



# COMPANY BUSINESS PLAN

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 American Manganese Inc.

***A Critical Metals Company Focused on  
Recycling Electric Vehicle Lithium-ion Batteries***



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## EXECUTIVE SUMMARY

American Manganese Inc. (“AMY” or the “Company”) is a critical metal company with a patent pending hydrometallurgical process proven to recover 100% of the cathode metals in a lithium-ion battery. With a projected 60 million electric vehicles expected to be on the roads by 2040, AMY is focused on recycling electric vehicle lithium-ion batteries.

Some of the cathode metals necessary to a lithium-ion battery (cobalt, lithium, nickel, manganese, and aluminum) are projected to be in short supply and major manufacturing companies are investing billions to secure these metals. Governments are also advocating strategies to ensure such metals are sourced reliably in an environmentally friendly manner. AMY believes that the answer to sourcing sustainable, ethical, and environmentally friendly battery metals is with the Company’s lithium-ion battery recycling technology that has been recognized by global institutions.

AMY successfully raised \$2.3 million as of February 16, 2018 for a pilot plant that Kemetco Research Inc. will use to demonstrate the patented recycling process on a continuous basis, from battery material scraps collected from recyclers in the US and Europe. The data obtained from pilot plant testing aims to reduce technical risks for a larger revenue-generating demonstration plant before achieving the main company goal of constructing a commercial scale plant.

The Company’s near-term demonstration plant is estimated to cost \$10 million and would be capable of processing 3 tonnes of cathode metals per day. At current commodity prices of these metals, the AMY process is estimated to generate an annual gross profit before tax of \$10.7 million to \$59.8 million (55% - 87% operating margin), depending on the battery chemistry. This includes estimated expenses for feedstock, process reagents, labour, general and administrative expenses, utilities, feed material delivery, maintenance, building rent, and shipping. The estimated payback period for the demonstration plant is dependent on the battery chemistries sourced but would be no longer than a year. The Company believes that the demonstration plant is a necessary preparation step towards a full commercial plant, which is expected to be more profitable due to economies of scale.

The Company plans to pioneer their process and be a global leader in the lithium-ion battery recycling industry as the most economically viable and environmentally friendly recycler. Current recycling strategies conducted by competitors include storing spent batteries in landfills or burning the whole battery pack in a smelter with no strategic metal recovery. In contrast, the AMY process would recover 100% of the cathode metals, meaning no waste stream going back into the environment, as well as a complete recirculation of the process water.



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## BUSINESS OVERVIEW

Headquartered in Vancouver, Canada and led by the CEO and President, Larry Reaugh. American Manganese Inc. (“AMY” or the “Company”) was incorporated under the laws of British Columbia on July 8, 1987 and is a publicly traded company with its shares listed on the TSX Venture Exchange trading under the symbol “AMY”; “AMYZF” in the OTC markets; and under “2AM” in the Frankfurt Stock Exchange. Currently, the Company has approximately 152.7 million issued and outstanding shares with a market capitalization of \$41 million. As well as 38.1 million warrants and options shares valued at \$7.2 million.

AMY is a critical metal company with a focus on recycling electric vehicle (EV) lithium-ion batteries (LIB). Due to rapid development and commercialization of EVs, the LIB market is growing exponentially along with the metals utilized in the batteries, such as lithium, cobalt, manganese, nickel, and aluminum. These metals are currently sourced from mines that are limited in production by social and environmental barriers in their operating countries. In addition, the existing methods for recycling spent EV LIBs are inefficient and limited, but EV manufacturers are being held accountable on collecting and recycling their spent LIBs. In order to capitalize on the demand for the battery metals, the Company plans to be an industry leader and the lowest cost recycler of cathode materials in spent LIBs, with their patent pending hydrometallurgical process, which was initially developed at Artillery Peak, one of AMY’s mineral properties.

AMY holds mineral property rights to a low-grade manganese deposit known as Artillery Peak in Arizona. From the Artillery Peak material, Kemetco Research Inc. completed successful production of working lithium-ion battery prototypes, utilizing chemical manganese dioxide (CMD). This discovery gave momentum to continue developing the advanced hydrometallurgical process, seen in Figure 1, where electrolytic manganese can be recovered from a low-grade manganese resource. The process is patented under US Patent No. 8460681, Chinese Patent No. 201180050306.7, Republic of South Africa Patent No. 2013/01364.

In April of 2016, the Company announced its intent to contract Kemetco Research Inc. and extend their existing intellectual property on recycling cathode materials in lithium-ion batteries. By November 2017, Kemetco had successfully recovered 100% of the cathode materials using their process. AMY then filed the Co-operative Treaty Patent application and Non-Provisional Patent application for their hydrometallurgical process in November 2017.



*Figure 1 - Electrolytic Manganese Dioxide Recovery Process for Low Grade Manganese Ores*

The Company's other mineral property rights include the high-grade Hazelton Cobalt-Copper-Gold project in British Columbia, which is in a joint venture with New World Cobalt Limited - whom can earn a 60% interest in the project by expending \$2,000,000 on exploration, issuing 200,000 shares of New World Cobalt Limited, and paying \$40,000 in option payments. The agreement allows AMY to realize value from its Hazelton holdings, while allowing the Company to maintain its core focus on the promising battery materials recycling work and extend its patented process for the recovery of additional rare metals and minerals.

AMY's and Kemetco's experience in the mining industry provides them with a strong understanding of the raw materials and the processes necessary to get the metals to the global market.



## STRATEGY

The Company's mission is to become the lowest cost recycler of lithium, cobalt, manganese, nickel, and aluminium from spent EV lithium-ion batteries. Based on current EV sales projections, AMY expects to be able to source enough spent lithium-ion batteries to operate a full commercial scale plant.

In the near term, AMY plans to construct a 3 tonne per day (TPD) demonstration plant to treat cathode scraps and fine cathode materials. The scraps would be sourced from recyclers and battery manufacturers since 4-5% of production gets scrapped from faulty cathode production, on average. In addition, these scraps are obtained without physical separation of battery cells and there is a sufficient supply source to continuously operate a 3 TPD demonstration plant. An example of these scraps can be seen in Figure 2, which have been provided to AMY by a US recycler. The European supply of fine cathode materials is sourced from recycled batteries that are milled down to a fine powder, as seen in Figure 3.



*Figure 2 - Cathode Scraps from US Recycler*



*Figure 3 - Fine Cathode Materials from Europe*

AMY is currently testing both supplies of cathodes at a pilot plant to collect analytical data and to reduce the technical risk of a future demonstration plant and commercial plant. AMY has already completed the necessary milestones (as seen in Figure 4) -- proof of concept testing, patent applications, and IP development -- to advance on the path to a commercial plant.

As EV sales increase and spent lithium-ion batteries from older EVs have to be disposed of, AMY believes EV manufacturers, battery manufacturers, and waste collection enterprises will look to license AMY's recycling technology in close proximity to their own facilities. Tesla has already announced that part of their plan for their new Gigafactory is to allow for large-scale recycling of old EV and energy storage batteries (Clean Technica, 2017). Therefore, by incorporating AMY's recycling technology, companies like Tesla can provide a cradle-to-grave solution for their batteries.

