

**COLLERINA COBALT LTD (ASX:CLL)**

**FAST TRACK  
HPA PRODUCTION**



# Disclaimer



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# Corporate Snapshot

## TRADING INFORMATION

ASX CODE	CLL
Share Price (1-Aug-18)	11.5c
52 week trading range	2.1c – 18.0c
Issued Shares	508.3M

## POST-RIGHTS ISSUE CAPITAL STRUCTURE <sup>1</sup>

Issued Shares	559.1M
Unlisted options (@2c)	8.0M (expire 21 October 2018)
Unlisted options (@10c)	30.0M (expire 31 October 2019)
Market Cap (fully diluted)	\$68.7M
Cash	\$4.0M
Enterprise Value	\$64.7M

<sup>1</sup> It is proposed that Rimas Kairaitis be issued with 10M unlisted options at a strike price of 15c with a maturity date of 31 October 2020. The issuance of these options will be subject to shareholder approval.

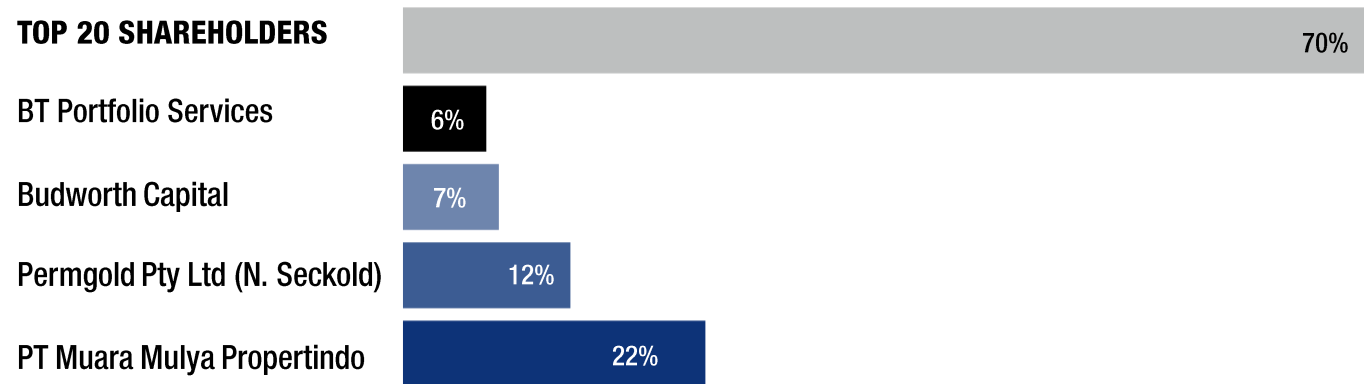
## SHARE PRICE PERFORMANCE



# Corporate Snapshot

## SHAREHOLDERS

### TOP 20 SHAREHOLDERS



### RECENT HIGHLIGHTS

2017/2018

**99.99% HPA**

**4N (99.99%) purity achieved in HPA testwork program**

**HPA FIRST**

**Adoption of the HPA First process**

**\$4.0M**

**\$4.0M underwritten Rights Issue (July 2018)**



**First HPA production using the HPA First process**

**PFS**

**HPA First Pre-Feasibility Study due October 2018**

# Board & Management



**Norman Seckold**  
Chairman

30+ years in the full time management of natural resource companies. Past Chairman and Director of listed companies including Bolnisi Gold NL, Timberline Minerals Inc., Perseverance Corporation Limited, Valdora Minerals NL, Palmarejo Silver and Gold Corp. and Cockatoo Coal Limited. Currently Chairman of Santana Minerals Limited and Planet Gas Limited and unlisted public company Nickel Mines Limited.



**Justin Werner**  
Managing Director <sup>1</sup>

20+ years' mining and management experience. Previously consulted to a number of blue chip mining companies including BHP, Rio Tinto and Freeport McMoran. Successful track record of mine discovery and development. Currently a Director of unlisted public company Nickel Mines Limited.



**Peter Nightingale**  
Director and CFO

20+ years as a Director or Company Secretary for a range of resource companies including Pangea Resources Limited, Timberline Minerals Inc., Perseverance Corporation Limited, Valdora Minerals NL, Mogul Mining NL, Bolnisi Gold NL, Cockatoo Coal Limited and Sumatra Copper and Gold plc. Currently a Director Planet Gas Limited and unlisted public companies Nickel Mines Limited and Prospech Limited.



**Rimas Kairaitis**  
Technical Director <sup>1</sup>

20+ years experience in minerals exploration and resource development in gold, base metals and industrial minerals. Led the geological field teams to the discovery of the Tomingley and McPhillamy's gold deposits in NSW and steered the Hera gold-lead-zinc Project from discovery through to successful commissioning and commercial production. Previously founding Managing Director and CEO of ASX-listed Aurelia Metals.



**Tony Sgro**  
Non-Executive Director

Chemical Engineer with 45+ years' senior management experience in the supply of specialised equipment to the process industries with an emphasis on mining and oil & gas.

Co-founder, Director and General Manager of Kelair Pumps for 36 years.

<sup>1</sup> It is proposed that Rimas Kairaitis will replace Justin Werner as Managing Director in August 2018 following a planned IPO of Nickel Mines Limited.

# “HPA FIRST” - FAST TRACK PATH TO HPA PRODUCTION

The HPA First process uses the Company’s proprietary licenced solvent extraction (SX) and refining technology and a feedstock blend of readily available industrial products rather than an acid leach solution generated from the Collerina Project ore

## SIMPLER



### Does not require mining operation

- Simplified flow sheets with no acid plant, leach vessels, filtration plant, neutralisation circuits or tailings
- Single site industrial location

## BETTER



### Dramatically improved business case:

- Dominant HPA revenue fast tracked
- Higher aluminium feed tenor
- Significant CapEx reductions
- Significant OpEx reductions

## FASTER



### Fast track to cashflow:

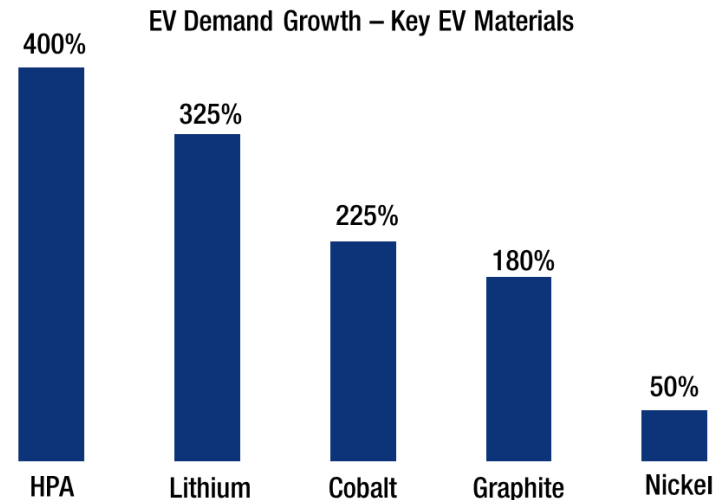
- Faster DFS – simpler pilot plant
- Faster Permitting - single site industrial zoning
- Faster track to financing and construction to operational cash-flow

