

**Developing Australia's Largest Onshore Manganese Resource**  
**Producing High Purity Manganese for Li-Ion Batteries.**



LARGE MANGANESE RESOURCE



INNOVATIVE PROCESSING



HIGH PURITY MANGANESE PRODUCTS



**MONTEZUMA**  
MINING COMPANY LTD

# Disclaimer

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## Tight Capital Structure Strong Balance Sheet

### Financial Information

ASX Ticker	MZM
Shares on Issue	83.5M
Share Price	\$0.27
Market Capitalisation	\$22.6M
Cash & Investments (30 Sept 17)	~12M
Debt	Nil
Enterprise Value	~\$10.6M
Top 20 Shareholders	~67%

### Board and Management

Seamus Cornelius	Chairman
Justin Brown	Executive Director
John Ribbons	Non Executive Director
Dave O'Neill	Exploration Manager

### Share Price Performance

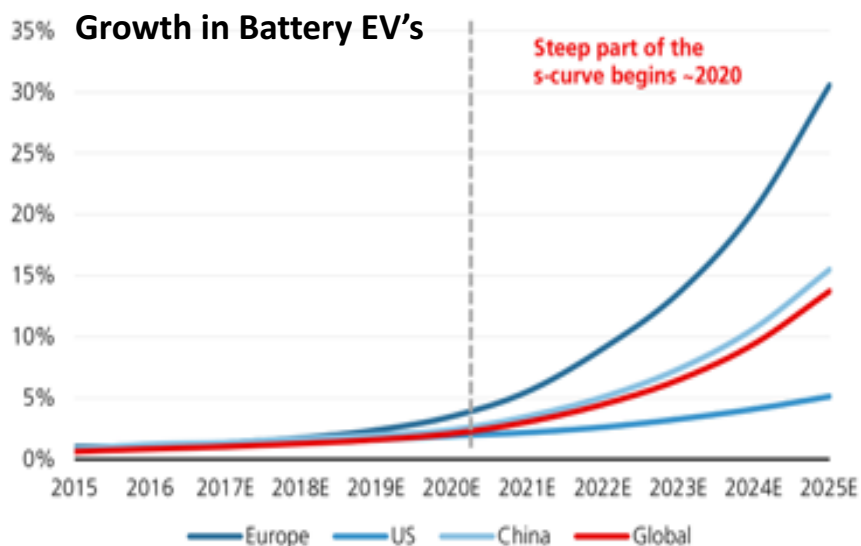


### Major Shareholders

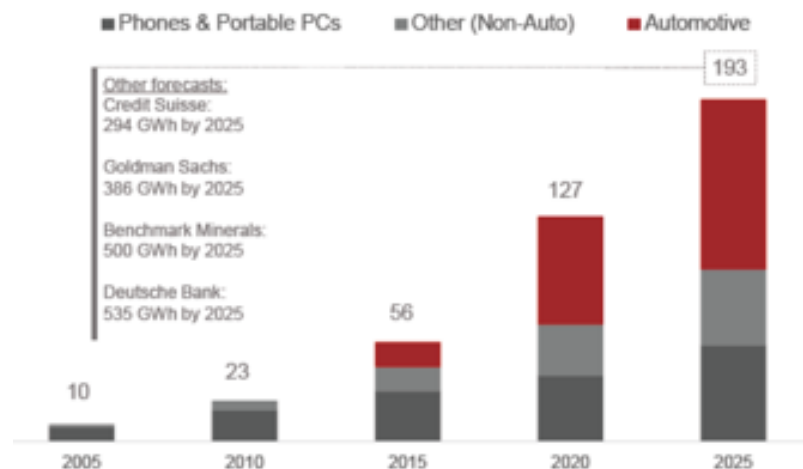
Top 20 Shareholders	67%
Board and Management	8.2%
JP Morgan Nominees Australia	11.4%
Duketon Mining Ltd	6.5%

