



**ILUKA**

**Iluka Resources Limited**

**Eneabba Rare Earths Refinery – Final Investment Decision**

3 April 2022

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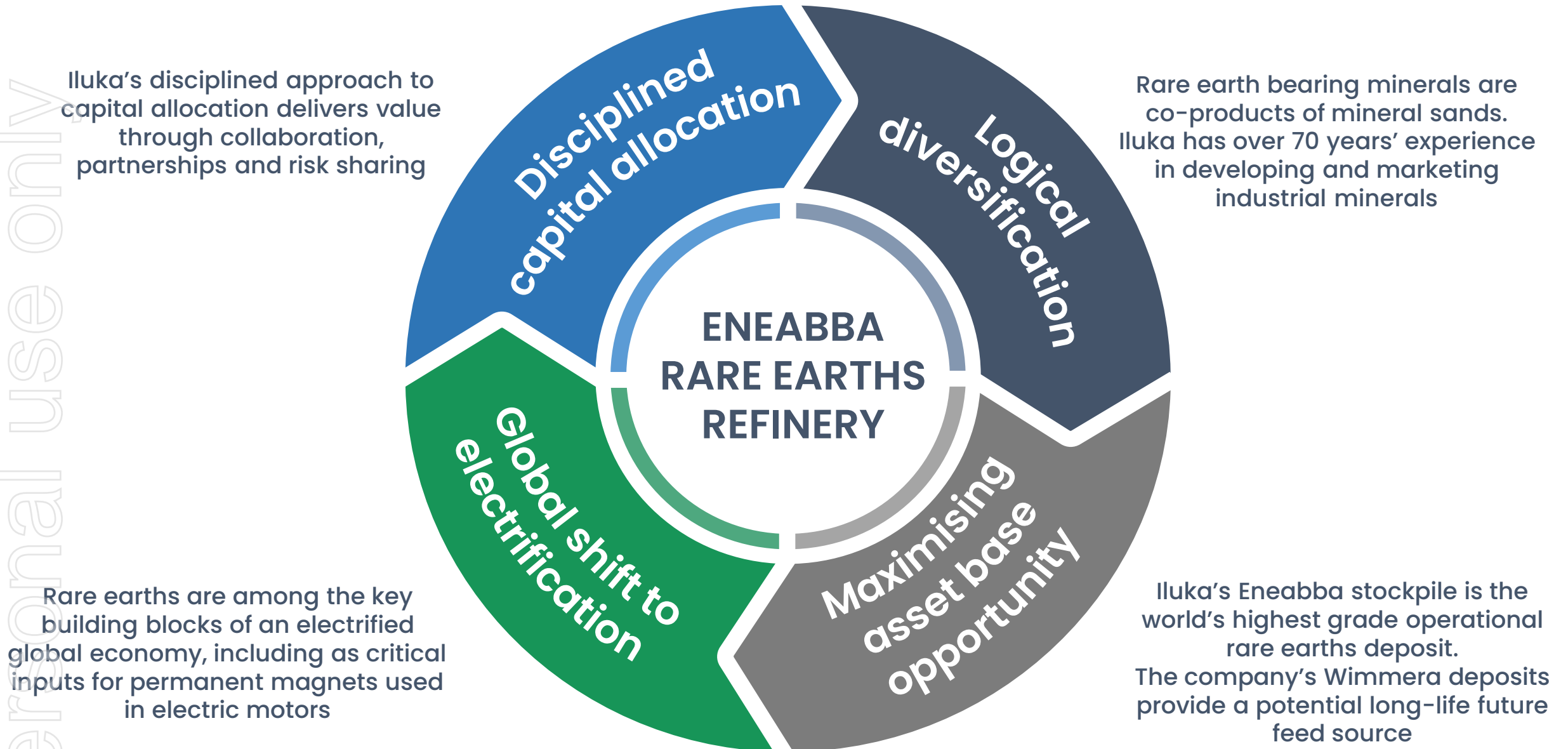
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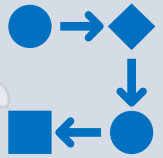
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# Approval of Eneabba rare earths refinery (Phase 3)

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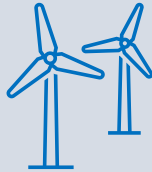
## Fully integrated rare earths refinery

A significant downstream infrastructure asset comprising roasting, leaching, purification, solvent extraction, product finishing and permanent waste disposal, producing separated rare earth oxides. Builds on existing screening (Phase 1) and concentrating (Phase 2) plant and infrastructure.



## Multi-decade facility

Designed specifically with the capacity to be globally material; the capability to process multiple feedstocks (Iluka and third parties); and for minimal environmental impact. Eneabba stockpile to be initial feed source. Potential future feedstocks include Iluka's Wimmera and other deposits and third party sources.



## Domestic production of critical minerals

Producing rare earth oxides essential to global electrification, including high value neodymium (Nd), praseodymium (Pr), dysprosium (Dy) and terbium (Tb). These are critical inputs for the permanent magnets used in electric vehicles, wind turbines, electronics, defence and other applications.



## Risk sharing arrangement

Project funded by Iluka and the Australian Government. Iluka's contribution includes cash and the unique Eneabba stockpile. Australian Government funding via loan under the Australian Government's \$2 billion Critical Minerals Facility, administered by EFA. Risk sharing measures include non-recourse debt, royalty payments to Iluka and flexibility in repayment schedules.



## Solid project economics with significant potential for growth

Upside potential associated with the refinery's longevity beyond the Eneabba stockpile. Optionality for additional feedstock sources to extend life and improve returns.<sup>1</sup>