# About High Purity Alumina (HPA)



- HPA is the pure form of aluminium oxide ( $Al_2O_3$ ) HPA is the pre-cursor material for the manufacture of **sapphire glass** and **ceramic coated Lithium-Ion-Battery (Li-B) separators**
- Its value derives from its physical properties of extreme hardness and chemical stability
- Purity is determined by the concentration of trace elements in the alumina compound eg, iron, magnesium, sodium
- Price and performance of HPA varies upon product density, crystal structure, particle size and distribution and degree of purity

4N HPA is the largest sector of the HPA market and is seen by Collierina Cobalt as the most logical sector of the market in which to focus in terms of demand volumes and margin optimisation



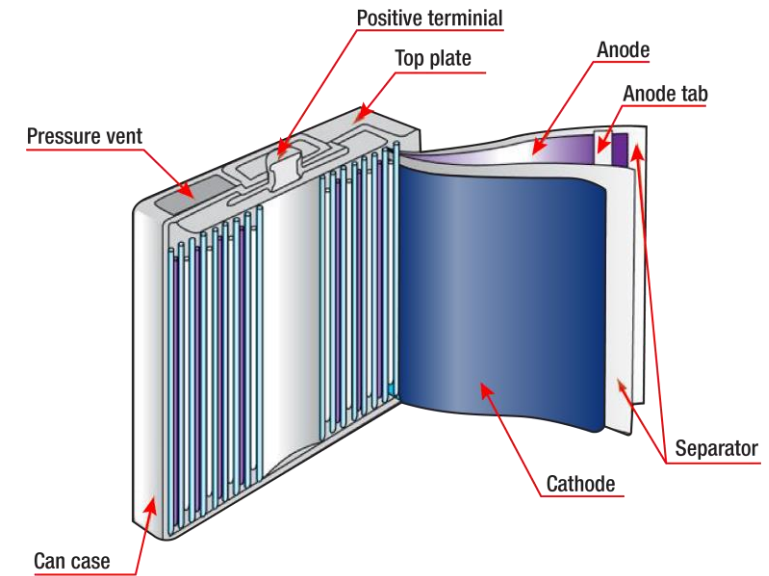
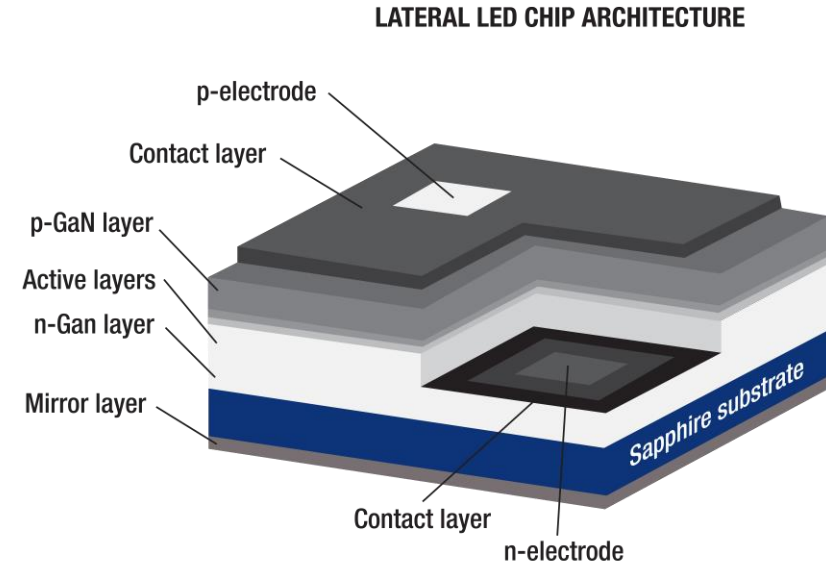
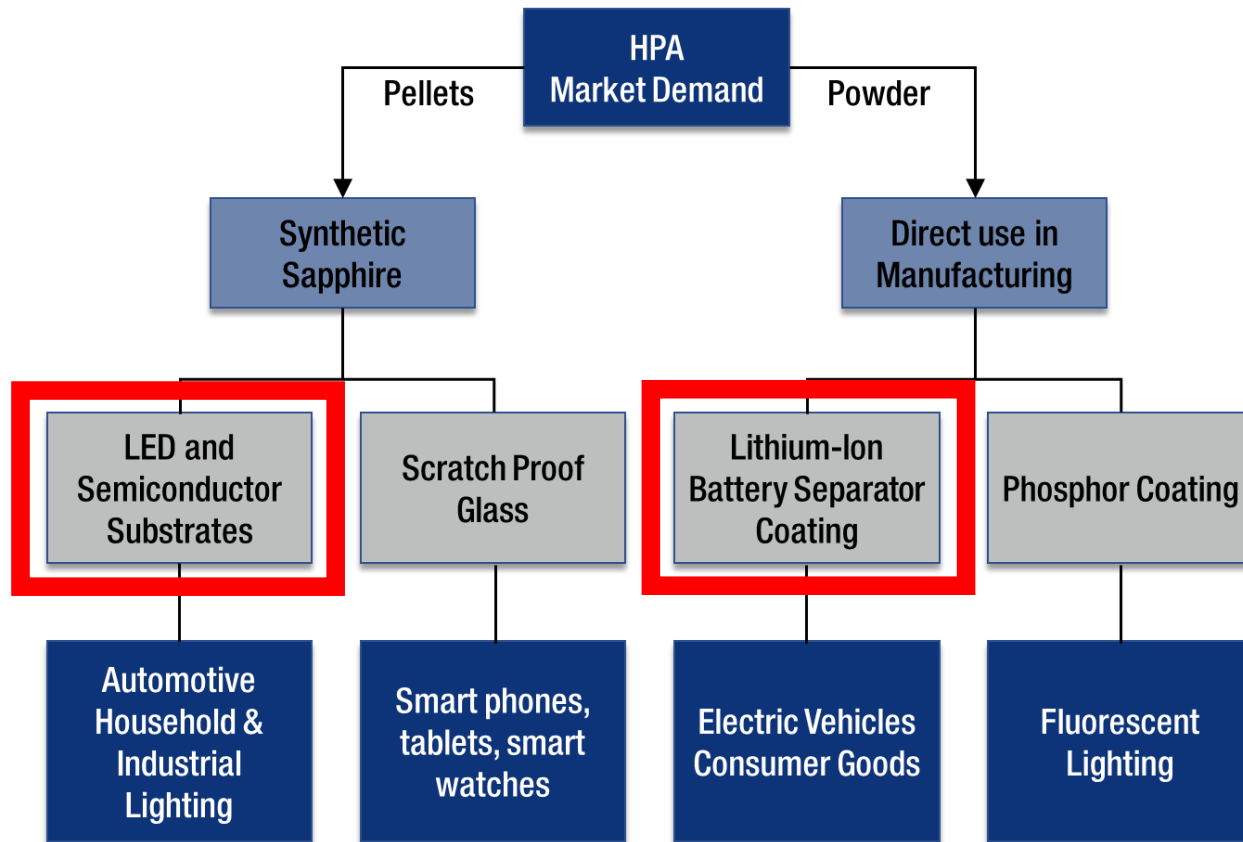
Source: Various Industry Sources & Research

## PRICE FOR PURITY

SGA	99.5% purity	~US\$400/t
3N HPA	99.9% purity	~US\$10-25/kg
4N HPA	99.99% purity	~US\$25-50/kg
5N HPA	99.999% purity	~US\$50-100/kg
6N HPA	99.9999% purity	By negotiation in a very limited market.

