

Commitment to the Future

# Developing High Purity Chemicals from Lepidolite Corporate Presentation<sup>1</sup>

May 2020

<sup>1</sup> This presentation should be read in conjunction with the Lepidico Announcement to the ASX dated 28 May 2020, "Definitive Feasibility Study Delivers Compelling Phase 1 Project Results"



**LEPIDICO**



# Developing a Sustainable Lithium Chemical Business on Lepidolite Resources

- Lepidico's (ASX: LPD) strategic objective is to develop a sustainable vertically integrated lithium business that commercialises its proprietary technologies and provides above average returns from mine to battery grade lithium chemical production.
- Phase 1 Project Definitive Feasibility Study completed May 2020 for:
  - redevelopment of two mines within the 80% owned Karibib Project (KP) in Namibia and the design of a new flotation plant to produce a lepidolite concentrate for export to...
  - ...a chemical conversion plant in Abu Dhabi employing Lepidico's clean-tech process technologies, L-Max<sup>®</sup> and LOH-Max<sup>®</sup>, which together extract lithium and manufacture lithium hydroxide along with valuable by-products;
  - attractive economics include a 31% Internal Rate of Return and NPV<sub>8%</sub> of US\$221 million (A\$340 million) ungeared, based on a 14 year production life; and
  - strategic caesium and rubidium high value products plus bulk by-products collectively give aggregate production on a total lithium equivalent basis of 7,060tpa LCE.
- Market capitalisation of c. A\$36 million and A\$5.3M cash at 26 May 2020.

LiOH

Rb

\$\$\$

SiO<sub>2</sub>

Li<sub>2</sub>CO<sub>3</sub>

ESG

Cs

K<sub>2</sub>SO<sub>4</sub>



LEPIDICO

# Corporate Snapshot

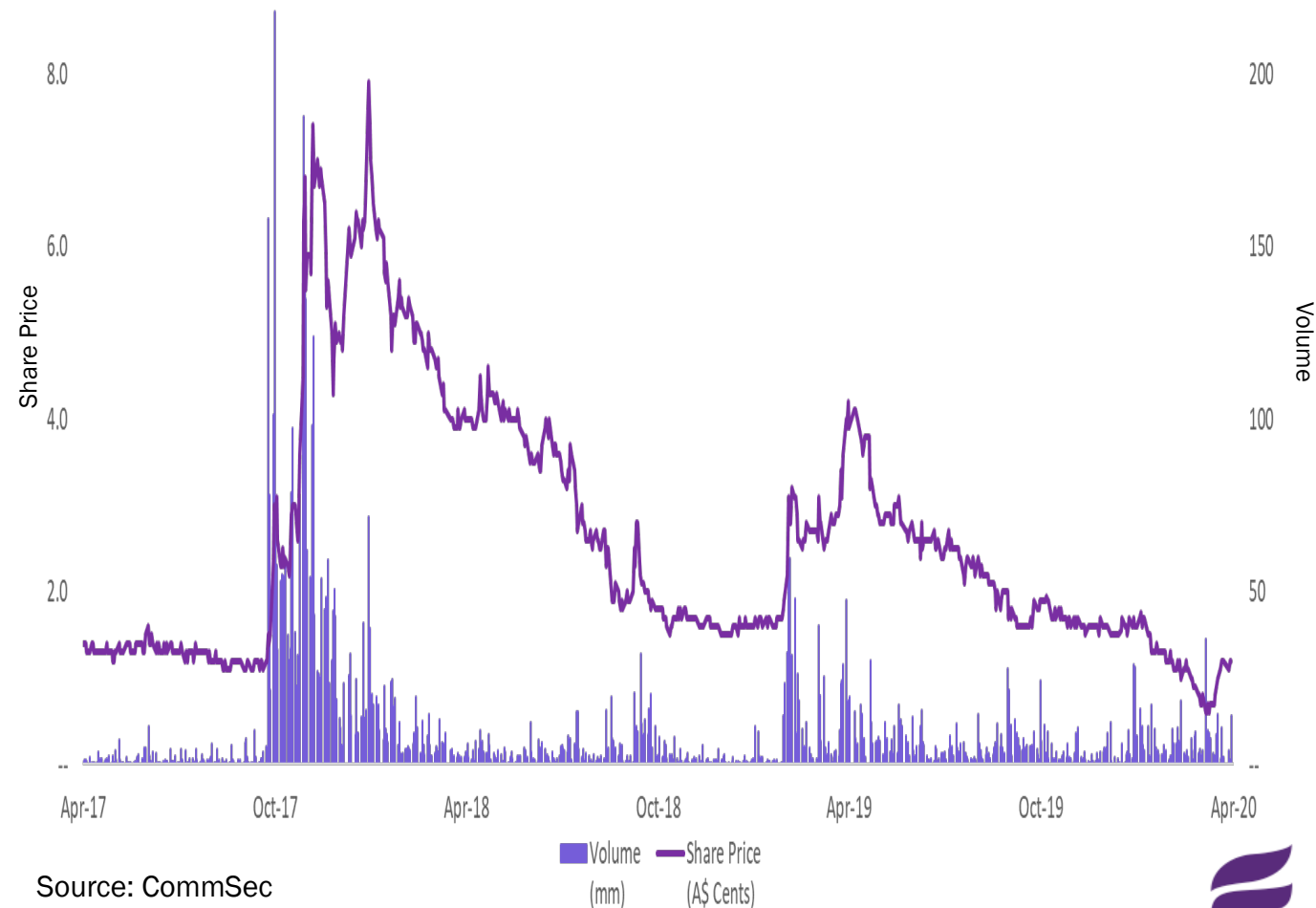
## Lepidico Ltd (ASX:LPD) Board of Directors

Gary Johnson	Chairman, Non-executive	Metallurgist
Joe Walsh	Managing Director	Mining Engineer
Mark Rodda	Non-Executive Director	Lawyer
Cynthia Thomas	Non-Executive Director	Banking & finance

## Capital Structure

Market Capitalisation	\$36M (@ 0.7¢; 27 May 2020)	
Shares on issue	5,185,735,038	
Options (listed & unlisted)	914M, 2.0¢ – 10.0¢	
Warrants (unlisted)	104M, 4.0¢	
Convertible Note	108M, C3.7¢	
Major Shareholders (last reported May 2020)	Strategic Metallurgy	7.1%
	Galaxy Resources	6.4%

## LPD share price/volume



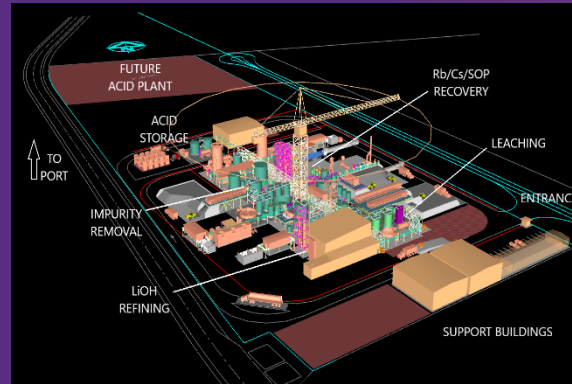
Source: CommSec

Volume (mm) Share Price (A\$ Cents)





# Asset Overview



## Phase 1 Chemical Plant, Abu Dhabi

DFS completed for hydrometallurgical plant employing L-Max® & LOH-Max® proprietary technologies

