

# Macarthur Minerals Ltd. (TSXV: MMS) – Miner with a Superior Grade Project, Early Cash Flow Prospects and Strong Earnings Leverage



## Investment Highlights

- **Macarthur Minerals Ltd. (TSXV: MMS, ASX: MIO, OTCQB: MMSDF)** (“MMS”, or “Company”) is an iron ore mine developer with iron ore, gold and lithium assets across Australia and the U.S. Its flagship asset is the Lake Giles Iron Project, which is in Western Australia and had a Preliminary Economic Assessment (“PEA”) filed in 2019.
- **Flagship Project Boasts Robust Economics:** Lake Giles has a projected post-tax NPV@8 of \$535 million, post-tax IRR of 21%, and a payback period of three years. The project is interesting given it is planned to produce two types of iron ore-bearing minerals, magnetite, and hematite. This allows the company to produce higher-quality iron ore (65%+ Fe content) considered attractive by Chinese steelmakers.
- **Early Cash Flow Potential:** Considering the hot iron ore prices, MMS has completed a mine gate sales agreement with Golden West Resources for 400,000 tonnes of iron ore for early production of export, to hasten ore revenue sales.
- **Development Catalysts in the Pipeline:** MMS is working on advancing Lake Giles to the Feasibility Study (“FS”) stage and negotiating key infrastructure access with existing government owned Rail and Port to facilitate export sales.
- **Off-take Agreement:** Binding, life of mine Offtake and Marketing Agreement with Glencore.
- **Based on our analysis and valuation models, we are initiating coverage with a BUY rating and a fair value per share estimate of C\$1.19 per share.**

<b>Current Price (C\$):</b>	\$ 0.52
<b>Fair Value (C\$):</b>	\$ 1.19
<b>Projected Upside:</b>	128.98%
<b>Action Rating:</b>	BUY
<b>Perceived Risk:</b>	HIGH

<b>Shares Outstanding:</b>	139,614,135
<b>Market Capitalization (C\$):</b>	\$ 72,599,350
<b>P/E</b>	-
<b>P/B</b>	1.16
<b>YoY Return</b>	184.21%
<b>YoY TSXV Return</b>	27.11%

\*Note all \$ amount are A\$ unless otherwise stated.

## Key Financial Data (FYE - Mar 31)

(A\$)	2020	2021
Cash	\$ 4,518,165	\$ 5,018,170
Working Capital	\$ (5,003,072)	\$ (6,062,093)
Mineral Assets	\$ 66,218,216	\$ 67,513,545
Total Assets	\$ 71,936,697	\$ 74,233,519
Net Income (Loss)	\$ (4,177,115)	\$ (15,905,637)
EPS	\$ (0.05)	\$ (0.13)

July 26<sup>th</sup>, 2021

MMS is an Australian mining company with a broad portfolio of exploration and development projects located in Australia and the U.S. Though MMS is focused on its iron ore properties, it has significant mineral holdings prospective for gold, lithium (brine and hard rock), as well as other major base metals. The portfolio's flagship asset is the Lake Giles Iron Project, a development project located in the Yilgarn region of Western Australia. The Lake Giles Iron Project consists of two prospective project regions:

- **The Moonshine Magnetite Project:** The Moonshine Project comprises two major mineralized zones, the Moonshine and Moonshine North Deposits with a magnetite resource of 53.9 million tonnes (Measured), 218.7 million tonnes (Indicated) and 997 million tonnes (Inferred). It is envisioned that the Moonshine magnetite product will provide the primary feedstock for a future high-grade iron ore operation, with magnetite ore typically yielding higher Fe contents post-processing.
- **The Ularring Hematite Project:** The Ularring hematite resource (approved for development) presently comprises Indicated resources of 54.5 million tonnes at 47.2% Fe and Inferred resources of 26 million tonnes at 45.4% Fe.<sup>1</sup> Though Moonshine is expected to provide the bulk of the feedstock for Lake Giles' future production, the company is looking to access Ularring's hematite ore resources in the near-term. This will provide MMS with near-term cash potential as well as the chance to leverage buoyant iron ore pricing.

Since acquiring the Lake Giles tenement package in 2005, MMS have invested over A\$100m in exploration, studies and permitting (Mining Leases, Native Title and Heritage Agreements) that is the building blocks for the Moonshine Magnetite and the Ularring Hematite projects. In addition to the above projects that comprise the Lake Giles Iron Ore Project, MMS also has an additional iron ore prospective project, the Teppo Grande Project.

Though this report will be focused on the iron ore projects of the company (specifically Lake Giles), investors should note that MMS' non-iron ore portfolio has significant exploration value which could be unlocked in the near-term, as the company is working on spinning out the assets into a separate listing. This could unlock major value tied up in the company's non-core assets, whilst freeing up capacity to focus solely on Lake Giles' development and push through to production.

With clear development objectives for calendar 2021 in the works and near-term cash flow potential buoyed up by a hot iron ore market, MMS is well positioned to become Australia's next high-grade iron ore producer.

## *The Lake Giles Iron Ore Project*

Located in Western Australia, a famously prolific region for iron ore production, Lake Giles comprises 15 contiguous tenements that together cover a total area of 6,200 hectares. The property area is approximately 450 km east of state capital Perth and is also 175 km northwest

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<sup>1</sup> These resources are quoted from blocks above a 40 % Fe cut-off grade in a June 2012 NI43-101 report prepared by CSA Global for the purposes of examining a beneficiation of the hematite resource to produce a high grade 60% Fe, low impurity sinter fine product.

of Kalgoorlie. Mineralization at Lake Giles comprises both hematite and magnetite iron ore, but is also considered prospective for nickel and gold.

### Lake Giles Iron Ore Project Regional Positioning



Source: Company

MMS came into control over the Lake Giles tenements when it purchased the assets of a previous operator, Internickel Australia, in 2005. However, mineral exploration has taken place at Lake Giles since at least the 1960's, and project ownership has changed multiple times since then. Lake Giles has most recently been explored primarily for its iron ore mineralization but was previously explored for both gold and nickel mineralization. The exploration history of the project is summarized in the timeline below.

### Lake Giles Project Exploration Timeline

Period	Activity
1997	Aeromagnetic surveys commissioned by Titan resources NL, while exploring for gold.
2000-2004	Compilation and review of historic exploration data and limited field work including geological mapping and rock chip sampling. Primary focus of this work was exploration for nickel sulphide targets.
2004	Helicopter "HOISTEM" electromagnetic survey, at 200 metre line spacing, totalling 950 square kilometres.
2005-2006	Geological mapping and reconnaissance rock chip and auger sampling of exploration targets including pisolite and BIF iron targets
June 2006	Auger sampling of pisolite iron targets, with approximately 229 holes drilled to around 4 metre depth on a 100 metre east-west by 500 metre north – south pattern.
July 2006	Phase One RC drill program comprising 7 holes (LGRC01 to LGRC07) for a total of 937 metres.
Aug – Sept 2006	Phase Two RC drill program comprising 20 holes (LGRC08-LGRC026) for a total of 3,007 metres.
Jan – Feb 2007	Phase Three RC drill program comprising 16 holes (LGRC27 to LGRC42) for a total of 3,502 metres.
Sept 2007 –Jan 2008	Phase Four RC drill program comprising 21 holes (LGRC57 to LGRC78) for a total of 3,703 metres.
March – April 2008	Phase Five diamond drill program comprising 5 holes (LGDH63, LGDH65, LGDH68, LGDH69 and LGDH77) for a total of 1,003 metres.
Feb – June 2008	Phase Six RC drill program comprising 26 holes (LGRC79 to LGRC104) for a total of 5,608 metres.
June 2008 – Dec 2009	Phases Seven and Eight RC drilling to define Inferred magnetite Mineral Resources. LGRC105 to LGRC220, 116 holes for 23,834.5 metres.
Feb – Dec 2010	Phase Nine RC drilling on near-surface hematite mineralisation at 5 priority deposits and increase Moonshine Mineral Resource. LGRC221 to LGRC513 (293 RC holes for 21,745 metres) and LGDD001 to LGDD006 (six diamond holes for 796.6 metres). Included 27 hole (441m) for CID targets.  Seventeen RC holes for 3,112.6 metres at Cody's Ridge, E30/317 (CRRC001 to CRRC017) – magnetite exploration.
Feb – Dec 2011	RC drilling on near-surface hematite mineralisation at Snark, Drabble Downs and Central, and deep infill RC drilling at Moonshine to increase resource confidence. LGRC514 to LGRC1629 (1,117 holes for 61,206.4 metres) and MMRC001 to MMRC029 (30 holes for 7,627.9 metres). Short diamond drilling on near-surface hematite mineralisation for metallurgical and geotechnical tests, and one deep diamond hole at Moonshine for metallurgy (LGDD007 to LGDD035, 29 holes for 1,580.4 metres).
Feb – April 2012	Resource infill RC drilling on near-surface hematite mineralisation at Banjo, Drabble Downs and Central. LGRC1630 to LGRC1874, 245 holes for 13,812.5 metres. Short diamond drilling on near-surface hematite mineralisation at Banjo, Snark and Central for metallurgical tests (LGDD042 to LGDD051, 10 holes for 335.0 metres).

*Source: Company*

In terms of road accessibility and local infrastructure, the property area is accessible from Kalgoorlie-Boulder (population of approximately 30,000) by going north on the Menzies Highway for 130 km, before heading west from the small town of Menzies for 120 km. In the

project area, intra-property access is facilitated by several tracks that have been developed over its exploration history, including those recently cleared by MMS. However, these local tracks can become impassable if there is heavy rain. Whilst Lake Giles is a significant distance away from Perth, Kalgoorlie-Boulder is close enough to support mining and exploration operations, and the city provides enough local infrastructure to support multiple large-scale mining operations in Western Australia. In addition, Kalgoorlie-Boulder is serviced by daily commercial flights from Perth. Whilst the closest local town of Menzies has limited infrastructure and services, it can support the essentials and provides Lake Giles with railway access and road freight.

The project site itself is remote and there is little existing infrastructure, save for unsealed roads and an exploration camp. Both power and water needs are met via external, mobile sources, such as diesel-powered generators and potable water trucked from Kalgoorlie-Boulder. Once commercial-scale mining is possible, however, it is expected that suitable amendments to the power and water infrastructure will be required. To meet future power needs, network power can be accessed via the West Kalgoorlie substation approximately 130 km southeast of the project. As an alternative, the Kalgoorlie gas line is approximately 130 km east of the project. For water needs, there is a major water pipeline located approximately 130 km south of the project, whilst there is saline groundwater supply in the project region. Additional infrastructure needs, such as the railway freight and port facilities to support iron ore shipments, are discussed in a later section.

Climate-wise, the property area is characterized by a semi-arid climate, with temperature ranging from a high of 40°C in the summer season to a low of 4°C in the winter season. Average annual rainfall is 275.7 mm, with conditions allowing for mining activities year-round save in the case of heavy rainfall, which can cause short disruptions. The project area is comprised of low ridges that generally strike in a northwest-southeast direction, rising from sandy plains. Local vegetation is dominated by mulga scrub with local patches of low to medium eucalypt woodland and areas of salt-tolerant greenery.

### *Mine Economics & Operational Characteristics*

At Lake Giles, the main resource zones are concentrated in the Moonshine Magnetite Deposit and the Ularring Hematite Deposit. The Ularring Hematite resource estimate is dated from 2019, whereas the Moonshine Magnetite resource was updated in a 2020 Technical Report. Project-wide resources comprise measured and indicated resources of 272.5 mt and inferred resources of approximately 1,023 mt.

