

# Manganese X Energy Announces Positive PEA for its Battery Hill Project After-Tax NPV 10% of \$486M US, and IRR of 25%

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## Sensitivity analysis shows after-tax NPV 10% of US\$914 Million at US\$4,200/t HPMSM

Montreal, May 12, 2022 - [Manganese X Energy Corp.](#) (TSXV: MN) (FSE: 9SC) (OTCQB: MNXXF) ("Manganese X", "MN", or the "Company") is very pleased to announce positive results from the independent Preliminary Economic Assessment ("PEA") for its wholly owned Battery Hill project (the "Project") located near Woodstock, New Brunswick. The PEA was prepared by Wood Canada Ltd. ("Wood"), an independent engineering services group with extensive experience in mining and mineral processing.

All dollar values are in US dollars unless otherwise stated.

### PEA Highlights:

- Robust Economics
  - After-tax net present value using a 10% discount rate ("NPV<sub>10</sub>"): \$486 million
  - 25% internal rate of return ("IRR")
  - Capital costs ("CAPEX") of \$350 million with a payback of 2.8 years
  - Average annual gross revenue of \$177 million per year over the 47 years Project life
  - Average annual gross revenue of \$220 million over the first seven years
  - Life of mine ("LOM") operating cost ("OPEX") of \$122/t material processed
- HPMSM Market Price
  - Base case market price of \$2,900/t for battery-grade high-purity manganese sulphate ("HPMSM") is well below the long-term forecast price of \$4,200/t HPMSM estimated by CPM Group
- Price Sensitivity
  - Base case undiscounted after-tax cashflow: \$3.4 billion
  - Sensitivity analysis shows after-tax NPV<sub>10</sub> reaches \$914 million at \$4,200/t HPMSM - see sensitivity analysis Table 1 below
- Long Mine Life
  - 40-year mine production life and seven years of stockpile reclaim feed
  - Total LOM production of 3.2 million tonnes of HPMSM
  - Average annual HPMSM production of 68,000 tonnes over the LOM
  - Average annual HPMSM production of 84,000 tonnes in the first seven years of production
- Low Environmental Impact
  - Flowsheet produces a filtered residue leach product with initial acid-base accounting and non-acid generating test results showing no acid drainage risk
- Project Objectives
  - Project is now advancing towards a pilot project, pre-feasibility study as well as advancing a drilling program to upgrade and expand manganese resources

### Sensitivity Analysis:

Table 1 - Selected Financial Metrics Sensitivity to Price

Metrics	HPMSM Price (\$/t)							
	\$1,400	\$1,900	\$2,400	\$2,900 <sup>1</sup>	\$3,400	\$3,900	\$4,400	\$4,200 <sup>2</sup>
Before-Tax Metrics								
Undiscounted Cashflow (\$M)	1,483	2,945	4,407	5,869	7,331	8,793	10,255	9,670
NPV <sub>8</sub> (\$M)	168	527	886	1,245	1,604	1,963	2,322	2,178
NPV <sub>10</sub> (\$M) <sup>3</sup>	77	363	648	933	1,218	1,503	1,789	1,675
NPV <sub>12</sub> (\$M)	14	248	481	715	948	1,181	1,415	1,321

IRR (%)	13%	21%	28%	35%	41%	47%	52%	50%
Payback Period (years)	6.2	3.7	2.7	2.1	1.7	1.5	1.3	1.4
After-Tax Metrics								
Undiscounted Cashflow (\$M)	849	1,702	2,552	3,403	4,254	5,104	5,955	5,614
NPV <sub>8</sub> (\$M)	45	257	465	673	880	1,088	1,296	1,212
NPV <sub>10</sub> (\$M) <sup>3</sup>	(13)	156	321	486	651	815	980	914
NPV <sub>12</sub> (\$M)	(54)	85	220	355	489	624	759	705
IRR (%)	10%	16%	21%	25%	30%	34%	37%	36%
Payback Period (years)	7.2	4.5	3.4	2.8	2.4	2.1	1.9	1.9

Note: <sup>1</sup>Base case \$2,900/t HPMSM price is a risk managed price used for the PEA study. <sup>2</sup>\$4,200/t HPMSM represents long-term market price estimate from CPM Group. <sup>3</sup>NPV<sub>10</sub> is the base case.

