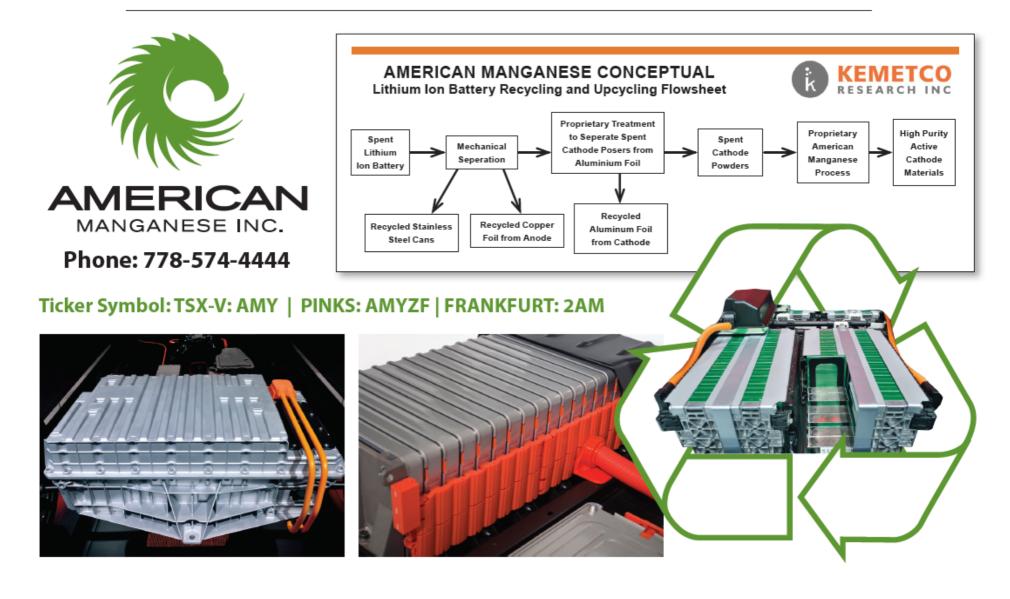
# american manganese inc.com A Critical Metal Company Focusing on Recycling Lithium Ion Electric Vehicle Batteries



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# INDEX

- 4. Summary
- 5. Share Capital
- 6. Biography of Presenter
- 7. Corporate Objective and Strategy
- 8. Technology History
- 9. Recycling Technology
- 10. The Problem
- 11. The Opportunity
- 12. Customers
- 13. Market Size
- 14. Competitors
- 15. Battery Chemistry & Economics

- 16. Cathode Materials are Critical & Strategic
- 17. Cobalt Production Dynamics
- 18. Cobalt Production Chart
- 19. Cobalt Twelve (12) Year Chart
- 20. Cobalt Produced Annually
- 21. Global Lithium Prices
- 22. Disassembly of a Tesla Battery Cell
- 23. Milestones
- 24. Summary
- 25. Further Information



#### **SUMMARY**

- Leader in Lithium Ion Electric Vehicle Battery Recycling
- Mining Batteries Eliminates Mining Ore
- Valuable Cathode Materials (Cobalt) Delivered to Our Door Step (\$3.00/lb Tipping Fee)
- Business Opportunity in Recycling Plants
- Equity Investment Participation in Disruptive Technology Critical to the Production of Electric Cars



#### **AMERICAN MANGANESE INC. - SHARE CAPITAL**

#### Shares Structure – April 3, 2017

Market Cap Undiluted	\$30.0 Million				
Diluted	\$35.8 Million				
Basic Issued & Outstanding Shares	139,647,169				
Warrants and Options Shares	31,059,790				
Fully Diluted	170,706,959				
Warrants and Options Diluted \$	\$3,472,308				
52-Week High/Low	C\$0.38 - \$0.01				
Listing: Common Shares	TSX.V: AMY				
Pink Sheets: AMYZF.pk Frank: 2AM					



#### **BIOGRAPHY OF THE PRESENTER**

#### LARRY W. REAUGH

President and Chief Executive Officer of American Manganese Inc. from February 1998 to present.

Mr. Reaugh has fifty-three years' experience in the mining industry and for the past thirty-five years he has been the CEO & President of several exploration, development, production companies and 12 years in internet and technology companies listed on the TSX, TSX Venture and NSDAQ exchanges.

Several of his companies have made significant discoveries, three of which (gold) went on to be producing mines.

Through his career, Mr. Reaugh has raised in excess of \$300 million for junior resource mining companies. Part of this is the \$25 million dollars raised for AMY over the past eighteen (18) years.