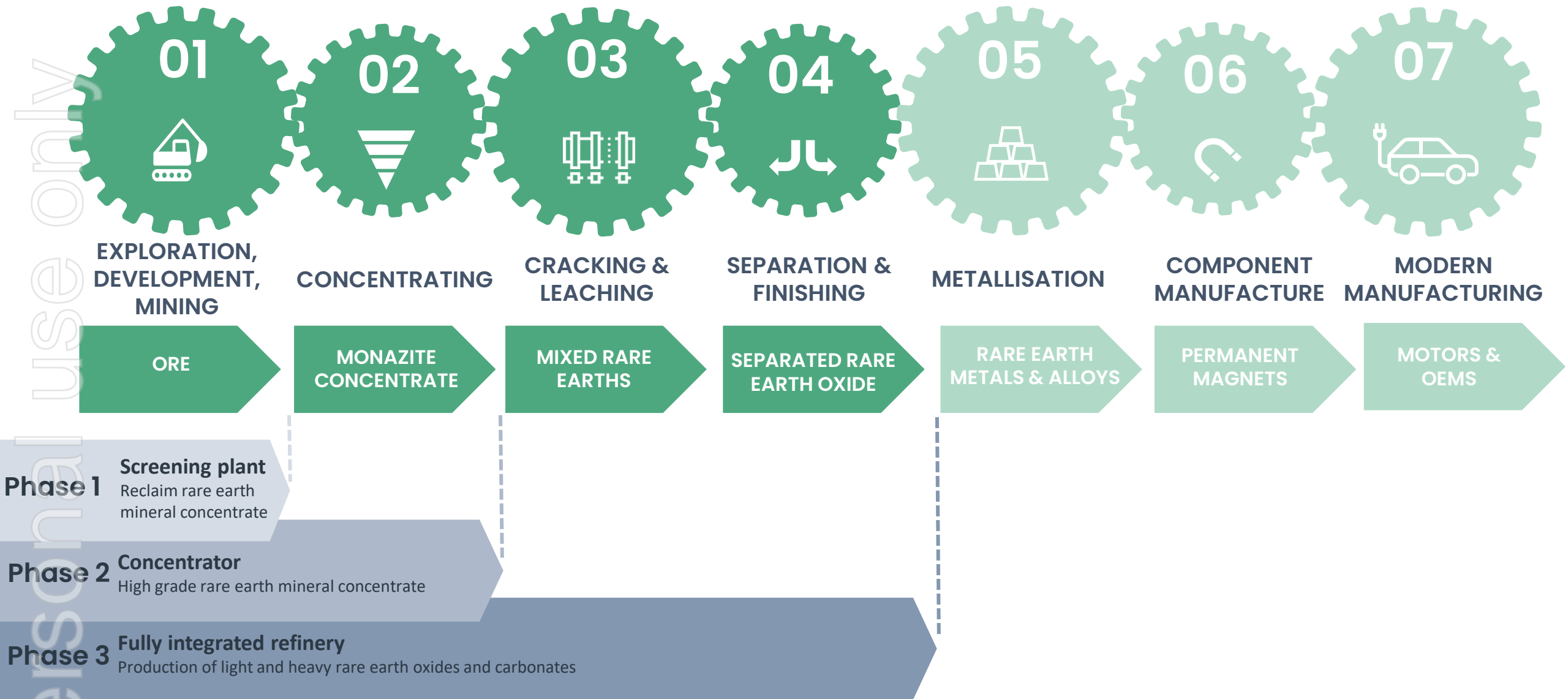


## First production 2025

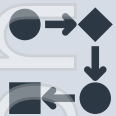
Construction to commence H2 2022, first production expected 2025. Eneabba stockpile does not require any mining infrastructure, providing speed to market.

<sup>1</sup>. Subject to price assumptions

# A fully integrated refinery



*Refinery advantaged by fully integrated design and Eneabba brownfields location, enabling minimal environmental impact.*



### Integrated refinery

Roasting and leaching, purification and finishing at one integrated site



### Brownfield site

Iluka has operated at Eneabba since the 1970s



### Stockpile optionality

Internal feedstock options of Eneabba stockpile and Wimmera deposits

### Refinery feed and circuit capacities

Feed rate	55ktpa
TREO <sup>1</sup>	17.5ktpa
NdPr <sup>2</sup>	4ktpa
Dy+Tb	0.5ktpa



### Utilities

Site has access to major utilities – power, water, gas, roads, rail



### Product logistics

Final product transported to Port of Fremantle (250km) for sale



### Major employer

Construction workforce ~300  
Operational workforce ~270



### Site access

Workforce camp at Eneabba township, drive in-drive out from Perth



### Permanent waste disposal

Facilities constructed inside previous mining voids without rehandle

CARESTER

Your partner for Rare Earths

Industry experts embedded with owners team

## Western Australia

- Geraldton Port / Narngulu processing plant
- Eneabba refinery and monazite stockpile
- Cataby mine
- Perth / Fremantle Port

1. TREO plant capacity is 23ktpa with all circuits fully utilised. Modelled plant capacity based on various feed blends is 17.5ktpa.  
2. The refinery circuits will produce Nd, Pr, didymium oxides (a mixed NdPr oxide product). NdPr plant capacity is 5.5ktpa.



*Eneabba refinery designed as multi-decade facility capable of processing multiple feedstocks. Initially fed by Eneabba stockpile at minimal cost, potential future feedstock sources include Iluka’s Wimmera deposit and third parties.*

**Initial feedstock**

**Eneabba**

- The Eneabba stockpile comprises the rare earth bearing minerals monazite and xenotime, produced as by-product from Iluka’s Narngulu mineral processing plant and stored since the early 1990s.
- Located at surface on a brownfields operational site, requiring simple reclamation.
- High assemblage of valuable neodymium and praseodymium.
- Mineral sands operations at Iluka’s Cataby and Jacinth-Ambrosia sites will continue to replenish the stockpile.

**Future feedstock options**

**Wimmera and other Iluka**

- Iluka’s large scale Wimmera resource is located in the Murray Basin, Western Victoria.
- The Wimmera project is currently the subject of a preliminary feasibility study.
- Wimmera’s rare earth minerals are similar to those stockpiled at Eneabba, with a higher proportion of the high value, heavier elements, dysprosium and terbium.
- Monazite and xenotime are naturally occurring within all heavy mineral resources, eg. Balranald.

**Future feedstock options**

**Third parties**

- Third party feed could supplement Iluka’s internal feed options.
- The facility has the capability to process any mineral sands sourced rare earth mineral and most monazite-xenotime concentrates.

*Ultimate plant blend will depend on availability of feed, feed capacity, separation and finishing capacity and maximising the production of high demand REOs based on market conditions.*



*The refinery has been designed specifically with the capability to process rare earth concentrates from Iluka production sources and third parties, establishing a strategic processing hub.*

*The capital estimate includes the plant and infrastructure cost of this capability.*

Capital Summary	\$m
Cracking and leaching plant	170-200
Separation and finishing	320-390
Plant and infrastructure	110-140
Project indirect costs, owners costs, commissioning, growth and contingency	400-470
Total	1,000-1,200



Eneabba Phase 2





- Refinery operating costs will vary depending on the feed rate and feed blend of the plant
  - operating costs based on processing the Eneabba stockpile feed are estimated at ~\$160 million p.a.
  - main variable costs are reagents and energy
- Not included in operating costs are feedstock costs, sustaining capital or state royalties

**Feedstock costs excluded from operating costs**

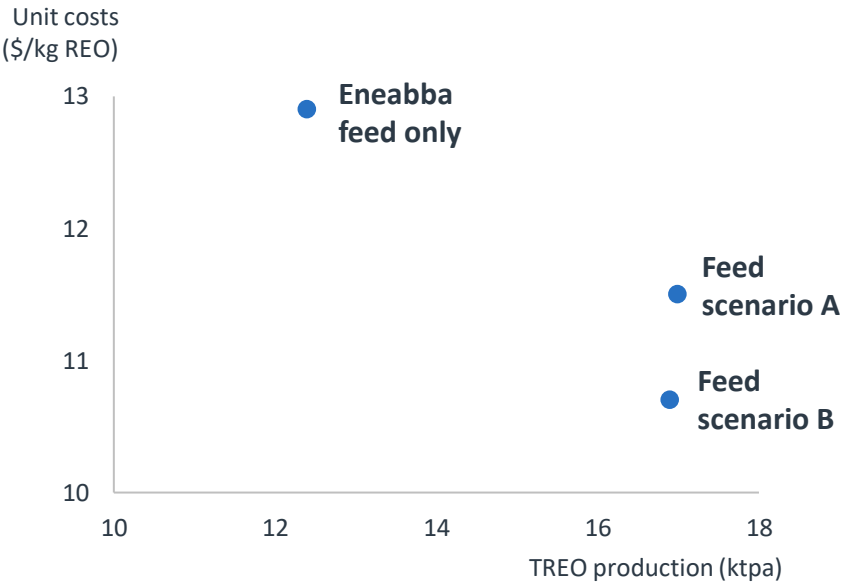
**Eneabba** – Eneabba stockpile forms part of the refinery project, reclamation and concentrating costs excluded