## Strong Li-Ion market growth will drive demand for Tech Metals <sup>1,2</sup>

- Over 15M electric vehicles forecast by 2025.
- Non EV Li-Ion battery demand to also grow strongly including;
  - Grid Storage
  - Cellular Phones
  - Power tools, E Bikes, medical applications etc
- China pushing for Zero Emission Vehicle (ZEV) program: 8% EV by 2018, 12% by 2020.
- Forecast CAGR of 6.1% to 2021.
- A lot more high purity manganese is needed for this to happen.**



## Growth in Battery Sales (GWh)<sup>2</sup>



<sup>1</sup>Source: UBS Global Research May 2017

<sup>2</sup>Avicenne Energy Analysis 2014 et al as indicated. Avicenne estimates include China Auto Upside case

## Manganese is part of a battery powered future

- 3M has its own patented NMC, based on work done at Dalhousie University.
- LG Chem makes NMC batteries used in the Chevy Volt and Nissan Leaf.
- General Electric uses the Li-MnO<sub>2</sub> system as it offers the best balance of safety and performance.
- BMW i3 also use NMC batteries.
- Tesla signed 5-year exclusive partnership with Dr. Jeff Dahn, a prominent NMC battery researcher.



**“M” is for Manganese**

## Manganese and next generation batteries

- Cost, performance and safety are key factors battery technologies.
- Manganese is important for low cost, high performance, safer batteries.
- Many next-generation manganese batteries are safer and perform better.



“As a result of the **superior battery performance**, the **high safety** of aqueous electrolyte, the facile cell assembly and the cost benefit of the source materials, this **zinc-manganese dioxide system** is believed to be promising for large-scale energy storage applications.” 1 September 2017\*



“a novel manganese and sodium-ion-based material might become a contender, offering a **potentially lower-cost, more ecofriendly** option to fuel next-generation devices and electric cars.” 6 July 2017\*\*

\*<https://www.nature.com/articles/s41467-017-00467-x>

\*\*<https://www.sciencedaily.com/releases/2017/07/170706143156.htm>

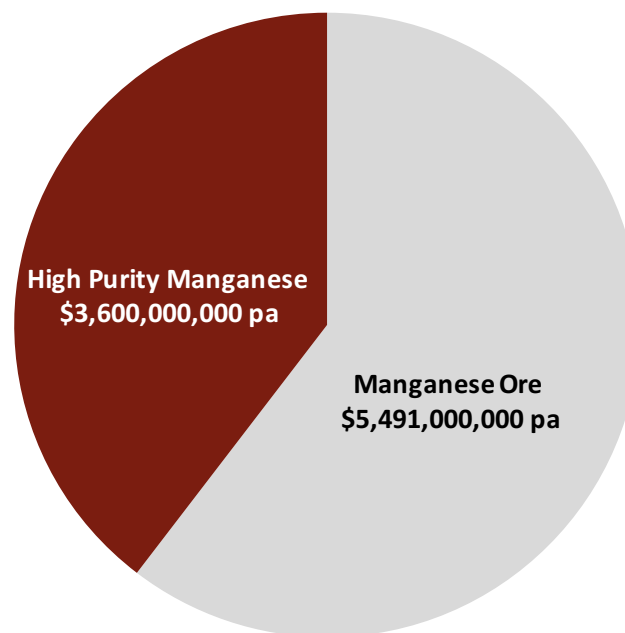
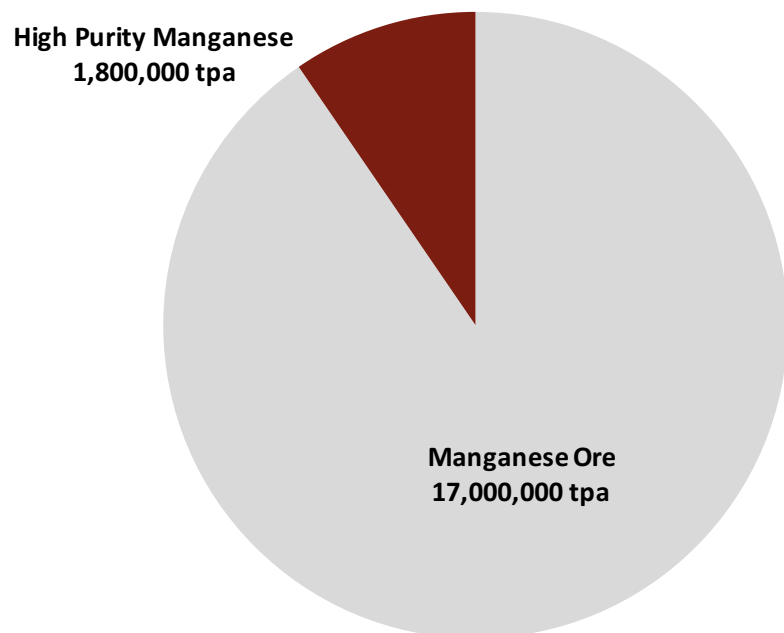