#### **CORPORATE OBJECTIVE & STRATEGY**

#### CORPORATE OBJECTIVE

A diversified critical metals company focusing on upcycling Lithium Ion Electric Vehicle Batteries.

#### CORPORATE STRATEGY

To recycle valuable cathode materials for the global lithium electric vehicle battery industry. The process eliminates the need for heat and furnaces, as the recovery of the metals take place at ambient temperatures. The result is a cleaner, environmentally sustainable, robust recycling alternative to current disposal methods.





## **TECHNOLOGY HISTORY**

The recycling opportunity currently underway has its roots in American Manganese Inc.'s technology for economically producing Electrolytic Metals (EM) from very low grade deposits located at Artillery Peak, Arizona. Normal process utilize grades from 35-55% Mn whereas Artillery grades range from 2-3%. Artillery Peak is the largest deposit of Manganese in the U.S. with a potential of billions of pounds available. Partially answers U.S. concern for Strategic Metals.

The process is patented in the U.S., China and South Africa. American Manganese was successful where the U.S. Bureau of Mines tried and failed to produce EM economically for approximately sixty years. Kemetco recognized the process could be adapted to Recycling Electric Vehicle Batteries.



## **RECYCLING TECHNOLOGY**

The following achievements have been realized as follows:

- Cathode materials such as lithium & cobalt have returned extractions of 100%.
- Precipitation tests have recovered 100% of cobalt and 87% of the lithium. (tests yet to be to be completed on Nickel and Manganese.
- Production of rechargeable Lithium Cobalt prototype button batteries have been successfully completed.
- A US provisional patent was applied for on November 11, 2016.



## THE PROBLEM

- Currently Recycling EV Batteries Consists Of Storage (Landfill) &/or Pyrometallurgical Processes (Burning In Smelters)
- China Has Legislated That All EV Manufacturers And Importers Come Up With A Feasible Recycling Program
- European Union Has Set A Timeline For Battery Manufactures And Importers To Recycle Spent Lithium Ion Batteries
- Canada Has Three (3) Provinces With Mandatory Recycling Programs
- In the US there is no Federal Regulations for Battery Recycling, some States do.



#### THE OPPORTUNITY

American Manganese Inc. Has Developed A Robust Recycling Solution that is Closed Loop and Reduces the Need For New Mines, Landfill Waste, Energy Consumption, Co<sub>2</sub> Emissions and Critical and Strategic Metal Consumption.





## **CUSTOMERS**

- Battery Manufactures
- Electric Vehicle Manufactures
- Commodity Firms wanting Off-take Agreements
- Mining Companies (company presenting at the Cobalt Institution in Morocco May 17, 2017)
- Large Corporations looking to partner on our Technology
- Mining Companies Expanding into Different Mining Streams.
- Oil Companies expanding into alternative energy



#### **MARKET SIZE**

- 2015 276,000 EV Batteries reached the end of Life
- 2020 356,000 will reach their end of life
- 2025 849,000 will reach their end of life
- 2040 Estimates of 40 million EV Vehicles will be in service
- Emerging Lithium Ion Storage Batteries opens a huge new area of opportunity



## **RECYCLING COMPETITORS**

	PROOF OF CONCEPT	PATENTS	RECOVERIES		*RECOVERY METHOD	
AMERICAN MANGANESE INC. SURREY, B.C. CANADA	Completed	US Patent Application Applied for: November 11, 2016	COBALT 100%	LITHIUM 87%	Hydro Metallurgy	
RETRIEVE	Completed	Not Found	Small Amount Not Recovered	Not Recovered	Hydro Metallurgy	
WORCESTER POLYTECHNIC INSTITUTE	Completed? No Information	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	
BURNING BATTERIES IN SMELTERS ANYWHERE IN THE WORLD	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 reduces cycle-life. Reuse would delay but not eliminate the need for battery recycling.