Production of Lithium Hydroxide, Caesium Formate & Rubidium Sulphate

## Karibib Project, Namibia

DFS completed for mine redevelopments & a new flotation plant

Concentrate exported to Abu Dhabi



Corporate Office, Toronto

Strategic Metallurgy Pty Ltd

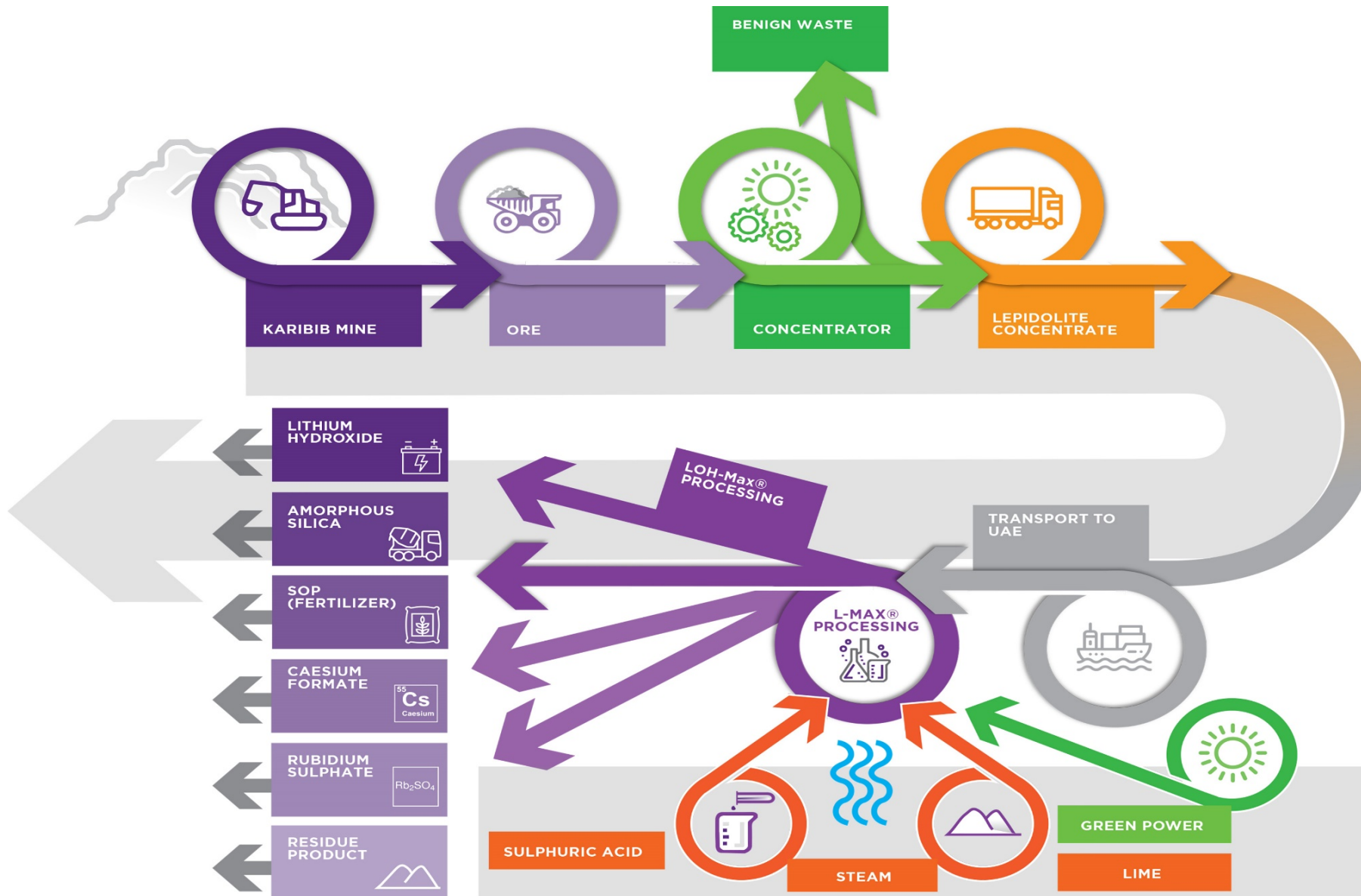
Lepidico Registered Office & Technical Capability, Perth