Martin Kepman, CEO of Manganese X, states, "We are extremely pleased with the positive economics demonstrated by our PEA. Our Battery Hill Mineral Resource has the potential to be the most impressive manganese properties in North America and has several attributes that make it attractive for development and commercialization. Battery Hill has robust economics, strong value metrics and a short payback period for a relatively low capital investment. The PEA represents the most significant milestone to date for Manganese X and makes us the forerunner of becoming the first publicly traded company in Canada and the US to commercialize high-purity electric vehicle (EV) quality compliant manganese. Thanks to our proprietary extraction process, we can develop a superior quality manganese product by eliminating selenium, considered a toxic pollutant and yet utilized by some of the HPMSM producers worldwide to reduce their costs of production. Given selenium is a highly toxic element, its use negatively impacts the environment and is known to affect the quality of downstream products, particularly for high-end applications such as lithium-ion-battery production. Our final product should be able to justify a premium to the market price."

Martin Kepman continues, "The Company has been working diligently on corporate development beyond the PEA and is currently in discussion with a number of interested parties. This is a very exciting time in history for manganese as it relates to battery chemistry and the EV revolution, making it an equally exciting time for Manganese X. We intend to be at the forefront of a domestic supply as well as meeting the expectations of North American battery manufacturers."

Table 2 - Key Financial Outcomes

NPV <sub>10</sub>	\$486 million
IRR	25%
LOM	40 years mine production 7 years stockpile reclaim
OPEX	\$122/tonne processed
CAPEX	\$350 million
Average Annual Production HPMSM	68,000 tonnes
Average Daily Mine Production Rate	1,000 tpd
LOM Production	Measured and Indicated Mineral Resource: 12.2 million tonnes @ 7.45% Mn Inferred Mineral Resource: 4.7 million tonnes @ 8.26% Mn
HPMSM Market Price used in PEA Study	\$2,900/tonne
Average Strip Ratio (Waste:Mill feed)	1.35
Pay Back Period	2.8 years
Average LOM Annual Gross Revenue	\$177 million

Note: Numbers may not sum due to rounding

The PEA is preliminary in nature; it includes Inferred Mineral Resources that are considered too speculative geologically to have the economic considerations applied to them that would enable them to be categorized as Mineral Reserves, and there is no certainty that the preliminary economic assessment will be realized. Mineral Resources are not Mineral Reserves and do not have demonstrated economic viability.

## PEA Summary

## Mineral Resource Estimate Update:

The Mineral Resource estimate has been reported in accordance with NI 43-101 and was prepared by Mercator Geological Services Ltd. ("Mercator") with an effective date of 12 May 2022. The 2021 Mineral Resource statement has been renewed to reflect updated costs and an HPMSM price as per a market analysis report recently obtained. The Mineral Resource estimate is tabulated in Table 3.

Table 3: Battery Hill Deposit Mineral Resource Estimate - Effective Date May 12, 2022

Cut-off (Mn %)	Category	Tonnes (Million)	Mn (%)	Fe (%)
1.5	Measured	11.32	6.72	10.94
	Indicated	23.82	6.24	10.50
	Measured Plus Indicated	35.14	6.39	10.64
	Inferred	27.72	6.46	10.73

## Notes:

1. Mineral Resources were prepared in accordance with the CIM Definition Standards for Mineral Resources and Mineral Reserves (MRMR) (May 2014) and CIM MRMR Best Practice Guidelines (November 2019).
2. Mineral Resources are defined within an optimized pit shell with average pit slope angles of 45° and a 2.9:1 strip ratio (waste: mineralized material).
3. Pit optimization parameters include: pricing of US \$2,900 (CDN \$3,625)/t for HPMSM (HPMSM = 32% Mn; CDN \$1.25 to US\$ 1.00 exchange rate), mining at CDN \$7.43/t, a 3% gross metal royalty, combined processing and G&A (1,000 tpd process rate) at CDN \$126.31/t processed, an overall Mn recovery to HPMSM of 78%, and a selling cost of US \$65.00/t HPMSM. Fe content did not contribute to the pit optimization process but was applied for bulk density determination purposes (see note 6).
4. Mineral Resources are reported at a cut-off grade of 1.5 % Mn within the optimized pit shell. The cut-off grade reflects the marginal cut-off grade used in pit optimization to define reasonable prospects for eventual economic extraction by open pit mining methods.
5. Mineral Resources were estimated using Ordinary Kriging methods applied to 3 m downhole assay composites. No grade capping was applied. Model block size is 5 m by 5 m by 5 m.
6. Bulk density was applied using a regression curve based on Mn % and Fe % block grades. Average bulk density for Mineral Resources is 3.01 g/cm<sup>3</sup>.
7. Mineral Resources may be materially affected by environmental, permitting, legal, title, taxation, sociopolitical, marketing, or other relevant issues.
8. Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability.
9. Figures may not sum due to rounding.