#### **Moonshine Magnetite Deposit Resource Estimate (First Table is for the Moonshine and Moonshine North Pits)**

Category	Tonnes (Mt)	Head grade (%)					Concentrate grade (%)					
		Fe	P	SiO <sub>2</sub>	Al <sub>2</sub> O <sub>3</sub>	LOI	DTR	Fe	P	SiO <sub>2</sub>	Al <sub>2</sub> O <sub>3</sub>	LOI
Measured	53.9	30.8	0.05	45.4	1.6	2.7	32.2	66.0	0.031	6.2	0.2	-0.7
Indicated	218.7	27.5	0.046	51.1	1.4	1.6	31.0	66.1	0.017	6.7	0.1	-0.1
Subtotal	272.5	28.1	0.047	50.0	1.4	1.8	31.2	66.1	0.02	6.6	0.2	-0.2
Inferred	449.1	27.1	0.047	52.6	1.0	1.4	29.2	65.0	0.026	8.4	0.1	0



Deposit	Category	Tonnes (Mt)	Head grade (%)				Concentrate grade (%)					
			Fe	SiO <sub>2</sub>	Al <sub>2</sub> O <sub>3</sub>	LOI	DTR	Fe	P	SiO <sub>2</sub>	Al <sub>2</sub> O <sub>3</sub>	LOI
Sandalwood	Inferred	334	31.1	48.4	1.5	-0.6	33.1	64.7	0.03	9.5	0.06	-2.7
Snark	Inferred	69	27.8	49.8	1.6	2.4	23.4	66.2	0.03	7.5	0.13	-2.8
Clark Hill North	Inferred	130	25.8	42.6	1.7	0.14	33.2	62.4	0.04	12.1	0.16	-2.6
Clark Hill South	Inferred	15	32.3	47.0	0.6	0.02	31	63.8	0.02	9.8	0.14	0.0

Source: Company

#### Ularring Hematite Deposit Resource Estimate

Deposit	Reporting cut-off grade (Fe%)	Category	Tonnes	Fe %	P %	SiO <sub>2</sub> %	Al <sub>2</sub> O <sub>3</sub> %	LOI %	S %
Snark	40	Indicated	21,830,000	47.2	0.07	17.5	6.1	7.7	0.15
	40	Inferred	10,960,000	45.2	0.07	21.8	5.1	6.8	0.09
Drabble Downs	40	Indicated	11,070,000	47.2	0.06	16.6	6.4	8.3	0.26
	40	Inferred	360,000	43.6	0.05	24.0	4.8	7.8	0.09
Central	40	Indicated	15,090,000	47.0	0.05	16.2	7.2	8.1	0.12
	40	Inferred	10,190,000	45.3	0.05	20.3	6.3	7.5	0.08
Banjo – Lost World	40	Indicated	6,470,000	47.8	0.06	16.7	6.6	7.4	0.14
	40	Inferred	3,880,000	45.4	0.06	18.7	7.6	7.9	0.09
Moonshine	50	Inferred	600,000	53.0	0.06	13.4	6.7	6.1	0.15

Source: Company

In 2019, the company filed a PEA that outlined projections for the Lake Giles Iron Ore Project, with preliminary valuations based on expectations around conceptually feasible extraction methods and the existing resources identified at Moonshine and Ularring. The PEA, which was based on resources that were not updated for the 2020 Technical Report on the Moonshine deposit, found the following to be key returns characteristics:

#### Lake Giles Mine Economics Summary and Returns Characteristics Magnetite Project

Financial Valuation	
NPV at 8% discount rate*	A\$535 million
Internal Rate of Return*	21%
Project life	31 years
Fe grade of saleable product	65 – 68% Fe
Total sales tonnes	82.8 Mt
Capital payback period	3 years
Total revenue generated (real)	A\$9.83 billion
Long Term Fe price	US\$86 /t (FOB)
Long term A\$/US\$ exchange rate	0.70

\* Real, after-tax

\*\* Benchmark 65% Platts Fe Index adjusted to final product grade

Source: Company

MMS are looking to utilize both Moonshine's magnetite resources and Ularring's hematite resources to create a blended, high-grade concentrate from an open pit operation. Based on the projected operational specifications, Lake Giles is expected to have a mine life of 31 years in the base case, with LOM run-rate production of between 2.5-3.4 mt per annum in blended concentrate ranging 65-68% Fe. Whilst we believe the final blended product mix is likely to be more accurately projected in a future FS, the 2019 PEA assumed a blending ratio of 1:3 of hematite to magnetite ore with an iron content averaging about 64.5% Fe. A tenuous first production date of Q1-2024 has been projected. MMS expects to mine Lake Giles using conventional drill, blast load and load techniques, with ore stockpiled at ROM pads before being crushed and processed at the concentrate plant. Concentrated product will then be road hauled to a rail siding and transported by rail to the Port of Esperance for export sale. Regarding fleet requirements, MMS is expected to run two 110 tonne excavators, which will load 90 tonne capacity haul trucks. Mining operations from drill through to haulage to the primary crusher are expected to be contracted out, whilst all mine technical services are expected to be provided by MMS.

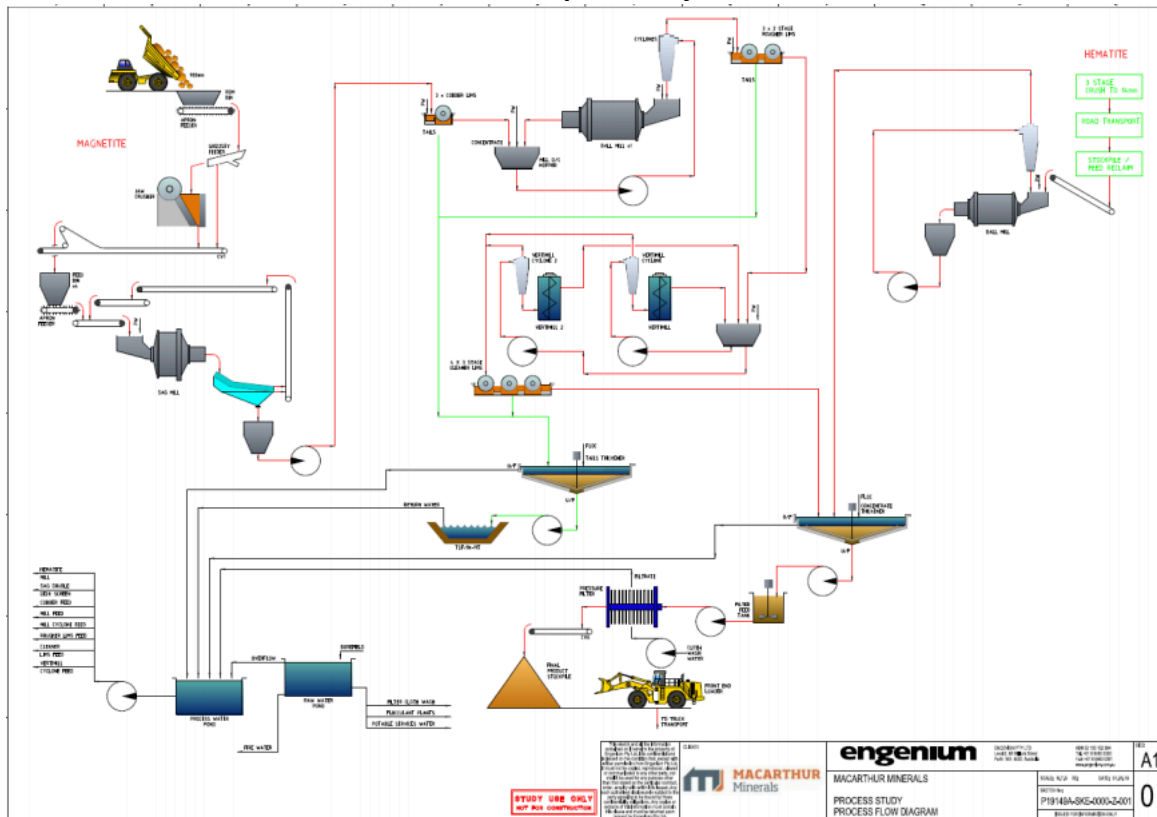
**Lake Giles Mining Characteristics**

<b>Description</b>	<b>Units</b>	<b>Ore</b>	<b>Waste</b>	<b>Total</b>
Weight Recovery - magnetite	%			38.00%
Concentrator Iron Recovery	%			95.00%
Stripping Ratio - magnetite				3:1
Stripping ratio - hematite				3.7:1
Mining Tonnage pa - magnetite	Mtpa	6.5	19.5	26.0
Mining Tonnage pa - hematite	Mtpa	0.9	3.3	4.2
Total mining tonnage	Mtpa	7.4	22.8	30.2
Annual Concentrate Production	Mtpa			3.35

*Source: Company*

On the processing side, because of the hybrid nature of the operation, MMS expects to utilize different processing methods for the hematite and magnetite resources. On the hematite side, the concentration process is much simpler than the magnetite ore beneficiation process. For hematite ore from Ularring, ore need only be selected on a high-grade basis, subjected to conventional three stage crushing and milling to facilitate later mixing with magnetite product. Magnetite processing is more complicated and extensive. The first stage of beneficiation calls for primary crushing to bring feed down to a suitable size to feed through to a Semi Autogenous Mill. It is likely that the crusher would be close to the processing plant and an ore stockpile will be located between the mine and the plant. Semi-Autogenous grinding in a closed circuit would be the first stage of milling, bringing feedstock down to a small enough size to go through the first round of magnetic separation. The first pass through the cobbles should reject coarse tailings whilst maintaining a high level of magnetite recovery. Further reduction of the concentrate's size through various grinding media will be needed before the feed is ready for the finishing stage of magnetic separation, which provides increasingly higher grades and eliminates impurities to a sufficient degree. Because of the wet processing requirements and size of the tailings (approximately 57% of processing feed is expected to end up in the tailings), waste material storage will be of high importance.

### Lake Giles Conceptual Project Flowsheet



Source: Company

At Lake Giles, the key infrastructure categories include mining, processing / beneficiation, logistics and utilities. Given the project area is remote, MMS expects to run a fully serviced mine with FIFO and locally located staff support. To support operations, 20 MW of power supply is needed for processing, 4 MW will be needed for crushing and screening, and the mine camp will need 1-2 MW. These power supply needs are expected to come from a combination of renewables and diesel generators, both mobile and fixed on-site. In addition, water needs have been estimated at 2 giga-litres per annum, with options for water access including the water supplies of abandoned mines within 75 km, the WaterCorp Kalgoorlie Pipeline approximately 120 km to the south, and greenfield bore development (though water in the region is thought to be hypersaline). With regards to intra-project logistics, a 30 km internal access road would be built to link the major deposits together and to the sealed roads providing outside project access.

Based on the PEA filed in 2019, the total project CAPEX has been forecasted at A \$466.4 million, of which Aus \$315.1 million is considered direct project capital cost, and Aus\$151.3 million is attributed to indirect project costs. It is estimated that the construction period will last approximately 18 months, during which the CAPEX will be disbursed. As would be expected for a magnetite-inclusive operation with high beneficiation requirements, the largest CAPEX allocations are attributable to mining and processing infrastructure. The scope of accuracy used in the PEA is estimated at +/- 30-35%, implying significant potential deviation, and we note that a more accurate CAPEX estimation is unlikely to become available



until the company completes its FS. The key assumptions that were used in the PEA to estimate Lake Giles' CAPEX include:

- Mining operations are contracted out to mining services companies.
- Logistics (loading, haulage, rail and port handling) are contracted out.
- Power generation is contracted out.
- Processing is done by the project's owner.

The assumptions reflect that the PEA's authors believe that MMS can reduce necessary CAPEX by contracting certain activities and items to third parties. In addition to the project elements that are expected to be contracted, the PEA suggested that contracting out the beneficiation plant operations, project water supply and site accommodation could provide further opportunities to reduce CAPEX.