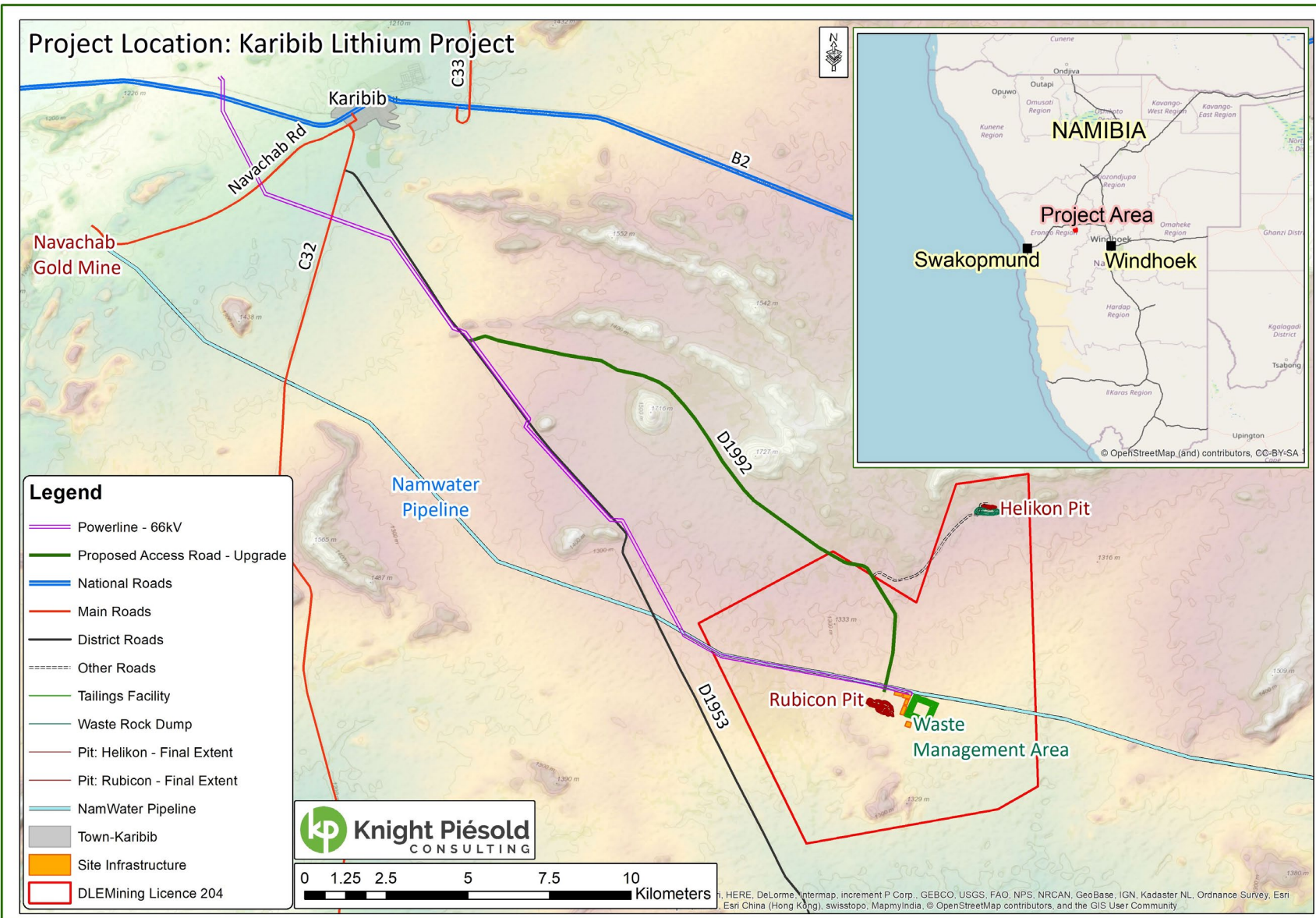
L-Max® Pilot Plant operational



# Phase 1 Project Schematic



# Karibib Project Overview



Fully permitted Project under  
Granted 68km<sup>2</sup> Mining Licence

Water extraction licence & 85%  
recycling of process water

Brownfield redevelopment of  
Rubicon & Helikon mines

Construction of new small scale  
60,000tpa concentrator

Direct access to excellent existing  
regional infrastructure

New 25km line for grid power

+1,000km<sup>2</sup> land position  
prospective for lithium, caesium,  
rubidium & gold



# Mining, Reserves & Resources

## Ore Reserve Estimate Rubicon & Helikon 1 deposits

Ore Category	Mt	Li <sub>2</sub> O %	Rb %	Cs ppm	Ta ppm	K %
Proved	1.93	0.59	2.75	410	50	2.10
Probable	4.79	0.41	2.06	290	40	1.99
<b>Total Ore</b>	<b>6.72</b>	<b>0.46</b>	<b>2.26</b>	<b>320</b>	<b>50</b>	<b>2.02</b>

## Mineral Resource Estimate 0.15% cut-off for Rubicon & Helikon 1

Deposit	Resource Category	Tonnes (M)	Li <sub>2</sub> O (%)	Rb (%)	Cs (ppm)	Ta (ppm)	K (%)
Rubicon + Helikon 1	Measured	2.20	0.57	0.27	389	51	2.14
	Indicated	6.66	0.38	0.22	274	42	2.06
	Inferred	0.17	0.70	0.29	1100	150	2.18
	<b>Total</b>	<b>9.04</b>	<b>0.43</b>	<b>0.23</b>	<b>318</b>	<b>46</b>	<b>2.08</b>
Helikon2 <sup>#</sup>	Inferred	0.216	0.56				
Helikon3 <sup>#</sup>	Inferred	0.295	0.48				
Helikon4 <sup>#</sup>	Inferred	1.510	0.38				
Helikon5 <sup>#</sup>	Inferred	0.179	0.31				
Global	Measured	2.20	0.57	0.27	389	51	2.14
	Indicated	6.66	0.38	0.22	274	42	2.06
	Inferred	2.37	0.43				
	<b>Total</b>	<b>11.24</b>	<b>0.43</b>				

JORC Code (2012) compliant Ore Reserve estimate for lithium, rubidium and caesium

Ore exposed at surface and deposits pre-stripped by historical mining

Strip ratio just 0.5 to 1 for the first 2 years and 3.8 to 1 LoM

Most mine development work complete including haul road to Helikon 1

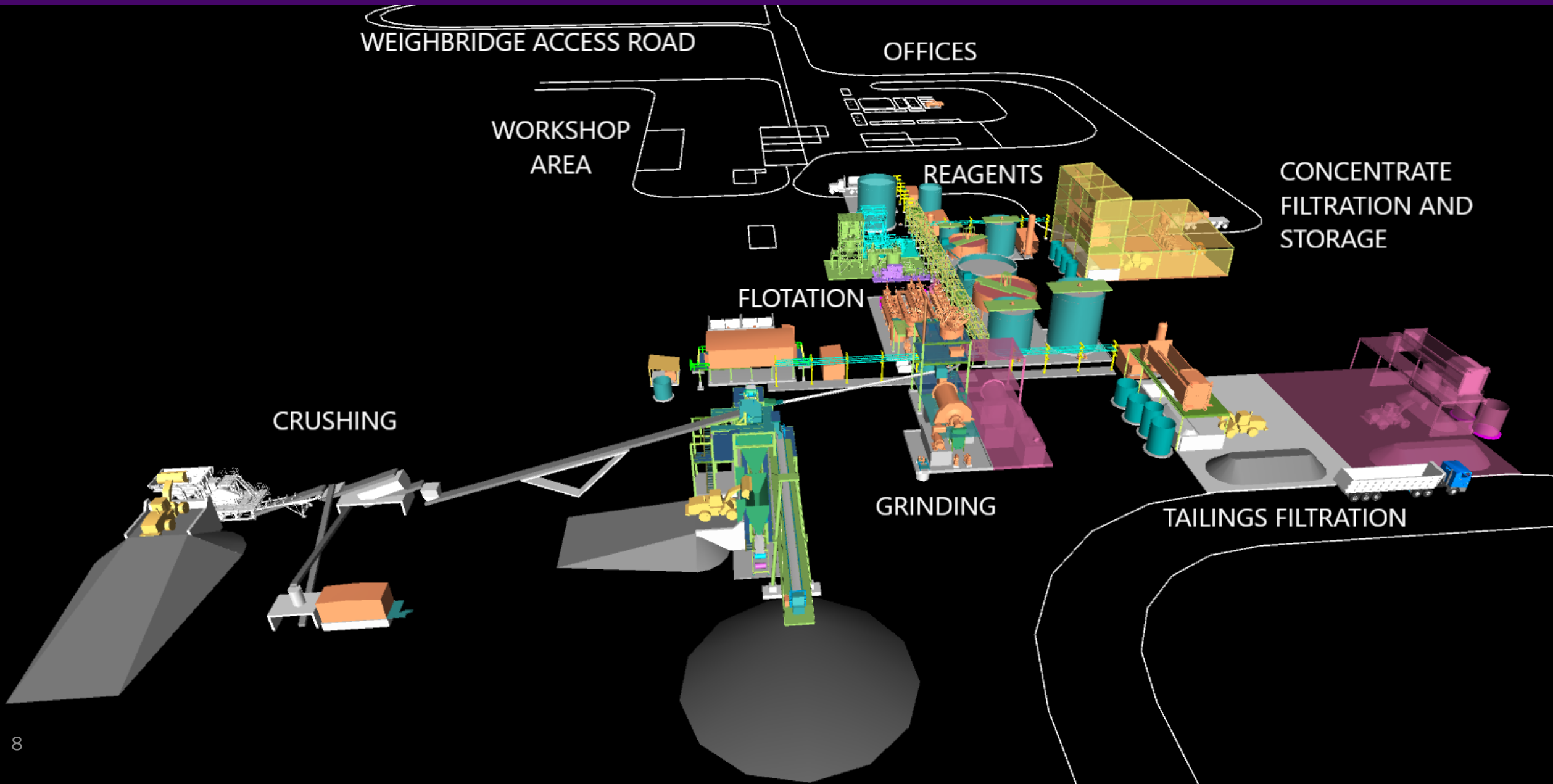
76% conversion of M&I Resources to Reserves

Inferred Resource potential supports expansion potential or Phase 2 Project development