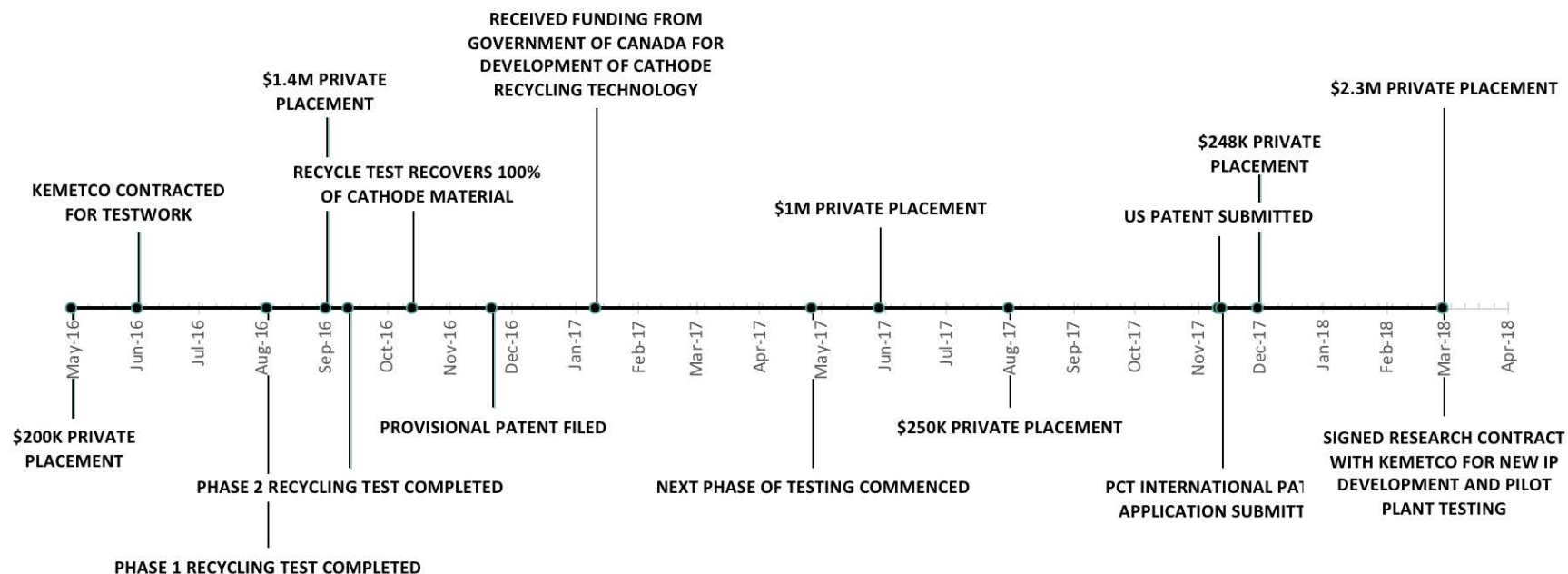


Figure 4 - Completed Milestones

#### Future Milestones:

Complete Pilot Plant Testing – May 2019  
Construct 3 TPD Demonstration Plant – 2020  
Develop Commercial Plant – TBD



## OPERATING PLAN

AMY has signed a research contract with Kemetco Research, on February 16<sup>th</sup>, 2018, to continue work on new IP development and patents, as well as the engineering, design, construction, commissioning, installation and testing of the pilot plant. The total budget approved by the Company is \$2,277,000 including contingencies and the entire project is expected to take 12-15 months. The pilot plant will demonstrate AMY's patent pending proprietary recycling technology in a continuous operation and will provide data for a future development of the demonstration plant which can be scaled up to a commercial plant.

A demonstration plant capable of processing 3 TPD of cathode material is estimated to cost \$10 million and would allow AMY to process the feedstock sourced from cathode scraps and fine cathode material. The Company believes a 3 TPD demonstration plant is sufficient for the current feedstock rate, but AMY's main objective is to develop larger commercial plants. The estimated revenue generated during the demonstration plant operation, highlighted in the Financial Plan, will demonstrate the potential magnitude of a commercial plant recycling a larger feedstock of EV LIBs.

The amount of metals produced each year from a 3 TPD demonstration plant is illustrated in Figure 5. American Manganese Inc. expects the commercial plants output to be competitive in metal production to that of an operating mine.

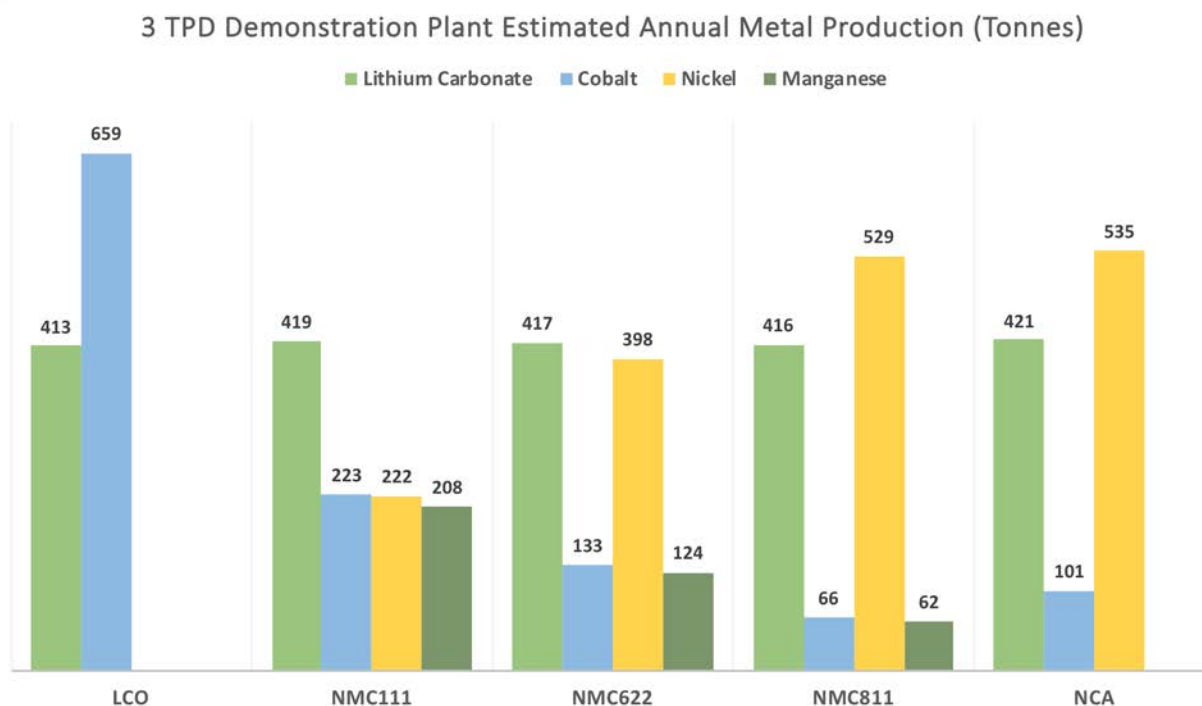


Figure 5 - 3 TPD Demonstration Plant Estimated Annual Metal Production



As seen in Figure 6, the American Manganese process is roughly illustrated:

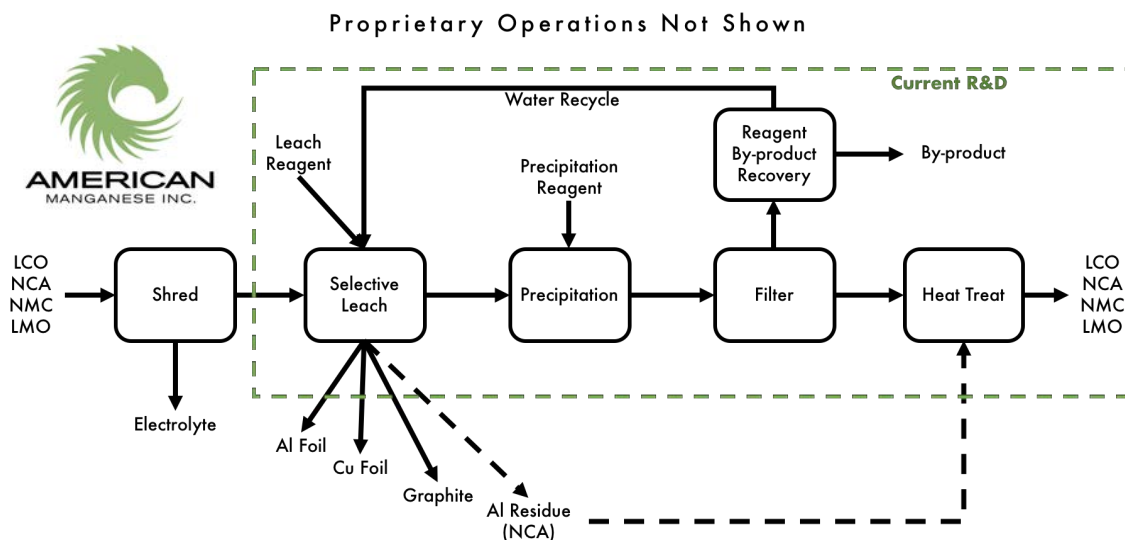


Figure 6 - American Manganese Inc. Battery Recycling Flow Sheet

The process begins with the mechanical separation of the spent EV LIB and is then treated with a series of proprietary processes to produce a high purity active cathode material. Tests by Kemetco confirm that the AMY process is able to recover 100% of the cathode metals (cobalt, lithium, nickel, manganese, aluminium) in an EV LIB after leaching and precipitation. The conceptual lithium-ion battery recycling and upcycling flowsheet can be seen in Figure 7.