**Wimmera** – Transfer price excluded

**Third parties** – Purchase price excluded

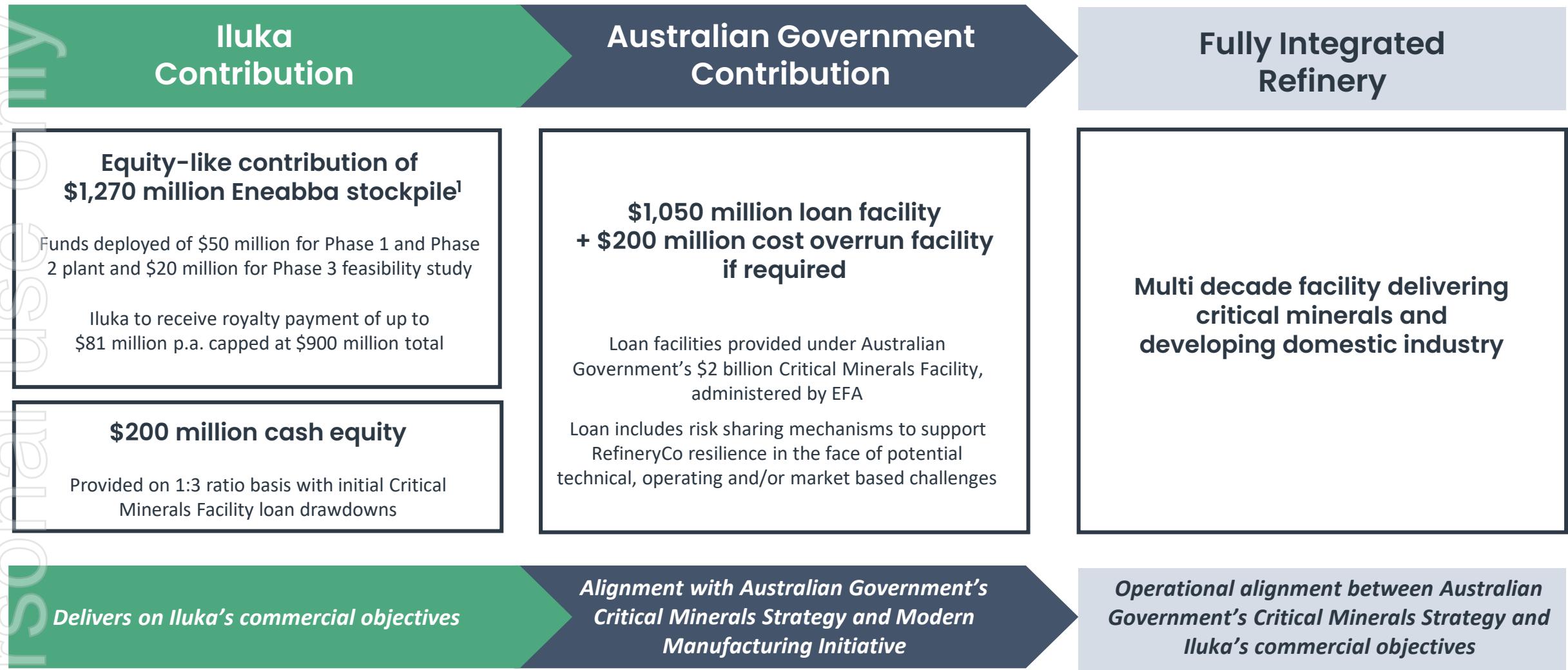
\$m p.a.	Illustrative operating costs <sup>1</sup> (Eneabba feed only)	% fixed costs
Labour, camp and admin	80	100
Cracking, leaching and purification	40	15
Separation and finishing	35	15-20
Transport	5	0
<b>Total refinery cash operating costs</b>	<b>~160</b>	-
TREO production	12.4 ktpa	-
<b>Unit operating costs</b>	<b>~\$13/kg REO</b>	-

**Illustrative operating costs alternative feed scenarios<sup>1</sup>**



1. Steady state life of mine average. Feed scenarios A and B based on preliminary analysis of multiple feed sources with operating costs ultimately dependent on feed mix and assemblage.

*Eneabba Phase 3 is being delivered through a risk sharing arrangement between Iluka and the Australian Government.*



1. NPV of nominal after tax cash flows of Eneabba Phase 2 at discount rate 10% using Feb 2022 monazite spot prices. Spot monazite price of US\$11,180/t converted from CNY to USD at spot FX rate of 0.1564. Revenue and costs from mineral sands by products excluded. Includes replenishment of stockpile from Jacinth-Ambrosia and Cataby.

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Key terms

Iluka contribution

- Eneabba stockpile, Phase 1 and Phase 2 plant transferred to new RefineryCo
- Cash equity provided on 1:3 ratio basis with initial Critical Minerals Facility loan drawdowns
- Royalty payment to Iluka of up to \$81 million p.a., capped at cumulative \$900 million. Royalty accrues from July 2022, payable from project cash flows

Critical Minerals Facility loan

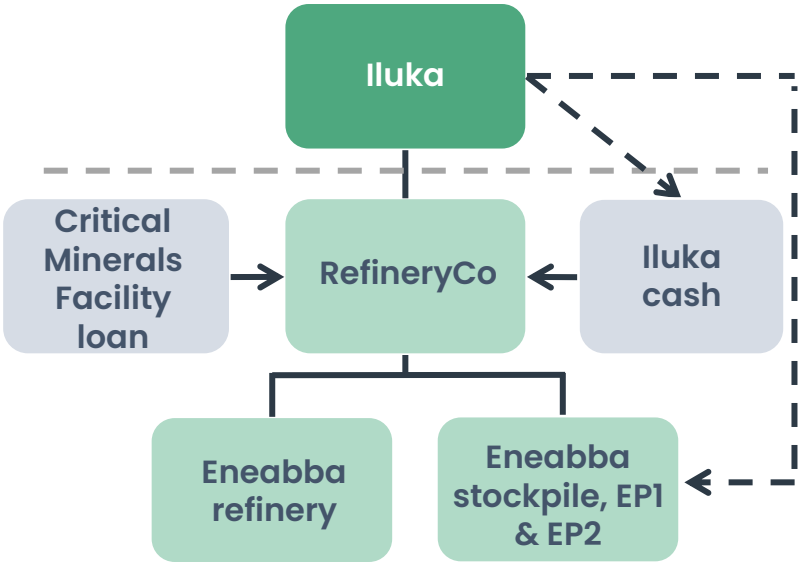
- Loan provided under the Critical Minerals Facility, administered by EFA, to RefineryCo, non-recourse to Iluka
- Terms reflective of Iluka’s unique stockpile contribution and the project’s strong alignment with the Critical Minerals Strategy and significance as Australia’s first fully integrated rare earths refinery. These terms include interest charged at BBSY + 3% and long term facility tenor, up to 16 years
- Interest capitalises pre project completion, flexible payment profile thereafter<sup>1</sup>
- Security provided over Phase 1, Phase 2, Phase 3 and Eneabba stockpile

Other terms

- Excess cash flows above scheduled repayments shared between accelerated Critical Minerals Facility loan repayments and Iluka<sup>1</sup>
- Additional risk sharing measures include project completion flexibility, repayment schedule flexibility,<sup>2</sup> and other terms

1. Residual cash flows distributable 50:50 between accelerated Critical Minerals Facility loan repayments and Iluka distributions, subject to RefineryCo minimum cash requirements and financial ratio tests.  
2. Post project completion, the Critical Minerals Facility loan has various risk sharing mechanisms in place including the ability to accrue obligations from one period to the next if RefineryCo has insufficient funds (refer to cash waterfall on subsequent slide).