Mineral Resource estimates in progress for lepidolite surface stockpiles

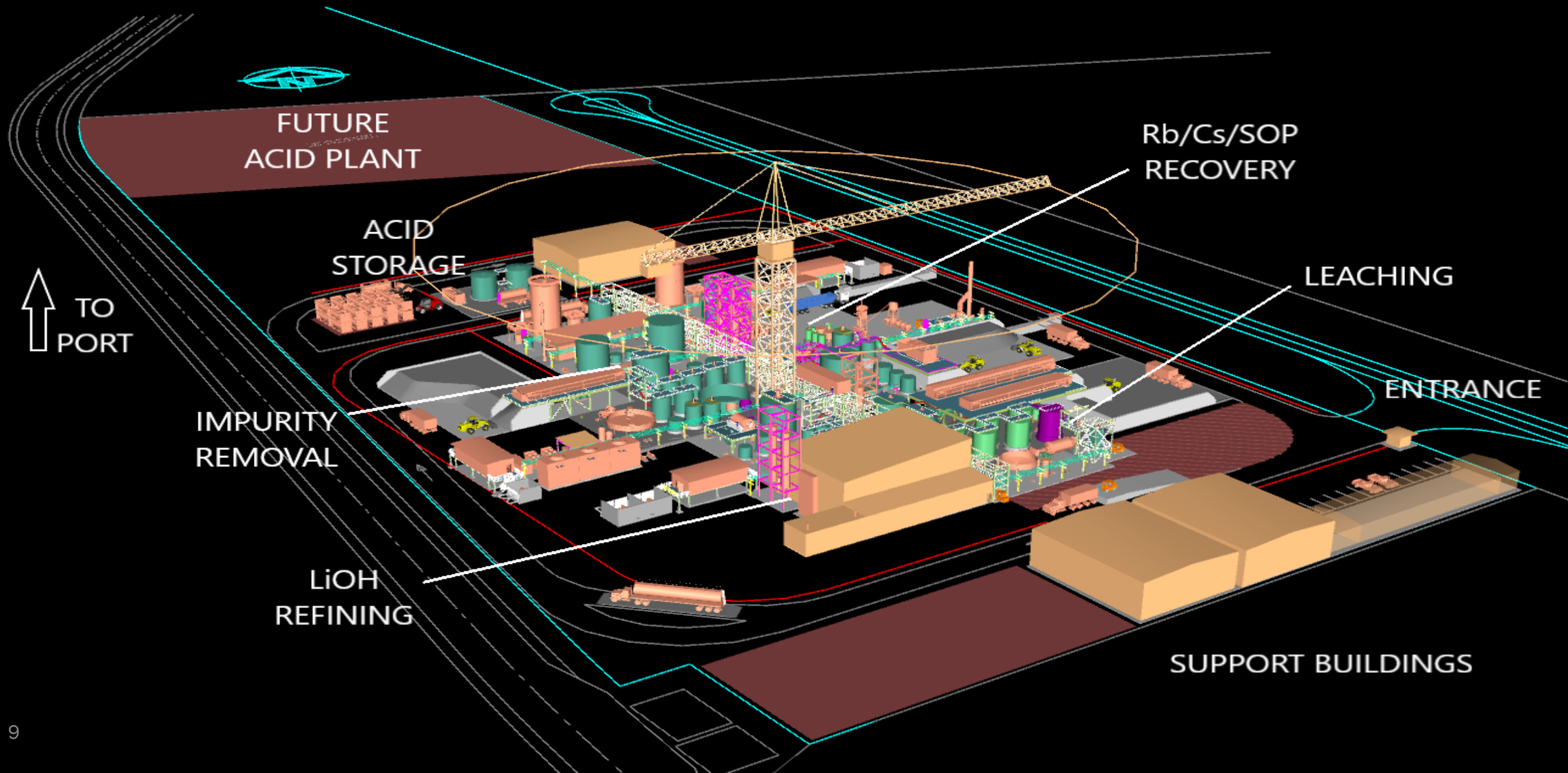


# Karibib Concentrator – conventional flotation





# Chemical Conversion Plant

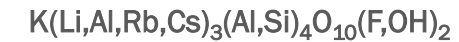


# The L-Max<sup>®</sup> & LOH-Max<sup>®</sup> Advantage

- ✓ The Australian Patent Office declared L-Max<sup>®</sup> to be “novel, inventive, industry applicable and patentable” for production of lithium carbonate
  - ✓ Australia, Japan & US patent protection received
- ✓ L-Max<sup>®</sup> leaches lithium from non-conventional, less contested mineral sources; lithium micas and phosphates, and achieves high extraction rates
- ✓ L-Max<sup>®</sup> utilises common use, inexpensive reagents & is energy efficient
- ✓ L-Max<sup>®</sup> reagents and operation have straightforward occupational health & safety characteristics, and excellent ESG credentials
- ✓ L-Max<sup>®</sup> utilises conventional equipment & operates at atmospheric pressure and modest temperature
- ✓ High value by-products, Cs and Rb; and bulk by-products potassium sulphate fertiliser (SOP), amorphous silica and gypsum residue; with zero-waste potential
- ✓ Scalable technology: scoping study design parameters for a larger Phase 2 Plant indicate significant reduction in already competitive capital intensity: US\$10,500/t after credits @ 20,000tpa LCE
- ✓ LOH-Max<sup>®</sup> allows direct production of lithium hydroxide with generation of potentially problematic sodium sulphate



Lepidolite



Amblygonite



Zinnwaldite





# Phase 1 Project Definitive Feasibility Study

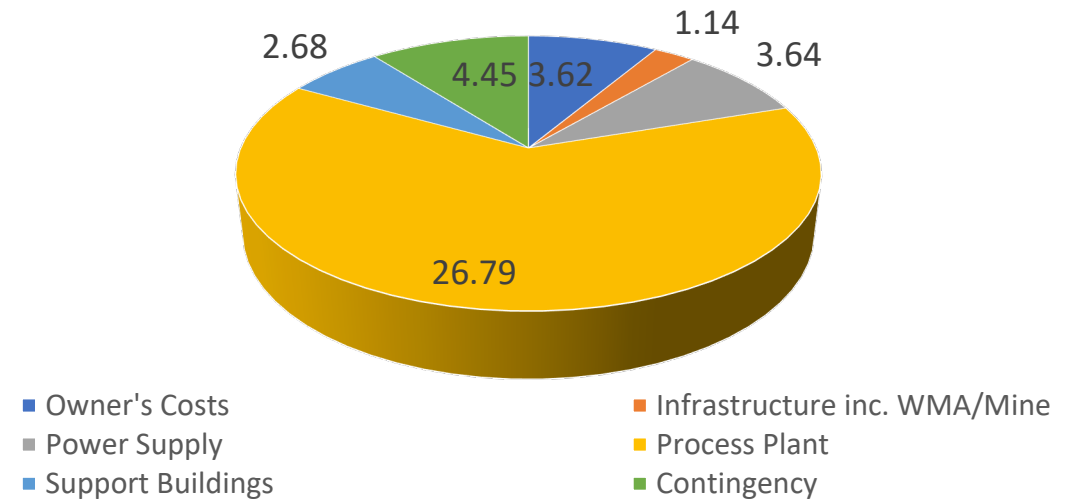
Key Results	Unit	Value
Post-Tax NPV <sub>8</sub>	US\$M	221
Post-Tax NPV <sub>0</sub>	US\$M	521
Project IRR (Real terms)	%	31
Project Payback (from start of production)	Years	3
Lithium Hydroxide <sup>1</sup>	tpa	4,879
Rubidium Sulphate <sup>1</sup>	tpa	1,542
Caesium Formate <sup>1</sup>	tpa	246
C1 cash cost (by-product LCE basis)	US\$/t LCE	1,656
AISC (by-product LCE basis)	US\$/t LCE	3,221
Free Cash Flow undiscounted	US\$M	521
Average Annual Free Cash Flow (post ramp-up)	US\$M	49