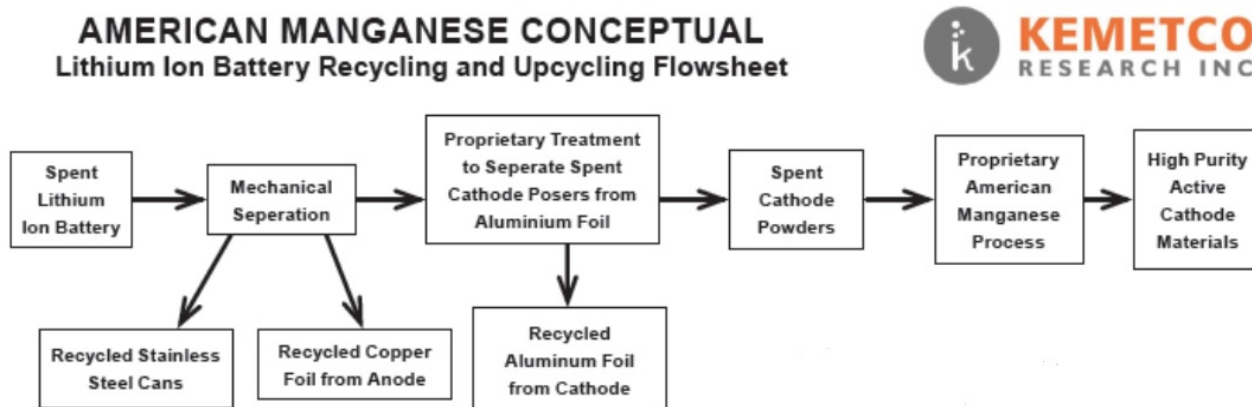


Figure 7 - Lithium-Ion Battery Recycling and Upcycling Flowsheet

Kemetco Research has developed the hydrometallurgical process in their well-equipped extractive metallurgy laboratory and the process will be further tested in the pilot plant. With their experienced staff, Kemetco is capable of carrying out further laboratory testing, complete plant design, and construction work. Kemetco's labs are in close proximity to AMY's office and a strong communications line is maintained between the two companies.



## FINANCIAL PLAN

The following information outlines the estimated expenses and profit calculations for a \$10M demonstration plant capable of processing 3 tonnes of cathode material per day. The Company expects that with a commercial plant, the economies of scale from such a larger plant will result in greater profitability. This forecast has been performed by Kemetco as a third-party review.

### Annual Gross Profit – Current Commodity Price

Battery Chemistry	LCO	NMC111	NMC622	NMC811	NCA
<b>Estimated Revenue Before Tax (USD/day)</b>	\$187,488	\$83,427	\$65,927	\$52,913	\$62,050
<b>Estimated Expenses</b>					
Reagents	\$2,945	\$2,945	\$2,945	\$2,945	\$2,945
Labour and G&A	\$8,928	\$8,928	\$8,928	\$8,928	\$8,928
Utilities	\$350	\$350	\$350	\$350	\$350
Feed Material Delivered	\$7,796	\$7,796	\$7,796	\$7,796	\$7,796
Maintenance	\$1,440	\$1,440	\$1,440	\$1,440	\$1,440
Building Rent	\$500	\$500	\$500	\$500	\$500
Shipping & Packaging	\$1,857	\$1,857	\$1,857	\$1,857	\$1,857
<b>Total Estimated Expenses (USD/day)</b>	\$23,816	\$23,816	\$23,816	\$23,816	\$23,816
<b>Estimated Gross Profit Before Tax (USD/day)</b>	\$163,673	\$59,612	\$42,111	\$29,097	\$38,235
<b>Operating Margin</b>	87%	71%	64%	55%	62%

*Figure 8 - Estimated Gross Profit with Current Commodity Price*

The revenues were derived simply from current commodity prices for each of the recoverable cathode metals, multiplied by the amount of each metal expected to be contained in 3 tonnes of cathode material. This was done for each of the battery chemistries. It is important to note that the cathode metals (cobalt, lithium, nickel, manganese, and aluminum) can be 100% recovered using AMY's process. Figure 9 shows these calculations



Battery Chemistry		Lithium Carbonate	Cobalt	Nickel	Manganese	Aluminum	Total Estimated Value (USD)
Price (\$/kg)		\$14.00	\$95.01	\$13.36	\$2.04	\$2.05	
LCO	Metal Content (kg)	1,132	1,806	-	-	-	
	Est. Value	\$15,854	\$171,634	\$0	\$0	\$0	\$187,488
NMC111	Metal Content (kg)	1,149	611	608	570	-	
	Est. Value	\$16,086	\$58,049	\$8,131	\$1,162	\$0	\$83,427
NMC622	Metal Content (kg)	1,143	365	1,090	340	-	
	Est. Value	\$16,009	\$34,661	\$14,564	\$694	\$0	\$65,927
NMC811	Metal Content (kg)	1,139	182	1,448	169	-	
	Est. Value	\$15,951	\$17,268	\$19,349	\$346	\$0	\$52,913
NCA	Metal Content (kg)	1,154	276	1,466	-	42	
	Est. Value	\$16,150	\$26,225	\$19,590	\$0	\$86	\$62,050

Figure 9 - Estimated Value of 3 Tonnes of Cathode Material at Current Commodity Prices



For a 3 tonnes per day (TPD) demonstration plant, the estimated annual gross profit margin (before tax) ranges from \$10.7 million to \$59.8 million (55% - 87% operating margin), depending on the battery chemistry. These margins are based on revenues calculated from today's metal prices. In contrast, even if the revenues were to be adjusted downwards by using the 3-year average commodity price for cobalt (\$61/kg), lithium carbonate (\$10/kg), and nickel (\$11/kg), the same 3 TPD demonstration plant is still projected to be profitable (see Figure 10). Assuming the expenses do not change, the operating margin is then estimated to be 39% - 81%, with an annual gross profit before tax in the range of \$5.6 million to \$36.2 million.

### Annual Gross Profit – 3 Year Average Commodity Price

Battery Chemistry	LCO	NMC111	NMC622	NMC811	NCA
<b>Estimated Revenue Before Tax (USD/day)</b>	\$122,853	\$57,081	\$46,668	\$38,924	\$44,827
<b>Estimated Expenses</b>					
Reagents	\$2,945	\$2,945	\$2,945	\$2,945	\$2,945
Labour and G&A	\$8,928	\$8,928	\$8,928	\$8,928	\$8,928
Utilities	\$350	\$350	\$350	\$350	\$350
Feed Material Delivered	\$7,796	\$7,796	\$7,796	\$7,796	\$7,796
Maintenance	\$1,440	\$1,440	\$1,440	\$1,440	\$1,440
Building Rent	\$500	\$500	\$500	\$500	\$500
Shipping & Packaging	\$1,857	\$1,857	\$1,857	\$1,857	\$1,857
<b>Total Estimated Expenses (USD/day)</b>	\$23,816	\$23,816	\$23,816	\$23,816	\$23,816
<b>Estimated Gross Profit Before Tax (USD/day)</b>	\$99,037	\$33,265	\$22,852	\$15,108	\$21,011
<b>Operating Margin</b>	81%	58%	49%	39%	47%

*Figure 10 - Estimated Gross Profit with a 3-Year Average Commodity Price*

On the expense side, reagents are the primary direct cost in AMY's patented process. The same composition of reagents is used for all battery chemistries and, as can be seen above, this expense is only a fraction of the recovered value from the batteries cathode.

The labour that is accounted for in a 3 TPD demonstration plant will include three shifts of four plant operators working an 8-hour shift and operating 24 hours/day at a rate of \$45/hour. Additional staff such as, an office administrator, an accountant, shipping and receiving, an assistant manager, and a manager have each been accounted for in the 8-hour shift at a rate of \$45/hour. The total labour cost per day is estimated to be \$5,760, plus an additional \$3,168 for G&A.