Refinery corporate structure

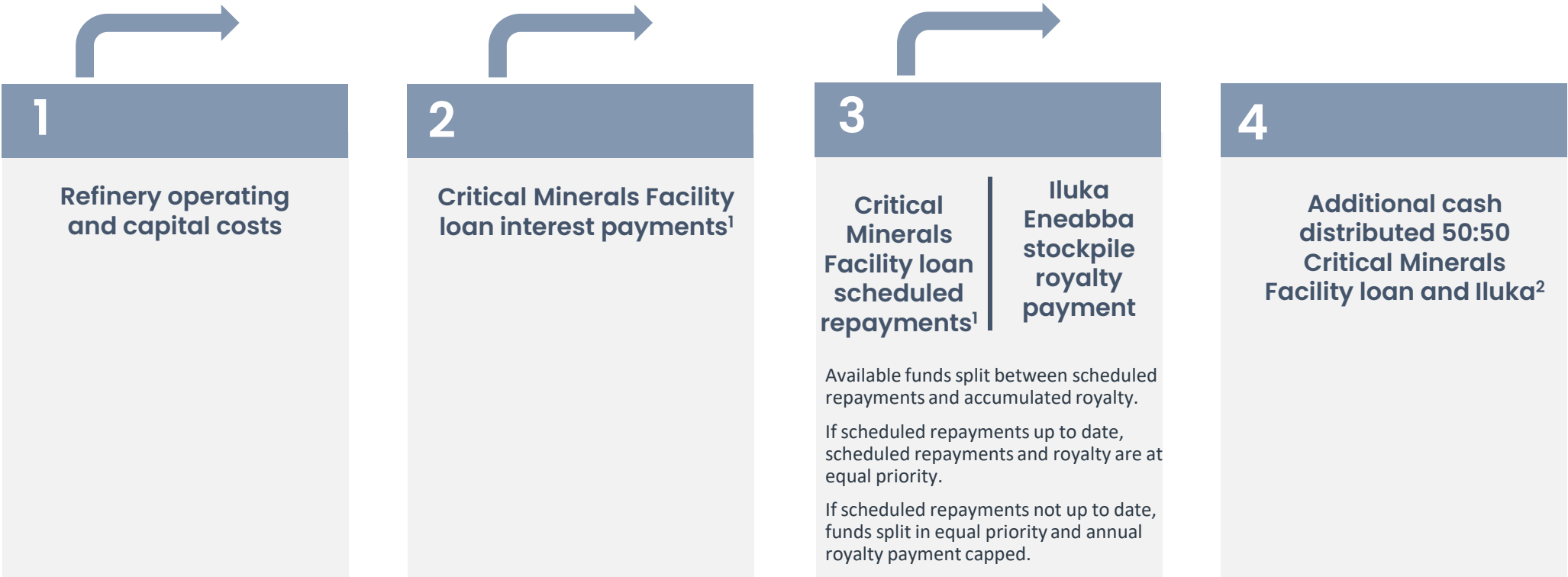


“RefineryCo” is an Iluka owned Special Purpose Entity (SPE)

- RefineryCo to build, own and operate the refinery
- Loan facility to RefineryCo is non-recourse to Iluka



Refinery cash flow waterfall priorities



1. Interest and loan repayment obligations only commence post project completion. In addition, the Critical Minerals Facility loan has various risk sharing mechanisms in place including the ability to accrue obligations from one period to the next if RefineryCo has insufficient funds.

2. Residual cash flows distributable 50:50 between accelerated Critical Minerals Facility loan repayments and Iluka distributions, subject to RefineryCo minimum cash requirements and financial ratio tests.

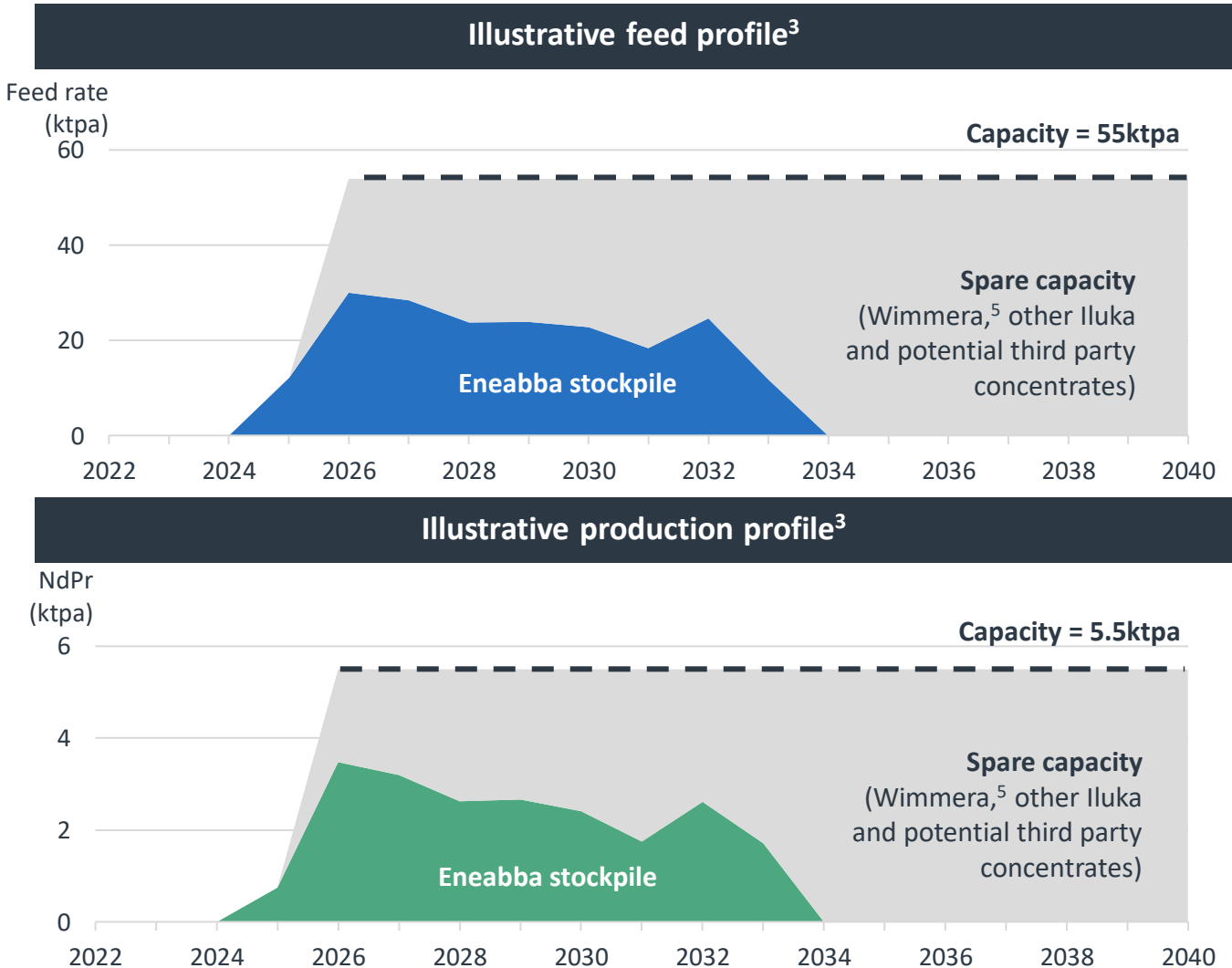


*Utilising only the Eneabba stockpile as feedstock, the Eneabba refinery generates sufficient cash flow<sup>1</sup> to repay the EFA loan facility and provide a solid economic return to Iluka via equity distributions and royalty payments.*

Illustrative refinery economics (Eneabba stockpile only)	
Production life	9 years (to 2033)
Average TREO production	12.4ktpa
Average NdPr production	2.7ktpa
Price assumptions	Adamas Sept 2021 <sup>2</sup>
LOM avg TREO basket price (2021, real)	US\$36/kg
LOM avg NdPr price (2021, real)	US\$106/kg
EFA loan repaid in full	By 2032
Project NPV <sup>4</sup>	\$524m

Notes:

- 1. Subject to price forecasts
- 2. Adamas price forecasts set out on slide 22.
- 3. Illustrative Eneabba only production life only – flexibility to extend production life subject to securing additional feedstock sources.
- 4. Project NPV (8.25% post tax nominal WACC) assesses post tax free cash flows prior to financing charges and distributions. Excludes any terminal or option value for utilisation of the Eneabba refinery post production from Eneabba feedstock.
- 5. Wimmera is currently subject to a PFS, which is expected to be complete in late 2022. Additional feedstock sources are illustrative only.



