manganese
X Energy Corp

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A UNIQUE INVESTMENT OPPORTUNITY UNCOVERED

- We have uncovered a unique investment opportunity to take advantage of a growing change in material to the lithium battery - **MANGANESE**
- Market Growth: Not just about Electric Vehicles (EV) anymore
  - Surge in demand from EV
  - New utility storage devices are being launched
  - Major commercial interest in back up and off-grid power

Auto

Mercedes-Benz

Utility/Energy

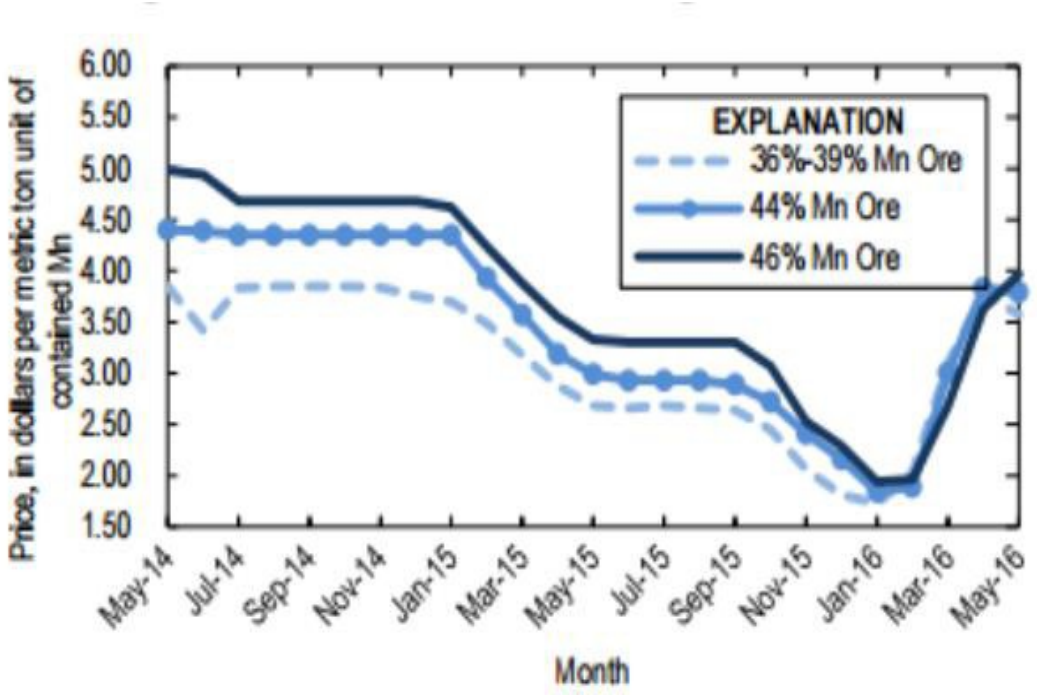
Technology

WHY MANGANESE (Mn) MATTERS

- Manganese (**Mn**) is among the most widely used metals in the world, fourth after iron, aluminum, and copper.
- Using **Mn** can significantly bring down the manufacturing cost of lithium ion batteries which is a major factor in the high cost of EV.
- 90% of manganese is now used in the steel industry.
- Presently, there are **no producing manganese mines in North America.**

MANGANESE PRICE DOUBLED IN 5 MONTHS

USGS Mineral Industry Surveys



CATALYST – NEW LITHIUM-ION CHEMISTRIES

Lithium Cobalt Oxide

- High energy density

BUT

- Longer to charge
- Short lifespan

Nickel Cobalt Aluminum (NCA)

- Good specific energy
- Good energy density

BUT

- High raw material cost
- Safety Issues i.e. explosion

Nickel Manganese Cobalt (NMC)

- Ability to tailor to energy or power
- Low raw material cost
- Prolonged lifespan
- Reduced battery charging time