Other foreseeable expenses include rent for a 15,000 ft<sup>2</sup> facility, as well as the shipping and packaging costs for two 20-tonne loads of processed product shipped across Canada every week.

By initially treating cathode scraps in a 3 TPD demonstration plant, American Manganese can bypass the disassembly process costs of AMY's proposed automated battery cell disassembly technology, which will be used on the projected growing disposal of spent EV LIBs. The increase in feedstock, from EV LIB disassembly, would allow AMY to scale up to a commercial plant.

At current commodity prices and dependant on the battery chemistry being treated at 3 TPD - AMY estimated a payback period for a \$10M demonstration plant as early as 3 months and no later than a year, seen in Figure 11.

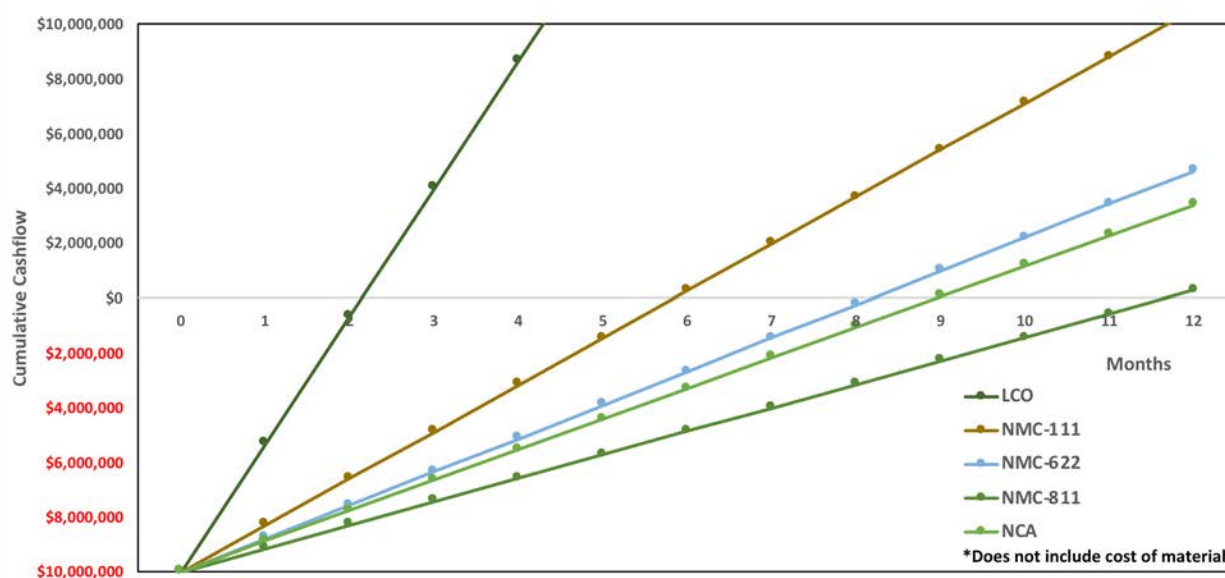


Figure 11 - Pro Forma \$10 Million Demonstration Plant Estimated Payback Period (3 TPD)



## MARKET ANALYSIS AND COMPETITION

Due to decrease in lithium-ion battery costs, the demand for electric vehicles has exploded. Morgan Stanley predicts that EVs will outpace gasoline-powered vehicles in two decades (Lambert, 2017). Recycling companies are preparing for the electric vehicle revolution by honing their processes to extract metals from spent lithium-ion batteries more cheaply and efficiently in order to capitalize on an expected shortfall in metals such as cobalt when sales of electric vehicles take off (Reuters, 2017). In addition to the expected shortfalls, the United States Government has signed an Executive Order to ensure secure and reliable supplies of critical metals (such as the ones used in battery technology) as a strategy to reduce foreign dependence.

Cobalt, an essential battery metal, has been one of the best performing metals since 2016 and has nearly quadrupled in price in the last two years, mainly thanks to the emerging EV market and personal electronics driving up the demand. Currently, rechargeable batteries constitute 55% of the global cobalt demand (BMO, 2018) over a variety of battery applications, as seen in Figure 12. An increase in EV sales and a continued growth of personal electronics will continue to drastically increase the demand in cobalt.

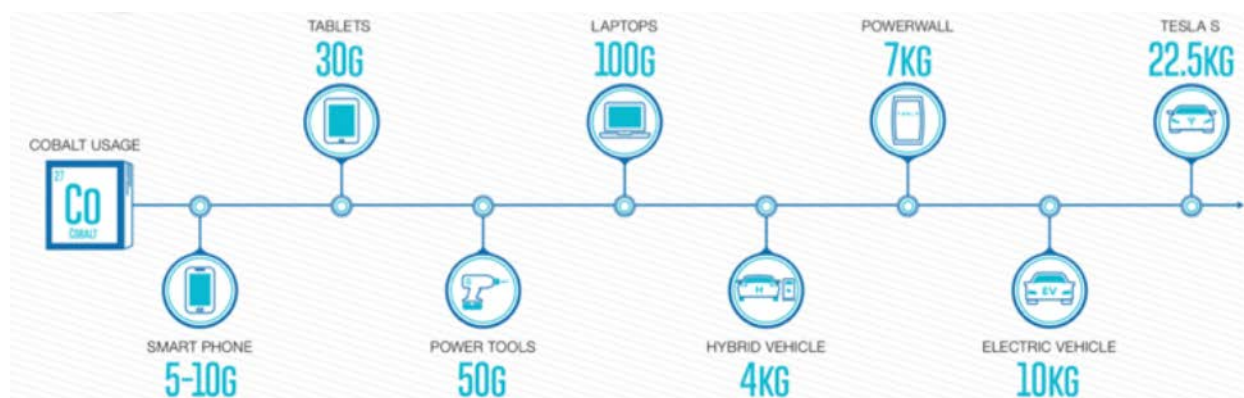


Figure 12 - Cobalt Use by Application (Seeking Alpha, 2018)

However, coupled with the spike in demand is a supply insecurity since 97% of cobalt is mined as a by-product of copper and nickel mines, making cobalt vulnerable to copper and nickel market fluctuations (Mining Technology, 2017). In addition, 60% of the global production of cobalt is contributed by the Democratic Republic of Congo, where political violence, government royalties, and child labour are making cobalt production uncertain for a growing battery supply chain.



### 2017 MINE PRODUCTION (METRIC TONS)

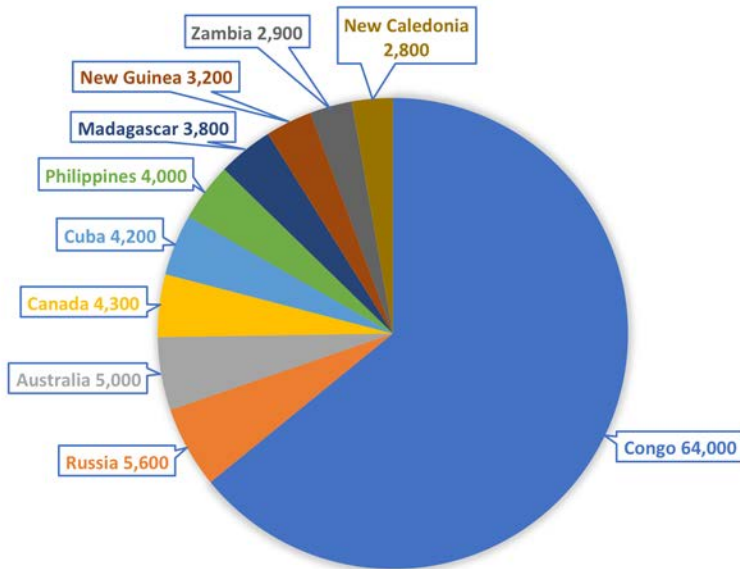


Figure 13 - World Cobalt Production in 2017 (USGS, 2017)