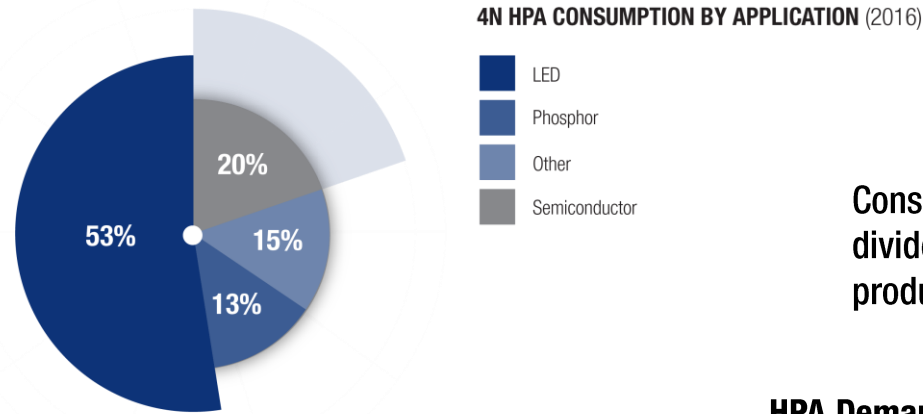
Source: CRU

# High Purity Alumina (HPA) Market



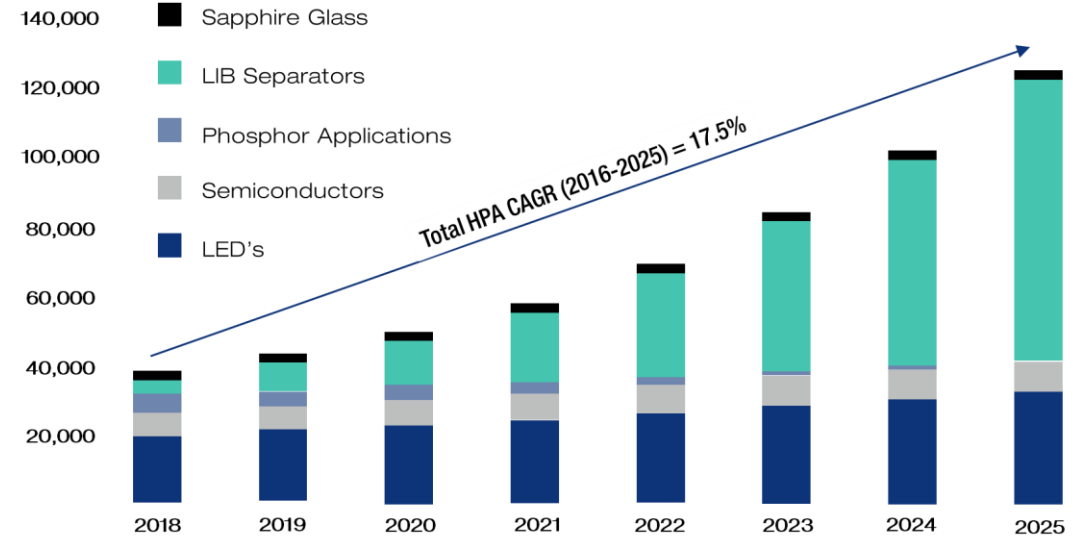
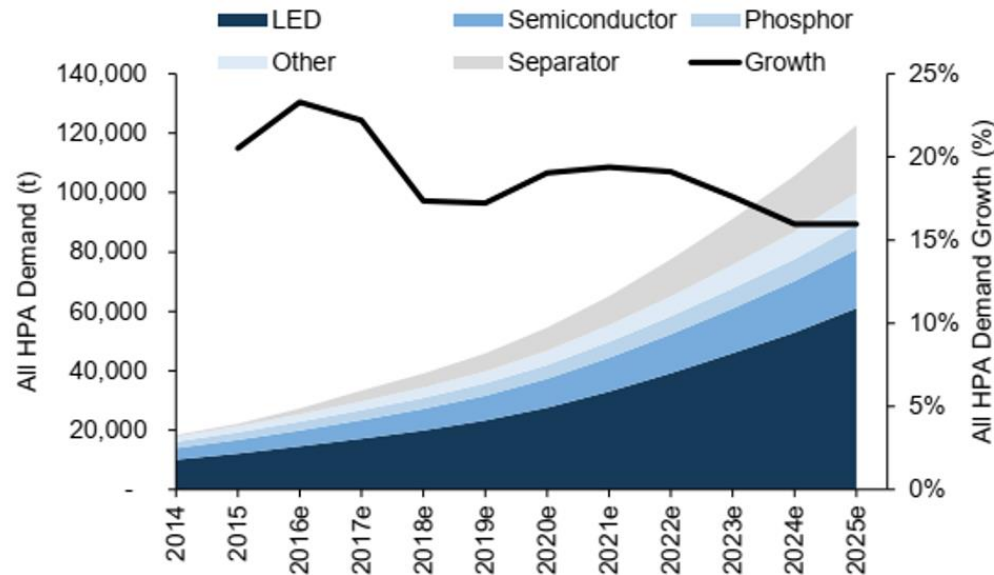


# High Purity Alumina (HPA) Demand – A Battery ‘Metal’



Consensus market agreement on strong demand growth for HPA to 2025. Market analysts divided on growth driver being either the increasing adoption of LED (Light Emitting Diode) products and/or separator coatings in lithium ion batteries (Li-B's).