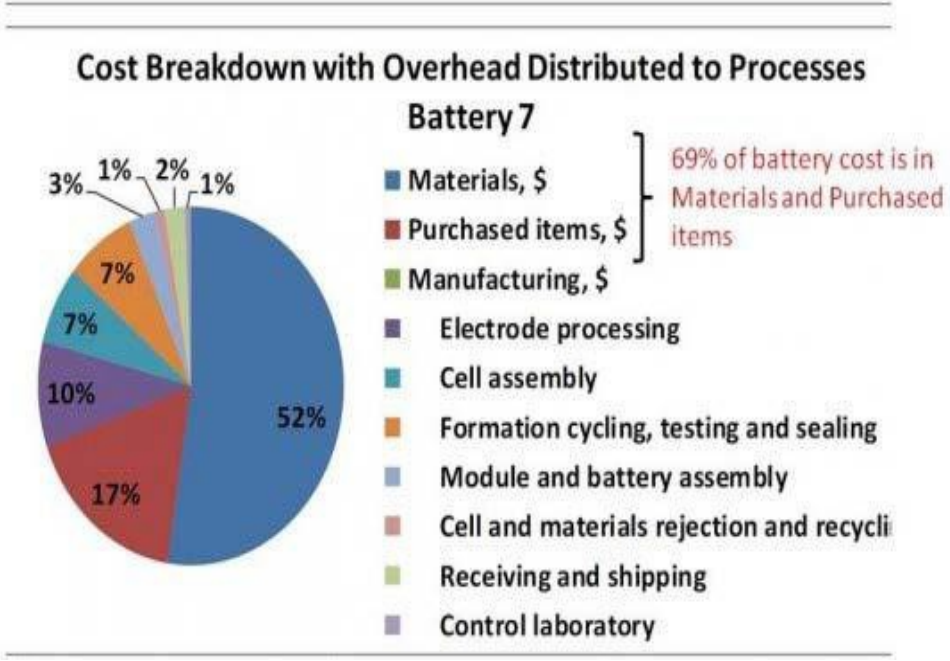
NMC batteries are becoming the rechargeable battery of choice for next generation industrial and automotive uses.

MANGANESE IS MUCH CHEAPER THAN COBALT

Fig 4

Overall Cost breakdownfor16kwh Battery

LMO Chemistry (Volt)



- **52%** of battery cost is in raw materials
- The first generation of lithium batteries were made from lithium cobalt oxide (NCA) which are used by Tesla.

*"**Lowering battery cost via changes to cell chemistry** and Giga factory scale benefits are **critical determinants of Tesla's ability to sell** an affordable Model 3 starting at $35K. Our analysis details a potential path to a **30% cell level cost reduction to ~$88/kWh** by using a **more efficient** lithium-rich **nickel cobalt manganese cathode** (vs. NCA)"*

Jefferies Equity Research SVP – Dan Dolev

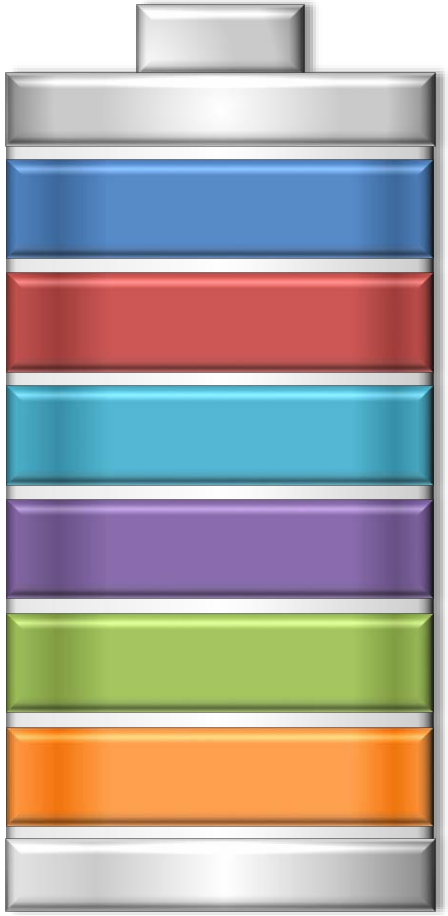
ADVANTAGES OF MANGANESE BATTERIES

- **Manganese** currently sells for **$1.14/lb** and provides **a cheaper option as the Tesla** battery accounts for **50%** of the price of the car.
- If cobalt prices were to reach around $15/lb (they are currently closer to $14/lb), cobalt-based energy storage systems may not be competitive in the medium to long term.

Argonne National Laboratory (Chicago)

- Argonne's **NMC** formulation is **significantly cheaper** than Elon Musk's NCA batteries. NCA costs $60 per kilowatt hour compared with $45 for Argonne's NMC.

MINE TO BATTERY MARKET STRATEGY
VALUE ADDED PRODUCTS - HIGHER ROI



Manganese X Energy will focus on **Electrolytic Manganese Dioxide (EMD)**.

EMD is a value added material to manganese like spherically coated graphite is to graphite.

EMD is **the critical component of the battery cathode mix** in today's alkaline & lithium ion batteries.

EMD is also well suited for cathode mix in **bulk energy storage & energy management** for portable power and integrating solar and wind renewable energy.