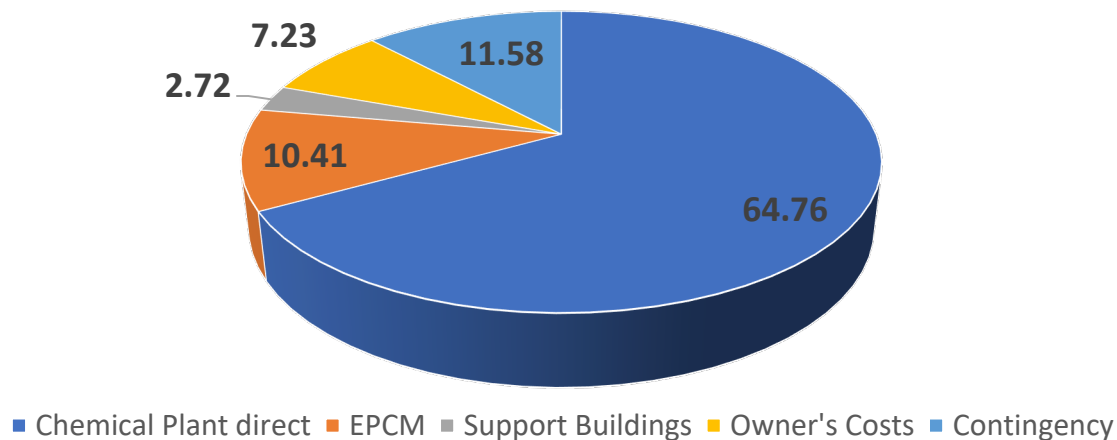
# Capital Cost Summary

Pre-production Capital	\$M
Karibib Project	37.9
Chemical Plant	85.1
Contingency (13%)	16.0
<b>Total Pre-production</b>	<b>139.0</b>
Working capital	16.0
Leasing value	5.5

Karibib Project Pre-production Capital



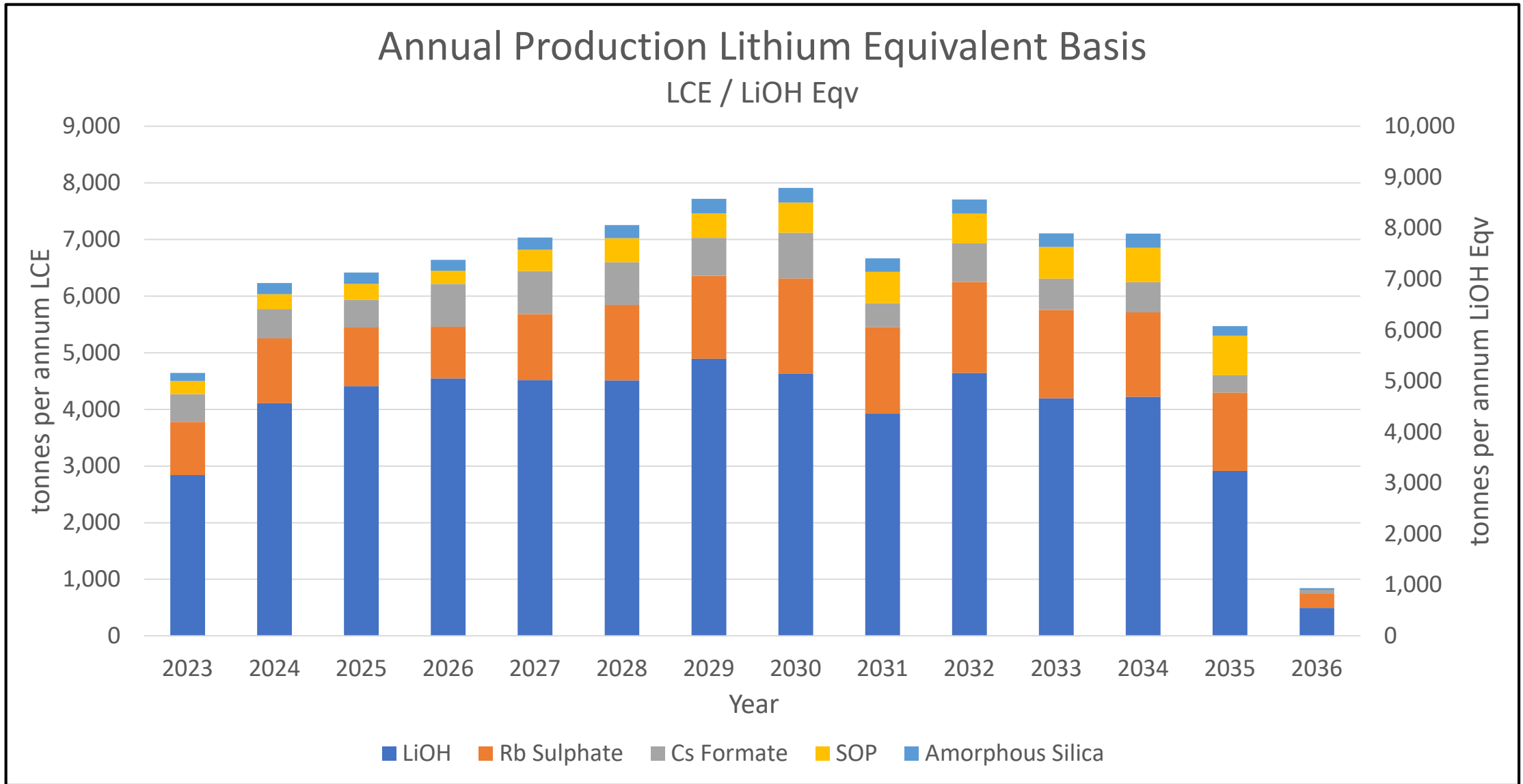
Chemical Plant Pre-production Capital



Sustaining Capital – Life of Project	\$M
Karibib Project	14.2
Chemical Plant	8.7
Acid Plant	15.6
<b>Total Sustaining</b>	<b>38.5</b>



# Life of Mine Production



# Metallurgical Recoveries

Alkali Metal	Recovery to concentrate	Chemical Plant recovery to product
Lithium	80.6%	90.0%
Caesium	85.0%	51.8%
Rubidium	69.3%	89.6%
Potassium	55.0%	94.0%

Concentrator recoveries optimised for lithium and caesium

Mineral species: lepidolite and lithium muscovite (Li, Cs & Rb) plus amblygonite

Concentrate target grade 3.0% to 4.0%  $\text{Li}_2\text{O}$  depending on mineralogy