\*Management & Kemetco's Examination of recycling and Hydro Metallurgy of our competitors has shown no overlapping chemistries with our Technology. American Manganese's process strongly suggests leadership in the Competing Technologies



## **BATTERY CHEMISTRY & ECCONOMICS**

At current metal prices, the gross contained metal value of the cathode materials in a typical 85 kWh electric vehicle (EV) battery pack, weighing about 500 kg, for the most popular battery chemistries are estimated as follows:

		BATTERY CHEMISTRY					IN BATTERY	BATTERY \$6.60/kg
		LITHIUM	COBALT	NICKEL	MANGANESE	ALUMINIUM		TIPPING
	Price (\$/kg)*	\$42.29	\$54.00	\$10.14	\$1.98	\$1.80		
Lithi	um Cobalt (LCO)	11kg	93.7kg	0kg	0kg	0kg		\$3.00/lb
	Est. Value	\$465.19	\$5,059.80	\$~	\$~	\$~	\$5,524.99	\$3,300.00
Nickel Mangane	se Cobalt (NMC)	9.7kg	27.5kg	27.4kg	25.6kg	0kg		
	Est. Value	\$410.21	\$1,485.00	\$277.84	\$50.69	\$~	\$2,223.74	\$3,300.00
Nickel Cobalt A	luminium (NCA)	8.5kg	10.9kg	57.7kg	0kg	1.7kg		
	Est. Value	\$359.47	\$588.60	\$585.08	\$~	\$3.06	\$1,536.20	\$3,300.00

#### Tonnes of Cobalt per 100,000 batteries

LCO 9,370 tonnes NMC 2,750 tonnes NCA 1,090 tonnes

\*Converted from carbonate to metal prices for Nickel, Aluminium are sourced from Kitco.com; for Electrolytic Manganese Dioxide at USGS; for Lithium sourced from the Outsiders Club, and Cobalt from infomine.com



#### **CATHODE MATERICALS ARE CRITICAL & STRATEGIC**

- Cobalt: Currently in deficit supply, critical for Lithium Ion Batteries and up over 150% in the past year to \$24.50/Lb. \$54.00/Kg. (U.S.) - (\$54,000/tonne)
   Present Price \$25.40/Ib - \$56.00/Kg (U.S.) - (\$56,000/Tonne)
- Lithium: predicted to be in deficit supply trading at \$9,000/tonne. In some cases twice that in China
- Nickel: Possibly entering deficit supply trading at \$11,000/tonne
- Manganese: bullish reports for electrolytic manganese dioxide for battery storage will significantly boost consumption. Currently \$2,000/tonne
- Aluminum: Currently \$1,950/tonne



## **COBALT PRODUCTION DYNAMICS**

While global production of refined cobalt surged from 52,400 tons in 2005 to 99,000 tons in 2015, the bulk of the increase was attributable to new capacity from African copper mines. In addition to thorny regulatory issues for companies that buy metals from African miners, metal production from African mines is not necessarily reliable.

According to the Cobalt Development Institute, the battery industry uses 41% of global cobalt supplies. Over the next 10 years, that percentage will increase to about 65%. While there is limited competition in the global markets for lithium. Cobalt provides the high energy density for Lithium Ion Batteries.

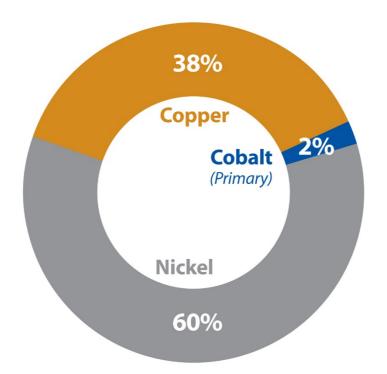
Tesla cannot launch a \$35,000 Model 3 without a Giga-Factory that's operating at or near its design capacity of 35 GWh per year. This will require about 7,800 tonnes of cobalt per year.

The bottom line for investors is, "AMY'S EV Battery Recycling Plan will could alleviate the cobalt shortage and replace a large percentage of future mining requirements."



## **COBALT PRODUCTION**

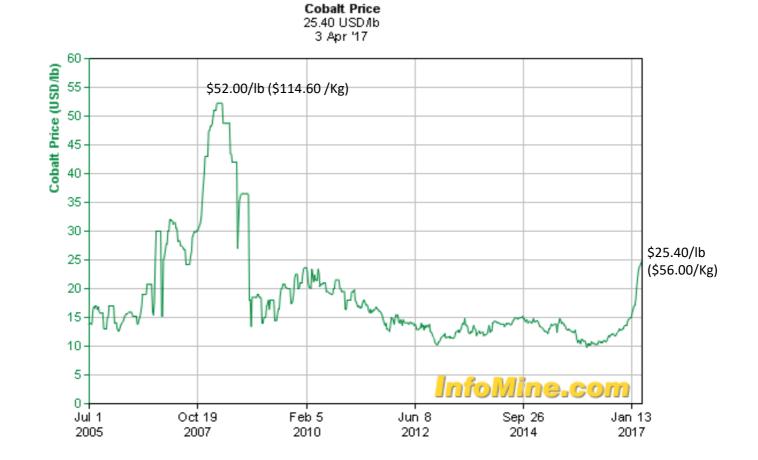
#### Most Cobalt production is mined as a by-product



