Copper Market Outlook:
Long term prospects are positive

Vanessa Davidson, Director of Copper Research & Strategy

Copper to the World Conference, Adelaide Convention Centre, 26th June 2018
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Key developments since the last ‘Copper to the World Conference’

Prices have moved higher...

LME 3-M price, $/tonne

…but copper market remains in surplus

Refined copper supply demand balance, '000t

Key developments since last year’s conference:

- **LME Price**: Strong increase (+22%)
- **SD balance**: Small surplus persists (~120kt)
- **Visible stocks**\(^{(1)}\): Similar to last year (1.3Mt)
- **Demand**: Upgraded reflecting EV\(^{(2)}\) story
- **China**: Economic transition firmly underway
- **Supply**: Projects starting to get the go-ahead
- **Producer Margins**: Sharp recovery (~40%)

Data: CRU. Notes: (1) Visible stocks = LME, Comex, SHFE, China bonded (2) EV = Electric vehicles
Shortages still expected but size of deficits reduced and transition into deficit delayed

LME 3-month price and annual global refined supply/demand balance, 2015-2022

Data: CRU
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China’s economic transition is underway but some growth is still expected

Total Chinese copper demand by end-use (including scrap), 2017 vs 2022, '000 tonnes

Data: CRU
As Chinese growth slows, the rest of the world starts to pick-up

Growth in world refined copper consumption and volume growth in selected 5-year periods

Growth in global refined copper demand, %

<table>
<thead>
<tr>
<th>Year</th>
<th>Global</th>
<th>China</th>
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<tr>
<td>2015</td>
<td>1.2%</td>
<td>3.8%</td>
</tr>
<tr>
<td>2016</td>
<td>2.5%</td>
<td>4.5%</td>
</tr>
<tr>
<td>2017</td>
<td>1.7%</td>
<td>4.9%</td>
</tr>
<tr>
<td>2018</td>
<td>2.6%</td>
<td>3.1%</td>
</tr>
<tr>
<td>2019</td>
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<td>1.7%</td>
</tr>
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<td>1.7%</td>
<td>1.0%</td>
</tr>
<tr>
<td>2021</td>
<td>1.6%</td>
<td>0.8%</td>
</tr>
<tr>
<td>2022</td>
<td>2.0%</td>
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Absolute consumption growth in period, Mt

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<th>Period</th>
<th>Global</th>
<th>China</th>
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<tr>
<td>2007-12</td>
<td>1.6Mt</td>
<td></td>
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<tr>
<td>2012-17</td>
<td></td>
<td>3.3Mt</td>
</tr>
<tr>
<td>2017-22</td>
<td></td>
<td>2.6Mt</td>
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Data: CRU
Longer term, electric vehicles will provide significant boost to copper demand

Notes: FCEV = Fuel cell electric vehicles, BEV = Battery electric vehicle, PHEV = Plug-in hybrid electric vehicle, HEV = Hybrid electric vehicle

Data: CRU
Global demand growth has been upgraded mainly on EV story

World refined copper consumption forecasts made in 2017 and in 2018, index 2014=100

Data: CRU
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Growth in global mine output is tapering off

Global mine production; ‘000t of contained copper

CAGR:
- 2001-06: 1.8% p.a.
- 2006-11: 1.5% p.a.
- 2011-16: 4.8% p.a.
- 2016-21: 1.5% p.a.
- 2021-25: 0.6% p.a.

Growth accelerates, 2011-16
Growth slows, 2016-25
Steady growth in output, 2001-11

Mine production by type, ‘000t Cu

Data: CRU
Reserve exhaustion remains an issue: Many key mines to cease production in coming years

Peak annual copper production ('000t) vs expected end of life (year)

Data: CRU
Pipeline of large projects remains thin…

Projects that have recently started-up or are due to start-up, LOM capacity >100,000t/y, '000t

Data: CRU
…but several smaller projects, many with Chinese backing, have been given the green light

Copper mine projects 2017-2022 with capacity of >=50,000t/y and <100,000; LOM copper production capacity; '000t

Data: CRU
Plenty more investment needed: almost all uncommitted projects are required by 2035

Forecast committed copper mine production and potential from uncommitted projects*

* Committed production after disruption; Uncommitted before any adjustments

Data: CRU
Most potential production is located in South America, especially Chile…

Mine projects by region and status and with start-up dates of between now and 2035

Data: CRU
**Structure of Presentation**

1. **Current Copper Market:** *Transition to deficit yet to occur but widely anticipated*

2. **Demand Outlook:** *Copper demand has been upgraded*

3. **Supply Outlook:** *Mine projects starting to move*

4. **Price Outlook:** *Upward pressure on prices but there are risks*
Robust margins should assist new project development

Producer margins at 90\textsuperscript{th} and 50\textsuperscript{th} centiles of net of by-product cash cost curve, 2017 US$/t

Data: CRU
Prices will move higher but risk of substitution exists

Real copper prices*, 1908-2018, $/t (2017$)

Copper to aluminium price ratio

Data: CRU, LME. Note: *LME cash or equivalent
Global copper consumption growth to decelerate in short-term due to Chinese economic restructuring...

...but electric vehicles have led to more positive longer term outlook for global copper demand

Large sized project pipeline still thin but small scale projects are moving

Cathode market well supplied at present. Deficits expected in early 2020s but they are smaller than a year ago

Positive long term outlook. High prices needed to attract investment, but risk of substitution if prices rise too high

Data: CRU
Thank you for your attention!