<b>Lake Giles CAPEX Summary</b>	
	<b>Capex (A\$M)</b>
Mine	8.7
Crushing	29.0
Process	120.6
Tailings	14.7
Infrastructure	99.0
Logistics	22.0
Port	21.0
<b>Total direct costs</b>	<b>315.1</b>
Construction indirects	47.3
Owners costs	9.5
EPCM	31.5
Contingency	63.0
<b>Total indirect costs</b>	<b>151.3</b>
<b>Total project</b>	<b>466.4</b>

*Source: Company*

Like the CAPEX estimates from the 2019 PEA, OPEX was estimated to a predicted accuracy of +/- 30-35%, and costs were estimated based on pricing for key items in Q1-2010. Because of the period used we believe there are significant cost pressures and opportunities for inaccuracy in operating cost estimation. As an example, Australian mining labour markets have experienced significant tightness, and were experiencing out of trend labour inflation over the past decade. The OPEX costs per tonne of concentrate, summarized below, capture the expected costs from ore extraction through to ship loading at the Port of Esperance. Note however, that key expenses that are likely to occur have been omitted from the estimation, including costs tied to mine rehabilitation, corporate overheads, lease costs, finance charges,

exploration costs and other key expense items. The key assumptions used in estimating Lake Giles' OPEX include:

- Extraction operations will be contracted out, covering ore mining, and stockpiling at the mine site ROM pads.
- The processing facility will encompass all key processing operations, including crushing, grinding, separating and tailings removal.
- Indirect expenses will be tied to services to facilitate operations infrastructure, logistics, and camp support.

Lake Giles OPEX Summary		
	Opex A\$/t	
	Magnetite	Hematite
Mine	12.03	13.85
Crushing	1.20	3.00
Process	13.41	0.32
Tailings	0.47	
Road transport	7.20	8.73
Filtration	0.35	0.35
Rail	11.31	11.31
Port	3.89	3.89
Indirects	3.61	3.61
<b>Total operating costs (\$/t concentrate)</b>	<b>53.47</b>	<b>44.71</b>

*Source: Company*

### **Route to Market and Supply Chain Considerations**

One of the most crucial elements of Lake Giles' advancement for MMS to address is securing the logistics infrastructure for the project and setting up a feasible route to market for future production. This is especially challenging given the currently hot market conditions and the rush of producers and mine developers to secure sufficient supply chain capacity to get product from mine to market (and thus capitalize on favourable iron ore prices). Because of the bulk nature of iron ore mining production, extensive haulage, storage, and transportation capacity will need to be erected to suitably move large volumes of ore from Lake Giles to the Port of Esperance. In addition, given the long-lived nature of the Lake Giles Project and the possibility for iron ore demand volatility throughout the project's mine life, the company will also need to secure a binding capacity allocation from one or more of the key port operators in the region.

The Port of Esperance, which is accessible by approximately 500 km of railway, has been selected as the preferred port to utilize as a base for future iron ore shipping. The Port of Esperance is a deep-water port that is run by the Southern Ports Authority, which also runs

the Port of Albany and Port of Bunbury. The Port of Esperance is accessible via existing railway facilities and has the capability to handle “Capesize” dry cargo vessels (up to 200,000 tonnes capacity), which are one of the largest classes of ore bearing bulk carriers used to transport mineral products overseas. Based on the most recent trade data, the port has handled 13.3 million tonnes of exports over the last 12 months, with most of the gross tonnage being mineral volumes. The key metallic minerals handled at the Port of Esperance include nickel and iron ore.

**Port of Esperance Export Data (Rolling 12 Months)**

Month	Minerals	Grain	Wood Products	Other	Non Cargo	Total	Ship Visits
July	502,570	22,500	0	6,088	0	531,158	7
August	821,123	0	0	5,973	0	827,096	10
September	784,393	89,680	0	5,459	0	879,532	12
October	1,105,877	0	0	3,970	0	1,109,847	10
November	881,078	95,667	41,798	0	0	1,018,543	8
December	1,016,016	371,115	0	3,662	0	1,390,793	18
January	788,493	311,640	38,719	0	0	1,138,852	15
February	942,089	294,418	0	5,266	0	1,241,772	14
March	929,061	300,407	0	7,050	0	1,236,518	15
April	1,011,236	308,104	0	0	0	1,319,340	15
May	782,094	310,540	0	18,316	0	1,110,950	17
June	1,301,626	147,578	44,860	0	0	1,494,064	13
<b>TOTAL</b>	<b><u>10,865,657</u></b>	<b><u>2,251,649</u></b>	<b><u>125,377</u></b>	<b><u>55,784</u></b>	<b><u>0</u></b>	<b><u>13,298,467</u></b>	<b><u>154</u></b>

*Source: Southern Ports*

The iron ore currently being exported through the Port of Esperance originates from the Koolyanobbing Iron Ore mine owned and operated by Mineral Resources Ltd. (ASX: MIN). MIN acquired the mine in 2018, and in so doing secured the majority of the export flow for the Port of Esperance, which was reliant on the mine’s previous owner for trade flow. At the Port of Esperance, key infrastructure items of note for iron ore exporters include:

- **Rotary Car Dumper (“RCD”):** The Port of Esperance includes an existing RCD that is owned by MIN and has design capacity for 12 mt per annum. For the twelve months ended Q3-FY2021, MIN shipped a total of 10,119 mt (wet), implying the RCD is currently underutilized. Southern Ports requires that unallocated capacity be made

available to other operators, though as far as we can tell, MIN gets priority on any allocations as its product comes to port.

- **Berth No. 3:** Of the three berths at the port, Berth No. 3 is utilized for loading ships with iron ore. The berth is 230 meters long and can service Capesize vessels with a LOA between 165-300 meters. The bulk ore loader at Berth No. 3 has a maximum loading rate of 4,500 tonnes per hour and an optimal loading rate of 2,800 tonnes per hour for iron ore.
- **Storage Sheds:** The port requires that iron ore be stored in sealed sheds to minimize dust impact. At current, there are four sheds designated for iron ore storage, but these are not available for usage by MMS. However, there is land available at the Port of Esperance to build two new storage sheds, with each projected to have up to 300,000 tonnes storage capacity.

**Port of Esperance Layout (2019 PEA)**



Berths (Red Numbers)	Storage Facilities (Yellow Numbers)
1. Berth No. 1 – Grains 2. Berth No. 2 – Mineral Concentrate, Fertiliser, Fuel 3. Berth No. 3 – Iron Ore	1. Shed 1 - Iron Ore 2. Shed 2 - Iron Ore 3. Shed 6 - Mineral Concentrate 4. Shed 7 - Mineral Concentrate 5. Shed 5 - Mineral Concentrate 6. CBH Operations 7. Summit Fertilisers 8. Gas Fired Power Station 9. Shed 3 - Iron Ore 10. Shed 4 - Iron Ore 11. Shed 10 - Sulphur 12. Container Storage Area
General Infrastructure (Green Numbers)	
1. Rotary Car Dumper 2. Smith Street Level Crossing 3. Potential Shed Storage Area	

*Source: Company*

MIN has expanded Koolyanobbing's throughput from 8 mt per annum to 11 mt per annum, and MIN's management have been quoted as targeting a throughput target in the medium-

term above 12 mt per annum. As a result of the expected increase in throughput and the 12 mt cap on the RCD at the port, it appears that existing rail unloading capacity at the Port of Esperance is unlikely to be sufficient to support Lake Giles' future production. In addition, the lack of available storage sheds means MMS will also need to secure greenfield iron ore storage facilities at the port. Because of this, one of MMS' major development considerations in the near-term is to negotiate unloading and storage capacity with the Southern Ports Authority at the Port of Esperance, including access to the Berth No. 3.

To this end, MMS entered a Memorandum of Understanding ("MOU") with the Southern Ports Authority to work on achieving access to required facilities at the Port of Esperance. The MOU was announced in February 2021, and whilst not binding, does establish a preliminary pathway by which to achieve the necessary port access for future exports. In the lead up to the MOU, MMS had been working on several initiatives, including developing a Helix Dumper solution for iron ore unloading at the Port of Esperance. On October 7, 2020, MMS announced that its solutions provider RCR Mining Technologies had completed an engineering design report to support the usage of a Helix dumper at the port. The report has been circulated to key stakeholders involved at the Port of Esperance and is expected to help illuminate key decision-makers on the key points of the proposed infrastructure and its benefits. The Helix Dumper is expected to have a handling throughput well in excess of Lake Giles' projected concentrate throughput, and the dumper system is well suited to unloading magnetite given the technology's successful use in the Scandinavian magnetite ore mining industry for some time.

**Helix Dumper in Action (Conceptual Example)**



*Source: RCR Mining Technologies, Kiruna Wagon*

Based on its design capacity, the Helix Dumper can handle up to 25,000 tonnes per hour, but at optimal rates can improve Berth No. 3's optimal loading rate to 4,500 tonnes per hour (or its current maximum loading rate). Because the Helix Dumper is expected to add significantly more capacity to the Port of Esperance, we believe a key value proposition to the Southern Ports Authority is the potential for significantly more processed tonnages, as third-party access will be allowed for the unutilized capacity. In addition to open access, MMS expects to develop the unloading system without requiring material CAPEX contributions from either



the Southern Ports Authority or the Western Australian government. Outside of the Helix Dumper plans, MMS is also looking to negotiate with the port for the build-out of a new 300,000 tonne storage shed, and the Southern Ports Authority is expected to deliberate on suitable land allocations for both the proposed dumper system and shed.

Whilst establishing or otherwise accessing the necessary ore handling infrastructure at the Port of Esperance is in itself a major development hurdle for MMS, connecting Lake Giles to the port will also require significant work and investment. At a high level and without further work on project feasibility, the logistics route planned for Lake Giles is shown below. It is expected that ore mined from Lake Giles will be hauled from the mine by road to a rail siding in the vicinity of the Jaurdi Station, 90 km south of the project. The company will look to utilize quad road trains with 180 tonne payload capacity. From the rail siding, MMS will transport volumes via rail line down to Kalgoorlie and through to the Port of Esperance, where it will be exported. Key considerations regarding the envisioned path to port include:

- The haulage plan will need to connect the project to Jaurdi Station via existing public roads or newly built private roads. To maximize logistical efficiency and reduce operating costs, the highest payloads possible for haulage vehicles should be used. As a result, greenfield road development would allow for the largest capacity vehicles to be used, though the trade-off would be the CAPEX incurred.
- Two 30,000 tonne stockpiles will need to be maintained at the rail siding, to allow for continuous rail loading at the station. The stockpiles will also minimize the impact of road traffic disruptions.
- Below rail capacity from Jaurdi through to the Port of Esperance is managed by Arc Infrastructure, who will be the key stakeholder for MMS to negotiate with for rail access.
- Above rail capacity is expected from one of the key Australian rail freight operators, which include Aurizon Holdings Ltd. (ASX: AZJ), Pacific National and One Rail Australia. AZJ serviced the Koolyanobbing iron ore mine under its previous owner, for which it was contracted to move 11.8 mt per annum on the existing rail to the Port of Esperance. MMS will need to secure a rail freight operator to transport iron ore from Lake Giles, which could be subject to capacity constraints (especially given currently tight market conditions). One risk factor could be increasing tonnages out of MIN's Koolyanobbing Mine, which could choke up rail capacity and lead to development constraints for MMS.