## HPA Demand Outlook (2018-2025)



Source: Petra Capital

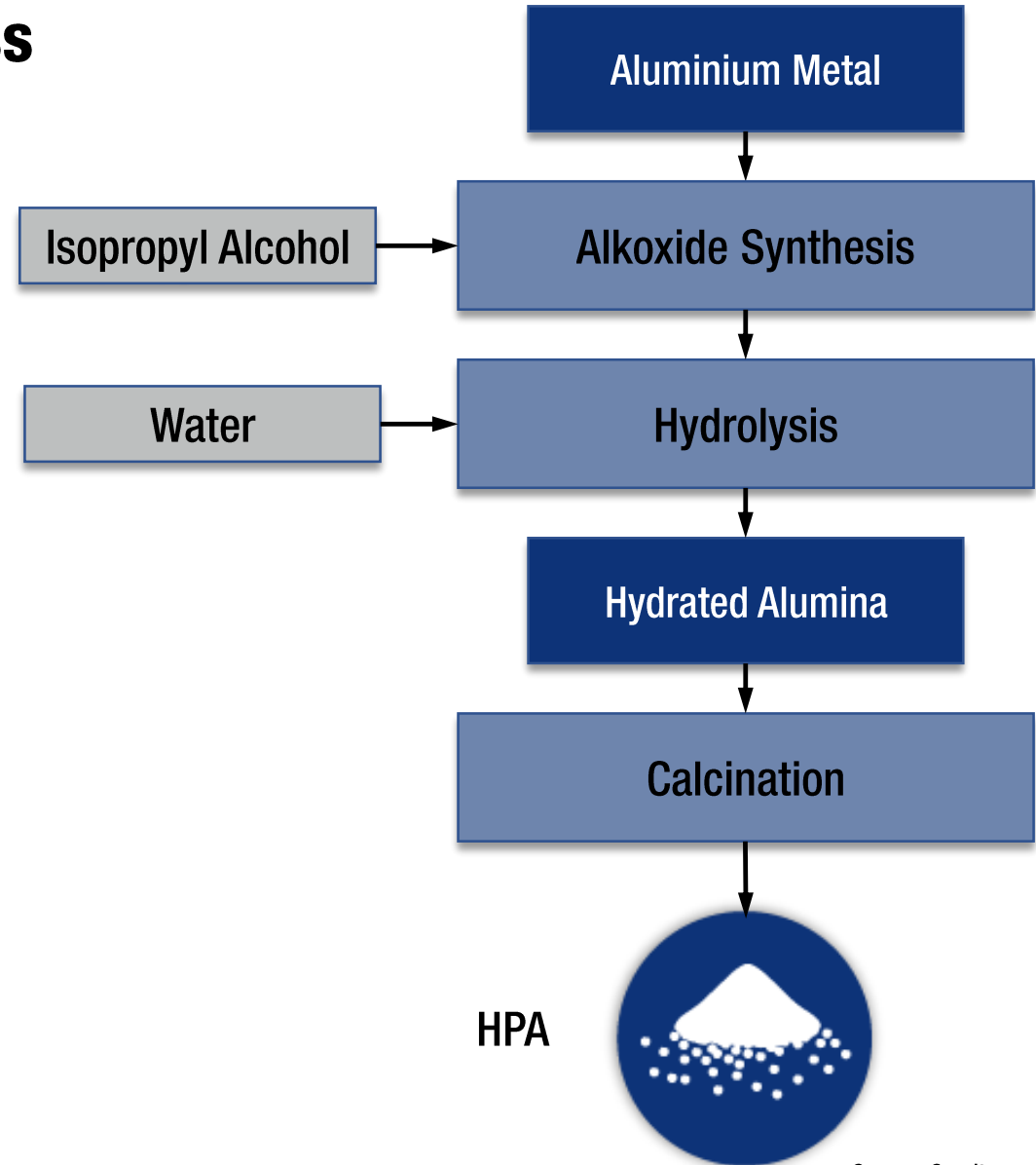
Source: CRU

# Existing HPA Market Production Process

Existing HPA production is synthesised from Al metal feedstock

Aluminium alkoxide is synthesised from aluminium metal and alcohol, and hydrated alumina is produced by hydrolysis of alkoxide, and finally high purity alumina is obtained by calcination.

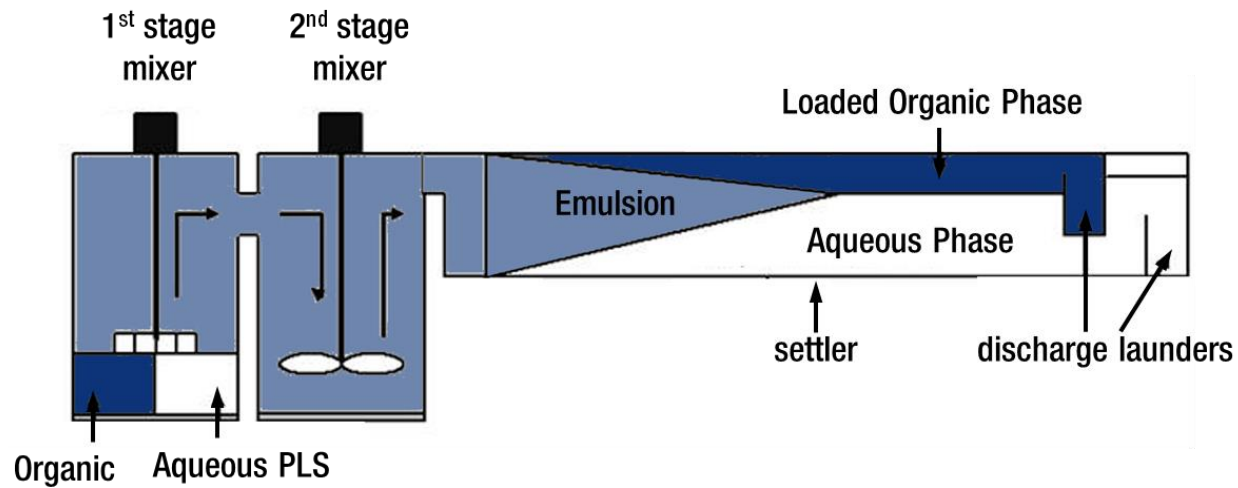
**High Cost:** Contains the inherited process cost of Al metal feedstock (Bayer Process+ Hall-Hérault Process)



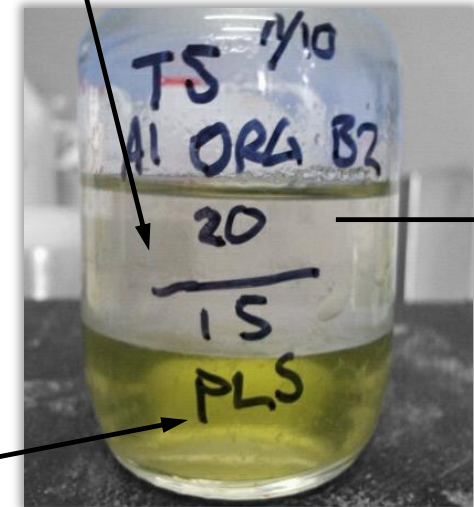
Source: Sumitomo Chemicals

# Our HPA Process – Solvent Extraction

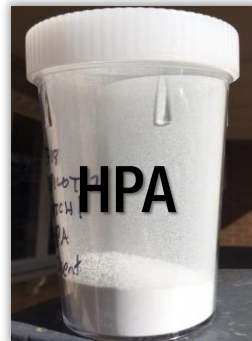
- Highly selective process delivers HPA purity
- Atmospheric wet chemical process
- Solvent Extraction accounts for ~25% of global copper production