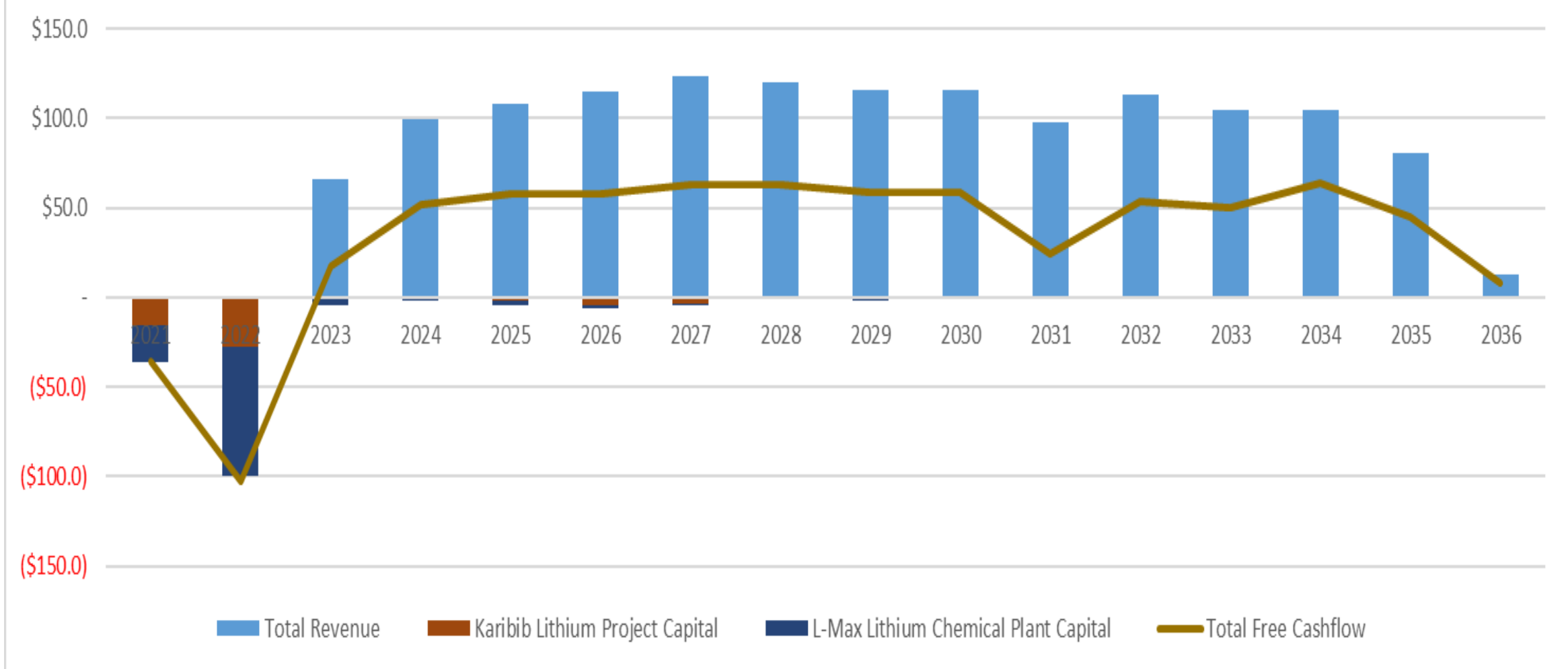
Significantly higher extractions of lithium versus conventional spodumene concentration & conversion, & brine production

Recovery improvements seen from optimisation

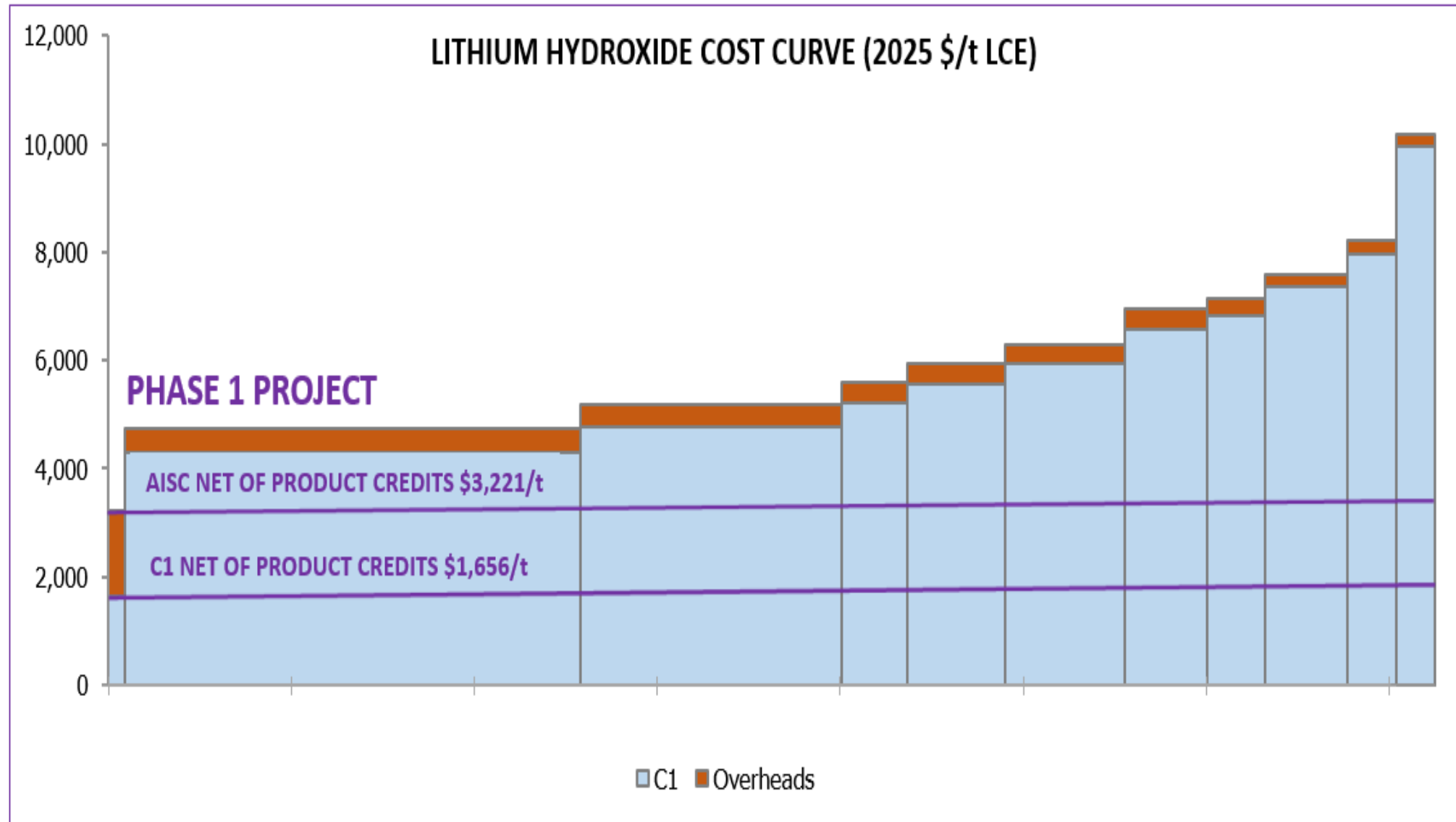


# Free Cashflow & Margins (US\$)

Phase 1 Project Cashflow Profile \$M



# Low All in Sustaining Costs





# ESG – Excellent Credentials imbedded into ESIA's

## Karibib Lithium Project, Namibia:

- ✓ Brownfield site – redevelopments designed largely within the footprints of former mining activities
  - ✓ Sustainable closure – industry best practice closure plans that will rectify mining and processing legacy issues
  - ✓ Social benefits – creation of 115 jobs to benefit local communities and no relocation requirement
  - ✓ Renewable energy – utility objective to have 80% of power generated from renewable sources within 5 years
  - ✓ No tailings storage facility – co-disposal of benign dry stacked flotation plant tails with mine waste
  - ✓ Small scale mining fleet – electric option will be reviewed as right-sized equipment becomes available
  - ✓ Water sourced locally from the ground with >85% of process water recycled
- 