### ECONOMICALLY VIABLE RESERVES (METRIC TONS)

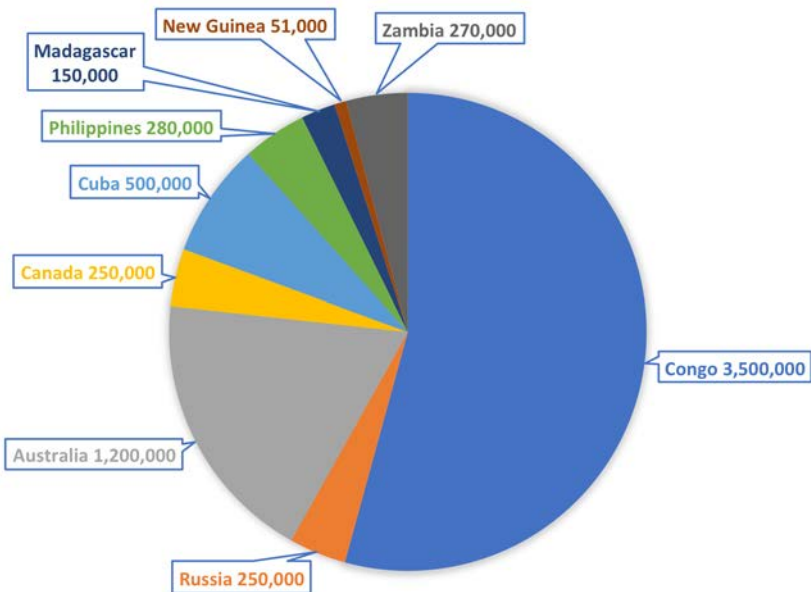
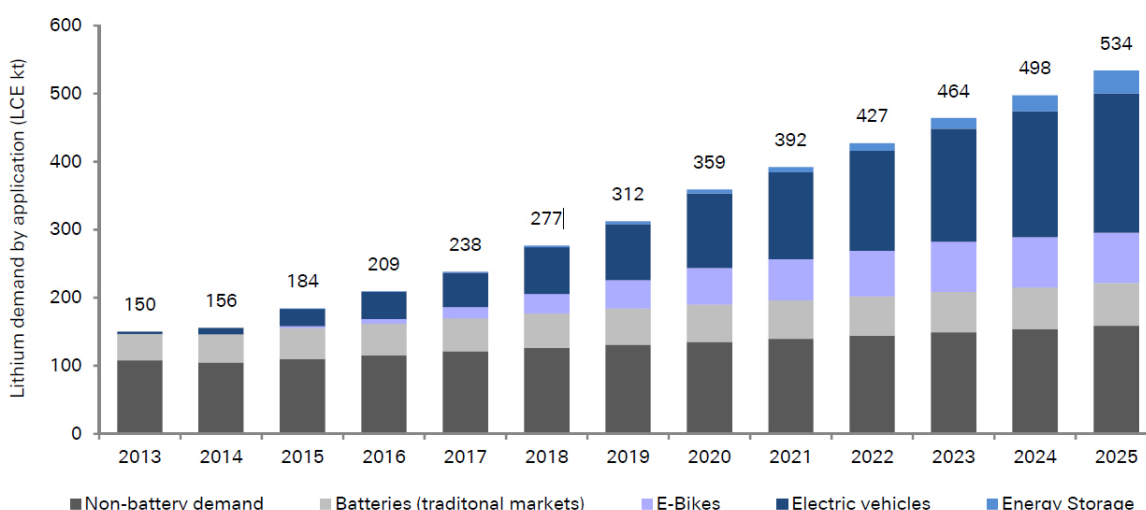


Figure 14 - World Cobalt Reserves (USGS, 2017)



Major auto manufacturers, such as Volkswagen, have heavily invested into a new range of electric vehicle models, but failed to secure a long-term supply of cobalt to use in their electric vehicle lithium-ion batteries (MINING, 2017). Despite the rise in demand from EVs, the cobalt market is already being squeezed by electronic manufacturing giants, such as Apple, who have been seeking to secure long-term supplies of cobalt directly from mining companies. With over 300 million iPhones, iPads, and MacBooks sold annually, Apple is estimated to need 4,500 tonnes of cobalt each year (Small Caps, 2018). That is just short of all the cobalt produced in Russia in 2017, which is the second largest cobalt producer.

Global demand of Lithium Carbonate Equivalent (LCE) was 184kt in 2015 and expected to reach 534kt by 2025, with more than a third of the demand credited to EVs as seen in Figure 15. Currently Argentina, Bolivia, and Chile account for 54% of the global lithium resources, also known as the 'Lithium Triangle' (Investing News, 2017). However, lithium is produced from capital intensive brine or hard rock mineral deposits, which will need to develop and increase production quickly in order to respond to market demands. Recycling spent LIBs would reduce mining impact, foreign dependence, and secure a supply of LCE.



**Figure 15 - Forecasted Lithium Demand by Application (Metals Tech, 2017)**

There is no standard lithium-ion battery used in EVs and each comes with a trade-off in Specific Energy, Specific Power, Safety, Cost and Performance that manufacturers will market their EV models with. Lithium and cobalt are required in many of the popular battery cathodes, as seen in Figure 16. While Lithium-Iron-Phosphate (LFP) and Lithium-Manganese-Oxide (LMO) configurations do not require cobalt, they are also not popular cathodes for EV batteries due to their low energy density. Existing EV battery packs either use a Nickel-Cobalt-Aluminum (NCA) or Nickel-Manganese-Cobalt (NMC) cathode. The NCA cathode is the preferred chemistry for Tesla, while manufacturers such as BMW, Nissan, and Chevrolet incorporate the NMC battery.

China is by far the largest market for EVs, representing 30% of global sales (BMO, 2018), and their top EV manufacturers, such as BYD and BAIC, have been using the LFP batteries in their models.



However, China has introduced national subsidies that favor battery cathodes with increased energy density, which has encouraged Chinese EV manufacturers to make the switch to the NMC battery (BMO, 2018).

The Lithium-Cobalt-Oxide (LCO) battery remains popular in personal electronic devices such as mobile phones and laptops due to its excellent energy density. However, its high percentage of cobalt makes it uneconomical for an EV.

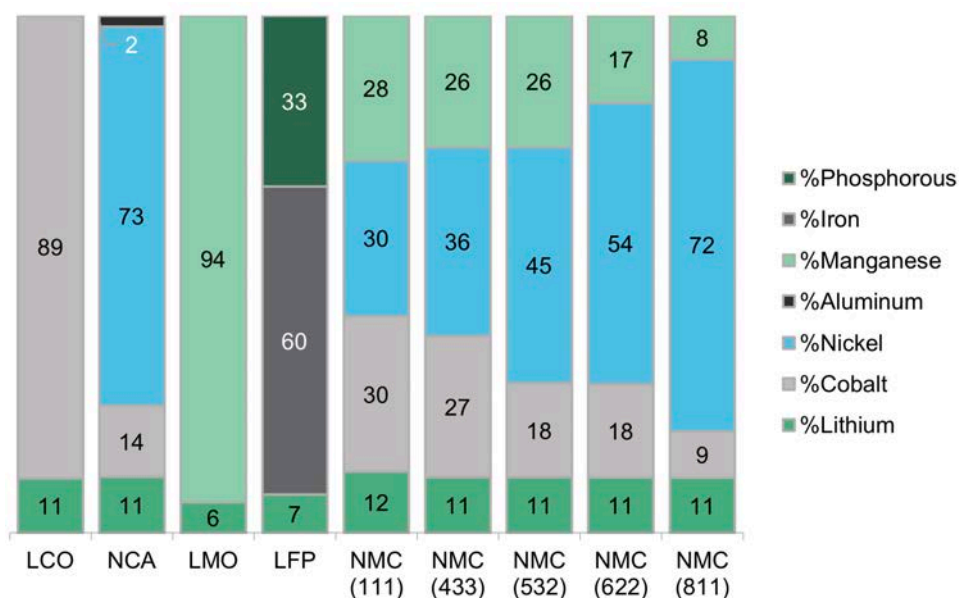


Figure 16 - Metal Composition in Popular Battery Chemistries (Bloomberg, 2017)

The battery industry is largely focused on changing the internal electrochemistry of existing LIBs, such as improving the electrodes and the electrolyte, in order to bring costs down and improve performance. Due to cobalt supply constraints, battery manufacturers are investigating opportunities to reduce cobalt content in the cathode, but not entirely remove it because it stabilizes the battery. For example, the NMC-111 is one-part nickel, one-part manganese, and one-part cobalt. By switching to an NMC-811, which is 80% nickel, 10% manganese, and 10% cobalt, manufacturers face the consequences of lower thermal stability and longevity as seen in Figure 17.