*Mineral sands business (and growth opportunities) will not be impacted by RefineryCo's debt.*

## 1 Mineral sands business + Deterra stake (20%)

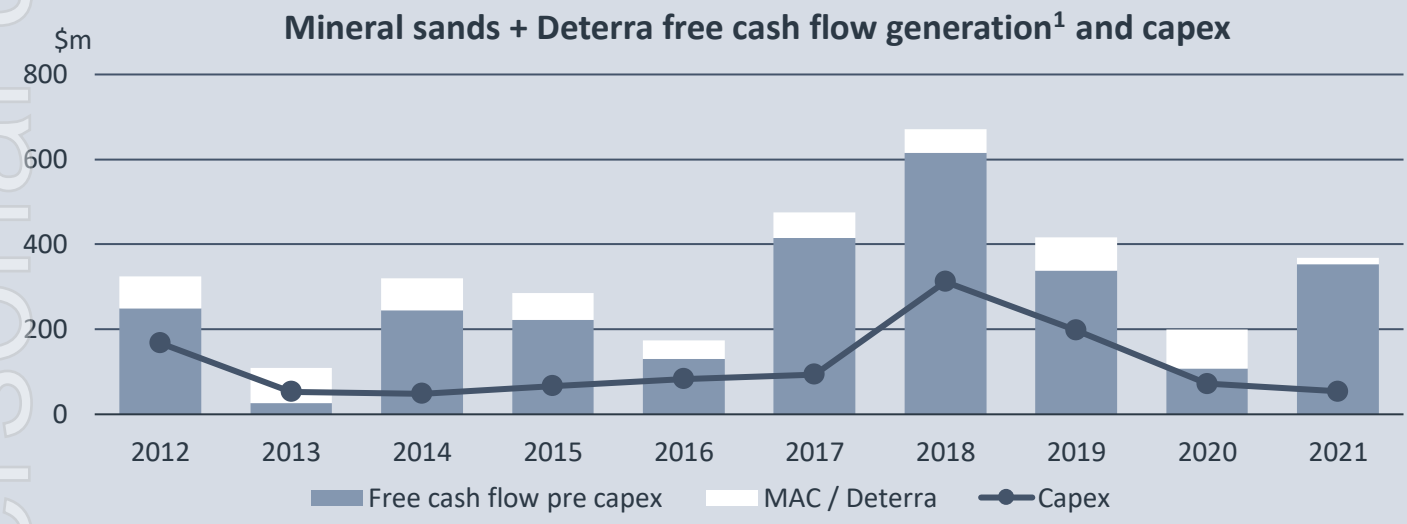
- Strong cash flow generation from mineral sands operations to fund project pipeline – average \$270 million cash inflow over last 10 years, excluding capex
- Net cash position of \$295 million as at 31 December 2021
- Multi Option Facility (MOFA) provides funding headroom
  - total facilities \$512 million (as at 31 December 2021), maturity July 2024

### Debt framework

- No net debt through the cycle

### Dividend framework:

- 100% of dividends received from Deterra Royalties; and
- a minimum of 40% of mineral sands free cash flow not required for investing or balance sheet activity



1. Free cash flow excludes acquisition cost of Sierra Rutile Limited.

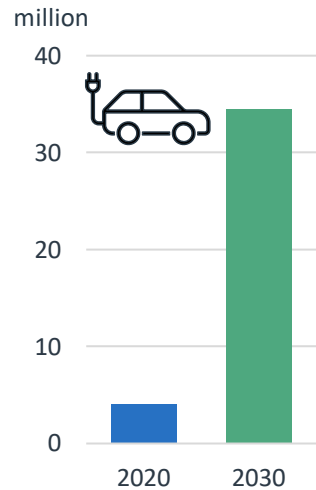
## 2 Rare earths business

- Term of facility is up to 16 years, non-recourse to Iluka
- Maximum Critical Minerals Facility debt of \$1,250 million
- Peak debt expected ~2025
- Iluka's royalty and additional cash distributions are expected to deliver attractive cash flows to Iluka
- Potential Iluka dividend framework for RefineryCo cash flows will be reviewed and announced closer to commissioning



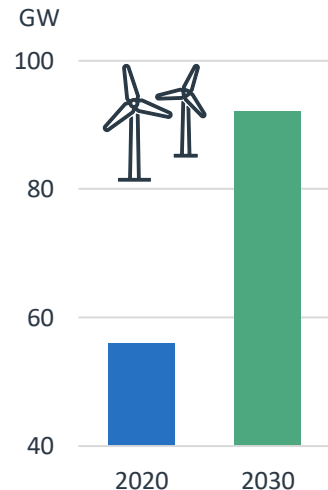


Forecast passenger electric vehicles

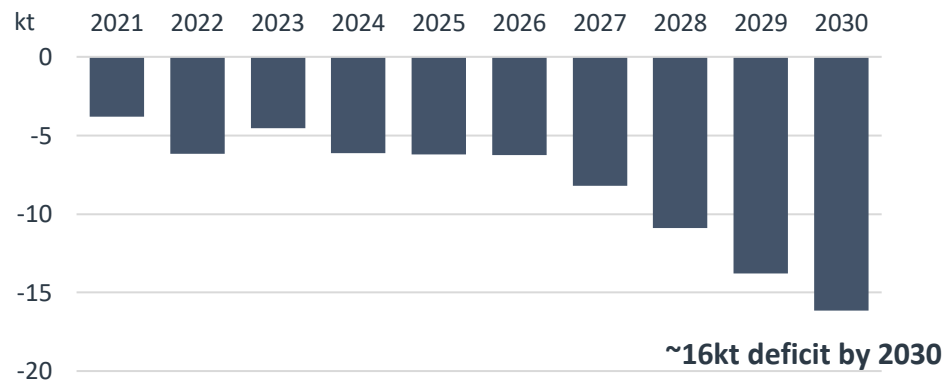


Source: Adamas Intelligence

Forecast wind power installation



Forecast NdPr oxide market deficit



Source: Adamas Intelligence

Rapid growth in rare earth oxide demand forecast –  
**NdPr** key input to permanent magnets

EVs currently ~6% of passenger vehicle sales  
→ forecast ~40% by 2030 requiring  
**~30 kt of NdPr**