## Lepidolite Chemical Conversion Plant, Abu Dhabi:


- ✓ Relatively modest power consumption; gas fired electrical power to be supplemented by future solar projects
- ✓ Heat recovery equipment included in design to reduce gas consumption
- ✓ Low emissions with net carbon intensity for integrated project of 5-7t CO<sub>2</sub>/t LiOH.H<sub>2</sub>O after amorphous silica credit
- ✓ SOP, Cs/Rb by-products to provide further carbon credits (to be quantified)
- ✓ Residue product could generate additional carbon credits and result in a zero-waste facility
- ✓ Social benefits – creation of 119 jobs and low impact as built on existing industrial park
- ✓ Small footprint minimises steel and concrete in construction

# Transitioning to Development & Implementation

- Complete Karibib ESIA aligned with Equator Principles and IFC Performance Standards
- Finalise land lease agreement for the KIZAD chemical plant location
- Complete Abu Dhabi permitting, including ESIA aligned with Equator Principles and IFC Performance Standards
- Complete independently audited Greenhouse Gas Assessment
- Complete co-habitation agreement for local stakeholders of the Karibib Project
- Indicated Mineral Resource estimate for surface stocks at Karibib for inclusion in the future Ore Reserve: lepidolite rich stockpile estimate 727,000t has the potential to increase project life by 2 years
- Technical & commercial engagement with offtake partners, including further product sample generation, for binding agreements for lithium, rubidium, and caesium high-value chemicals
- Re-engage, following COVID-19 lockdown restrictions lifting, with bulk by-product offtakers
- Finalise full funding package with finance advisor Lion's Head Global Partners
- Complete detailed planning for implementation, including EPCM contract tender for both process plants
- Finalise agreements with consumable suppliers and logistics providers
- Complete integrated acid plant engineering study



# Implementation Schedule

	Lepidico Phase 1 Plant Project Schedule																																			
	Revised May 2020																																			
	Funding						Project Implementation																		Wet commissioning						Early Operations					
	2020 H2						2021						2022						2023																	
Rolled up Tasks	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
KP Mining License ECC Renewal/ESIA/ESMP																																				
Chemical Plant Permitting																																				
Supply and services agreements																																				
Off taking and Financing Plan																																				
Final Investment Decision (FID)																																				
<b>Implementation - Karibib Project</b>																																				
Early Works - long lead items procurement																																				
Engineering and Procurement																																				
Construction																																				
Rubicon pit development and ramp up																																				
Mechanical Completion																																				
Commissioning																																				
First concentrate delivery to KIZAD																																				
<b>Implementation - Chemical Plant</b>																																				
Early Works - long lead items procurement																																				
Engineering and Procurement																																				
Construction																																				
Mechanical Completion																																				
Commissioning																																				
First stage of ramp up																																				
Project complete																																				
Product Qualification commences																																				

# Pilot Plant

- 15kg per hour L-Max<sup>®</sup> pilot plant completed on schedule and within A\$3M budget, April 2019
- Campaign 1 completed August 2019
- LOH-Max<sup>®</sup> capability demonstrated January 2020

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- Pilot plant has:

- demonstrated L-Max<sup>®</sup> technical viability using small scale industrial equipment, similar to that employed in the Phase 1 Plant design; expenditure eligible for R&D tax refund (43%);
- produced 99.95% Li<sub>2</sub>CO<sub>3</sub> and >99.5% LiOH.H<sub>2</sub>O with very low impurities;
- produced high purity potassium sulphate (SOP) of more than 96% K<sub>2</sub>SO<sub>4</sub>, equivalent to 52.2% K<sub>2</sub>O;
- production of caesium-rubidium formate; SG > 2.2, good clarity and low levels of deleterious elements;
- produced amorphous silica P<sub>100</sub> 25µm, complies with standards for fly ash (and fumed silica – TBD);
- reduced scale-up risk at nominal throughput of 6.9tph for Phase 1 Plant to 460 times; and
- provided data for optimisation of Phase 1 Plant operating parameters.



# Caesium & Rubidium Markets



## Strategic metals for niche global markets

### Main industrial applications

- Caesium and rubidium can substitute for each other in many applications
- Cs & Rb uses include chemical catalysts, electricity generation (photoemissive properties that convert electromagnetic radiation to electrical current), electronics manufacture including night vision equipment and solar cells, and in medical applications
- Cs is also used as a completion fluid in oil wells (c. 80% recycled)

### World Cs supply

- Mined pollucite is largely depleted aside from one mine controlled by a single Chinese company
- Both Cs & Rb are designated as critical minerals by the U.S. Government, and identified as strategic as the U.S. is 100% reliant on imported material

### Quality

- High density Cs formate brine with a specific gravity (s.g.) of c. 2.2 required for oil drilling

### L-Max<sup>®</sup> will provide a new source of Cs & Rb

- DFS test work has produced a high specification Cs/Rb formate brine with an s.g. of 2.2 and rubidium sulphate

### Prices

- No market prices are available for these alkali metals.

- 21 ▪ An industry derived price forecast of US\$42,900/t is employed for Cs formate and US\$15,100/t for Rb-sulphate

# Potassium Sulphate (SOP)



## High value, chloride free fertiliser

### Main industrial applications

- Chloride free fertilisers such as SOP represent premium quality nutrients
- SOP is used extensively in fruit and vegetable growing and to reduce chloride accumulation in soils

### Existing SOP supply

- Global market is estimated to be c. 6 million tonne in 2020 with annual demand growth of 5%
- Global fertiliser demand is expected to increase greatly in the years to come as the world population grows, accompanied by decreasing arable land availability per capita and growth in alternative fuels which use crops as feedstock

### Quality

- 52%  $K_2O$  and 17% - 18% S, with no chloride content

### L-Max<sup>®</sup> can provide a new source of low-cost SOP

- DFS test work produced a high specification SOP of more than 96% purity, equivalent to 52.2%  $K_2O$

### Price

- 22 ▪ Ex-works prices range between US\$500-US\$600/t, with an average of US\$540/t assumed for the DFS



# Amorphous Silica

**Supplementary Cementitious Material: used to reduce CO<sub>2</sub> footprint of cement**

## Main industrial applications

- Amorphous silica is extensively used as a supplementary cementitious material (SCM), exploiting its pozzolan properties to materially reduce the carbon footprint of cement and concrete
- Pozzolans in themselves possess little or no cementitious value but which will, in finely divided form and in the presence of water, react chemically with calcium hydroxide at ordinary temperatures to form compounds possessing cementitious properties

## Existing supply

- Fly ash and silica fume are extensively used as SCMs, which are generally abundant

