Liquidity is enhanced by a normalisation process which allows for the submission of data which can be standardised to CRU's strict definition but is sourced from a wider array of data.

Transaction data is prioritised as an input to these prices to help ensure they reflect the actual spot market. Inclusion of other price types detailed in the Group Compliance Framework is permissible where this does not compromise accuracy but enhances liquidity.

Final published prices are a range as prices in these markets tend to be more widely distributed and a range better reflects the spread of data as a basis for negotiations or use in contracts. However, Manganese Sulphate is assessed as a single point value.

Data Providers

CRU price assessments are based on regular contact with a wide network of market participants situated at critical nodes in the supply chain. This network is constantly reviewed to seek a balance of buyers and sellers that are representative of the market. Our network of market participants providing regular indications and data are defined as 'data providers'.

Data providers must have access to data relating to actual spot market transactions (a purchase or a sale), or if permitted by the methodology, bid/offer information or be able to provide a credible opinion on such prices in the absence of any other data over the relevant time period. They are therefore typically employed in sales or marketing functions on the sell side and purchasing functions on the buy side, or act in a trading function. Data Providers may also include individuals in finance functions if they can provide the same price information.

Each data provider is required to meet the criteria stipulated in Section 2.4 of the CRU Group Compliance Framework and Methodology Guide and must exist on a list of approved data providers before their data can be considered for admission into published prices.

Data Submitted and Submission Processes

Data providers can submit prices to CRU by telephone, email, private one-to-one instant messenger services, other private means of communication or where applicable, proprietary CRU system.

Admissible price data are concluded and reported transactions, confirmed bids and offers, indicative bids and offers and opinion. The type of price data submitted should be indicated to CRU. Transaction data is

prioritised as an input and to that extent the hierarchy of acceptable price types follows that described in Section 3.1 of the CRU Group Compliance Framework and Methodology Guide. Where transaction data is submitted, CRU seeks to verify each deal with both parties but where this is not possible, a third or fourth party may be consulted.

For each product, Data Providers provide CRU with a single price figure or a range of prices relating to spot business, except where indicated in the price Definition (e.g. if a contract price).

Data providers are to provide CRU with admissible price data relating to market activity within the following windows:

Weekly prices:
- 12:30 UK on Friday of the week prior to publication and 12:30 UK on the Friday of publication.

Monthly prices:
- 16:00 one calendar month prior to publication and 16:00 on the day of publication in the appropriate regional time zone. However, data will usually be collected in a period nearer to the day of publication to ensure accuracy and timeliness of the final assessment.

Information must be submitted to CRU by window close times if it is to be eligible for admission to the subsequent price assessment.

Data Submission Dependency and Minimum Threshold

CRU seeks to receive market information from a broad range of active data sources and seeks to increase the number of companies willing to submit market data. If a limited number of market participants are active in the market, and the market data received constitutes a significant proportion of the total data on which is the assessment is based, CRU will use expert judgement on whether to exclude, include or defer the indication received until more information is received. This expert judgement would be based on observation of the previous price, short term historical price trends, other quantitative market data including prices in other related active markets, producer price change announcements, qualitative information such as that received from interactions with market participants or other CRU Price Assessors, and other sources of information relevant to the market.

CRU does not outline minimum data thresholds to determine price assessments covered in this methodology document to avoid establishing non-representative assessments that may be deemed unrepeatable. Periods of liquidity differ across markets and data thresholds could result in price assessments that do not accurately reflect the market. Price Assessors, instead, aim to source data from a wide range of industry participants to establish premium assessments, in line with the individual premium market data specifications, such as size, timing, loading locations, outlined in this methodology.

When no admissible data is received, Price Assessors follow the processes set out in the “Price determination in an illiquid market” section and expert judgement would be used to determine the final price value. Further details can be found under Section 2.1 of the CRU Group Compliance Framework and Methodology Guide.

Final Price Assessment

Expert Judgement

Expert judgement may apply to decisions on what type of price data is submitted; if the deal is executed at arms-length; if normalisation of price data submitted is required; the means of any normalisation, and the inclusion of a data point in the calculation of the final price (exclusion of outliers).

Expert judgement may also be used to determine the final price value in illiquid market conditions.

A Price Assessor will consult with one or more colleagues before any application of expert judgement if in any doubt, or where collective input would improve the quality of a judgement.

Consistency in the application of expert judgement is achieved through a combination of selection, formal and informal training and review, supervision and control processes as detailed in section 4.5 of the CRU Group Compliance Framework and Methodology Guide.

Normalisation

Data which meets the precise price specification is eligible for admission without any adjustments. Data which does not fit the specification may still be eligible as an input to the price, but would be subject to a normalisation process.

Normalisation is an essential price adjustment process used to align reported market information with a pricing methodology. Decisions to normalise a price and/or choice of values used in the normalisation process are forms of expert judgement.