Lake Giles Logistics Route (2019 PEA)



Source: Company

To progress the Lake Giles Project and connect the project to the Port of Esperance, MMS has done the following:

- Haulage and Rail Loading:** On June 25, 2020, MMS lodged applications with the Department of Mines, Industry, Regulation and Safety ("DMIRS") to develop a haul road from the Moonshine Magnetite Deposit to a proposed rail siding adjacent to the Perth to Kalgoorlie rail line. The location of the rail siding would provide optionality to MMS in choosing between the Port of Esperance or the Port of Kwinana for exporting iron ore.
- Below Rail Capacity:** On July 15, 2020, the company announced that it had received a proposal from Arc Infrastructure to develop a Commercial Track Access Agreement. Apart from signaling that Arc Infrastructure is open to facilitating rail capacity for MMS (potentially allaying fears around lack of rail capacity), it also provides a degree of certainty to MMS regarding below rail logistical arrangements, allowing MMS to proceed with Technical Report progress.
- Above Rail Capacity:** Whilst MMS has yet to secure a formal agreement with an operator for the projected tonnages out of Moonshine, it has made significant progress on agreements covering a portion of the direct shipping ore ("DSO") capacity. On July 8, 2021, MMS announced it had entered into a term sheet with Pacific National to transport up to 400,000 tonnes per annum of DSO between Kalgoorlie and the Port of Esperance. The agreement calls for a two-year starting tenure upon the completion of negotiations, with the possibility of a two-year extension, and Pacific National has indicated that the appropriate rolling stock will become available in Q1-2022. Whilst this doesn't cover the full operation, it does serve as a starting point and example of the ability of MMS to negotiate logistics arrangements.

Finally, apart from securing physical logistical capacity, MMS will also need to find suitable offtake capacity in a secure customer with adequate appetite for iron ore product. To this end, MMS is uniquely positioned given it has signed a binding LOM offtake agreement with Glencore PLC (LSE: GLEN), which is estimated be worth US\$4 billion in revenue over the first ten years of the agreement's life. Key terms of the agreement, which was signed in March 2019, include:

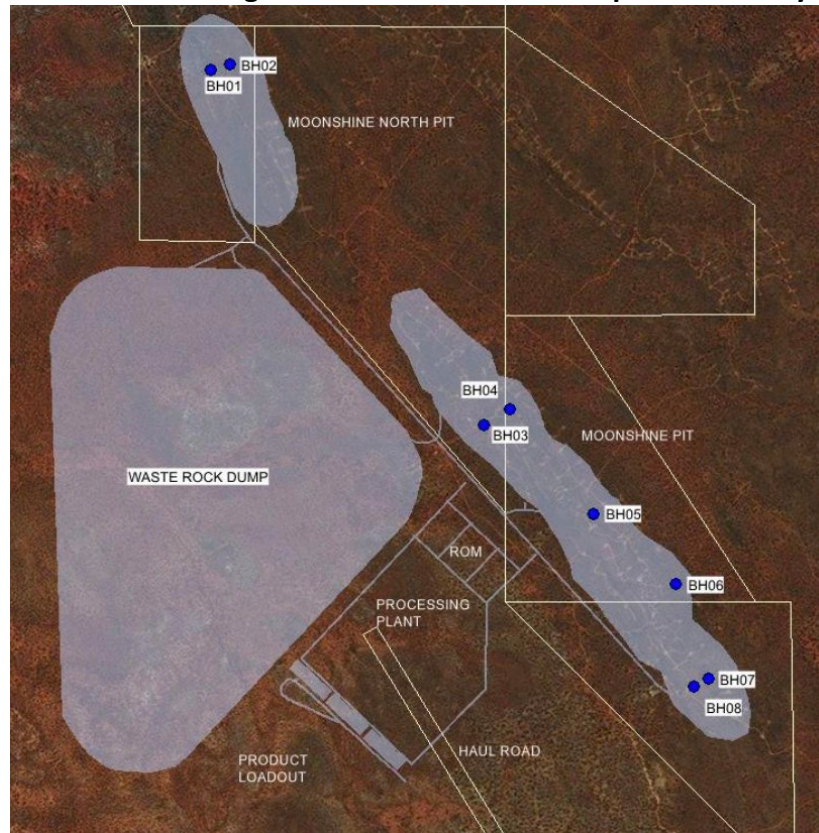
- GLEN will provide offtake for approximately 4 million tonnes per annum over the first 10 years of the agreement, with the option to extend for a following 10 years for all tonnes of future Lake Giles iron ore production.
- GLEN is responsible for the marketing, shipping, delivery, and associated freight insurances.
- GLEN agrees to release up to 70% of its offtake volume where MMS secures project financing from a strategic Investor, subject to their securing offtake of the product produced.

The agreement has multiple benefits outside of the revenue security and visibility implied. It also provides security along the value chain, communicating to key stakeholders that MMS has the future sales arrangements to back volume flow out of Lake Giles. For key parties instrumental to the development plan, such as the South Ports Authority, it can communicate that facilitating MMS' infrastructure initiatives will not be met with significant credit risk (i.e. via a failure of MMS to secure payment for goods).

### *Key Recent Events and Upcoming Catalysts*

In the calendar 2021 year, MMS is targeting three key areas: advancing Lake Giles to the FS stage, pursuing early hematite DSO production at Ularring, and repositioning its non-iron ore assets in the Pilbara (via a spin-out). In addition to these primary goals, MMS expects to also work on key complementary objectives, including strategic partnerships with key parties crucial to developing Lake Giles and project financing. On the FS development front, MMS has been actively taking steps to progress Lake Giles further, with the FS being a key milestone in the run up to entering the construction phase of the project. Most recently, the company announced that it was on the verge of commencing a drilling program to support mine-planning work instrumental to the FS, with plans to drill eight core holes covering 1,560 meters, with depth ranges of between 175-230 meters per hole. It is expected the program will take 6-8 weeks to complete. The program is designed to address the footwall and hanging wall of the main pits, which is key information relevant to the first phase of magnetite mining at Moonshine Pit.

### MMS 2021 Drill Program Over Lake Giles Conceptual Mine Layout

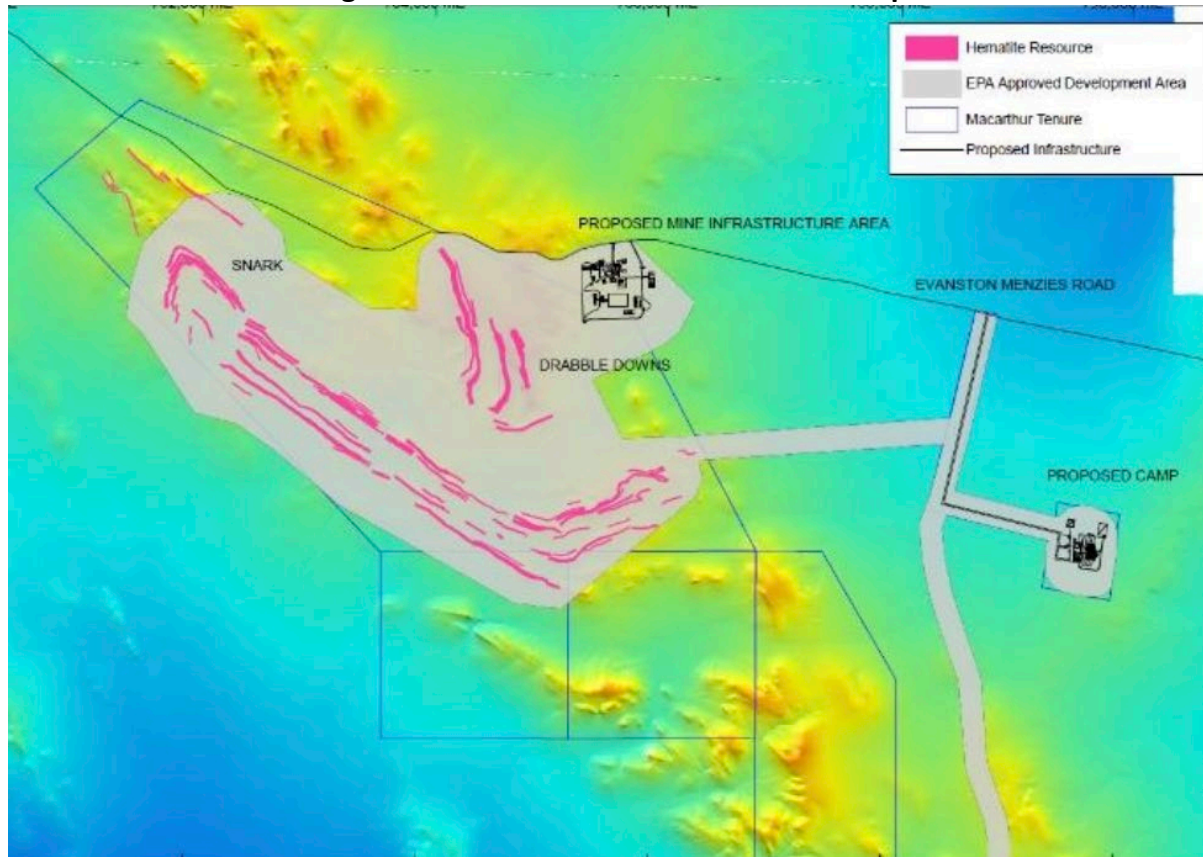


*Source: Company*

The drilling program announcement comes off the back of a previous announcement in April 2021 around MMS' move to advance with a mine design and road haulage study for Lake Giles. Preliminary mine design work has already been completed, and the company's consultants have already sourced pricing information from local contractors for key operations from excavation through to rail loading. In addition to this, the company has been working on addressing key issues around water supply, which is also an important element of mine infrastructure. Though there is existing water infrastructure in the region, MMS has elected to undertake a groundwater search program focused on the Rebecca palaeovalley close to the project. The western limb of the Rebecca palaeovalley is approximately 15-40 km east of Lake Giles and MMS believes that it could contain a groundwater resource that is currently unused by other miners in the Yilgarn.

Regarding the push to early DSO production, MMS has also made big strides in pushing to earlier-than-expected revenue. With the iron ore pricing at current levels and tight supply chains doing little to exacerbate the hot market activity, MMS is looking to get its foot in the door as soon as it can. This could allow it to generate supportive cash flows for bringing the magnetite production through, which could alleviate the burden of securing project financing. The company recently announced its intention to pursue a simple DSO operation consisting of mobile crushing and screening, with a focus on the Snark and Drabble Downs deposits at the Ularring Project. The deposits are within fully granted mining leases, with existing environmental protection approvals and a lack of aboriginal land title issues.

### Ularring Hematite: Snark and Drabble Downs Deposits



*Source: Company*

In addition to this, MMS has also made an application for licenses covering 74 hectares adjacent to the Snark Deposit, with the intention of using the land for the non-process support infrastructure for the DSO operation. This would include structures such as vehicle workshops, water storage, offices, fuel supply, stockpiles and loadout facilities. With mine planning work underway, MMS expects to lodge a mining proposal with DMIRS during Q3-2021, which the company expects to precede further development milestones and financing close. Should the company successfully deliver on this initiative, MMS offers an attractive forward cash flow curve profile, as cash flow grows in line with the company's different production scenarios.