## A premium product

High purity manganese makes up;

- 10% of the global manganese market by volume but;
- 40% of the global market by value.

At 100% electric car penetration, market forecast to grow by 240%<sup>1</sup>, equivalent to +\$5B

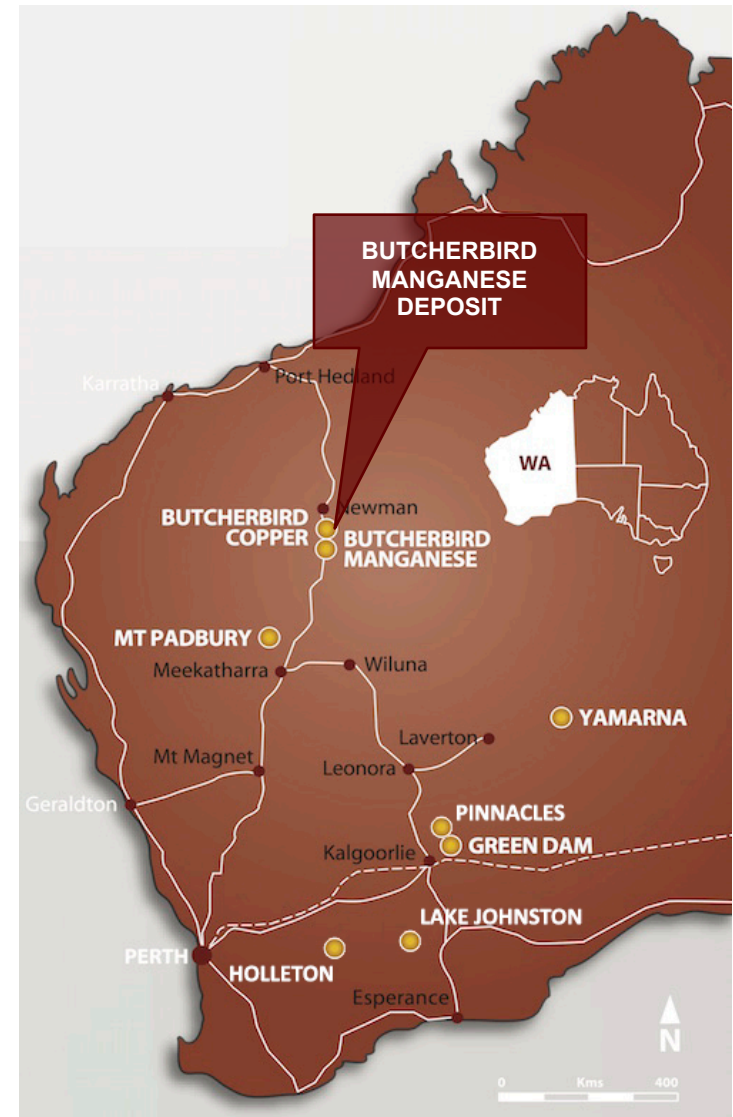


<sup>1</sup>UBS Global Research May 2017

Assumes EMM price of USD\$2,000/t Ref: <https://www.metalbulletin.com/My-price-book.html?price=34473>

Assumes manganese price of USD\$3.23/dmtu Ref: <https://www.south32.net/docs/default-source/all-financial-results/reports-and-presentations/mamatwan-site-tour-2016.pdf>

- Australia's largest onshore manganese deposit.
- >180 Mt of manganese ore<sup>1</sup>.
- Excellent local infrastructure.
- Moving towards development.
- 100% owned by Montezuma.
- Low risk mining jurisdiction.