Aluminium Loaded Organic Phase



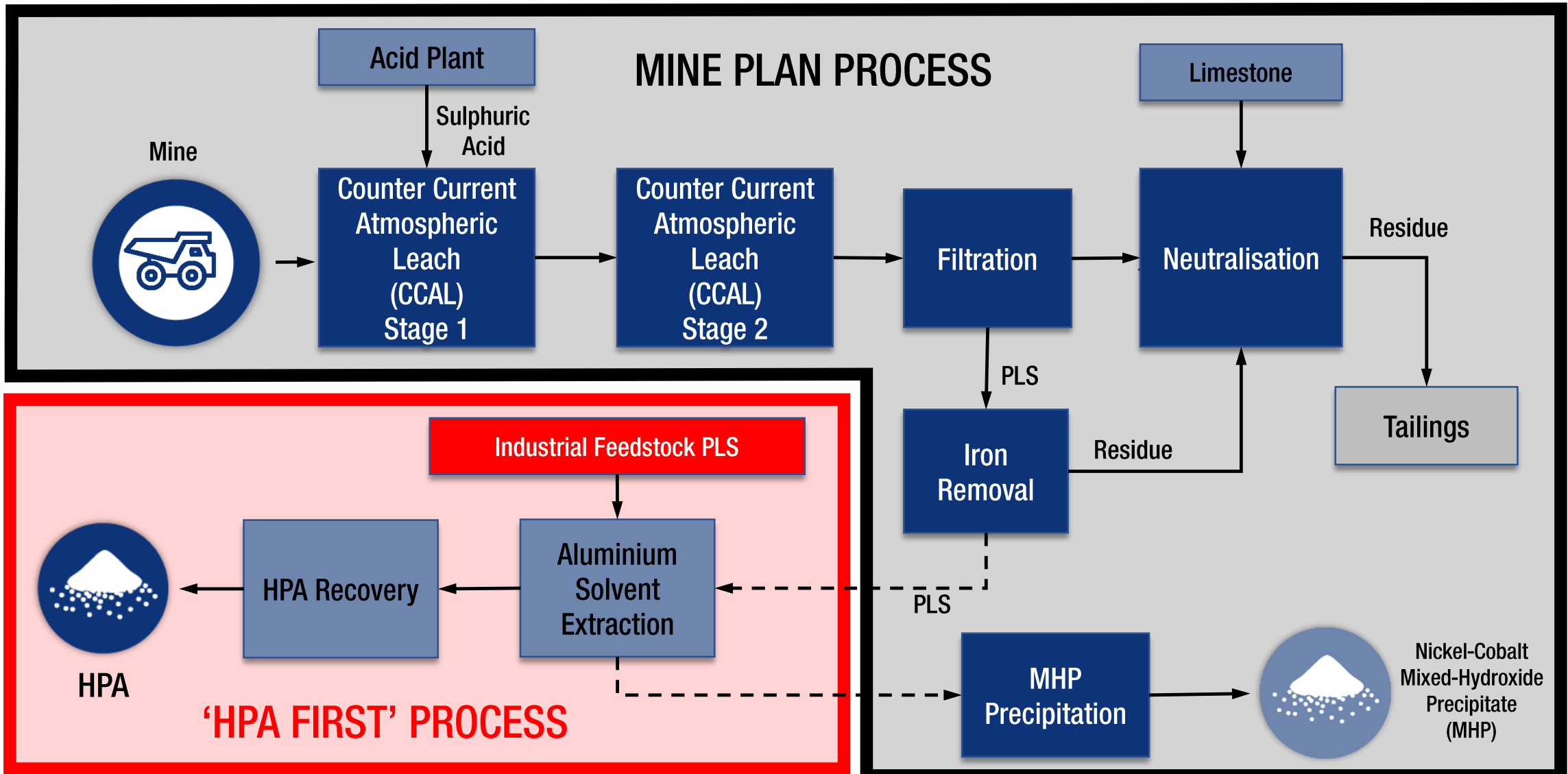
Aqueous Phase (Raffinate)