## Quality

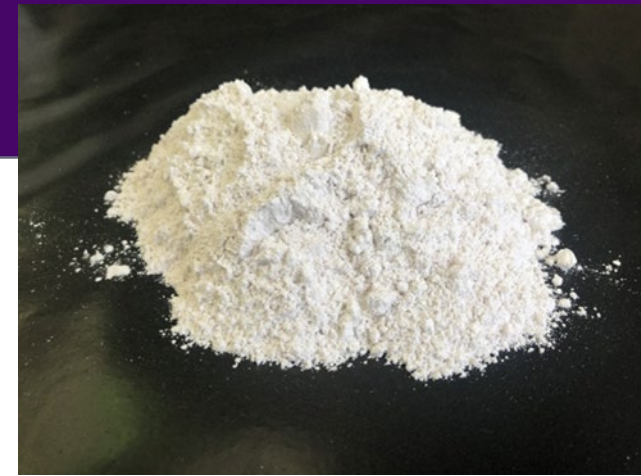
- The American Society for Testing and Materials (ASTM) provides specifications for fly ash and silica fume

## L-Max<sup>®</sup> will provide a new source of by-product amorphous silica

- DFS test work has produced an amorphous silica that meets the ASTM specification for fly ash and silica fume when finely ground

## Price

US\$100/t ex-works employed in the DFS as a substitute for fly ash; silica fume prices are around US\$300/t ex-works



# Gypsum



## Environmentally friendly

### Main industrial applications

- In the UAE gypsum is extensively employed in the manufacture of cement as a retarding agent, with typically 5% gypsum is added to cement clinker and this sourced from

### Existing $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$ supply

- Global supply was estimated at 246 million tonnes in 2014 largely sourced from numerous small scale de-centralised open pit operations and recycling
- Synthetic gypsum is typically sourced from flue gas de-sulphurisation
- Natural rock gypsum is generally employed in the UAE with c. 2M tpa consumed, imported from Oman

### Quality

Low impurities required for agricultural use, with building material use more flexible

L-Max<sup>®</sup> can provide a new source of by-product gypsum displacing mined product

Gypsum residue generated from Pilot Plant and tested under the DFS for industrial use

### Price

Ex-works price in the UAE is estimated to be US\$11/t

# Investor Highlights

## Competitive Strategic Advantage

- L-Max<sup>®</sup> & LOH-Max<sup>®</sup> support competitive capital intensity for smaller, lower risk projects versus conventional processes
- By-product potential means L-Max<sup>®</sup> has a competitive All in Sustaining Costs
- Li-mica and Li-phosphate deposits are relatively abundant, allowing Lepidico's process technologies to be leveraged for growth

## Feed Sources

- Lepidico has acquired a large prospective ground position in Namibia supported by a lepidolite rich Reserve and Resource base
- L-Max<sup>®</sup> amenability tests have been successfully undertaken on 18 different lithium mica and phosphate deposits globally
- Tailings and waste dumps rich in lithium-micas offer near term production opportunities

## L-Max<sup>®</sup> & LOH-Max<sup>®</sup>

- Employ conventional processes using industry standard equipment, operated at ambient pressure and moderate temperature
- Employ common use, inexpensive reagents with straightforward health, safety and environmental characteristics
- Have a novel flowsheet that have either received patent protection or are the subject of an international patent application

## Pathway to Production

- DFS confirmed viability of constructing a strategically located Phase 1 L-Max<sup>®</sup> Plant in Abu Dhabi, processing lithium-mica concentrate imported from Lepidico's fully permitted Karibib Project in Namibia
- ESIA's, permitting, product offtake and financing workstreams have started, transitioning the Phase 1 Project to development
- Concentrate supply to start in 2022 for first chemical production in 2023

## Proven Team

- Management team experienced in core areas of process, project and business development
- A strong industry track record that includes building company transforming mining and processing projects in frontier regions
- Significant technology and project milestones already accomplished, enshrined in Phase 1 Project DFS



# Strategic objective...

...to position Lepidico as a low-cost producer of high-value critical and strategic metals by leveraging proprietary process technologies and thereby be a first mover in lithium mica mineral development and production.



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# Important Notice

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Where the Company expresses or implies an expectation or belief as to the success of future exploration and the economic viability of future projects, such expectation or belief is based on management's current predictions, assumptions and projections. However, such forecasts are subject to risks, uncertainties and other factors which could cause actual results to differ materially from future results expressed, projected or implied by such forecasts. Such risks include, but are not limited to, exploration success, commodity price volatility, future changes to mineral resource estimates, changes to assumptions for capital and operating costs as well as political and operational risks and governmental regulation outcomes. For more detail of risks and other factors, refer to the Company's other Australian Securities Exchange announcements and filings. The Company does not have any obligation to advise any person if it becomes aware of any inaccuracy in, or omission from, any forecast or to update such forecast.

## Forward-looking Statements

All statements other than statements of historical fact included in this release including, without limitation, statements regarding future plans and objectives of Lepidico, are forward-looking statements. Forward-looking statements can be identified by words such as "anticipate", "believe", "could", "estimate", "expect", "future", "intend", "may", "opportunity", "plan", "potential", "project", "seek", "will" and other similar words that involve risks and uncertainties. These statements are based on an assessment of present economic and operating conditions, and on a number of assumptions regarding future events and actions that are expected to take place. Such forward-looking statements are not guarantees of future performance and involve known and unknown risks, uncertainties, assumptions and other important factors, many of which are beyond the control of the Company, its directors and management of Lepidico that could cause Lepidico's actual results to differ materially from the results expressed or anticipated in these statements.

The Company cannot and does not give any assurance that the results, performance or achievements expressed or implied by the forward-looking statements contained in this release will actually occur and investors are cautioned not to place any reliance on these forward-looking statements. Lepidico does not undertake to update or revise forward-looking statements, or to publish prospective financial information in the future, regardless of whether new information, future events or any other factors affect the information contained in this release, except where required by applicable law and stock exchange listing requirements.

## Competent Person Statement

The information in this report that relates to the Rubicon and Helikon 1 Mineral Resource estimates is extracted from an ASX Announcement dated 30 January 2020 ("Updated Mineral Resource Estimates for Helikon 1 and Rubicon") and was completed in accordance with the guidelines of the JORC Code (2012). The Company confirms that it is not aware of any new information or data that materially affects the information included in the original market announcement and that all material assumptions and technical parameters underpinning the Mineral Resource estimates in the relevant market announcement continue to apply and have not materially changed. The Company confirms that the form and context in which the Competent Person's findings are represented have not been materially modified from the original market announcement.

The information in this report that relates to the Helikon 2 - Helikon 5 Mineral Resource estimates is extracted from an ASX Announcement dated 16 July 2019 ("Drilling Starts at the Karibib Lithium Project") and was completed in accordance with the guidelines of the JORC Code (2012). The Company confirms that it is not aware of any new information or data that materially affects the information included in the original market announcement and that all material assumptions and technical parameters underpinning the Mineral Resource estimates in the relevant market announcement continue to apply and have not materially changed. The Company confirms that the form and context in which the Competent Person's findings are represented have not been materially modified from the original market announcement.

The information in this report that relates to the Helikon 1 and Rubicon Ore Reserve is based on information compiled by John Wyche who is a Fellow of the Australasian Institute of Mining and Metallurgy (MAusIMM) and has sufficient experience which is relevant to the type of deposit and mining method under consideration and to the activity to which he is undertaking to qualify as a Competent Person as defined in the 2012 Edition of the "Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves." Mr Wyche is an employee of Australian Mine Design and Development Pty Ltd which is an independent consulting company. He consents to the inclusion in the report of the information compiled by him in the form and context in which it appears.



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Creative Resources Leadership

Website: [www.lepidico.com](http://www.lepidico.com)

Contact us: [info@lepidico.com](mailto:info@lepidico.com)