<sup>1</sup>Reference: Montezuma Mining Company Ltd ASX release dated 12 October 2017

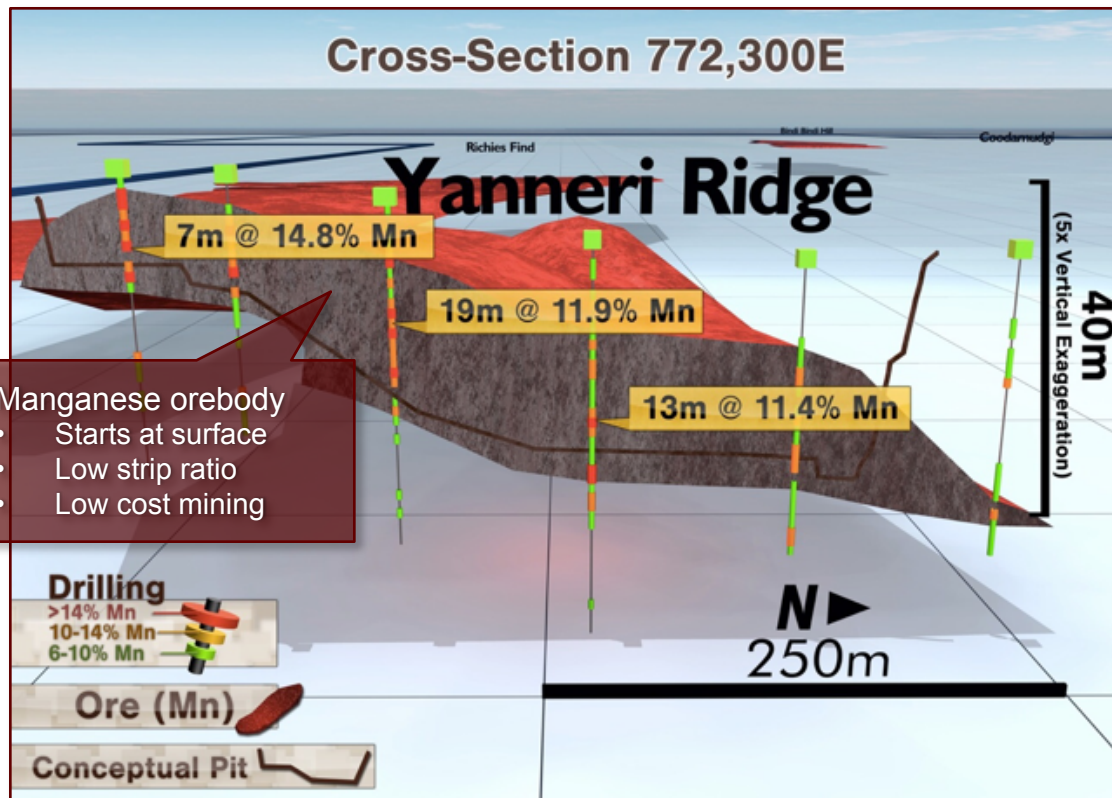


## World Class Manganese Resource

Prospect	Tonnes (Mt)	Mn (%)	SiO <sub>2</sub> (%)	Fe (%)	P <sub>2</sub> O <sub>5</sub> (%)	Al <sub>2</sub> O <sub>3</sub> (%)
<b>Yanneri Ridge</b>						
Inferred	48.0	10.7	43.0	11.1	0.262	10.7
Indicated	<b>22.5</b>	<b>12.0</b>	<b>43.8</b>	<b>11.6</b>	<b>0.297</b>	<b>10.6</b>
<b>Additional Deposits</b>						
Inferred	110.3	10.6	44.4	11.9	0.3	11.0
<b>Total</b>	<b>180.8</b>	<b>10.8</b>	<b>43.9</b>	<b>11.7</b>	<b>0.3</b>	<b>10.9</b>

- Inferred Resource Estimates completed for eight deposits.
- Significant upside potential to increase the resource with further drilling.
- Scale of development not resource constrained.