## Infrastructure:

The Project is located approximately 6 km northwest of the town of Woodstock and is accessible to the east via a new two-lane road that connects with Highway 560. Key site infrastructure includes security and administration, crushing facility, process plant and ancillaries, sulphuric acid plant, mining facilities (truck shop and maintenance), waste rock storage facilities, run of mine mill feed stockpile and filtered residue storage area, sedimentation ponds, power, water and fuel supply and distribution. Filtered residue from the process plant will be trucked to the filtered residue storage area for the first 24 years of mine production after which residue will be trucked to the Moody Hill Pit 2 and backfilled.

## Metallurgical Test Work:

Phase three of preliminary metallurgical test work completed by Kemetco Research Inc. ("Kemetco") has resulted in the refinement of a conceptual flowsheet and estimated mass balance to support the PEA. Test work focused on defining key process steps to establish major equipment requirements, reagent consumption and manganese recovery. The following main conclusions highlight the results drawn from this test program:

- Leaching and neutralization optimization resulted in improved solid-liquid separation and allowed an incremental increase in recovery
- Leach extractions on Moody Central mineralization were between 83 and 88%

- Effective removal of calcium and magnesium from leach solutions was demonstrated with the removal of up to 90% of both elements from leach solution
- Crystallization of manganese sulphate from evaporated and purified feed solutions was readily achieved
- The overall recovery to HPMSM is estimated to be 78%
- Final neutralized and washed solid residue samples showed little or no acid generation potential and all had positive neutralization potential. Toxicity characteristic leaching procedure (TCLP) tests were negative for all elements of concern.

#### Metallurgical Test Work Recommendations:

- Leaching parameters, leach solution purification and the crystallization processes will require further definition and optimization for both recovery and impurity rejection
- Additional locked-cycle testing is required on leach and neutralization, purification, crystallization and bleed stream treatment
- Pilot plant testing will demonstrate the process and generate sufficiently large HPMSM samples for end-user testing.

#### Process Method:

The proposed process for treating Battery Hill manganese resources is a whole ore sulphuric acid slurry leach performed under conditions which result in formation of a filterable residue. Leach solution is neutralized with a calcium base, concentrated by evaporation and purified through a proprietary selective cation removal process. The purified liquor is then further evaporated to produce a crystalline manganese sulphate monohydrate product meeting all specifications for sale as a battery grade product.

#### Mining Method:

The PEA mine plan assumes conventional open pit mining using a contract mining equipment fleet at a total mining rate of 1.0 million tonnes per year to provide a mill feed of 365,000 tonnes per year, or 1,000 tonnes per day. The ultimate pits and mine plan use an elevated cut-off grade strategy to help drive the project economics. The use of a stockpile for mineralized material allows higher-grade material to be processed early in the mine life to enhance project economics and to sustain mill operations 24-hours per day, seven-days per week at a single, central processing facility. The mining operations will have a 40-year mine production life, with a two-year pre-production period, and seven years of stockpile reclaim feed.