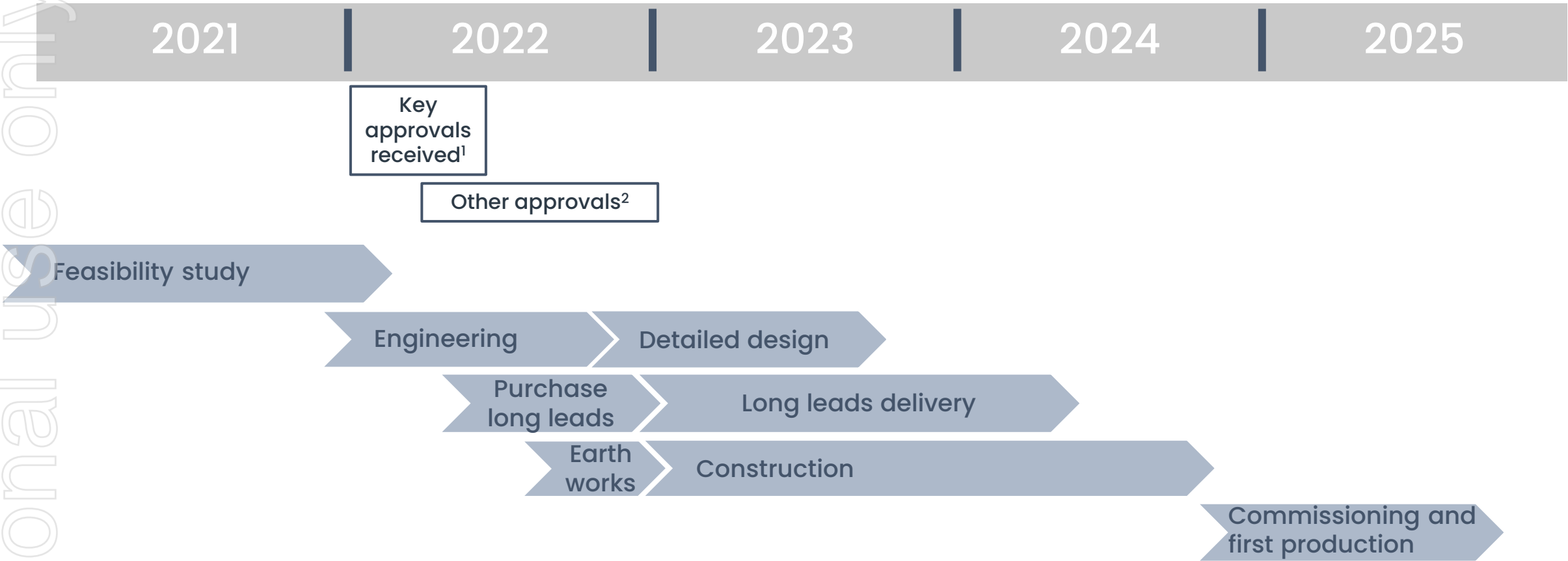
Wind turbines installed capacity forecast to grow by 35.7 GW by 2030, equivalent to  
**~6 kt of NdPr**



*Iluka has completed extensive market development activities as part of customer engagement, competitor analysis and discussions with industry participants.*

<b>Leverage experience</b>	Iluka has experience selling direct to customers in opaque, non-exchange-traded markets and into a wide range of supply chains.
<b>Contract structure mix</b>	A mix of longer and shorter term sales contracts will be targeted to provide stability and security of revenue while also exposure to upside price cycles.
<b>Attractive product mix</b>	Iluka will have the ability to supply customers a mix of light and heavy rare earths from its own independent feed source.

*Key State and Federal government environmental approvals decisions for the project have been made. Construction planned to start end 2022 with first production 2025.*



1. WA Environmental Protection Authority determined the level of assessment for the project as 'Not Assessed'; and the Commonwealth Department of Agriculture, Water and the Environment has determined that the project is 'Not a Controlled Action'.  
2. Approvals sought are State Agreement Proposal (Department of Jobs, Tourism, Science and Innovation), Works Approval, Operating Licence and Clearing Permit (Part V of Environmental Protection Act, Department of Water and Environmental Regulations), Radiation Management Plan, Radiation Waste Management Plan and Project Management (Mines Safety and Inspection Act and regulations, Department of Mines, Industry Regulation and Safety). All have been submitted.





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## **For more information contact**

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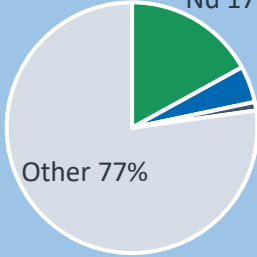
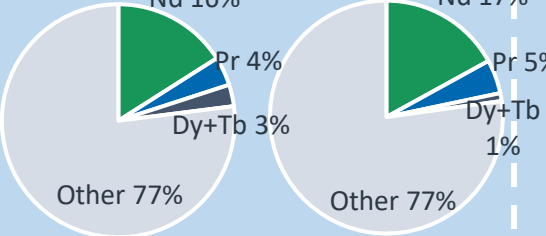
# Supplementary information



<b>Special Purpose Entity</b>	<ul style="list-style-type: none"> <li>• “RefineryCo” is an Iluka wholly owned Special Purpose Entity (SPE)</li> <li>• Critical Minerals Facility loan provided to RefineryCo, non-recourse to Iluka</li> <li>• Iluka contributes Phase 1 and Phase 2 plant and Eneabba stockpile to RefineryCo</li> </ul>
<b>Iluka equity</b>	<ul style="list-style-type: none"> <li>• \$200 million cash to be provided on an 1:3 ratio basis with initial Critical Minerals Facility loan drawdowns</li> <li>• \$1,270 million<sup>1</sup> equity-like contribution of Eneabba stockpile</li> <li>• Funds deployed of \$50 million for Phase 1 and Phase 2 plant and \$20 million for Phase 3 feasibility study</li> </ul>
<b>Critical Minerals Facility loan tranches</b>	<ul style="list-style-type: none"> <li>• Tranche A - \$1,050 million</li> <li>• Cost Overrun Facility - \$200 million available to RefineryCo if additional funding required to achieve Project Completion (on same terms as Tranche A)</li> </ul>
<b>Conditions to drawdown</b>	<ul style="list-style-type: none"> <li>• Finalisation of documents to provide security over Phase 1, Phase 2, Phase 3 and Eneabba stockpile</li> <li>• Final form due diligence materials</li> <li>• Finalisation of further material regulatory authorisations</li> </ul>
<b>Project completion</b>	<ul style="list-style-type: none"> <li>• Project Completion will occur when the Project Completion Tests have been completed – this includes both financial and operational performance measures</li> <li>• RefineryCo has up to 10 years to achieve Project Completion from Financial Close</li> </ul>
<b>Interest terms</b>	<ul style="list-style-type: none"> <li>• Interest charged at variable rate of BBSY + 3% over life of Critical Minerals Facility loan. This rate is reflective of Iluka’s unique stockpile contribution and the project’s strong alignment with the Critical Minerals Strategy and significance as Australia’s first fully integrated rare earths refinery</li> <li>• Interest is capitalised pre Project Completion</li> <li>• Post Project Completion, interest payable quarterly</li> </ul>
<b>Cash flow waterfall</b>	<ul style="list-style-type: none"> <li>• RefineryCo cashflow waterfall establishes priority of payments and distributions (priority rankings set out on slide 12)</li> </ul>
<b>Loan amortisation schedule</b>	<ul style="list-style-type: none"> <li>• Long term facility, up to 16 years. This tenor reflective of Iluka’s unique stockpile contribution and the project’s strong alignment with the Critical Minerals Strategy and significance as Australia’s first fully integrated rare earths refinery</li> <li>• Minimum repayment schedule of eight years from Project Completion based on Eneabba only</li> <li>• Repayment schedule commences on Project Completion with initial scheduled repayments over 12 years from Project Completion</li> <li>• Scheduled repayments can be deferred if RefineryCo has insufficient funds up to a 16 year facility term</li> </ul>
<b>Resolution events and default regime</b>	<ul style="list-style-type: none"> <li>• Resolution events and default regime designed to support RefineryCo resilience in the event of technical, operating and / or market based challenges</li> </ul>