This means it is hard to expand Cobalt production when more is needed

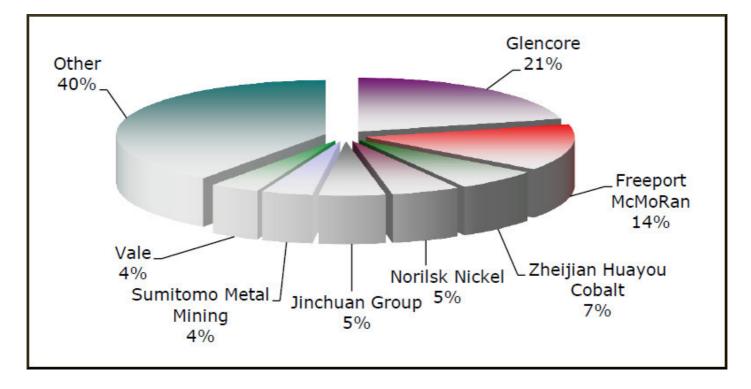


#### **COBALT 12 YEAR CHART**





#### **COBALT 100,000 TONNES PRODUCED ANNUALLY**



96% of Cobalt Comes as a By-product of Mining Nickel & Copper Deposits.
56% Is Produced In The Democratic Republic Of Congo a Country Sanctioned for Human Rights Abuse.

50% of The World Cobalt is Refined in China.



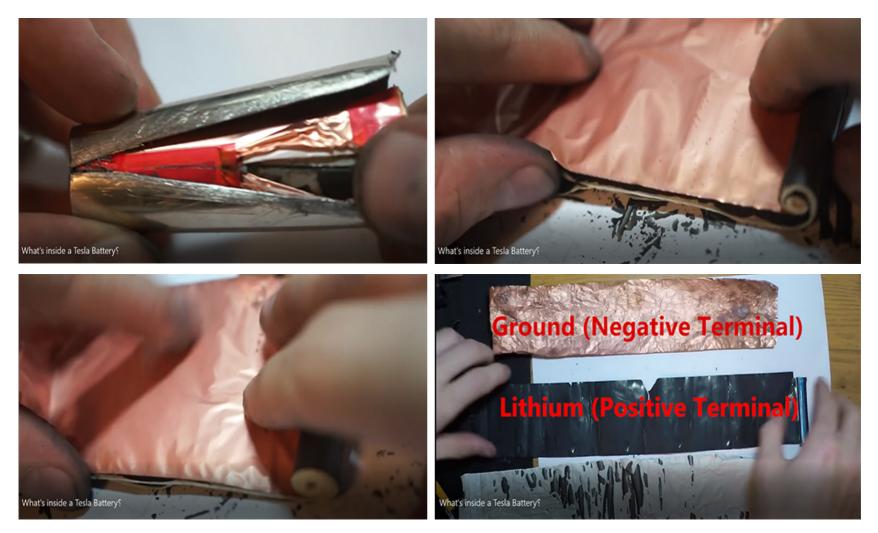
## **GLOBAL LITHIUM PRICES**





Slide No. 21– April 5, 2017

#### **DISASSEMBLY OF A TESLA BATTERY**



The Company is collaborating on Automating a Disassembly Line for Lithium Ion Battery Cells



## **MILESTONES**

- Completed Proof of Concept 2016
- Filed for US Provisional Patent 2016
- Raised a minimum of \$2,000,000 2016
- Completed Leaching Precipitation Testing on Lithium/Cobalt 2017
- Complete Leaching Precipitation Testing on Nickel/Manganese 2017
- File for Full U.S. Patent and Other Jurisdictions 2017
- Raise from \$10-\$25 Million dollars with Participation Partner 2017-2018
- Begin Pilot Plant build from Pilot work 2018
- Design Battery Disassembly Plant 2018
- Hire Engineering Firm to Estimate Costs of Operating and Capital Costs
   2018-2019
- Complete Environmental Permitting 2019
- Raise Capital and Build Operating Portable Plant 2019-2020



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#### **FURTHER INFORMATION**

CONTACT

Larry W. Reaugh, President, C.E.O. and Director

17942 55<sup>th</sup> Avenue, Suite #2

White Rock, B.C. V4B 1E6

Ph.: 778-574-4444

Email: <a href="mailto:lreaugh@amymn.com">lreaugh@amymn.com</a>

Website: www.americanmanganeseinc.com

