

13 FEBRUARY 2017

**CSIRO TO COMMENCE BATTERY GRADE ELECTROLITIC  
MANGANESE DIOXIDE STUDIES AT BUTCHERBIRD**

- CSIRO to commence studies to produce Electrolytic Manganese Dioxide (“EMD”) from the Butcherbird Manganese Deposit (100%MZM).
- Butcherbird is Australia’s largest onshore manganese resource at >170 million tonnes of mangiferous ore<sup>4</sup>.
- EMD is an important technology metal with over 90% of global consumption used in battery manufacturing.
- Lithium-Ion battery<sup>1</sup> cathodes contain up to 60% manganese, which is ~5 times the contained value and ~15 times the amount of lithium<sup>2,3</sup>.
- Co-funding grant approved by the Federal Government Department of Industry, Innovation and Science.



Montezuma Mining Company Ltd (“Montezuma” or “Company”) is pleased to announce that the Commonwealth Scientific and Industrial Research Organisation (“CSIRO”) Process Science and Technology Group has agreed to undertake research and development studies into the production of high purity Electrolytic Manganese Dioxide (“EMD”) from manganese ores sourced from the Company’s 100% owned, infrastructure endowed Butcherbird Project in Western Australia.

The investigations will also focus on improving the primary beneficiation grades achieved from the Butcherbird ores as a feedstock into the EMD process flow sheet(s) and as a potential marketable product for sale to the manganese alloy markets. Previous work achieved consistent grades of ~33% Mn, and this work will seek to further increase that<sup>5</sup>.

The Department of Industry, Innovation and Science have agreed to co-fund the work up to \$50,000 as part of the Innovations Connections Programme.

<sup>1</sup> <http://www.visualcapitalist.com/manganese-powering-the-next-generation-of-lithium-ion-batteries/>

<sup>2</sup> [http://batteryuniversity.com/learn/article/types\\_of\\_lithium\\_ion](http://batteryuniversity.com/learn/article/types_of_lithium_ion)

<sup>3</sup> <https://www.metalarly.com/lithium-price/>

**ABOUT MONTEZUMA MINING**

Listed in 2006, Montezuma Mining Company Ltd (ASX: MZM) is a diversified explorer primarily focused on gold and manganese. The Company’s primary objective is to achieve returns for shareholders through selected strategic acquisitions and targeted exploration.

Montezuma has 100% interests in the Yamarna Gold Project in the Yamarna Greenstone Belt, the Holleton Gold Project in the Wheat Belt region and the Butcherbird Manganese/Copper Project in the Murchison region, all located in Western Australia.

**MARKET DATA**

ASX code:	MZM
Share price:	\$0.14
Shares on issue:	83.5M
Market capitalisation:	\$11.7M
Cash (at 30 December):	~\$4.6M
Listed Investments:	~\$7.7M

**BOARD AND MANAGEMENT**

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



Company information, ASX announcements, investor presentations, corporate videos and other investor material on the Company’s projects can be viewed at [www.montezuma.com.au](http://www.montezuma.com.au)

## ABOUT THE BUTCHERBIRD PROJECT

The Butcherbird Manganese Deposit is Australia's **largest onshore manganese resource**<sup>4</sup> comprising large tonnages of near surface manganese oxide ore in seven deposits.

The Project also has some **excellent infrastructure advantages** with a gas pipeline and main bitumen highway passing directly adjacent to and through the mineralised envelope.

The mineralisation occurs as supergene enrichment of a regional scale basal manganese shale which underlies much of the Project area. The shale beds are gently folded and where the folds approach the surface topography, supergene processes have significantly upgraded the manganese content to form a potential feedstock for further upstream processing.

### BENEFICIATION POTENTIAL

The Company discovered the deposits in 2010-2011 and has subsequently undertaken several rounds of metallurgical test work which have shown that a **high silica concentrate with approximately 33% contained manganese and low deleterious elements** can be reliably produced through relatively simple processing methods<sup>5</sup>.

