Kobalt an der LME

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The origins of the LME goes back even further…

1. Origins in The Royal Exchange, London from 1571
2. The Jerusalem Coffee House, Cornhill, London early 1800
3. The London Metals and Mining Co. 1877

Originate from the need to formalise trading into one market place:

• fixed trading times
• standard contracts specifications
• source of price ‘discovery’
The LME is the leading global venue for metal market participants to manage their price risk

LME is the leading global exchange in all non-ferrous metals

In 2016, the LME traded

- 156.6 million lots
- $10.3 trillion notional value
- 3.5 billion tonnes

This equates to an average daily turnover of 618,627 lots

LME provides market leading pricing of futures contracts

LME is ideally positioned to deliver efficient, transparent and regulatory compliant risk management tools for the battery materials market
Linking physical sales contracts to reference prices brings substantial benefits

**Benefits of reference prices**

- Always pay/receive a fair price, derived from market supply and demand
- Yearly negotiations are simplified, and focus on premiums/discounts
- Easier to negotiate longer term contracts
- No need for renegotiations
- EV battery material industries sustainable in the long term
- Attractive for mining investors
- No basis risk when hedging on exchange

**Benefits of on exchange trading**

- Manage price risk exposure according to firm’s individual risk profile (i.e. liquid market to transfer undesired risk)
- Lock in profit margins
- More flexibility on pricing structure
- Visibility on the market expectation of future price movements (i.e. the forward curve) allows for better planning

Reference pricing and on exchange trading are natural steps in the evolution of a commodities market
Hedging on the LME allows market participants to lock future prices today

**What is hedging?**

*Definition:* Establishing a position in a commodity futures market (LME) which is equal and opposite to a risk on a physical market

- Protects against adverse price movements by locking in expected profit margin and protect inventory value
  - By hedging you reduce the uncertainty and your exposure to price movements
  - The financial hedge allows the buyer/seller to lock in a certain price to be paid/received in the future
  - If hedged, any losses on the physical market (affecting the inventory value) are offset by an increased value in the financial position.

**What can I hedge?**

- **Total sales**
  - Profit margin
  - Overheads
  - Production costs

- **Raw materials cost** – the commodity

- **Other hedgeable costs:** energy, FX, freight, interest rates, electricity, finished products etc.

- **Not hedged** – because these prices fluctuate based on location, company strategy and other factors

- **Hedged**
Development of the LME cobalt contract
LME cobalt price performance

Data as of 30-Apr-18. Price and index performances rebased at 100.
LME cobalt monthly volumes

Volumes data as of 30-Apr-18
LME cobalt futures open interest

MOI data as of 30-Apr-18
Recent evolution of the LME cobalt specification

Apr-15: LME announces that Coarse Grain Powder will become a deliverable shape with effect from 14-Jul-15.

Jul-15: Coarse Grain Powder becomes a deliverable shape.

Dec-16: First Coarse Grade Powder brand listed FC COARSE COBALT POWDER S1 d200/1000.

Feb-18: First Coarse Grain Powder warrants are issued.

Jan-17: LME announces that minimum purity of cobalt delivered under the LME cobalt contract will change from 99.3% to 99.8% with effect from 19-Jan-18.

Oct-17: 99.3% purity cannot be used for new warrants.

Jan-18: Cobalt contract switches to 99.8% minimum purity deliverable contract, 99.3% purity must be removed.

Purity

Powder
Responsible sourcing for LME cobalt
Potential LME framework for responsible sourcing

LME aims to enhance and support existing initiatives rather than further complicate.

- **High risk:** Cobalt, tin, copper, molybdenum
  - Externally audited that (i) standards (internal or external) comply with guidance, and (ii) brands comply with standards

- **Low risk:** Aluminium + alloys, zinc, lead, nickel
  - Self-attestation or external audit that (i) standards (internal or external) comply with guidance, and (ii) brands comply with standards
**Indicative LME timeline**

Outline of potential pathway to implementation

3 step plan of (i) disclosure, (ii) engagement and (iii) compliance to meet growing industry concern on responsible sourcing issues and increased demand for expanded LME remit to reflect this through amended brand specifications.