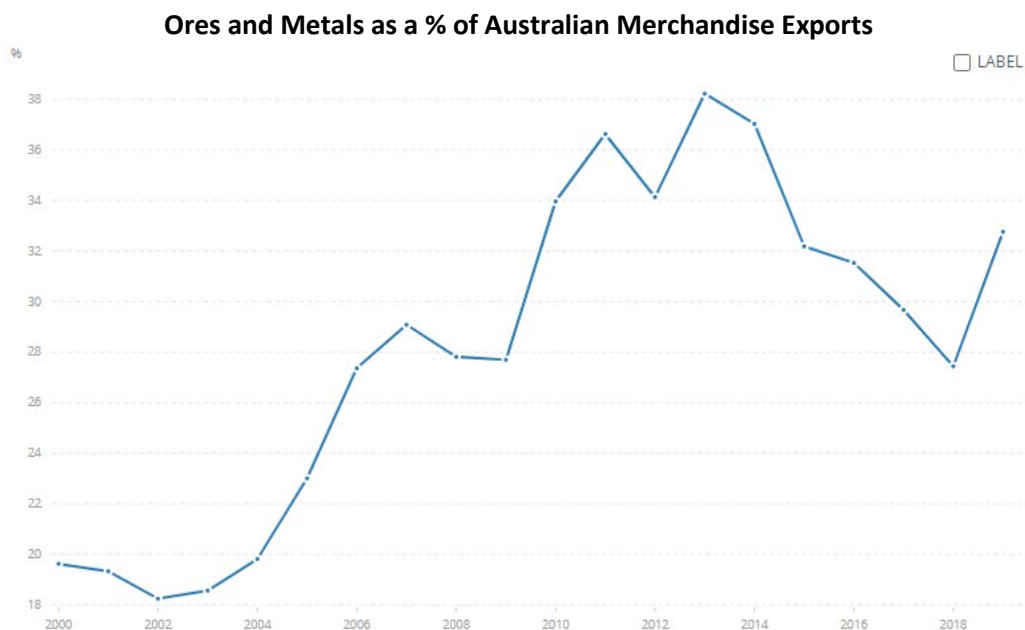
However, whilst Ularring is the easiest internal source of DSO to bring to market, it is not the only avenue available to MMS. As mentioned earlier, the company has secured a 400,000 tonne rail freight services agreement with Pacific National, with rolling stock expected to mobilize in Q1-2022 (perhaps as early as January 2022). In addition to this, the company has also secured (as of July 14, 2021) a 400,000 tonne DSO purchase agreement with GWR Group Limited (ASX: GWR). GWR's flagship C4 iron mine in Wiluna began production earlier in 2021. Under the terms of the mine-gate purchase, MMS will purchase 400,000 tonnes of DSO fines and lumps from GWR, with the agreement covering an initial two-year period with a two-year extension option. The sales price for GWR's DSO will be an equitable split of FOB pricing at the ship rail, post-MMS' costs of transportation. As may be obvious to readers, the MMS-GWR mine-gate purchase agreement lines up almost perfectly with the Pacific National deal, implying MMS has been working on this tie-up as part of its development plan. The reasoning



is logical – apart from securing a bridge of cash flow before Ularring comes online, it also provides a high-grade feedstock for blending with Ularring’s future DSO production. With higher-grades, MMS can secure better product pricing, which squeezes out additional earnings in the near-term that can be recycled into accretive investments in Lake Giles. In addition, the level of spot sales exposure is limited – because MMS’ production at Ularring would be covered by the Glencore offtake, the GWR product can be swiftly factored into the contracted offtake once Ularring is up and running.

## Industry Outlook

With a population of 25.27 million, a 2019 GDP of \$1.40 trillion and a 2019 GDP per capita of US\$55,057, Australia ranks around the top half of the pack globally for GDP per capita, according to the World Bank. In 2019, Australia had merchandise exports of \$271 billion, with 32.76% of these exports being ores and metals, according to the World Bank. The graph below outlines the contribution of mining products to merchandise exports between 2000 and 2019 (note that the Y axis is measured in percentage terms):

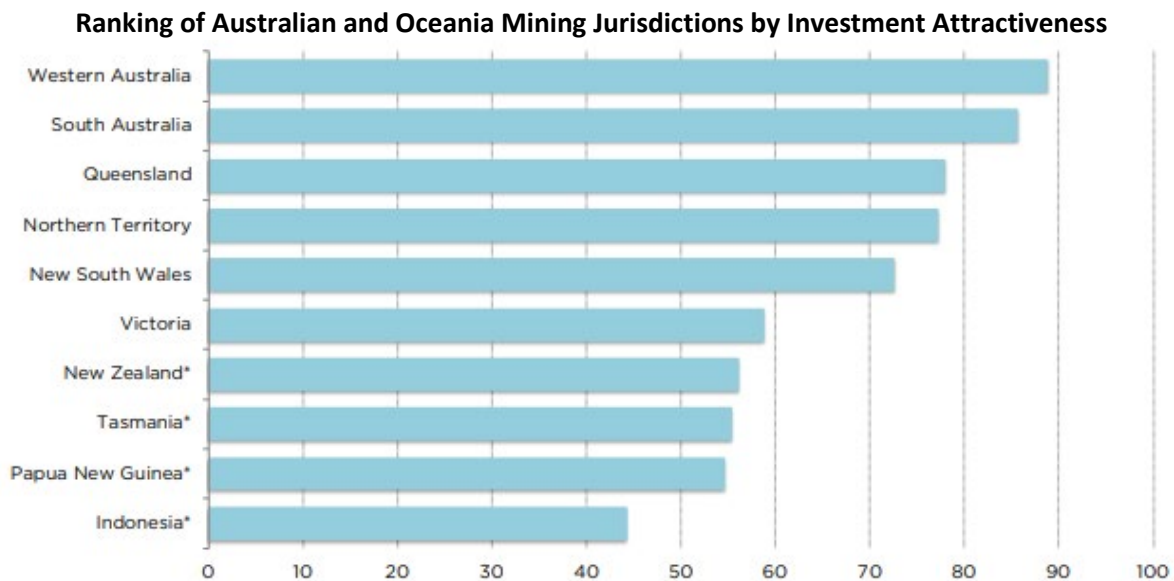


*Source: World Bank*

When accounting for both mining policy and intrinsic mineral potential, Australia is considered the most attractive jurisdiction globally. In the Fraser Institute’s annual mining survey, Australia is segmented into key states, including:

- Western Australia.
- Southern Australia.
- Queensland.
- Northern Territory.
- New South Wales.
- Victoria.

Both Western Australia and Southern Australia ranked in the top 10 out of the 77 surveyed mining jurisdictions for the institute's 2020 investment attractiveness index, with Western Australia ranking 4th and Southern Australia ranking 7th. In addition, most of the surveyed Australian mining jurisdictions (save Victoria and New South Wales) have consistently been in the top half of surveyed jurisdictions since at least 2016. The key mineral-rich states (such as Western Australia and Southern Australia) have exhibited stable investment attractiveness index scoring through time, suggesting that investors have viewed the jurisdictions positively over the longer-term. We imagine this is likely due to the mineral abundance and long history of mineral production for these states.

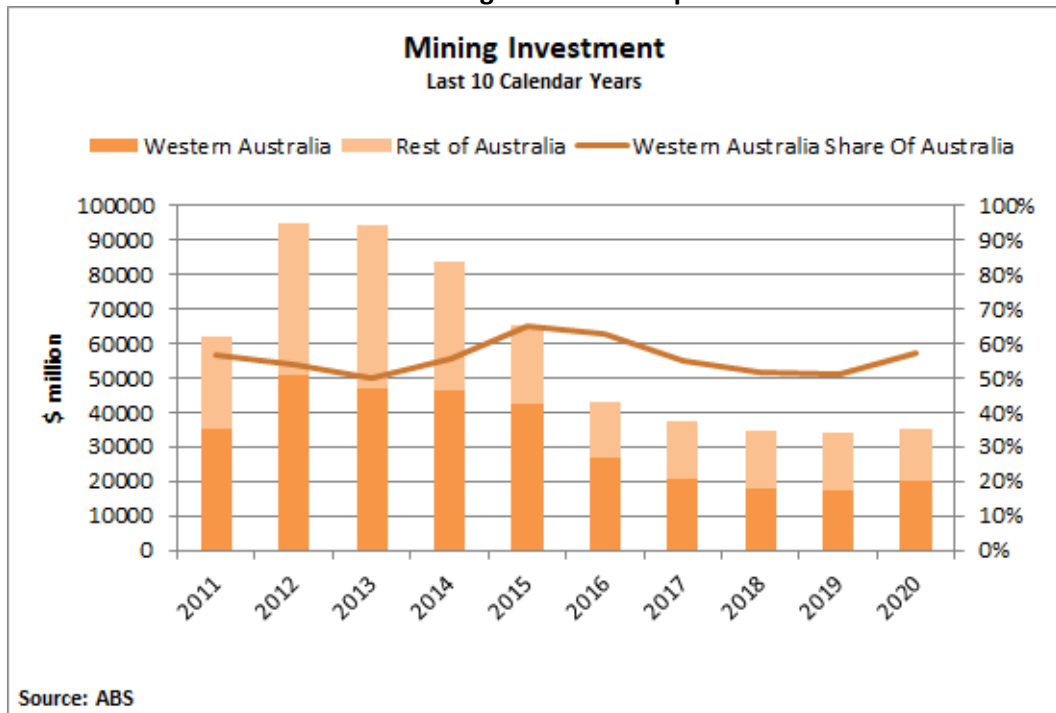


Source: Fraser Institute

Western Australia's investment attractiveness index is well justified by its share of the mining investment expenditure. In 2020, the state recorded \$20.01 billion in mining investment flows, up significantly on a YoY basis and representing 57% of nationwide mining investment. New CAPEX in the state for 2020 was \$27.66 billion, reflecting a 23% share of national new CAPEX for the year.



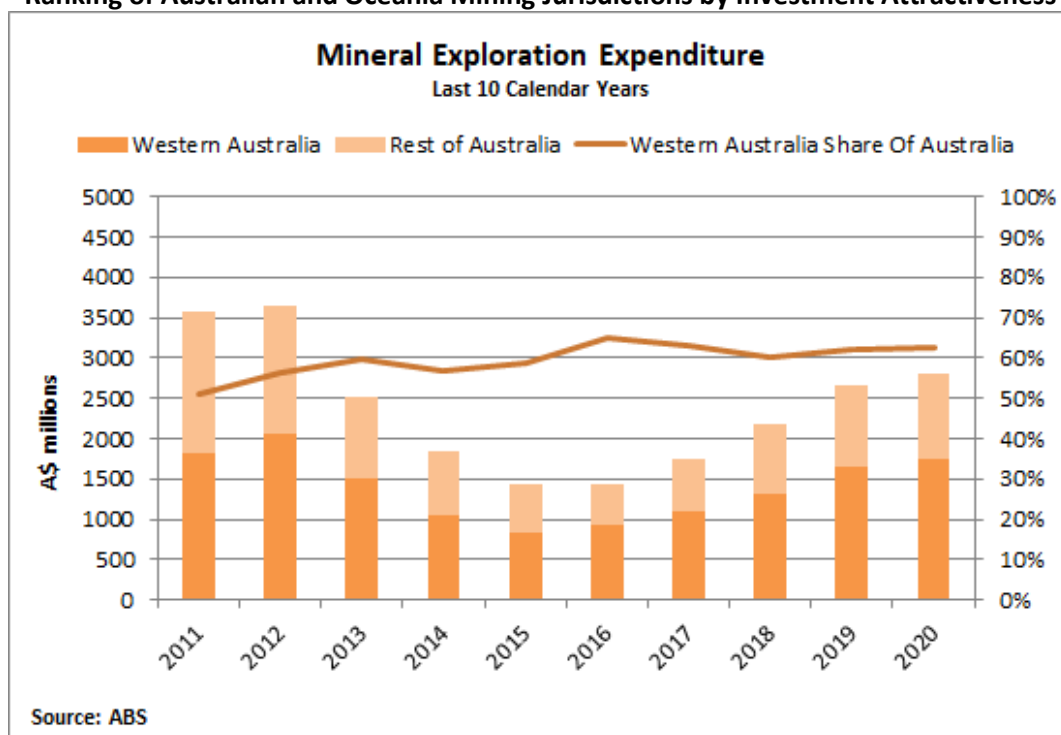
### Australian Mining Investment Expenditure



Source: ABS

Mineral exploration expenditures in Western Australia hit \$1.74 billion in 2020, an increase over 2019 and 62% of overall mineral exploration expenditures in Australia. Of the total mineral exploration spend in 2020, 22% was allocated to iron ore exploration, while the greatest commodity allocation of 52% was for gold exploration. Total drilling meters in Western Australia reached 10.63 million in 2020, representing a 2.3% increase YoY.