BE EARLY AND PROSPER
Graphite, Lithium & Cobalt trends lead the way

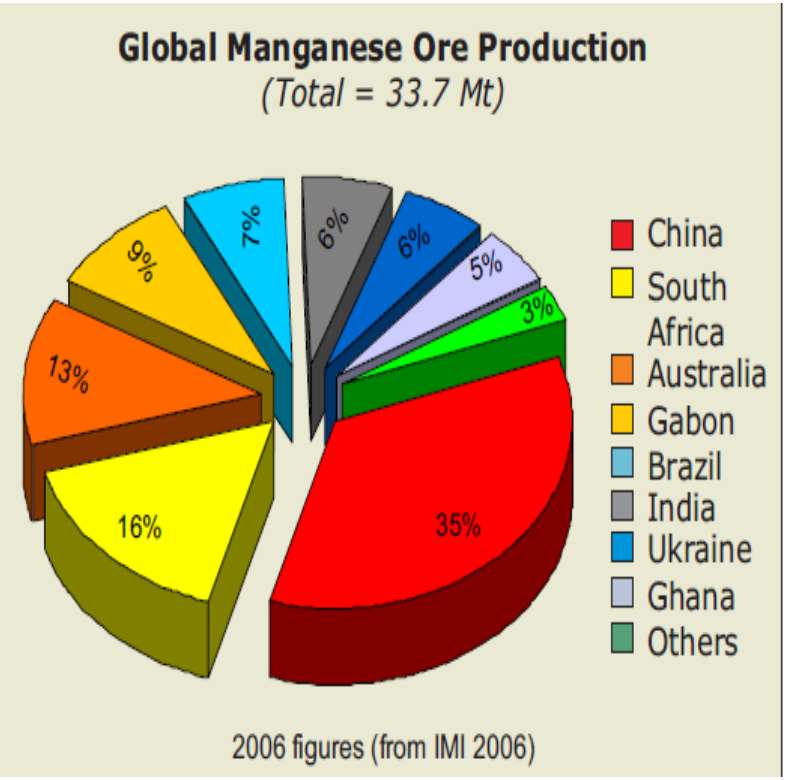
The drive in Li-ion battery demand caused a multi-year surge in junior mining companies that targeted the material supply chain.

Given that **more battery makers are using manganese** (NMC) in their cathode mix, we believe environmentally friendly manganese miners will catch **the next upside trend**.

INDUSTRY TREND – Going to Manganese

- 3M has its own patented **NMC**, based on work done by **Dr. Jeff Dahn** at **Dalhousie University.**
- LG Chem uses 3M's formulation of NMC and supplies its **NMC**-based Li-ion cells to Chevy Volt and Nissan Leaf.
- General Electric has selected the Li-**Mn**O2, system as it offers the best balance of safety and performance.
- BMW i3 also use **NMC** batteries.
- **Tesla recently signed 5-year exclusive partnership with Jeff Dahn**, a prominent **NMC battery researcher** to explore reducing the costs of its batteries.

NORTH AMERICA IS 100% DEPENDENT ON IMPORTED MANGANESE



- Manganese is currently mined in China, South Africa, Australia, Brazil, Gabon, Ukraine, India, Ghana and Kazakhstan.
- Problems with the deposits in developing countries
  - Environmentally damaging
  - Sustainability issues
  - Human rights issues
  - Political changes leading to mine seizures
- North America is 100% dependent on imported manganese.
- Presently, there are no producing manganese mines in North America.
- Manganese is listed as a key Strategic Metal for military hardware according to the US Department Of Defense.

CRITICAL ISSUES WITH CURRENT MANGANESE SUPPLIERS

China

- Horrible working conditions for workers
- Highly fragmented industry within China
- Lower grade and hard to mine and extract
- Most producers use a leaching process which requires a high quantity of sulfuric acid which causes significant environmental problems
- China adds a 20% export duty on Manganese exports in an attempt to curtail the outflow of the metal and the US imposes a 14% import duty

South Africa

- Oxide deposits are not optimal for battery grade manganese
- High grade - Uses high temperature roasting, this method works only for high grade manganese generally more than 35% grades but energy intensive
- Infrastructure issues - Restrictions on rail and port