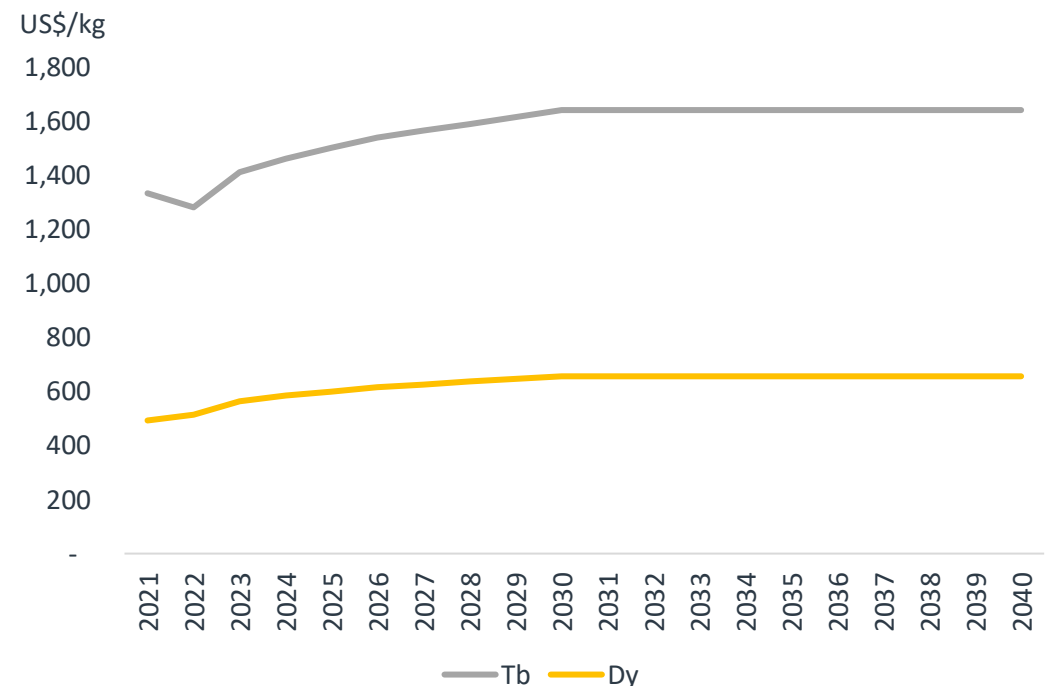
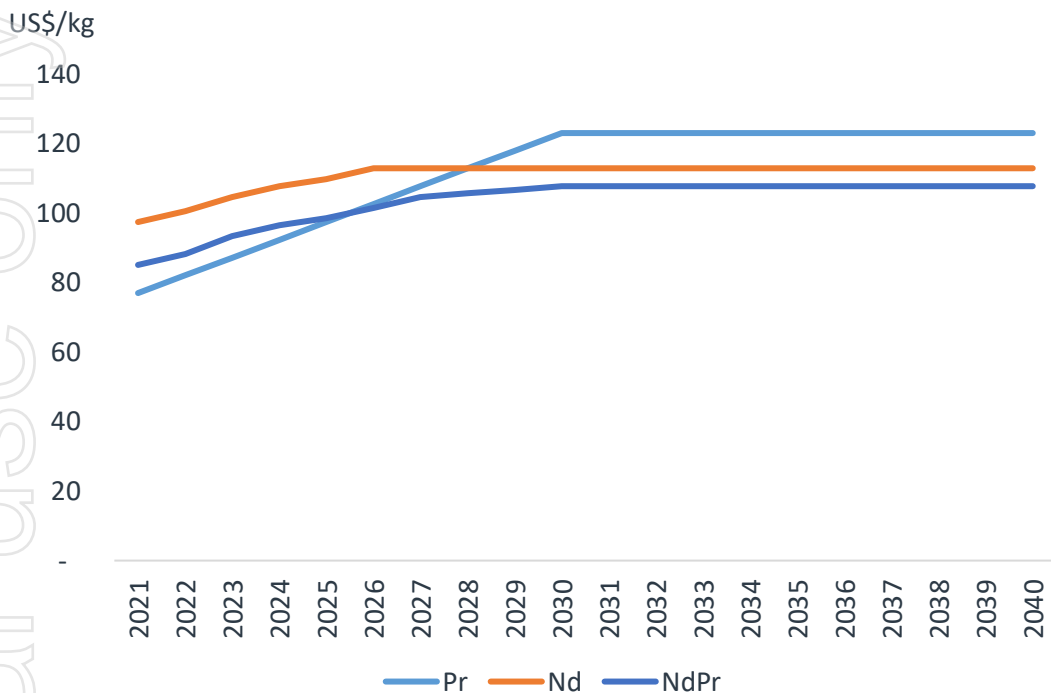
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	FEED RATE	RARE EARTH MINERALS	RARE EARTH ASSEMBLAGE	RECOVERIES AND FINAL PRODUCT
ENEABBA STOCKPILE ONLY FEED	24.6 ktpa monazite conc.	<p>Monazite = 85% of monazite conc. = 85% * 24.6 ktpa = 21 ktpa</p> <p>Rare earth oxides = 67% of monazite = 67% * 21 ktpa = 14 ktpa</p>	<p>Eneabba Stockpile</p>  <p>Nd 17% Pr 5% Dy+Tb 1% Other 77%</p>	<p>EP3 recovery assumption = 90% (simplified across all circuits)</p> <p>TREO = 90% * 14 ktpa = 12.4 ktpa</p> <p>NdPr = 12.4 ktpa * (17% + 5%) = 2.7 ktpa</p> <p>Dy+Tb = 12.4 ktpa * (1%) = 0.1 ktpa</p>
ENEABBA STOCKPILE + WIMMERA FEED	36 ktpa monazite conc.  Feed blend likely variable - assume 50:50 Eneabba / Wimmera	<p>Monazite = 85% of monazite conc. = 85% * 36 ktpa = 31 ktpa</p> <p>Rare earth oxides = 67% of monazite = 67% * 31 ktpa = 20.5 ktpa</p>	<p>Wimmera      Eneabba Stockpile</p>  <p>Nd 16%      Nd 17% Pr 4%      Pr 5% Dy+Tb 3%      Dy+Tb 1% Other 77%      Other 77%</p>	<p>EP3 recovery assumption = 90%</p> <p>TREO = 90% * 20.5 ktpa = 18.5 ktpa</p> <p>NdPr = 18.5 ktpa * wtd avg (21%) = 3.9 ktpa</p> <p>Dy+Tb = 18.5 ktpa * wtd avg (2%) = 0.4 ktpa</p>
PLANT DESIGN CAPACITY	55 ktpa			<p>TREO capacity = 23 ktpa NdPr capacity = 5.5ktpa Dy+Tb capacity = 0.75 ktpa</p>



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Notes: Prices shown are US\$/kg real 2021 incl VAT

## Mineral Resources and Ore Reserves Estimates

As an Australian company with securities listed on the Australian Securities Exchange (ASX), Iluka is subject to Australian disclosure requirements and standards, including the requirements of the Corporations Act and the ASX. Investors should note that it is a requirement of the ASX listing rules that the reporting of ore reserves and mineral resources in Australia comply with the 2012 edition of the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves (the “JORC Code”) and that the Ore Reserve and Mineral Resource estimates underpinning the production targets in this presentation have been prepared by a Competent Person in accordance with the JORC Code 2012.

The Mineral Resource estimate for Iluka’s Wimmera Deposits was presented in an announcement released by the ASX on 30 November 2021 “Wimmera Mineral Resource Estimate” which is available to view at [www.iluka.com/investors-media/asx-disclosures](http://www.iluka.com/investors-media/asx-disclosures).

The Mineral Resource estimate for Iluka’s MSP By-products Stockpile is extracted from the announcement dated 24 July 2019 “Eneabba Mineral Sands Recovery Project Update” which is available to view at [www.iluka.com/investors-media/asx-disclosures](http://www.iluka.com/investors-media/asx-disclosures). Updates to the Mineral Resource estimates for MSP By-products Stockpile, Iluka's Annual Report for 2020, released 25 February 2021 and Iluka's Annual Report for 2021, released 24 February 2022 which are available to view at [www.iluka.com/investors-media/asx-disclosures](http://www.iluka.com/investors-media/asx-disclosures).

Iluka confirms that it is not aware of any new information or data that materially affects the information included the original market announcements and updates in the Annual Reports and that all material assumptions and technical parameters underpinning the estimates in the relevant market announcements and updates in the Annual Reports continue to apply and have not materially changed.