### Ranking of Australian and Oceania Mining Jurisdictions by Investment Attractiveness



Source: ABS

Based on data from the U.S. Geological Survey (“USGS”), Australia is the world’s largest producer of iron ore, with latest figures suggesting it produced 37.33% of global iron ore mine production in 2020. In addition to its growing production share (since 2015), Australia also has the second highest ore grade after Brazil, and of the top four producers is the only one with implied ore grades that are rising on a 5 year CAGR basis. We believe that this is likely to reflect demand trends out of Chinese steel mills that are putting a premium on high-grade products.

#### Global Iron Ore Production Data (Thousands of Metric tons)

	2015	2016	2017	2018	2019	2020E	CAGR
<i>Usable Ore Data</i>							
Australia	817,000	858,000	883,000	900,000	919,000	900,000	1.95%
Brazil	397,000	430,000	425,000	460,000	405,000	400,000	0.15%
China	375,000	348,000	360,000	335,000	351,000	340,000	-1.94%
India	156,000	185,000	202,000	205,000	238,000	230,000	8.07%
Global	2,280,000	2,350,000	2,430,000	2,460,000	2,450,000	2,400,000	1.03%
<i>Fe Content</i>							
Australia	486,000	531,000	547,000	557,000	569,000	560,000	2.88%
Brazil	257,000	275,000	269,000	250,000	258,000	252,000	-0.39%
China	232,000	216,000	223,000	209,000	219,000	210,000	-1.97%
India	96,000	114,000	125,000	126,000	148,000	140,000	7.84%
Global	1,400,000	1,450,000	1,500,000	1,470,000	1,520,000	1,500,000	1.39%
<i>Implied Fe Grade</i>							
Australia	59.49%	61.89%	61.95%	61.89%	61.92%	62.22%	0.90%
Brazil	64.74%	63.95%	63.29%	54.35%	63.70%	63.00%	-0.54%
China	61.87%	62.07%	61.94%	62.39%	62.39%	61.76%	-0.03%
India	61.54%	61.62%	61.88%	61.46%	62.18%	60.87%	-0.22%
Global	61.40%	61.70%	61.73%	59.76%	62.04%	62.50%	0.35%
<i>Implied Production Share</i>							
Australia	34.71%	36.62%	36.47%	37.89%	37.43%	37.33%	1.47%
Brazil	18.36%	18.97%	17.93%	17.01%	16.97%	16.80%	-1.76%
China	16.57%	14.90%	14.87%	14.22%	14.41%	14.00%	-3.32%
India	6.86%	7.86%	8.33%	8.57%	9.74%	9.33%	6.36%
Global	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	

Source: USGS, Couloir Capital

In addition to producing the highest share of the world’s iron ore supply, Australia also has the largest iron ore reserves. It is estimated that over a quarter of global iron reserves sits in Australian ground, implying that Australia has the mineral abundance to sustain its leading production ranking, if only considering reserve ore supply.

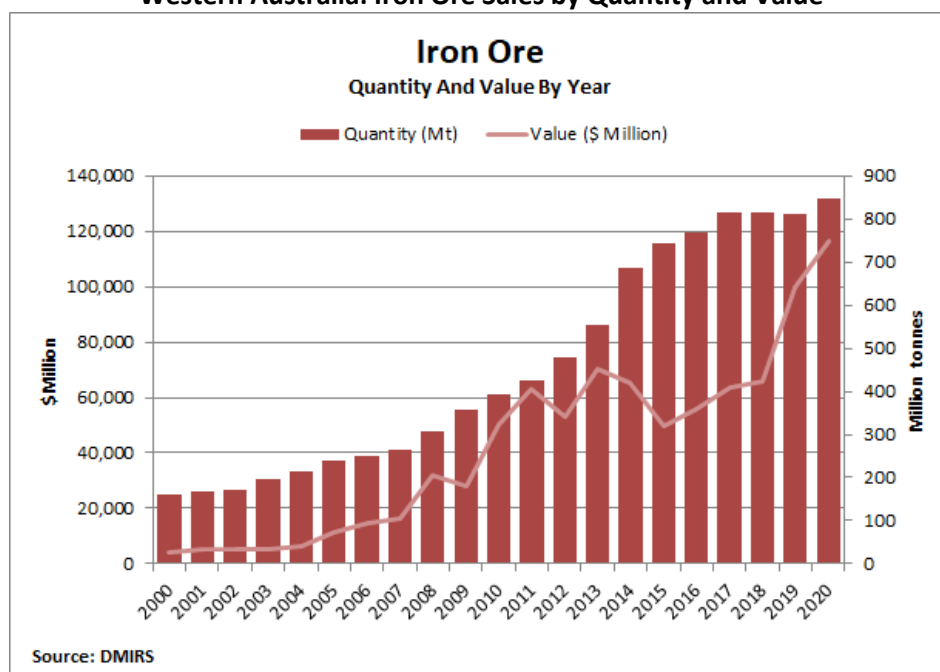
Global Iron Ore Reserves Data (Millions of Metric tons)

	2015	2016	2017	2018	2019	2020E
<i>Reserves</i>						
Australia	24,000	23,000	24,000	24,000	23,000	24,000
Brazil	12,000	12,000	12,000	17,000	15,000	15,000
China	7,200	7,200	7,200	6,900	6,900	6,900
India	5,200	5,200	5,200	3,200	3,400	3,400
Global	85,000	82,000	83,000	84,000	81,000	84,000
<i>Reserves (% of Global)</i>						
Australia	28.24%	28.05%	28.92%	28.57%	28.40%	28.57%
Brazil	14.12%	14.63%	14.46%	20.24%	18.52%	17.86%
China	8.47%	8.78%	8.67%	8.21%	8.52%	8.21%
India	6.12%	6.34%	6.27%	3.81%	4.20%	4.05%
Global	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Source: USGS, Couloir Capital

The vast majority of Australian iron ore production (99%) originates from the state of Western Australia, specifically from the Pilbara region in the north of the state. For the calendar year 2020, the state sold a total of 846.49 million tonnes of iron ore, which measured by value represented \$116.19 billion. 2020 was a blockbuster year for Western Australia iron ore production, which buoyed by strong prices, became the first year in which the sales value of state iron ore production crossed the \$100 billion mark. The growth trajectory of Western Australian iron ore sales has been in a significantly upwards direction since the beginning of the millennium, with 2020's sales reflecting a sales quantity and dollar value of sales CAGR (years 2000-2020) of 8.72% and 17.83%, respectively.

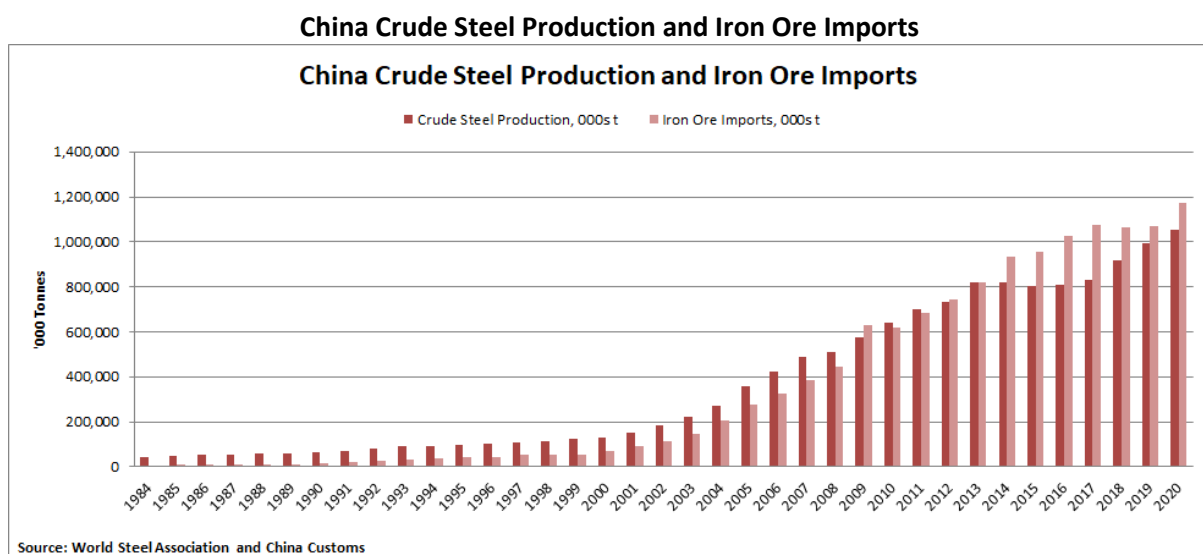
Western Australia: Iron Ore Sales by Quantity and Value



Source: DMIRS

Looking at the supply base, iron ore sales have typically been dominated by the Australian big three, BHP Group Ltd. (ASX: BHP), Rio Tinto Ltd. (ASX: RIO) and Fortescue Metals Group Ltd. (ASX: FMG). In 2020, 88% of iron ore sales were from these three miners. Despite the consistent growth in Australian iron ore production and the dominance of the big three domestic miners, we believe that iron ore supply may increasingly come from other operators in the medium-term, especially from the emergent mid-tier class of iron ore miners. This belief stems largely from the difficulties the domestic majors appear to be facing. RIO has had issues meeting its 360 mt per annum nameplate capacity, seemingly constrained in the 330-340 mt per annum range, and FMG has had major issues in bringing key growth projects to the finish line. In addition, RIO's infamous Juukan Gorge explosion has thrown the big three and their exploration activities into the regulatory spotlight, with expectations that it could become more difficult for them to conduct resource expansion. As a result, we expect mid-tiers and explorers to benefit from greater nimbleness.

Though Australia stands as the world's largest producer of iron ore, the majority of global iron ore consumption is by Chinese steel mills, whose voracious appetite has led to a near-vertical movement in Chinese iron ore imports since 1980. Crude steel production in China has grown at a CAGR of 8.72% since 1980, whilst Chinese iron ore imports have grown at a CAGR of 13.45% during the period. Australia's status as the world's leading producer of iron ore and China's status as the world's largest consumer of the same has led to an inevitable co-dependency, with both relying on each other to be the major counterparty for iron ore trade. In 2020, Australian iron ore shipments accounted for almost 60% of China's iron ore import mix, and on the opposite end China took in just short of 80% of Australia's iron ore export in the year. With over \$115 billion in value coming from iron ore exports alone (as of 2020), Australia has a major dependence on its iron ore trade, and substantial national income leverage tied to ferrous ore prices. It is estimated that for every US\$10 dollar increase in the per ton price of 62% Fe product, Australia earns \$11 billion in additional export income. Apart from the hard monetary value of exports the country relies on, an entire ecosystem has built around the Australian iron ore mining industry, and as such many major domestic markets (including regional real estate prices) can be tied to the health of the iron ore market.



*Source: World Steel Association and China Customs Data*

Because of the high degree of reliance on Chinese iron ore consumption, Australia also has significant risk tied to regional geopolitical tensions and how that could negatively impact iron ore trade flows. Sino-Australian relations have significantly deteriorated since the onset of the pandemic, and the fallout has led to material actions from the CCP that have hurt Australian commodities producers, with key tariffs including those on Australian barley and wine. More extreme than tariffs, China has also enacted import bans on key commodities exports out of Australia, including coal. Whilst the ban has had the side-effect of increasing gate costs for Chinese manufacturers, it has also caused significant hurt to Australian commodities producers, who have struggled to find a home for production given China's scale of demand and the resulting vacuum.