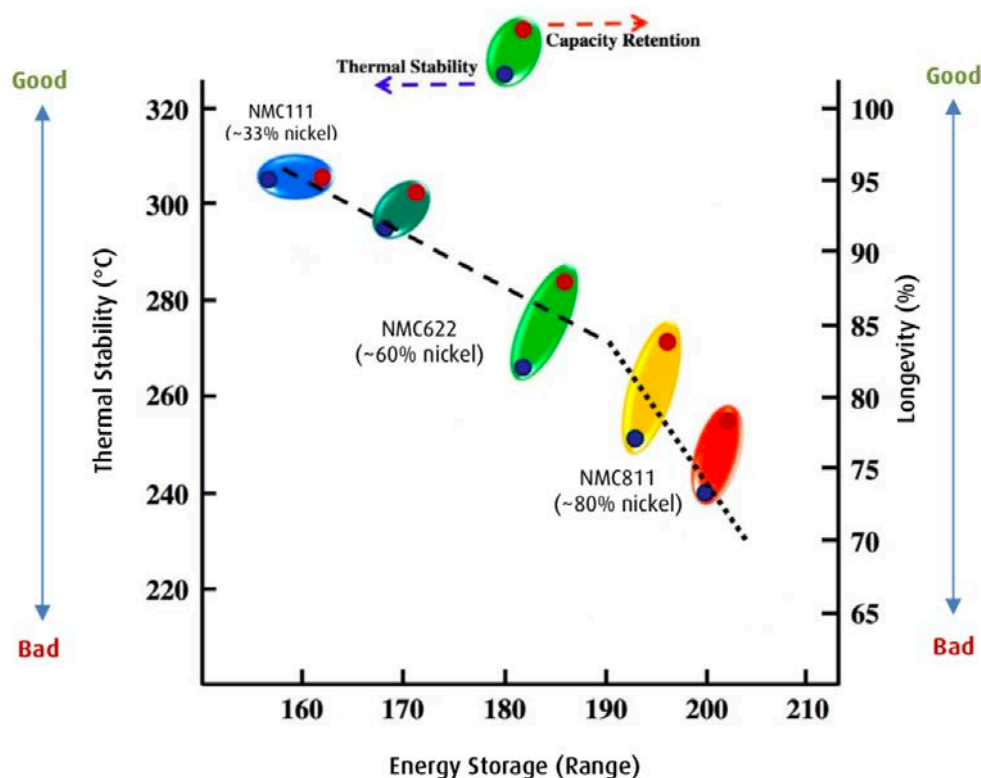


Figure 17 - Varying NMC Metal Composition (BMO, 2018)

In regards to anode improvements, Toshiba has redesigned the anode with a titanium niobium oxide material, which doubles the energy storage capacity and significantly reduces the charge time relative to the graphite-based anodes used today. These LIB improvements create more functionality and demand for the batteries, but it is not expected to affect the cathode recycling technology that AMY has developed.

Therefore, as newer battery technologies rise in expectations to beat out the lithium-ion battery, LIB improvements and infrastructure are continuing to improve on affordability and performance for the mass market. LIB manufacturing costs are forecasted to come down to \$100/kWh by 2025, compared to \$1,000/kWh back in 2010 (Clean Technica, 2017). Lower costs will increase the commercial potential of EVs at costs which are competitive to internal combustion engine vehicles.

An EV battery has a projected lifespan of 6-8 years. The number of spent EV LIBs would follow the same projected growth curve as in Figure 18, off-set by about 6-8 years. Therefore, with a projected 60 million EVs on the roads by 2040, the metal value in the eventually spent LIBs potentially makes the recycling of these metals a multi-billion-dollar industry. In contrast to mining for new metals, the metal content in a spent EV LIB is known and can be 100% recovered.

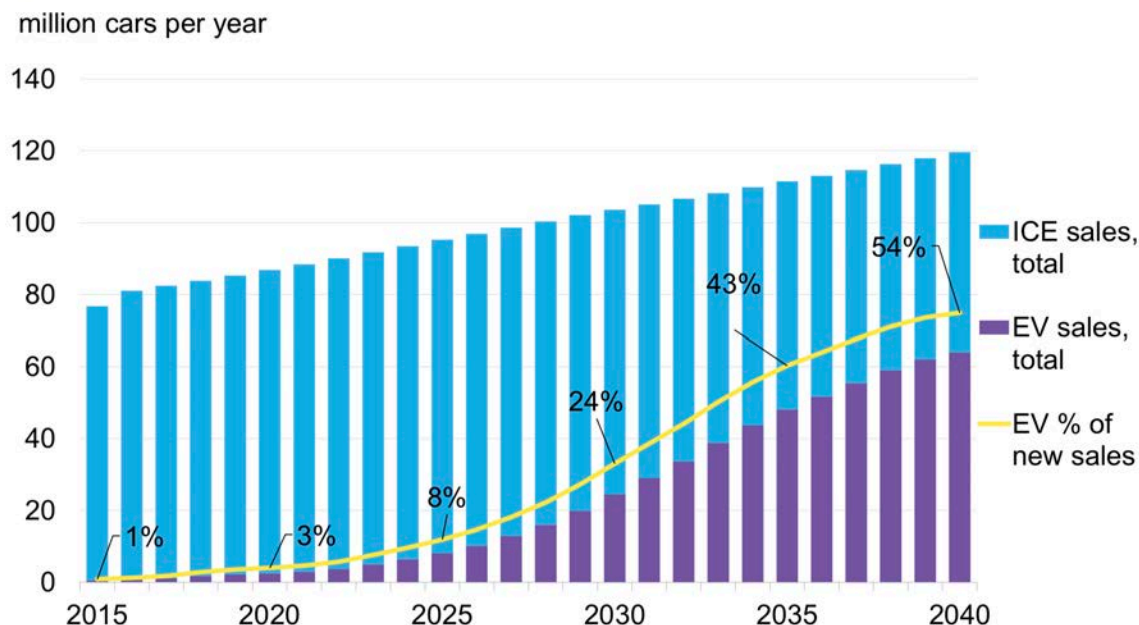


Figure 18 - Projected Electric Vehicle Sales (Bloomberg, 2017)

Recycling of spent LIBs is a certainty, thanks to ever-increasing regulations around the world. In China, legislation has been passed dictating that all Chinese EV manufacturers and importers must recycle used EV batteries. In Europe, the European Union has an EV battery recycling initiative called the European Union Battery Directive and the Canadian provinces of British Columbia, Quebec, and Manitoba all have mandatory recycling programs. Legislation in other parts of the world will continue to grow, and as the International Energy Agency (IEA) concludes, in their 2017 EV Forecast report, battery material recycling will become increasingly important and policies will need to be in place to deal with issues relating to battery ownership, transport, and recycling requirements (IEA, 2017). In addition, auto manufacturers are forming coalitions, such as *Drive Sustainability*, in order to identify and address ethical, environmental, human and labor rights issues in raw materials sourcing (Clean Technica, 2017).

Recycling competitors, such as Umicore, burn the whole battery using cheap and environmentally dangerous smelters, in a process known as pyrometallurgy. In addition, the metals recovered are in form of a low-quality slag that is useful for alloying but would need further refining to be sufficient for battery chemistry. Other known recycling competitors have reported zero or low recovery rates and have no patent applications in their current stages of research.

Strategies that place spent batteries in hazardous waste landfills, provided by companies such as Waste Management Inc., are an environmentally toxic solution that might be eventually prohibited by government and environmental policies.

Battery pack reuse options are not eliminating the need for battery recycling. Instead it is tying up the supply of critical metals needed for new EV batteries.