Exclusion of Outliers

A Price Assessor may use expert judgement in the exclusion of a data point as an input to the calculation of the final price. In doing so they would consider the range and distribution of data collected in the same timeframe from other data providers; previous data received from the same data provider; non-price information received from the data provider; market state and direction information from any other source. Inclusion or exclusion of input data in the final price is explicit and recorded.

Price Determination in an Illiquid Market

In the cases of zero submissions or where all submissions were deemed inadmissible, expert judgement would be used to determine the final price value. This choice would be based on: observation of the previous week's prices; short term historical price trends; other quantitative market data including prices in other related active markets, producer price change announcements; qualitative information such as that received from interactions with market participants or other CRU Price Assessors, and; other sources of information relevant to the spot market.

The Price Assessor will use their judgement to evaluate the volume, quality and coherence of any such market information they may possess. If one or more of these factors in combination does not provide a sufficiently clear indication of the direction and extent of market movement to allow the Price Assessor to confidently change the price from the previous value, the prior value would be rolled over to form the current period value.

Price Verification

Information from data providers and the final price assessments are captured and established in the CRU Prices System (CPS), or for SMU prices the SMU survey and SMU's pricing workbooks. The final prices are approved by another Price Assessor or the editor.

Deactivated Prices

A price assessment will remain active as long as there are sufficient buyers, sellers and/or traders for the Price Assessor to make an accurate assessment. If the quotation suffers from limited transparency or if business dynamics change, it may be deactivated following market consultation. Its history will still be available, but no further information will be collected for that assessment from the time it is deactivated.

Final Benchmark Publication

Prices are published in the CRU service/s below via CRU Online; DataLab (CRU's data delivery platform), data feeds including APIs and in some cases may be distributed via channel partners. Price publication dates may be varied around public holidays, in which case customers will be notified in advance.

Price published in: Battery Value Chain Service

Weekly prices are first published on CRU Online at 14:10 UK each Friday.
Monthly prices are first published on CRU Online at 14:10 UK on the first weekday of each month.

Price Detail

Cobalt

China

Cobalt Hydroxide 30% Co min, Spot price; China, CIF USD/lb

Price Series	Cobalt Hydroxide 30% Co min, Spot price; China, CIF
CRUOnline Name	Hydroxide China 30% Co min CIF
Price ID	1925
Currency	USD
Weight	lb
Attributes	Powder
Price Basis	CIF
Quality	30% Cobalt, Maximum: 6.5% manganese, 6.5% magnesium, 5% sulphur, 0.01% cadmium, 0.15% arsenic, 3% iron
Terms	Minimum tonnage: 50 tonnes
Duties & Tariffs	Duties and Tariffs excluded
Delivery	No more than 6 weeks forward
Counterparties	Loading location: Matadi Port, DRC. Main Consumer Markets: China.
Assessment Notes	Monthly assessment. First Friday of the month

Cobalt-in-Mixed Hydroxide Precipitate, Spot price; China, CIF %

Price Series	Cobalt-in-Mixed Hydroxide Precipitate, Spot price; China, CIF
CRUOnline Name	Mixed Hydroxide Precipitate China CIF
Price ID	1926
Currency	-
Weight	%
Attributes	Not attributable
Price Basis	CIF
Quality	30-45% nickel, minimum: 1% cobalt, 35% moisture content, maximum: 6% cobalt, 9% manganese, 4% zinc, 4% copper, 5% magnesium, 5% sulphur, 0.5% iron, 40% moisture content
Terms	Minimum tonnage: 100 tonnes
Duties & Tariffs	Duties and Tariffs excluded
Delivery	No more than 4 weeks forward
Counterparties	Loading location: Indonesian ports. Main Consumer Markets: China.
Assessment Notes	Monthly assessment. First Friday of the month

Cobalt, Sulphate, 20.5% Co, Spot price; China, DAP RMB/t

Price Series	Cobalt, Sulphate, 20.5% Co, Spot price; China, DAP
CRUOnline Name	Sulphate China 20.5% Co DAP
Price ID	1311
Currency	RMB
Weight	t
Attributes	Form: Crystal.
Price Basis	DAP
Quality	Co 20.5% min
Terms	Min. lot size 5t. Bank acceptance (other payment normalised)
Duties & Tariffs	VAT included, any other duties excluded
Delivery	No more than 4 weeks forward
Counterparties	Loading location: Producer plant. Main Consumer Markets: China.
Assessment Notes	Weekly assessment. Every Friday. Business reported by sellers to buyers – no inter-trade activity.