This medium grade concentrate is suitable for use in the production of silico manganese alloys, a major manganese feedstock for use in steel making. This concentrate will be used as the initial feed for the EMD production process test work.

### ABOUT EMD

Industry observers expect the global electrolytic manganese dioxide market to reach USD 635.7 million by 2022 with a **projected compound annual growth rate of 4.9%** from 2015 to 2022.<sup>6</sup>

Growth in demand from the battery manufacturing industry is expected to drive projected demand curves as technological advancements in **wind and solar power generation** and the need for associated grid electrical storage systems expands.

Battery production is the leading EMD consumer with market share estimated to exceed 90% of global consumption. This demand is expected to continue to grow in particular due to the current and expected future growth in the global electric vehicle industry, which in turn has a strong impact on battery demand. Manganese in the form of **EMD is a key ingredient in several types of widely used battery technologies including Li-ion, alkaline and zinc-carbon, and the next generation lithiated manganese dioxide batteries, with cathodes comprising over 60% Mn compared to approximately 4% lithium.**

Classification	Inferred Resource	
Cut-off	10% Mn	
Deposit	Tonnes (Mt)	Mn (%)
Bindi Bindi Hill	8.75	11.09
Budgie Hills	1.03	10.82
Cadgies Flats	0.25	11.08
Coodamudgi	12.9	11.48
Illgararie Ridge	17.0	10.71
Mundawindi	14.2	12.23
Richies Find	16.1	11.56
<b>SUBTOTAL</b>	<b>70.2</b>	<b>11.4</b>
Yanneri Ridge	48.8	11.8
<b>GLOBAL TOTAL</b>	<b>119.0</b>	<b>11.6</b>

Table 1. Inferred Mineral Resource Estimates at the Butcherbird Manganese Project are reported at a 10% Mn cut.

Classification	Inferred Resource	
Cut-off	8-10% Mn	
Deposit	Tonnes (Mt)	Mn (%)
Bindi Bindi Hill	5.7	9.2
Budgie Hills	3.5	8.9
Cadgies Flats	0.2	9.1
Coodamudgi	3.6	9.5
Illgararie Ridge	18.5	9.2
Mundawindi	2.1	9.4
Richies Find	6.6	9.4
<b>SUBTOTAL</b>	<b>40.1</b>	<b>9.3</b>
Yanneri Ridge	15.8	9.4
<b>GLOBAL TOTAL</b>	<b>55.9</b>	<b>9.3</b>

Table 2. Inferred Mineral Resource Estimates at the Butcherbird Manganese Project are reported at 8-10% Mn.

<sup>4</sup> Montezuma Mining Company Ltd ASX release dated 7 December 2012

<sup>5</sup> Montezuma Mining Company Ltd ASX release dated 27 December 2014

<sup>6</sup> <http://www.grandviewresearch.com/press-release/global-electrolytic-manganese-dioxide-market>