## AMERICAN MANGANESE INC. RECYCLING COMPETITORS

	PROOF OF CONCEPT	PATENTS	RECOVERIES		*RECOVERY METHOD
			COBALT	LITHIUM	
<b>AMERICAN MANGANESE INC.</b> SURREY, B.C. CANADA	Completed	<b>Final US Patent Application</b> Filed on November 10, 2017	<b>100%</b>	<b>100%</b>	<b>Hydro Metallurgy</b>
RETRIEVE TECHNOLOGIES	Completed	Not Found	Small Amount Not Recovered	Not Recovered	Hydro Metallurgy
WORCESTER POLYTECHNIC INSTITUTE (BATTERY RESOURCES)	Completed	US Patent Application Applied for: November 22, 2016	Not Reported	Not Reported	Hydro Metallurgy
INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA	Completed	Not Found	< 25%	< 50%	Hydro Metallurgy Plus High Cost Calcining
NEOMETALS LTD.	Completed	Patent Pending	99.2%	Not Reported	Hydro Metallurgy
UNIVERSITY OF CALIFORNIA SAN DIEGO	Completed	Not found	Not Reported	Not Reported	Heat Treating
UMICORE	Current Method of Disposal of Most Batteries	Not Patentable	40 - 70% Not Reusable in Batteries	Nil	High Cost of Smelting 'Not Environmentally Responsible'

**RECYCLE VS. REUSE**

2016 was a breakout year for the plug-in Vehicle Market which enabled cost reductions in Lithium Ion Batteries. Reuse has many Pro's and Con's such as increases cycle-life. Reuse would delay but not eliminate the need for battery recycling.

**Figure 19 - Recycling Technology Competitors**

Research for lithium-ion battery recycling is on-going worldwide, and the first group to successfully commercialize its recycling technology will set the standard for the emerging market. Recognized by institutions such as Bloomberg, AMY holds a strong position in lithium-ion battery recycling. For instance, during Samsung SDI's announcement to source cobalt from old phone batteries, they mentioned AMY as one of the leading recyclers for lithium-ion batteries (Bloomberg, 2018). Other literature and patent searches confirm that AMY's patented process for recycling cathode metals is unique technology.

AMY can recover 100% of the cathode metals from multiple chemistries such as LCO, NMC, NCA and LMO. The Company is also in a unique advantage because a Full Patent in the United States and a PCT International Patent has been filed to protect the new intellectual property that is being developed. An examination of recycling and hydrometallurgy of our competitors, as seen in Figure 19, has shown no overlapping chemistries with AMY's technology.

AMY has checked for 'Freedom to Operate' and is currently working with a patent agent and lawyer. The Company expects to file additional process improvement patents in 2018.



## OWNERSHIP AND MANAGEMENT

American Manganese Inc. is listed on the TSX Venture Exchange in Canada under the ticker symbol “AMY”; on the Frankfurt Stock Exchange under “2AM”; and on the OTC Pink Sheets under “AMYZF”. Regulatory filings for the Company can be found under its profile at [www.sedar.com](http://www.sedar.com). The Company’s shares are widely held.

The Company’s board of directors and officers are:



**Larry W. Reaugh - President & CEO, Director**

Larry Reaugh has 53 years’ experience in the mining industry and for the past thirty-seven years he has been the CEO and President of several exploration, development and production companies including 12 years in internet and technology breakthroughs listed on the TSX, TSX Venture and NASDAQ exchanges. Several of his companies have made significant discoveries, three of which (gold/silver) went on to be producing mines. Mr. Reaugh founded American Manganese Inc. in 1998 and has served as its President and CEO since that time.



**Michael MacLeod - P.Eng., MBA, Director**

Michael MacLeod has spent 40 years executing major capital projects and mine developments in the mining industry.



**Shaheem Ali - BBA, Chief Financial Officer**

Shaheem Ali is a finance and business management professional with 10 years’ experience in operations management, full cycle accounting, systems development and people management. Proven record of implementing financial and operational processes reducing operations costs and improved internal controls with Alderwoods Group Inc. where his experience includes governance and regulatory fund compliance with various states.



**Teresa Piorun - Senior Corporate Officer**

Teresa Piorun has been with the Reaugh group of companies for thirty years. Ms. Piorun is a senior corporate officer with wide-ranging responsibilities, serving as a focal point for communication with the board of directors, senior management and the company’s shareholders, and occupies a key role in the administration of critical corporate matters. She is the confidant and advisor to the CEO and other members of senior management, particularly on corporate governance affairs



**Norman L. Tribe - B.A.Sc., P.Eng., Director**

Norman Tribe is the president and principal of N. Tribe & Associates Ltd a geological contractor serving the mining industry for fifty-eight years. Mr. Tribe has a total of 58 years' experience in most phases of mining and reporting to the various government entities and stock exchanges.



**Andris Kikauka - P.Geo, Director**

Andris Kikauka is a graduate of Brock University, St. Catharines, Ont., with an Honours Bachelor of Science Degree in Geological Sciences, 1980. He is a member of the Geological Association of Canada. He is registered in the Province of British Columbia as a Professional Geoscientist.



**Jan Eigenhuis - Director**

Jan Eigenhuis is a former senior executive at Manganese Metal Company of South Africa (MMC). He currently acts as a consultant to the electrolytic manganese industry worldwide. It is notable that he counts MMC as well as the Chinese manganese producers as clients. Mr. Eigenhuis is a graduate of the University of Pretoria; B.Sc. (Chem. & Math.) and the University of South Africa; MBL (Master Business Leadership). He has 30 years of business experience in mineral beneficiation and in the electrolytic manganese metal industry.



**Ed Skoda - Director**

Edward Skoda obtained a Diploma in Mining Engineering Technology from the Haileybury School of Mines in Ontario in 1971 and a Diploma in Business Management from the British Columbia Institute of Technology in 1979. Mr. Skoda has over 30 years of experience in the mining industry in which time he has worked on many national and international projects.



**Kurt Lageschulte - Director**

Kurt Lageschulte is a Partner and Senior Analyst at Broadbill Investment Partners, LLC in New York. Broadbill Partners is an investment firm with offices in New York, Florida and California and currently has \$130 million of assets under management across four managed funds. Kurt is a founding partner at Broadbill, and was previously employed as a Senior Analyst with Aspen Advisors from 2002 to 2010. Kurt has worked as an advisor and active member of a number of committees. Most recently, he has advised the Special Committee of the Penn Treaty American Company board in a complex negotiation with industry regulators. Kurt's experience in the energy, renewable and mining industries, coupled with significant expertise in the capital markets will enable Kurt and the Broadbill team to help American Manganese in the reaching of its goals in the coming years.



#### **Shailesh Upreti - Advisory Board**

Shailesh Upreti is a well-respected lithium-ion technology expert and inventor of multiple breakthrough technologies. An IIT Delhi graduate, Mr. Upreti has worked closely with Professor Stan Whittingham in the past and holds multiple US patents and their foreign equivalents in more than 30 countries. In addition to his technical degree he has a second masters in international business management in combination with extensive experience as an entrepreneur. Shailesh has successfully brought more than 5 different technologies to market including one in the material recycling space. His 16 years of extensive experience includes bringing new products to market, business development, lithium-ion supply chain & industry networking, downstream processing and investigating organizational performance gaps. He is well integrated into the global battery industry and serves on various advisory boards. Shailesh is particularly adept in defining corporate commercial objectives, business support programs and achieving organizational goals while bringing new technology to market.



#### **David Langtry - Technical Advisor**

David Langtry has been a businessman since 1964 when he joined Langtry Agencies, a company which expanded nationally to become Langtry Industries and was sold in 2011 to ITOCHU, a Japanese conglomerate specializing in commodities. Mr. Langtry currently owns and operates Raider Hansen Inc., an industrial supplies company having 10 locations throughout British Columbia, as well as GRE Manufacturing, a glass recycling company. He also holds 10 worldwide patents. Mr. Langtry has a life time of experience in technology and financial markets.