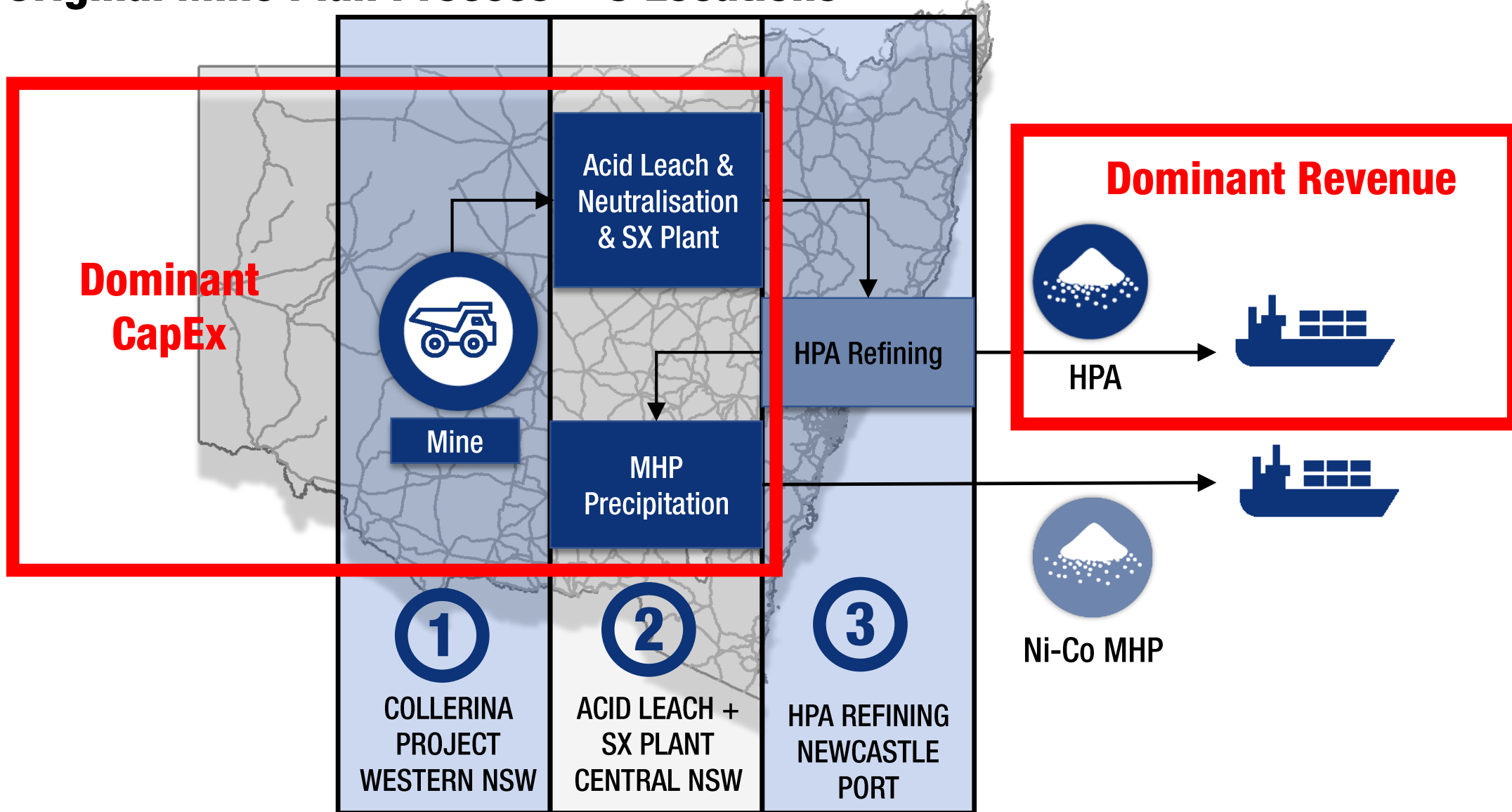
Proprietary processing steps

Aluminium loaded organic

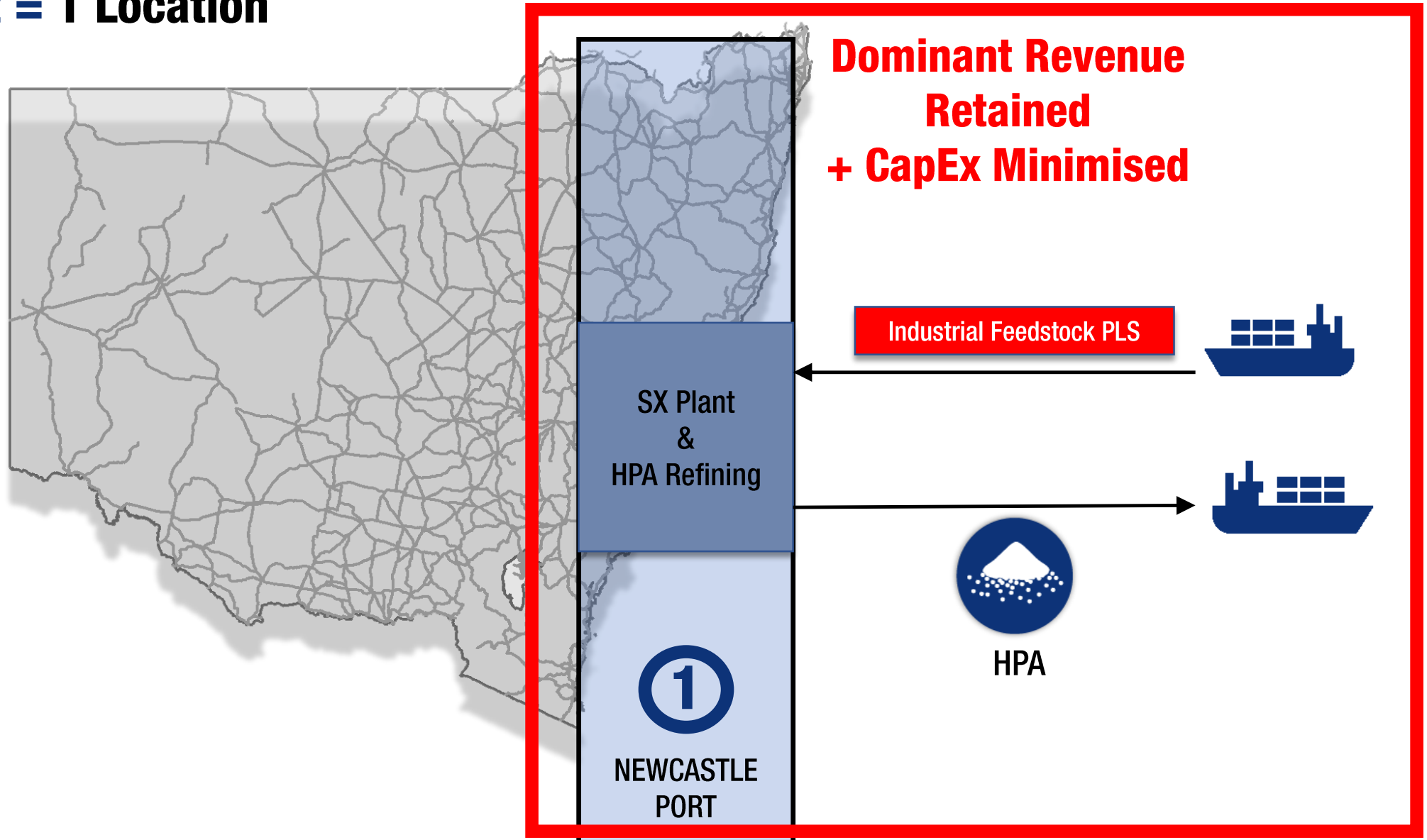
# HPA First – A Major Process Simplification






