Lithium

China

Lithium, Carbonate, 99.5% Li2CO3 Battery grade, Spot price; China, DAP RMB/t

Price Series	**Lithium, Carbonate, 99.5% Li2CO3 Battery grade, Spot price; China, DAP**
CRUOnline Name	Carbonate China 99.5% Li2CO3 Battery grade DAP
Price ID	1315
Currency	RMB
Weight	t
Attributes	Powder
Price Basis	DAP
Quality	Min 99.5% Li2CO3 (delivery of Min 99.2% Li2CO3 also accepted, if qualified for use in battery applications)
Terms	Min. lot size 5t. Bank acceptance (other payment normalised)
Duties & Tariffs	VAT included, any other duties excluded
Delivery	No more than 4 weeks forward
Counterparties	Loading location: Producer plant. Main Consumer Markets: China.
Assessment Notes	Weekly assessment. Every Friday. Business reported by sellers to buyers – no inter-trade activity.

Lithium, Hydroxide Monohydrate, 56.5% LiOH Battery grade, Spot price; China, DAP RMB/t

Price Series	**Lithium, Hydroxide Monohydrate, 56.5% LiOH Battery grade, Spot price; China, DAP**
CRUOnline Name	Hydroxide monohydrate China LiOH 56.5% min battery grade DAP
Price ID	1545
Currency	RMB
Weight	t
Attributes	Powder
Price Basis	DAP
Quality	Li 56.5% min, battery grade
Terms	Min. lot size 5t. Bank acceptance (other payment normalised)
Duties & Tariffs	VAT included, any other duties excluded
Delivery	No more than 4 weeks forward
Counterparties	Loading location: Producer plant. Main Consumer Markets: China.
Assessment Notes	Weekly assessment. Every Friday. Business reported by sellers to buyers – no inter-trade activity.

Spodumene, 6% Li2O, Spot price; China, CIF RMB/t

Price Series	**Spodumene, 6% Li2O, Spot price; China, CIF**
CRUOnline Name	Spodumene China 6% Li2O CIF
Price ID	1927
Currency	USD
Weight	t
Attributes	No other payable by-products or penalty elements
Price Basis	CIF
Quality	6% Li2O, 1.3% Fe2O3, maximum: 1.5% Fe2O3, 10% H2O
Terms	Minimum tonnage: 3,000 tonnes
Duties & Tariffs	Duties and Tariffs excluded
Delivery	No more than 90 days forward
Counterparties	Loading location: Producer plant. Main Consumer Markets: China.
Assessment Notes	Monthly assessment. First Friday of the month

Manganese sulfate

China

Manganese, Sulphate, min 32% Mn Battery grade, Spot price; China, EXW RMB/t

Price Series	Manganese, Sulphate, min 32% Mn Battery grade, Spot price; China, EXW
CRUOnline Name	China 32% Mn min battery grade, EXW
Price ID	1800
Currency	RMB
Weight	t
Attributes	Not applicable
Price Basis	EXW
Quality	32% Mn min, Fe 0.001% max, Zn 0.001% max, Cu 0.001% max, Pb 0.001% max, Cd 0.0005% max, K 0.01% max, Na 0.01% max, Ca 0.01% max, Mg 0.01%, max, Ni 0.005% max, Co 0.005% max
Terms	>33t. Bank acceptance bill/Cash
Duties & Tariffs	VAT included, any other duties excluded
Delivery	Not applicable
Counterparties	Main Consumer Markets: China mainland. Loading location: Producing plant
Assessment Notes	Monthly assessment. Business reported between sellers and buyers – no inter-trade activity.

Nickel

China

Nickel, Sulphate, min 21% - max 22.5%, Spot price; China, DAP RMB/t

Price Series	Nickel, Sulphate, min 21% - max 22.5%, Spot price; China, DAP
CRUOnline Name	Sulphate China min 21% - max 22.5%, Co 10ppm max DAP
Price ID	1314
Currency	RMB
Weight	t
Attributes	Crystal
Price Basis	DAP
Quality	Nickel content min 21%, max: 22.5%; Cobalt 10ppm max
Terms	Min lot size 1 tonne
Duties & Tariffs	VAT included, any other duties excluded
Delivery	No more than 4 weeks forward
Counterparties	Loading location: Producer plant. Main Consumer Markets: China.
Assessment Notes	Weekly assessment. Every Friday

Glossary of Terms

INCO TERM RULES FOR ANY MODE OR MODES OF TRANSPORT:

EXW – Ex-Works FCA – Free Carrier
CPT – Carriage Paid To
CIP – Carriage and Insurance Paid To
DAT – Delivered at Terminal
DAP – Delivered at Place
DDP – Delivered Duty Paid

INCO TERM RULES FOR SEA AND INLAND WATERWAY TRANSPORT:

FAS – Free Alongside Ship
FOB – Free On Board
CFR – Cost and Freight
CIF – Cost Insurance and Freight

COUNTRY ABBREVIATIONS USED:

We use ISO 3166 alpha-2 standard country codes

CRU

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