#### **Daniel McGroarty - Strategic Advisor**

Daniel McGroarty has consulted for nearly two decades to firms in the resource sector, with a focus on strategic and critical metals. He is principal of the non-profit American Resource Policy Network, a resource development think tank. He has served as a critical materials subject-matter expert for the U.S. GAO; testified before the energy and natural resource committees of the U.S. House and Senate; consulted to the Institutes for Defense Analyses, which provides research and analytical work to the U.S. Department of Defense for its National Defense Stockpile reports; and currently serves as Adjunct Professor at The George Washington University Graduate School of Political Management. Prior to establishing his consultancy, Dan served as Special Assistant to the President in the White House and as presidential appointee to two Secretaries of Defense.



## APPENDIX – FINANCIAL STATEMENTS

### AMERICAN MANGANESE INC.

Consolidated Statements of Financial Position

As at July 31, 2017 and July 31, 2016

(Expressed in Canadian dollars, unless specifically indicated otherwise)

	July 31, 2017	July 31, 2016
<b>Assets</b>		
<b>Current</b>		
Cash and cash equivalents	\$ 486,088	\$ 78,434
Amounts receivable (Note 6)	66,087	34,986
Prepaid expenses	233,541	34,048
	785,716	147,468
<b>Non-current</b>		
Reclamation deposits	38,772	39,919
Exploration and evaluation assets (Note 8)	5,021,687	5,210,964
<b>Total assets</b>	<b>\$ 5,846,175</b>	<b>\$ 5,398,351</b>
<b>Liabilities</b>		
<b>Current</b>		
Accounts payable and accrued liabilities (Note 6)	\$ 374,952	\$ 820,741
Payable to related parties (Note 7b)	7,093	152,382
<b>Total liabilities</b>	<b>382,045</b>	<b>973,123</b>
<b>Equity</b>		
Share capital (Note 9)	\$ 25,772,440	\$ 23,933,531
Prepaid share subscriptions	5,500	-
Share-based payments reserve	4,102,225	3,627,551
Warrants reserve	4,126,613	3,182,502
Accumulated other comprehensive income	2,166,639	2,383,997
Deficit	(30,709,287)	(28,702,353)
<b>Total equity</b>	<b>5,464,130</b>	<b>4,425,228</b>
<b>Total liabilities and equity</b>	<b>\$ 5,846,175</b>	<b>\$ 5,398,351</b>

Nature and Continuance of Operations (Note 1)

Commitments (Note 13)

Subsequent events (Note 16)

The accompanying notes are an integral part of these consolidated financial statements

Approved on behalf of the Board of Directors and authorized for issue on November 28, 2017

Larry W Reaugh

Director

Michael MacLeod

Director



# AMERICAN MANGANESE INC.

Consolidated Statements of Comprehensive Loss

For the years ended July 31, 2017 and 2016

(Expressed in Canadian dollars, unless specifically indicated otherwise)

	2017		2016	
<b>Expenses</b>				
Administration (Note 10)	\$	2,003,919	\$	308,566
Loss from operations		2,003,919		308,566
Finance income		(86)		(32)
Foreign exchange loss		3,101		-
Gain on sale of marketable securities		-		(30,264)
Impairment of mineral properties		-		532,000
<b>Loss for the year</b>		<b>2,006,934</b>		<b>810,270</b>
<b>Other comprehensive loss</b>				
Foreign currency gain (loss) on translation of subsidiary	\$	(217,358)	\$	3,641
(Realized) unrealized gain on marketable securities		-		(37,400)
<b>Other comprehensive loss for the year</b>		<b>(217,358)</b>		<b>(33,759)</b>
<b>Total comprehensive loss for the year</b>		<b>2,224,292</b>		<b>844,029</b>
<b>Basic and diluted loss per share</b>	\$	<b>(0.01)</b>	\$	<b>(0.01)</b>
<b>Weighted average shares outstanding (basic and diluted)</b>		<b>138,141,848</b>		<b>116,561,154</b>



# AMERICAN MANGANESE INC.

Consolidated Statements of Changes in Equity

For the years ended July 31, 2017 and 2016

(Expressed in Canadian dollars, unless specifically indicated otherwise)

	Number of shares	Share capital	Prepaid share subscriptions	Share-based payments reserve	Warrants reserve	Deficit	Accumulated other comprehensive income (loss)	Total equity
	(Note 9)	(Note 9)		(Note 9)	(Note 9)	(Note 9)	(Note 9)	
<b>Balance, July 31, 2015</b>	<b>112,725,880</b>	<b>\$ 23,897,993</b>	<b>\$ -</b>	<b>\$ 3,535,273</b>	<b>\$ 2,997,040</b>	<b>\$ (27,892,083)</b>	<b>\$ 2,417,756</b>	<b>\$ 4,955,979</b>
Share-based compensation	-	-	-	92,278	-	-	-	92,278
Issued for services	1,800,000	27,000	-	-	-	-	-	27,000
Issued pursuant to private placement	10,025,000	200,500	-	-	-	-	-	200,500
Cost of share issuance	-	(6,500)	-	-	-	-	-	(6,500)
Warrants issued with private placement	-	(185,462)	-	-	185,462	-	-	-
Loss for the year	-	-	-	-	-	(810,270)	-	(810,270)
Other comprehensive income (loss) for the period	-	-	-	-	-	-	(33,759)	(33,759)
<b>Balance, July 31, 2016</b>	<b>124,550,880</b>	<b>\$ 23,933,531</b>	<b>\$ -</b>	<b>\$ 3,627,551</b>	<b>\$ 3,182,502</b>	<b>\$ (28,702,353)</b>	<b>\$ 2,383,997</b>	<b>\$ 4,425,228</b>
Share-based compensation	-	-	-	582,032	-	-	-	582,032
Issued pursuant to private placements	15,290,316	2,349,505	-	-	-	-	-	2,349,505
Cost of share issuance	-	(156,843)	-	-	-	-	-	(156,843)
Warrants issued with private placement	-	(1,048,943)	-	-	1,048,943	-	-	-
Issued pursuant to options exercise	2,450,000	284,858	-	(107,358)	-	-	-	177,500
Issued pursuant to warrants exercise	5,509,999	410,332	-	-	(104,832)	-	-	305,500
Prepaid share subscriptions	-	-	5,500	-	-	-	-	5,500
Loss for the year	-	-	-	-	-	(2,006,934)	-	(2,006,934)
Other comprehensive income (loss) for the period	-	-	-	-	-	-	(217,358)	(217,358)
<b>Balance, July 31, 2017</b>	<b>147,801,195</b>	<b>\$ 25,772,440</b>	<b>\$ 5,500</b>	<b>\$ 4,102,225</b>	<b>\$ 4,126,613</b>	<b>\$ (30,709,287)</b>	<b>\$ 2,166,639</b>	<b>\$ 5,464,130</b>



## AMERICAN MANGANESE INC.

Consolidated Statements of Cash Flows

For the years ended July 31, 2017 and 2016

(Expressed in Canadian dollars, unless specifically indicated otherwise)

	2017	2016
<b>Cash flows used in operating activities</b>		
Loss for the year	\$ (2,006,934)	\$ (810,270)
Items not affecting cash:		
Impairment of mineral properties	-	532,000
Stock based compensation	582,032	92,278
Gain on sale of marketable securities	-	(30,264)
Shares issued in lieu of cash	-	27,000
Net changes in non-cash working capital items related to operations:		
Amounts receivable	(31,101)	(3,411)
Prepaid expenses	(199,493)	(33,000)
Accounts payable and accrued liabilities	(445,789)	30,980
Payable to related parties	(145,289)	37,574
Net cash used in operating activities	(2,246,574)	(157,113)
<b>Cash flows from (used in) investing activities</b>		
Exploration and evaluation expenditures	(24,310)	(6,217)
Proceeds from sale of marketable securities	-	45,564
Net cash from (used in) investing activities	(24,310)	39,347
<b>Cash flows from financing activities</b>		
Net proceeds from issuance of shares	2,675,662	194,000
Prepaid share subscriptions	5,500	
Net cash from financing activities	2,681,162	194,000
Effect of foreign exchange rates on cash and cash equivalents	(2,624)	-
<b>Increase in cash and cash equivalents</b>	<b>407,654</b>	<b>76,234</b>
<b>Cash and cash equivalents, beginning of the year</b>	<b>78,434</b>	<b>2,200</b>
<b>Cash and cash equivalents, end of the year</b>	<b>\$ 486,088</b>	<b>\$ 78,434</b>



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