## Simple Geology/Favourable Infrastructure



Ore starts at surface;

- low strip ratio
- low mining cost

Gas pipeline;

- low energy cost

Straddles bitumen highway;

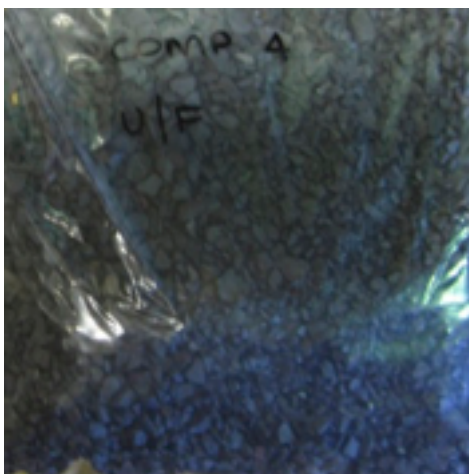
- low infrastructure cost

Port Headland 550km north;

- logistics solution in place

## Breakthrough Technology

- CSIRO flowsheet will produce high purity battery grade manganese.
- Products include Electrolytic Manganese Dioxide (“EMD”), Metal (“EMM”), and manganese sulphate (batteries and fertiliser).
- High purity manganese is a high value product which sells for >USD\$2,000/dmt\* (EMM).



LOW COST PLANT FEED FROM 100% OWNED MANGANESE RESOURCE



INNOVATIVE, NOVEL PROCESS TO PURIFY ORE AND ADD VALUE



HIGH PURITY PRODUCTS FOR Li-Ion BATTERIES, HIGH VALUE: >US\$2000/t\*

## Key differentiators

### Butcherbird Project\*

- Lower cost ore mined at surface
- Fast leach at ambient temperature and atmospheric pressure.
- Exothermic reaction produces energy.
- No sulphuric acid plant.
- Simple, novel purification pathway.
- Purified solution can produce EMM, EMD or manganese sulfate for Li-Ion batteries.

**Lower emissions, lower energy, lower cost  
disruptive new technology**

### Current Producers (China/South Africa)

- Requires high grade imported manganese ore.
- Reduction Roasting to 800-1000°C consumes energy.
- Sulphuric acid leach.
- Potentially more complex purification.
- Production of final products using toxic selenium.

**High emission, high energy,  
high cost, old technology**



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# Investment Case Summary

- World class, very large manganese deposit.
- Technology breakthrough on processing.
- Simple geology and flowsheet.
- Low production costs anticipated.
- Strong demand growth from battery revolution.
- Commercial studies underway.
- Strong balance sheet, tight capital structure.
- The only ASX listed exposure to this sector.



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Note: The information in this presentation that relates to Exploration Results, and Mineral Resources is based on information compiled by Mr Justin Brown who is a full-time employee of the Company and is a member of the Australasian Institute of Mining and Metallurgy.

Justin Brown has sufficient experience which is relevant to the style of mineralisation and type of deposit under consideration and to the activity 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'. Justin Brown consents to the inclusion in the report of the matters based on his information in the form and context in which it appears.

Please note with regard to exploration targets, the potential quantity and grade is conceptual in nature, that there has been insufficient exploration to define a Mineral Resource and that it is uncertain if further exploration will result in the determination of a Mineral Resource.

The information in this report that relates to Mineral Resources is based on information compiled by Mr Mark Glassock who is a member of the Australasian Institute of Mining and Metallurgy. At the time that the Mineral Resources were compiled, Mr Glassock was a consultant to Montezuma Mining Company Ltd. Mr Glassock is a geologist and has sufficient experience which is relevant to the style of mineralisation and type of deposit under consideration and to the activity 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 Glassock consents to the inclusion of this information in the form and context in which it appears in this report