# Original Mine Plan Process = 3 Locations



# HPA First = 1 Location

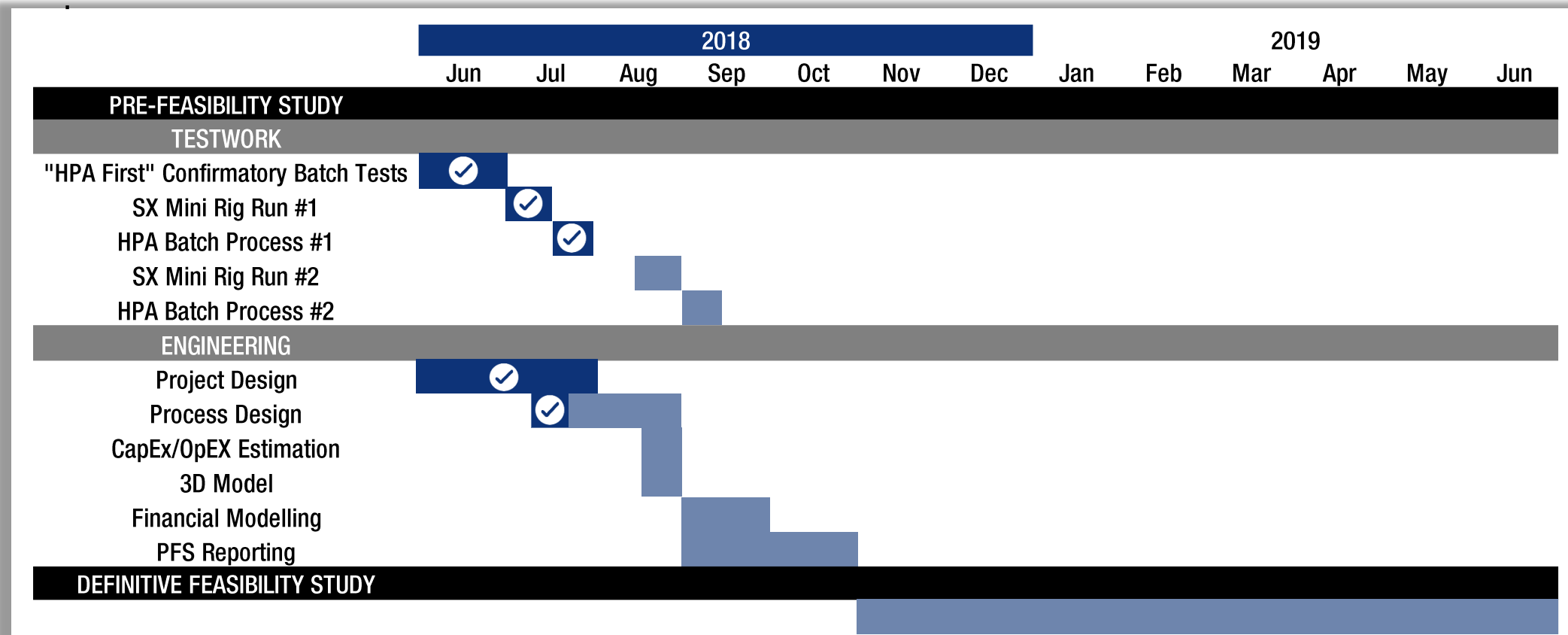


# Peer Comparison - HPA

					
<b>Projects</b>	<b>CLL</b>	<b>FYI</b>	<b>HEG</b>	<b>Altech</b>	<b>Orbite</b>
Project Stage	PFS Oct 2018	PFS Q2 2018	PFS Complete	BFS 2015 FID Approved	Restarting Production
Feedstock	Bulk Industrial Chemicals	Kaolin	Kaolin	Kaolin	Kaolin
<b>Project Units</b>					
Mining	N/A				
Feedstock Calcining	N/A				
Hydrochloric (HCl) Acid leach	N/A				
High Temperature HCl recovery	N/A				
Solvent Extraction (SX)		N/A	N/A	N/A	N/A
HPA Refining					
<b>CapEx</b>	<b>???</b>	<b>???</b>	<b>US\$271M</b>	<b>US\$298M</b>	<b>C\$498.5M</b>

# Indicative Timetable

- The first mini-rig run using the HPA First process has been completed, with the successful production of HPA .
- Now preparing for the second SX mini-rig and HPA run and construction of the DFS pilot plant
- PFS on track for delivery in October 2018.





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# THANK YOU

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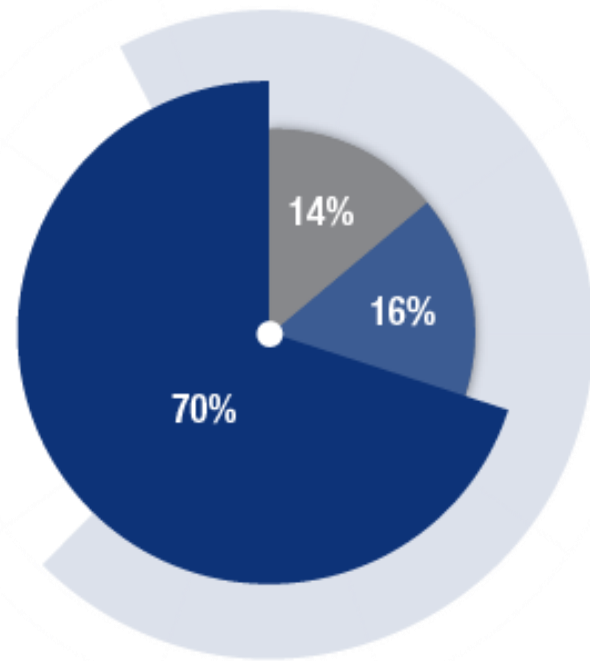
**COLLERINA COBALT LTD (ASX:CLL)**

# **Appendices**

## Appendix 1

# Demand for HPA – Regions

Demand for HPA is primarily being driven by the increasing adoption of LED (Light Emitting Diode) products, separators in lithium ion batteries (Li-B's) and scratch resistant artificial sapphire glass for smartphone screens and watches



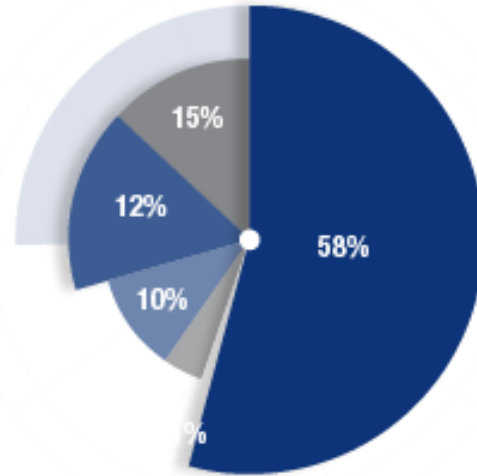
HPA DEMAND BY GEOGRAPHIC REGION (2016)



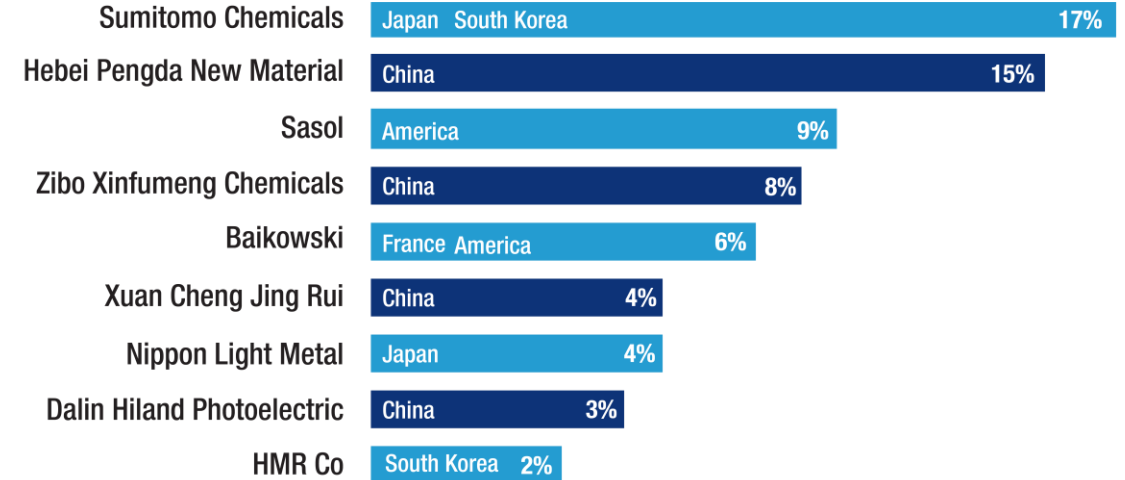
Growth demand is dominated by the APAC Region (~70% in 2016) primarily China, Japan and South Korea

As a would-be Australian based HPA producer, Collierina Cobalt is ideally placed to service the most dominant region of global HPA demand