WOODSTOCK MANGANESE DEPOSIT

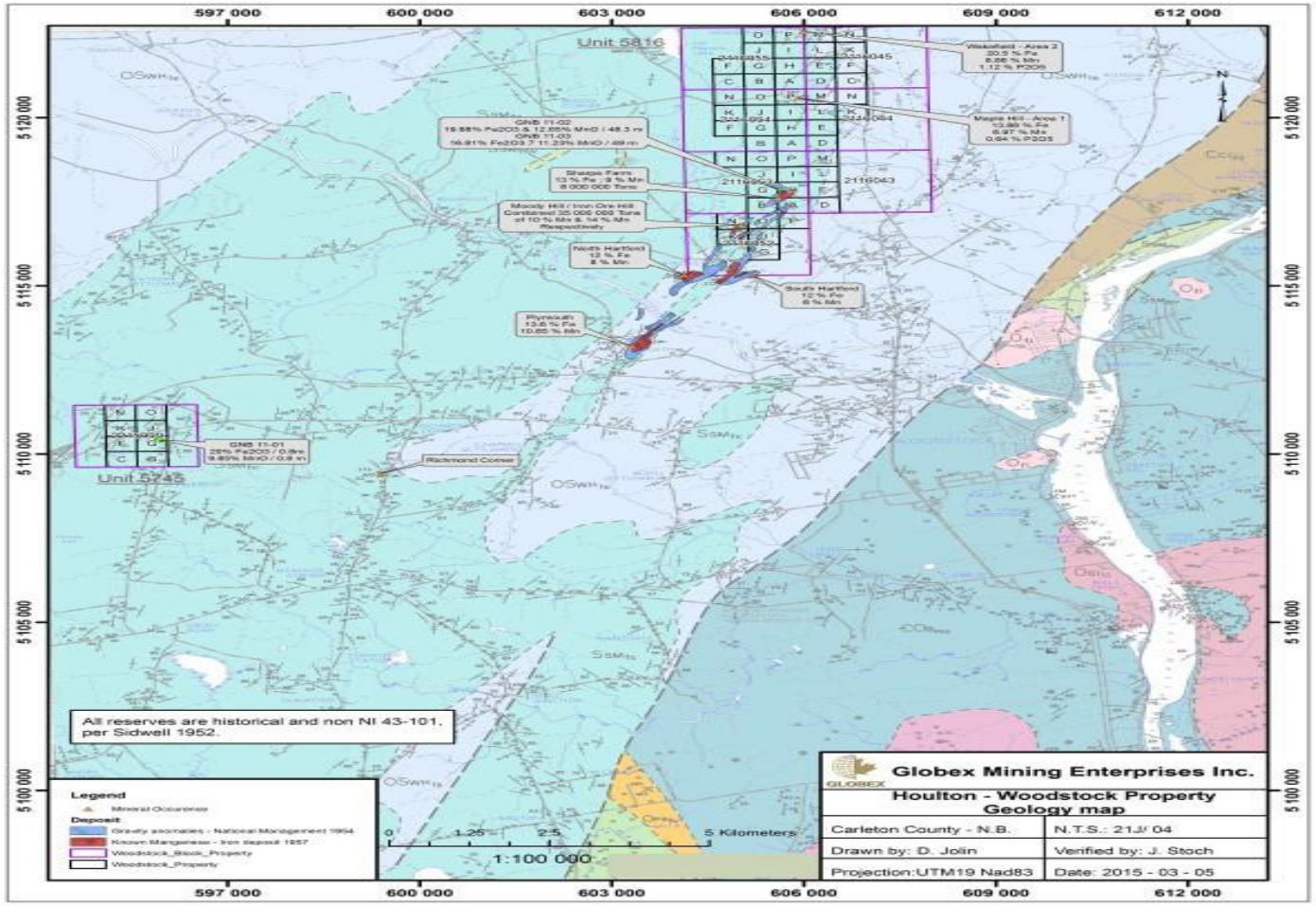
Property

The Houlton Woodstock property consists of 56 claims totaling 896 hectares located in Carlton County, New Brunswick that encompasses four Manganese zones: Iron Ore Hill, Moody Hill, Sharpe Farm and Maple Hill.

Exploration and Development

In 2011 two diamond drill holes were collared in the area of Iron Ore Hill to test at depth near the historic workings. Sampling from wide intervals of this mineralization returned assays greater than 11% MnO and 16% Fe_2O_3.

WOODSTOCK MANGANESE DEPOSIT



- The Manganese deposits are located approximately 5 km northwest of the town of Woodstock and are easily accessible from the Trans-Canada highway via all-weather roads.
- According to Fraser Institute's Annual Survey in 2014, New Brunswick is the top mining jurisdiction in Canada.

CAPITALIZATION OVERVIEW

Total Shares Outstanding	28,421,124
Warrants (@ $0.10)	11,103,129
Options	1,350,000

SUMMARY

- Manganese X Energy is the only pure play EMD company listed in Canada.
- Recent developments in lithium-ion-manganese batteries has opened up an entirely new technology avenue for its demand.
- Manganese is designated as a strategic metal in the USA. Currently, Canada and the USA import 100% of their manganese requirements.
- Unique opportunity to present to lithium, graphite and cobalt investors.
- North American companies are actively looking to source manganese supplies outside of China.
- “Giga” factories will substantially drive demand for battery materials.

Appendix

3M Cathode Powders – Less Cobalt, Maximum performance

Why Tesla's grid batteries will use two different chemistries

Revenue from Distributed Energy Storage Systems is Expected to Exceed $16.5 Billion by 2024

NMC- Lithium-Ion Battery Expert Jeff Dahn About To Start At Tesla Motors

LG Chem, 3M to start using nickel-manganese-cobalt oxide cathode materials

Cobalt and the Tesla effect: higher prices or a risk of substitution?

Argonne Computer Model And The Implications For The 3rd Generation Tesla

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