Australian iron ore producers have yet to be hit with punitive measures or trade restrictions, which we believe is likely due to the lack of alternative suppliers. The next largest supplier of iron ore, Brazilian output is almost entirely tied to Vale SA (NYSE: VALE) and its ability to ramp up production, and the miner's issue with returning to its pre-dam accident capacity is well documented. With China and India as the next largest producers of iron ore and both being heavy consumers, Australia's iron ore production looks to be safe in the near-term. However, key risks on the horizon (both short-term and long-term) include:

- **CCP intervention in commodities markets:** Broader inflation across key commodities have led to major cost pressures on Chinese manufacturers. As a result, the CCP has threatened to crack down on "speculation" and attempted to rein in runaway commodities inflation. In a historic move, the state recently moved to de-stock its strategic reserves, releasing copper, zinc and aluminium supply into the markets. Whilst the move may imply the threat of the same for iron ore, we believe that such a move is unlikely to be meaningfully replicable. Apart from the hot steel mill demand being the driver of prices, we believe the steel supply chain in China from mill to port is heavily constrained, and any reserve release into the market will not be moved fast enough to dent demand.
- **Tighter emissions standards and changing Chinese steel mill preferences:** As a result of tighter carbon emissions standards, Chinese steel mills are looking to reduce carbon footprints and coking coal usage. To do so, the mills appear to be moving towards higher-grade iron ore with less impurities, as feedstock with these characteristics will require less energy and therefore less coking coal consumption. This can pose a serious risk to Australian iron ore producers, as their product is lower grade than that of VALE.
- **VALE's comeback:** Despite struggling with throughput recovery to pre-dam accident levels and the impact of high covid cases on operations, we see it as inevitable that VALE will return in earnest at some point in the medium-term. When it does, it will bring high-grade iron ore to market that is likely to be favoured by the steel mills.
- **Chinese steel recycling policies:** Partially because of tense Sino-Australian relations and also as a result of concerns around feedstock cost and security, China is looking to shift some of its reliance away from imported iron ore and onto recycled scrap steel. Uptake of scrap as an alternative to iron ore has been slow due to its inferiority as feedstock for blast furnace operations, but the increasing shift to more efficient electric arc furnaces may result in a broader shift to recycled scrap.

- **CCP preference for non-Australian iron ore, long-term:** Especially given currently strained relations, China is likely to favour a long-term pivot away from reliance on Australia as its top supplier of iron ore. The state has publicly stated its intent to invest in globally significant mines and has actively looked to jurisdictions outside of Australia for new iron ore mines that could provide future supply. Whilst this could lead to a long-term shift in iron ore supply chains, we note that many of the key jurisdictions that China is looking to invest in (i.e., African states) carry material sovereign and political risk.

There are two major iron ores that are mined in Australia: hematite ore and magnetite ore. The majority of global iron ore production is hematite, as is that of the big three global iron ore majors, but magnetite ore production is becoming increasingly more prevalent. Hematite ore has typically been the dominant ferrous mineral mined, and the historic preference of miners to develop hematite deposits over magnetite deposits is largely due to the naturally high Fe content in hematite ore. Averaging between 56% and 64% Fe, hematite ore needs only minimal processing before it is high enough grade to be considered DSO. By comparison magnetite ore has low Fe content and needs significant beneficiation before it reaches shipment quality grades.

The key distinction that many overlook, however, is that magnetite ore has lower Fe content than hematite because magnetite ore contains less magnetite mineral than hematite ore contains hematite mineral (on a relative basis). At the mineral level, magnetite contains more iron than hematite, and has less impurities. This is an important consideration, as magnetite ore will yield an end-product (post-processing) that is purer and higher in iron content than hematite end-product. As pointed out above, Chinese steel mills are facing tighter emissions standards and are exhibiting a preference for higher quality feedstock with less impurities. In addition, using higher-grade iron ore feedstock keeps coke rates lower, reducing a steel mill's reliance on metallurgical coal (which is another major input cost). These demand trends may well drive a longer-term shift to higher Fe grades, and as such many iron ore producers may choose to shift to magnetite mining for its higher-grade end product (and resulting uplift in the merit order for steel mill procurement).

A significant question mark facing Australian iron ore producers is whether changing Chinese steel mill procurement preferences is a significant enough reason to justify a broader shift to magnetite from typical hematite DSO production. Despite access to premium pricing for a higher Fe product, mining magnetite ore requires significant amounts of processing and beneficiation, which results in higher costs despite a higher-grade end-product. The higher costs are because of magnetite ore having a lower iron content, typically 25-40% Fe, against hematite ore's typical content of 56-64% Fe. Apart from the cost associated with the beneficiation processes, the economic feasibility of a magnetite operation can also be impacted by the geological features of the project. As an example, deposits that are closer to the surface can be exploited with less waste rock processing, keeping strip ratios low and therefore reducing mining costs. Because significant processing is needed for a magnetite operation relative to a hematite operation, there's also a significant energy cost burden associated with crushing, so a softer rock makeup can also be beneficial. Water is almost always a crucial element of a miner's project infrastructure, but for magnetite operations it can be even more so given the need for wet processing in most cases. With so many things to



consider, it's not a surprise that many believe Australian miners simply don't have the technical capability to handle the extra downstream processing activity that comes with a magnetite mining operation.

Apart from the beneficiation cost pressures, magnetite mines appear to carry significant development risks, with key historical examples including CITIC Pacific Mining's Sino Iron project (which underwent massive cost overruns, delivery delays and legal issues) and Gindalbie Metals' Karara Magnetite Mine. More recently, FMG has experienced headaches trying to get its key growth project Iron Bridge to production. Once built up, the Iron Bridge Magnetite Project is expected to add 22 mt per annum in 67% Fe magnetite concentrate, providing FMG the high-grade product it needs to better compete with the big three producers. However, the project has experienced multiple cost blowouts and development delays, with the most recent estimate placing the project cost at up to US\$3.5 billion with a first production date of December 2022. This represents over \$1 billion in cost overrun and a delay of approximately 12 months (when considering the 6-month delay in first production and 6-month extension of the expected ramp up period to full nameplate). In addition, unit costs are expected to be 10% higher than projected in the 2019 FID and sustaining capital will similarly come in higher than expected.

Despite the developmental challenges and growing pains of pushing through the next generation of magnetite iron ore mines, we believe the pressures of a greener future will force adaptation in the iron ore mining industry. As longer-term demand trends cement themselves and steel mills turn quality preferences into procurement requirements, we think the ultimate choice left to global iron ore miners will be to shift to higher-quality deposits. Furthermore, as more and more producers successfully develop magnetite mines, we believe Australia's technical shortcomings should erode and local miners will become more competent in managing downstream iron ore operations. For now, iron ore miners focused on magnetite do face challenges, but we expect thematic changes to ease these operating risks over the long-term.

## **Management Overview**

Management and directors own a total of 8.26% of outstanding shares. We see insider shareholding as a positive indicator, as it implies that management and the board are likely to be aligned with investors in their interests and motivations. Generally speaking, insider share ownership above 10% is seen as relatively high. The table below outlines insider shareholding:

### Management Shareholding

Name	Position	Shares	% of Total
Andrew Bruton	CEO	1,050,000	0.75%
Cameron McCall	Executive Chairman	2,304,951	1.65%
Joe Phillips	Managing Director	4,824,904	3.46%
Alan Phillips	Non-Executive Director	2,001,750	1.43%
Daniel Lanskey	Independent Director	400,000	0.29%
Andrew Suckling	Independent Director	950,000	0.68%
			<b>8.26%</b>

*Source: SEDI, Couloir Capital*

The biographies of key management individuals (as provided by the company) are outlined below.

#### **Andrew Bruton – CEO**

Andrew has a background of over 20 years of top tier professional experience in corporate, mining, energy and infrastructure law. He has been recognised as a leading transactional and project lawyer in the mining and energy sectors in Australia. In senior leadership roles, Andrew has been responsible for large teams at both State and National levels. He is also an experienced company director. Having advised major Australian and international mining and energy companies on complex projects and transactions with multi-billion-dollar values, Andrew has a deep understanding of these markets. As a strategic thinker and leader with strong business acumen and a focus on delivering outcomes, he brings a wealth of expertise to Macarthur Minerals. Andrew holds both a Bachelor of Laws and a Bachelor of Business (Accountancy) from the Queensland University of Technology.

#### **Cameron McCall – Chairman**

Cameron McCall has a wealth of experience across the financial services and commercial property industries within Australia and internationally. He has been providing investment advice, equity capital raising and share trading for over 17 years to corporate entities and private clients at Hartley's Limited and Macquarie Bank Limited. Mr McCall has during his 40-year career built an extensive network of international and Australian based high net worth individuals and corporate entities. Mr McCall is currently running a corporate advisory business providing advice on asset acquisition and capital raising to international and Australian based organisations.

#### **Joe Phillips – Managing Director**

Joe Phillips was previously the Company's CEO in 2015 and was responsible for the original funding and development of the Company's significant iron ore assets, having completed its 2012 Prefeasibility Study for the Ularring Hematite Project and obtaining environmental approvals. Mr Phillips was educated at the University of Queensland he combines strong project management skills with a discipline in economics and a detailed understanding of the operation of public administrations and the elected governments in Australia.

#### **Alan Phillips – Non-Executive Director**

Alan Phillips has been a senior executive, director and chairman of ASX, TSX-V, TSX and AIM listed companies over a period of 40 years. Mr Phillips has experience in a broad range of

industries, but predominantly in the mining and exploration of copper, gold, ethanol and iron ore and technology sectors.

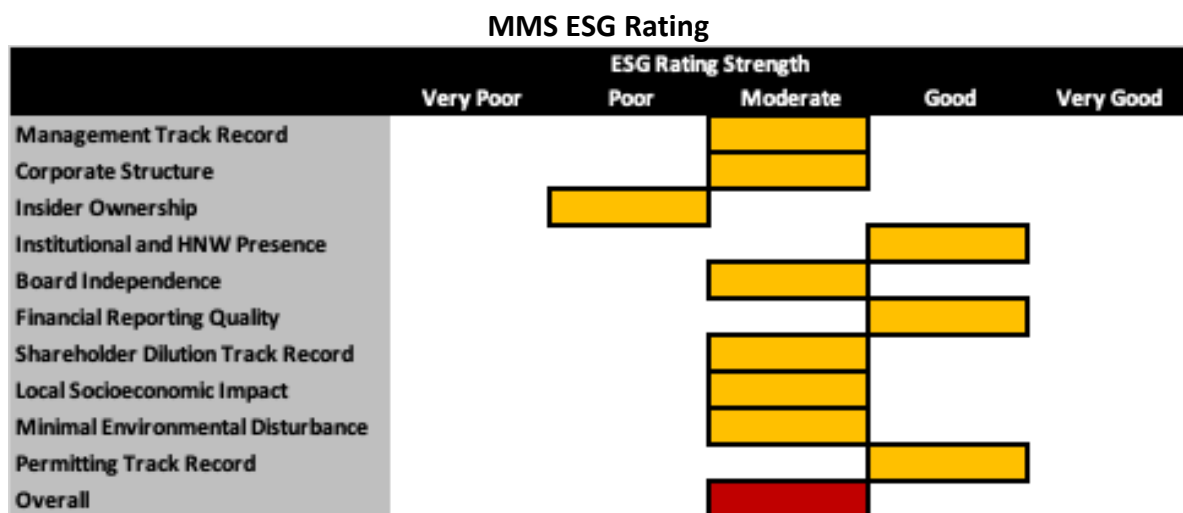
#### **Daniel Lanskey – Independent Director**

Mr Lanskey holds a post graduate Business Degree from Griffith University in Entrepreneurship and Venture Development. He has over 15 years' experience in Senior Management in the Public Markets and has been a director and/or Chairman of ASX, OTCQX and TSXV listed Companies. He has been involved in numerous start-up Companies across various industries including Information Technology, Oil and Gas, Mining and Real Estate. Working with an extensive capital market network across the Asia Pacific Region and North America has resulted in numerous successful capital raisings via Private Placements for Pre IPO-funds, Initial Public Offerings and Reverse Takeovers of existing Public Companies.