Deposit	Mineral Resource Category <sup>(1)</sup>	Material Tonnes mt	In Situ HM Tonnes kt	HM Grade (%)	Clay Grade (%)	HM Assemblage <sup>(2)</sup>				
						Ilmenite Grade (%)	Zircon Grade (%)	Rutile Grade (%)	Monazite Grade (%)	Xenotime Grade (%)
MSP By-Product Stockpile	Measured	682	573	84.0	3.1	32.4	26.4	-	20.2	1.2
	Indicated	237	186	78.5	3.7	35.3	32.6	-	12.9	1.7
	Inferred	62	43	69.4	4.7	38.2	28.5	-	12.1	1.1
Total <sup>(4)</sup>		981	802	81.8	3.3	33.4	28.0	-	18.1	1.3

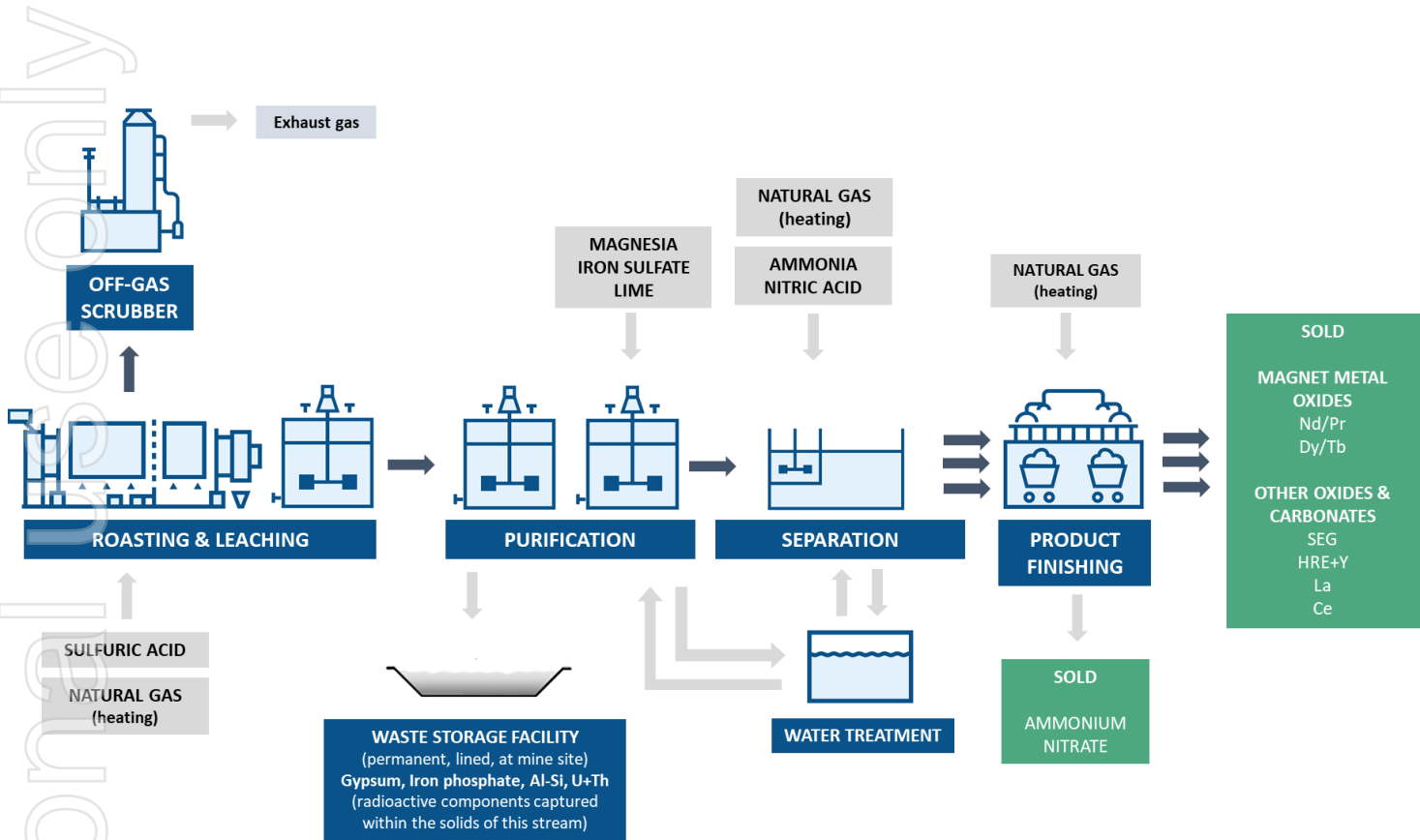
Deposit	Ore Reserve Category <sup>(3)</sup>	Ore Tonnes kt	In Situ HM Tonnes kt	HM Grade (%)	Clay Grade (%)	HM Assemblage <sup>(2)</sup>				
						Ilmenite Grade (%)	Zircon Grade (%)	Rutile Grade (%)	Monazite Grade (%)	Xenotime Grade (%)
MSP By-Product Stockpile	Proved	689	584	84.7	3.0	32.2	26.7	-	20.4	1.2
	Probable	221	173	78.3	3.7	35.1	33.2	-	12.7	1.7
Total <sup>(4)</sup>		910	756	83.1	3.2	32.9	28.2	-	18.6	1.3

Deposit	Mineral Resource Category <sup>(1)</sup>	Material Tonnes mt	In Situ HM Tonnes kt	HM Grade (%)	Clay Grade (%)	HM Assemblage <sup>(2)</sup>				
						Ilmenite Grade (%)	Zircon Grade (%)	Rutile Grade (%)	Monazite Grade (%)	Xenotime Grade (%)
WIM100	Indicated	339	15,870	4.7	13.0	33.0	17.0	6.0	2.2	0.5
	Inferred	99	3,370	3.4	14.0	35.0	17.0	6.0	2.2	0.5
WIM50	Inferred	360	14,820	4.1	11.8	38.3	16.0	7.4	1.8	0.4
WIM50 North	Inferred	577	33,120	5.7	14.2	29.0	14.6	4.0	1.8	0.4
Indicated Total		339	15,870	4.7	13.0	33.0	17.0	6.0	2.2	0.5
Inferred Total		1,036	51,310	5.0	13.3	32.1	15.2	5.1	1.8	0.4
Total <sup>(4)</sup>		1,375	67,180	4.9	13.3	32.3	15.6	5.3	1.9	0.4

Rare earth oxide assemblage

	Eneabba assemblage	Wimmera assemblage
Lanthanum	22%	18%
Cerium	45%	37%
Praseodymium	5%	4%
Neodymium	17%	16%
Promethium	0%	0%
Samarium	3%	3%
Europium	0%	0%
Gadolinium	1%	2%
Terbium	0%	0%
Dysprosium	1%	2%
Holmium	0%	0%
Erbium	0%	1%
Thulium	0%	0%
Ytterbium	0%	1%
Lutetium	0%	0%
Scandium	0%	0%
Yttrium	6%	14%

1. Mineral resources are inclusive of Ore Reserves
2. Mineral assemblage is reported as a percentage of in situ HM component.
3. Ore Reserves are a sub-set of Mineral Resources.
4. Rounding may generate differences in the last decimal place. The aggregated totals may appear to reflect a greater degree of precision than individual deposits to maintain consistency in reporting.



Cracking	Roasting the RE mineral concentrates with sulfuric acid to make water soluble
Leaching	Dissolving REs in water leaving insoluble gangue for disposal
Purification	Neutralisation to remove impurities including iron phosphate, aluminium, thorium and then removal of uranium by ion exchange
Separation	Solvent extraction to separate individual magnet metals from each other and other REs
Precipitation	Precipitation of REs as carbonates using ammonium bicarbonate, generating useful ammonium nitrate as a by-product
Calcination / drying	Drying and then calcining to produce pure magnet metal oxides

Magnet metals refers to Nd, Pr, Tb, Dy