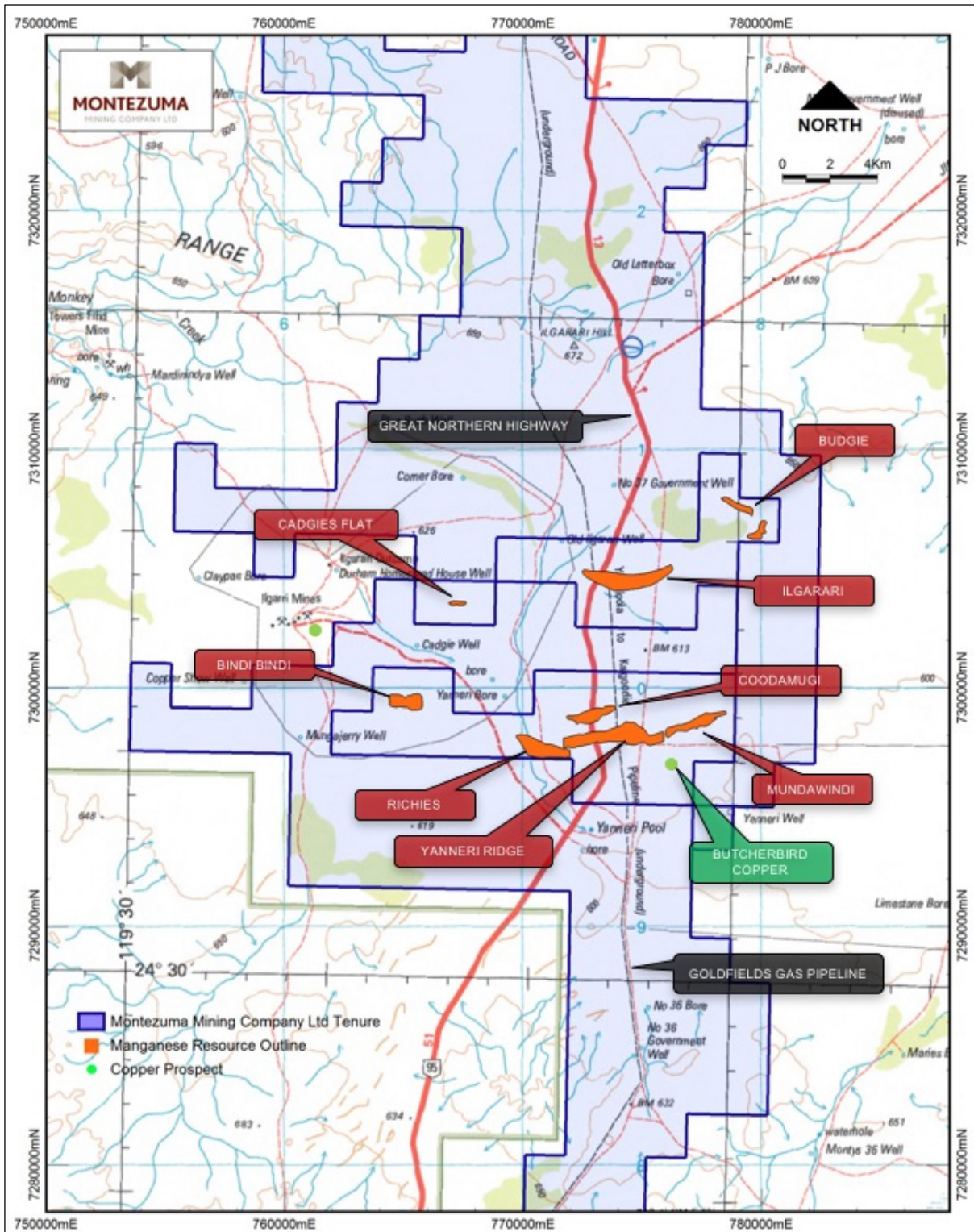


Figure 1: Butcherbird Manganese Project location plan including resource outlines.

**FOR MORE INFORMATION...**

Justin Brown

Executive Director

Phone: +61 8 6315 1400

Email: [jbrown@montezuma.com.au](mailto:jbrown@montezuma.com.au) Company information, ASX announcements, investor presentations, corporate videos and other investor material on the Company's projects can be viewed at <http://www.montezuma.com.au>.

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The information in this report that relates to Exploration Results, Mineral Resources and Mineral Reserves is based on information compiled by Mr Justin Brown who is a member of the Australasian Institute of Mining and Metallurgy. At the time that the Exploration Results, Mineral Resources and Mineral Reserves were compiled, Mr Brown was an employee of Montezuma Mining Company Ltd. Mr Brown 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 Brown consents to the inclusion of this information in the form and context in which it appears in this report

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 the announcement that relates to Mineral Resources for the Butcherbird Project is extracted from ASX announcement of 7 December 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 announcements and that all material assumptions and technical parameters underpinning the estimates in the relevant market announcements continue to apply and have not materially changed. The company confirms that the form and context in which the Competent Person's findings are presented have not been materially modified from the original market announcement. This information was prepared and first disclosed under the JORC Code 2004. It has not been updated since to comply with the JORC Code 2012 on the basis that the information has not materially changed since it was last reported.