## Appendix 2 Supply of HPA



GLOBAL HPA SUPPLY DISTRIBUTION - 2016E



% EXPECTED 2016 OUTPUT

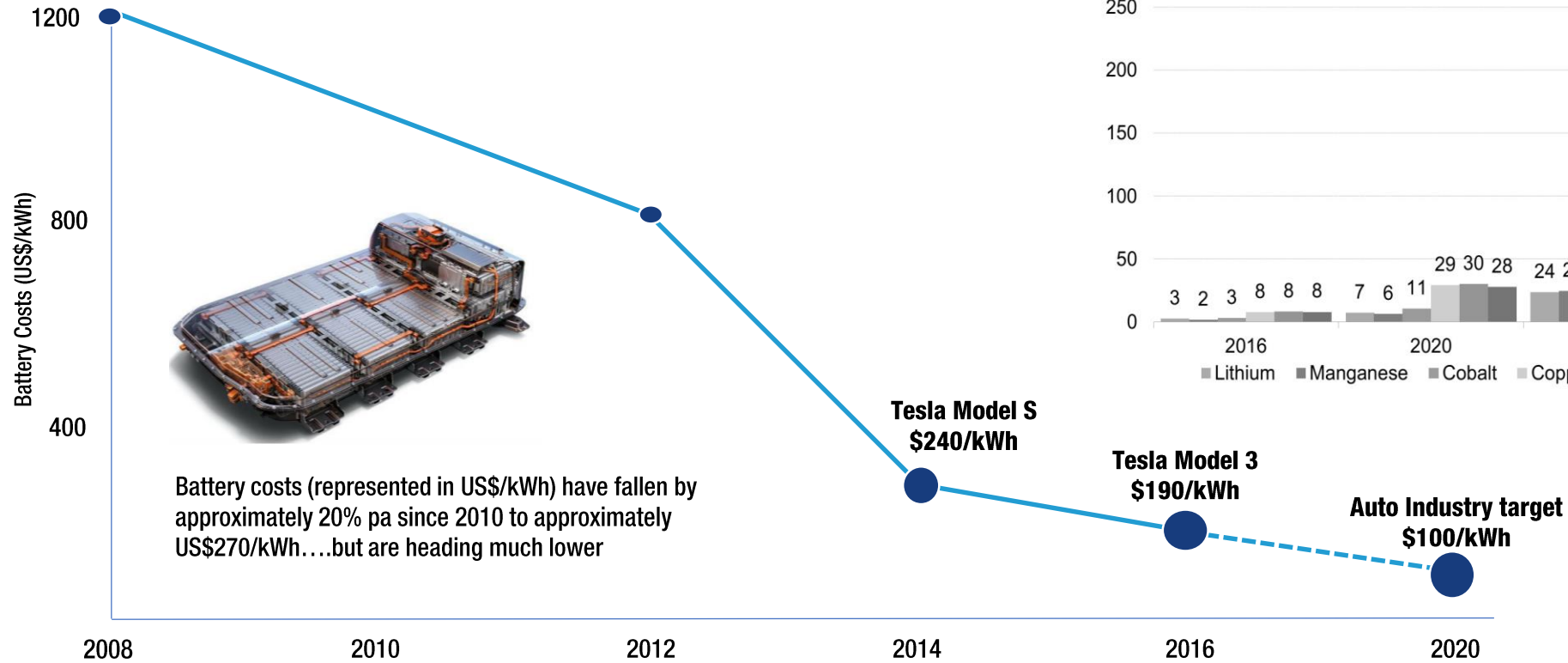
SOURCE: PERSISTENCE MARKET RESEARCH

- Current HPA supply is concentrated in the Asia Pacific region (~83%) with China the most prolific producer
- Current production is Dominated by large diversified chemical companies where HPA is a non-core product and an immaterial percentage of revenue (< 5% for Sumitomo Chemicals)
- Cobalt sees enormous opportunity as a focused HPA producer to:
  - Become a genuine alternative supply source to the existing dominant APAC producing countries, and more importantly
  - Fill an expected supply shortage as forecast HPA demand escalates over the next decade
- Collerina Cobalt stands to become an extremely low-cost HPA producer
- Strong potential exists for long-term offtake agreements prior to commercial production

## Appendix 3

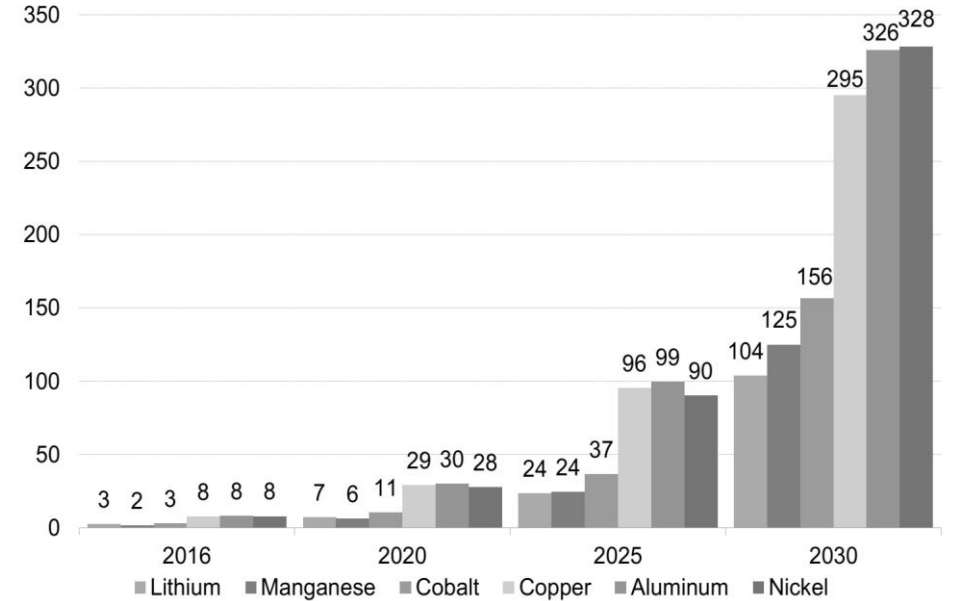
# Battery Costs Will Underpin EV Penetration

Batteries with lower cost structures and greater energy densities will drive EV penetration and demand for battery metals



## Forecast demand for key battery materials

Metal demand (thousand metric tons)



Source: Bloomberg New Energy Finance

# Appendix 4

## Statement of Compliance

### Competent Persons Statement (Process Development Testwork)

Information in this announcement that relates to metallurgical results is based on information compiled by or under the supervision of Mr Boyd Willis, an Independent Consultant trading as Boyd Willis Hydromet Consulting. Mr Willis is a Fellow and Chartered Professional of The Australasian Institute of Mining and Metallurgy (AusIMM). Mr Willis has sufficient experience to the activity which he is undertaking to qualify as a Competent Persons under the 2012 Edition of the 'Australasian Code for reporting of Exploration Results, Mineral Resources and Ore Reserves'. Mr Willis consents to the inclusion of the technical data in the form and context in which it appears.

For further information on testwork results and processes see ASX announcements dated 9 July 2018, 30 April 2018, 26 April 2018, 21 March 2018, 6 March 2018, 21 February 2018, 8 December 2017, 30 November 2017, 29 November 2017, 24 November 2017 and 13 November 2017.