#### **Andrew Suckling – Independent Director**

Andrew has over 25 years' experience in the commodity industry. He began in 1994 as a trader on the LME for Metallgesellschaft (MG). In that role, Andrew established a trading presence in China for MG, setting up a representative office in Shanghai in 1997. He then became a partner, research analyst and trader with the multi-billion-dollar fund, Ospraie Management, LLC and predecessor fund, Tudor Investment Corporation. He is the Executive Chairman at Cadence Minerals, an early investment strategy and development firm active in lithium and other technology minerals, as well as the founding principal and portfolio manager for Verulam, a discretionary commodity fund. Andrew is a graduate of Brasenose College, Oxford University earning a BA (Hons) in Modern History in 1993 and an MA in Modern History in 2000.

In addition to our review of the company's management and directorship, the below table outlines our ESG rating parameters for MMS. Note that this is a largely qualitative rating measure based on publicly available information – it may not fully reflect the company's true governance strength. Particularly strong governance ratings can positively impact our corporate valuations, whilst weak ratings call for a discount in our framework.



Source: Couloir Capital

## Financials Overview

At the end of FY2021, the company had cash and working capital of \$5.02 million and -\$6.06 million, respectively. The company's current ratio of 0.47x implies the inability of current assets to sufficiently cover current liabilities, implying an insufficient liquidity position at the end of March 2021. However, we note that most of the company's current liabilities are in a warrant liability, which we view as fairly inconsequential and non-cash. Monthly cash burn (negative free cash flow) for FY2021 was \$0.44 million, lower than the comparative period in FY2020, which we attribute to less exploration activity. The company has no formal debt, outside of a lease liability. The following table summarizes the company's liquidity position:

Key Financial Data (FYE - Mar 31)				
(A\$)		2020		2021
Cash	\$	4,518,165	\$	5,018,170
Working Capital	\$	(5,003,072)	\$	(6,062,093)
Current Ratio		0.50		0.47
Debt	\$	8,417,461	\$	213,476
Monthly Cash Burn	\$	(609,793)	\$	(439,911)
Cash from Financing Activities	\$	11,517,657	\$	5,778,937

Source: Company, Couloir Capital

The following table outlines the company's outstanding options and warrants at the end of FY2021. The company had 5.04 million options (weighted average exercise price of \$0.27 per share), and 25.78 million warrants (weighted average exercise price of \$0.55 per share) outstanding.

Options	Strike	Exercise Value
555,000	\$ 0.21	\$ 117,660
1,480,000	\$ 0.21	\$ 313,760
500,000	\$ 0.34	\$ 170,000
500,000	\$ 0.36	\$ 180,000
500,000	\$ 0.38	\$ 190,000
500,000	\$ 0.17	\$ 84,800
500,000	\$ 0.25	\$ 127,200
500,000	\$ 0.34	\$ 169,600
Warrants	Strike	Exercise Value
7,928,183	\$ 0.85	\$ 6,723,099
3,563,100	\$ 0.42	\$ 1,510,754
10,184,630	\$ 0.42	\$ 4,318,283
3,029,375	\$ 0.42	\$ 1,284,455
867,291	\$ 0.42	\$ 367,731
204,609	\$ 0.42	\$ 86,754

Source: Company, Couloir Capital

Though there have been multiple instances of options and warrants being exercised after the fiscal year-end, we estimate that potential cash proceeds from ITM securities could total in excess of \$8 million, if those ITM securities were exercised.

## Revenue and EPS Forecasts

As we only expect MMS to reach first production in Q1-2024, we will refrain from providing near-term revenue and EPS forecasts. Further justifying this includes the lack of certainty around supply chain logistics, and the parameters around the early DSO sales and mining at Ularring.

## Net Asset Valuation Model

Our models assume the production schedule outlined in the PEA, as well as many of the report's base case assumptions, but incorporates our own assumptions on LOM average Fe pricing (65%+ Fe) and discount rate. **Our base case DCF model, which assumes a long-term Fe price of US\$100 per tonne and a discount rate of 12%, implies a NAV of \$332.60 million, or \$2.05 on a per share basis.** Our discount rate of 12% is higher than the PEA's 8% discount rate, and we believe more accurately reflects the risk profile of the company at this point in time. The sensitivity table provided below outlines the various NAV per share given changes in the long-term Fe price or discount rate:

		LOM Fe Price Assumption (US\$/t)								
	\$	80	\$	90	\$	100	\$	110	\$	120
8%	\$	0.97	\$	2.42	\$	3.86	\$	5.31	\$	6.76
10%	\$	0.46	\$	1.64	\$	2.81	\$	3.99	\$	5.16
12%	\$	0.10	\$	1.07	\$	2.05	\$	3.02	\$	3.99
14%	\$	(0.16)	\$	0.66	\$	1.48	\$	2.29	\$	3.11
16%	\$	(0.36)	\$	0.34	\$	1.04	\$	1.74	\$	2.44

Source: Couloir Capital

## Comparables Valuation

As our other source of valuation, we consider MMS' relative valuation against other mining companies that we believe to be comparable. The table below outlines our peer group selection:

Company	Location	Stage	After-tax NPV (A\$)	Discount Rate	Market Cap (A\$)	P/ NPV (%)
Macarthur Minerals Ltd. (TSXV: MMS)	Australia	PEA	\$ 535,000,000	8%	\$ 80,669,047	15.08%
Magnetite Mines Ltd. (ASX: MGT)	Australia	PFS	\$ 669,000,000	8%	\$ 138,260,000	20.67%
Brockman Mining Ltd. (ASX: BCK)	Australia	DFS	\$ 2,300,000,000	10%	\$ 343,330,000	14.93%
Iron Road Ltd (ASX: IRD)	Australia	PEA	\$ 1,937,000,000	8%	\$ 217,870,000	11.25%
Carpentaria Resources Ltd (ASX: CAP)	Australia	PFS	\$ 1,418,300,000	10%	\$ 80,690,000	5.69%
<b>Average</b>						<b>13.52%</b>

Source: Couloir Capital, Public Disclosures

Based on the above metrics, we believe that MMS should be trading at a valuation of \$72.34 million or \$0.52 per share on a P/NPV basis, implying that the company is trading at fair value.

## Conclusion

**After accounting for our valuation models, we have arrived at fair value per share estimate of C\$1.19 per share.** We are initiating coverage on MMS with a BUY rating, and expect the following catalysts to materially impact our valuation estimate:

- Any news regarding the progress of the ongoing FS work.
- Any news regarding the advancement of an early DSO mining operation at Ularring.
- Further announcements around the MMS-GWR mine-gate purchase agreement.
- Any news regarding the advancement of negotiations around logistics infrastructure to connect Lake Giles to the Port of Esperance.
- Any news suggesting a delay in exploration and permitting timelines.
- Financing-related news that in any way significantly alters the company's capital structure.

## Risks

The following outlines some of the key risk considerations that investors should keep in mind when evaluating MMS as an investment opportunity:

- **Unproven Economics and Forecast Error:** Though the company did file a PEA on Lake Giles, any projections of future mine economics are subject to significant estimation error. Recoveries have not been proven at commercial scale, production scheduling is approximated and other key inputs to modelling may be impacted by biases or errors of various kinds.
- **Execution Risk on Key Development Milestones:** The company is working on multiple development initiatives simultaneously, including the Lake Giles FS, early production at Ularring and using GWR's production to generate early cash flows to support operations. Within each of these key initiatives there are multiple activities that carry a chance of failure, which can hold back the overall advancement of Lake Giles to commercial production.
- **Failure to Secure Route to Market:** It is vital that the company secures infrastructure connecting Lake Giles to the Port of Esperance, from haulage through to rail unloading capacity at the port itself. However, the Kalgoorlie-Esperance line was previously at full capacity under the previous operator of Koolyanobbing (now owned by MIN), and other factors point to constrained capacity being a potential issue MMS will need to face. Without logistics in place, Lake Giles will become a stranded asset.
- **Project Financing Risk:** The projected CAPEX is close to half a billion, a sum far in excess of the company's current equity valuation. Pure equity-funded development will incur outsized dilution, so it is likely the company will need to secure a line of debt / other project financing or attract a strategic partner to execute on the project.
- **Market Price Exposure and Impact on Execution Risk:** MMS' exploration and development activities will be sensitive to market pricing during the development



stage given its reliance on markets for funding needs. This is somewhat insulated by recent announcements of strategic partners potentially stepping in to provide project-level financing.

- **Capital Structure Deterioration Related to Ongoing Cash Burn:** There is the potential that the company's cash burn could sap liquidity to the point of the company needing to raise capital. Assuming no cash flows, there is a chance that MMS would do so via equity issuance. Depending on the price of the issuance, such issuance could be dilutive to existing shareholders.

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*Company specific disclosures, if any, are below:*

*None*

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*Each company within an analyst's universe, or group of companies covered, is assigned:*

- 1. A recommendation or rating, usually BUY, HOLD, or SELL;*
- 2. A 12-month target price, which represents an analyst's current assessment of a company's potential stock price over the next year; and*
- 3. An overall risk rating which represents an analyst's assessment of the company's overall investment risk.*

*These ratings are more fully explained below. Before acting on a recommendation, we caution you to confer with your investment advisor to determine the suitability of our recommendation for your specific investment objectives, risk tolerance and investment time horizon.*

**Couloir Capital's recommendation categories include the following:**

**Buy**

The analyst believes that the security will outperform other companies in their sector on a risk adjusted basis or for the reasons stated in the research report the analyst believes that the security is deserving of a (continued) BUY rating.

**Hold**

The analyst believes that the security is expected to perform in line with other companies in their sector on a risk adjusted basis or for the reasons stated in the research report the analyst believes that the security is deserving of a (continued) HOLD rating.

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The analyst is recommending that investors tender to a specific offering for the company's stock.

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**Very High Risk:** Venture type companies or more established micro, small, mid or large cap companies whose risk profile parameters and/or lack of liquidity warrant such a designation. These companies are only appropriate for investors who have a very high tolerance for risk and volatility and who can incur temporary or permanent loss of a very significant portion of their investment capital.

**High Risk:** Typically, micro or small cap companies which have an above average investment risk relative to more established or mid to large cap companies. These companies will generally not form part of the broad senior stock market indices and often will have less liquidity than more established mid and large cap companies. These companies are only appropriate for investors who have a high tolerance for risk and volatility and who can incur a temporary or permanent loss of a significant portion of their investment capital.

**Medium-High Risk:** Typically, mid to large cap companies that have a medium to high investment risk. These companies will often form part of the broader senior stock market indices or sector specific indices. These companies are only appropriate for investors who have a medium to high tolerance for risk and volatility and who are prepared to accept general stock market risk including the risk of a temporary or permanent loss of some of their investment capital.

**Moderate Risk:** Large to very large cap companies with established earnings who have a track record of lower volatility when compared against the broad senior stock market indices. These companies are only appropriate for investors who have a medium tolerance for risk and volatility and who are prepared to accept general stock market risk including the risk of a temporary or permanent loss of some of their investment capital.