- **NOW** (Nov-17)
  - LME sends out producer survey questionnaire
- **Q1 2018**
  - LME responsible sourcing position paper published
  - Period of industry engagement and feedback
- **Q2 2018**
  - LME to publish list of approved standards. Producers who have not responded to the LME producer survey to be flagged on LME website
- **Q3 2018**
  - All brands to have nominated a standard and certification regime, and a target date for compliance
- **Q4 2018**
  - H1 2019
  - H2 2019
- **2020**
  - All brands to be certified as compliant with chosen standard. LME to consider delistings in the event of non-compliance

**Timeline:**
- **Dec-17**
- **2018**
- **Q1 2018**
- **Q2 2018**
- **Q3 2018**
- **Q4 2018**
- **H1 2019**
- **H2 2019**
- **2020**
Considering a cash settled cobalt contract
Market uses both exchange and PRA pricing…

Data as of 17-May-18

LME cobalt cash price  MB cobalt low grade low quote
...but divergence between LME and PRA...

Communication of specs upgrade from 99.3% to 99.8%

99.3% metal cannot be used for new warrants

99.3% warrants must be removed

Price (US$/mt)

Jan-17 Feb-17 Mar-17 Apr-17 May-17 Jun-17 Jul-17 Aug-17 Sep-17 Oct-17 Nov-17 Dec-17 Jan-18 Feb-18 Mar-18 Apr-18 May-18

LME cobalt MB low grade mid MB high grade mid
...creates need for a new contract...

<table>
<thead>
<tr>
<th>Contract name</th>
<th>Cobalt</th>
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<tr>
<td>Contract type</td>
<td>Futures</td>
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<td>Delivery type</td>
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<td>Lot size</td>
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<td>Contract period</td>
<td>Monthly out to 15 months</td>
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<td>Price quotation</td>
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<tr>
<td>Final settlement procedure</td>
<td>Final settlement, following termination of the trading for a contract month, will be based on the PRA reported price</td>
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<tr>
<td>Trading venues</td>
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<td>Inter-office 24 hours a day</td>
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<td>Realised variation margins applied</td>
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...as part of the LME’s EV initiative

<table>
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<tr>
<th>Current LME offering</th>
<th>Cobalt</th>
<th>Nickel</th>
<th>Copper</th>
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New products

- Cobalt cash settled
- Lithium

Electric vehicle → Li-ion battery pack → Li-ion battery cells → Li-ion battery cathode material
LME’s roadmap for EV metals

Work with industry to serve the growing market’s needs

- Bring together key participants across the value chain to acknowledge the shared goals and challenges
- Discuss the rapid growth of electric vehicles and the impact on the development cycle of the commodities involved

**Formation of Advisory Group and discussion with existing Cobalt Committee**

**Discuss key questions for battery complex pricing**

- Gather feedback from the industry regarding the pricing methodology currently adopted
- Assess need for risk management per battery ingredient
- Develop understanding of the structure and specificities of the markets in the scope of the analysis

**Identify and refine best-practice pricing methodology**

- Identify, support and endorse the leading index providers
- Work with the industrial community to encourage industry wide adoption of index linked pricing
- Work with index providers to ensure compliance with appropriate regulations

**Launch risk management tools**

- Use LME’s know-how of price risk management to assess the needs of the battery materials market
- Launch effective, transparent, regulated and secure tools for price risk management
- Work with the industry to promote education, market participation and liquidity
Feedback from market participants and monitoring of trading activity will determine the best option.

- **Now**
  - Market engagement to discuss cash settled contract

- **Summer**
  - Publication of cash settled contract specifications

- **Year-end**
  - Engagement with users of current physically settled contract

**Cash settled contract**

**Physically settled contract**

**Arbitrage opportunities** may outweigh risk of **liquidity split**

**Option 1)**
- Liquidity risk materialises
- Liquidity migrates to cash settled contract, physically settled contract is terminated

**Option 2)**
- Arbitrage opportunities arise
- Market participants prefer to retain physically settled

**New responsible sourcing framework applies**
Contact

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