#### Independent Qualified Persons Statements:

The PEA was prepared for Manganese X by independent Qualified Persons (QPs) as defined under NI 43-101 from Wood and Mercator and are listed below. The independent QPs have prepared and approved the scientific and technical information disclosed in this press release derived from their respective sections of the technical report:

- Mr. Paul Baluch, P.Eng., Technical Director Civil/Structural/Architectural, Wood
- Mr. Alan Drake, P.L.Eng., Manager Process Engineering, Wood
- Dr. Greg Gosson, P.Geo., Technical Director Geology and Compliance, Wood
- Mr. Matthew Harrington, P.Geo., Senior Resource Geologist, Mercator
- Mr. Paul Ténrière, P.Geo., Senior Associate Geologist, Mercator
- Mr. Gil Violette, P.Eng., New Brunswick, Principal Hydrogeologist, Wood
- Mr. Piers Wendlandt, P.E., Principal Mining Engineer, Wood

#### Data Verification:

QP Harrington performed standard validation checks on the Mineral Resource model.

QP Drake visited the Kemetco testing facilities and had discussions with those who performed the test work, identified the drill holes and the intervals in which the metallurgical test samples were taken.

QP Gosson discussed with the marketing expert from CPM Group regarding the basis of their market analysis and price forecast.

QP Ténrière visited the Project site and compared select core intervals with original drill logs and sampled intervals, collected independent witness samples, reviewed quality assurance and quality control procedures, and completed a field inspection.

QP Violette visited the Project site during which he viewed drill core, completed field inspections of the Moody Hill target and surrounding areas, and assessed local infrastructure.

A description of the data verification methods for the Mineral Resource estimate is contained within the technical report previously filed on Manganese X's SEDAR profile (NI 43-101 Technical Report Battery Hill Project Mineral Resource Estimate, Woodstock Area, New Brunswick, Canada with effective date 18 June 2021).

#### Project Risks:

- The geological interpretation and assumptions on grade continuity based on limited drilling may change with more detailed drilling.
- There may be unrecognized metallurgical variability that could change the mine plan, metallurgical recoveries and/or process costs.
- With more project definition and engineering input, the capital costs may change more than the contingency allowance.
- Assumptions regarding supply demand forecasts for HPMSM, market entry strategy and HPMSM price may not be realized because of supply chain constraints.
- Permitting remains uncertain until more detailed environmental base line studies are completed.
- Community engagement is at an early stage and there is uncertainty regarding what is necessary for obtaining a social license to develop a mine.
- Footprint for establishing the project infrastructure will require agreements from local landowners which is at an early stage of assessment.
- Interpretation of the property agreements may be different to what has been assumed for the study.

#### About Manganese X Energy Corp.

Manganese X's mission is to advance its Battery Hill project into production, with the intent of supplying value-added materials to the lithium-ion battery and other alternative energy industries. The Company is also striving to achieve new environment-friendly more efficient methodologies, while processing manganese at a lower competitive cost. The company is the only publicly traded manganese company in North America moving rapidly toward commercialization of a manganese deposit.

Subsidiary Disruptive Battery Corp.'s mission is to develop an HVAC (heating, ventilation and air conditioning) air purification delivery system for cleaner and healthier air, aiming to mitigate COVID-19 and other contaminants on surfaces and in the air. For more information visit the website at [www.manganesexenergycorp.com](http://www.manganesexenergycorp.com).

On behalf of the Board of Directors of

[Manganese X Energy Corp.](http://www.manganesexenergycorp.com)

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Cautionary Note Regarding Forward-Looking Information:

This press release contains certain information that may constitute "forward-looking information" under applicable Canadian provincial securities legislation. Forward-looking information includes, but is not limited to, the results of the PEA, including statements relating to net present value, future production, future development and commercialization, estimates of cash cost, proposed mining plans and methods, cash flow forecasts, HPMSM recoveries, timing for permitting and environmental assessments, ability to acquire surface rights at a reasonable cost, realization of Mineral Resource estimates, capital and operating cost estimates, project and life of mine estimates, ability to obtain permitting by the time targeted, the timing and amount of estimated future production, exploration expenditures and potential upside and alternatives, the viability and efficacy of Manganese X's proprietary extraction process, including its ability to produce a superior manganese product, and its suitability for use in battery manufacturing. Readers should not place undue reliance on forward-looking statements.

Forward-looking statements involve known and unknown risks, uncertainties and other factors which may cause the actual results, performance or achievements of Manganese X to be materially different from any future results, performance or achievements expressed or implied by the forward-looking statements. The PEA results are estimates only and are based on a number of assumptions, any of which, if incorrect, could materially change the projected outcome. There are no assurances that the Project will be placed into production. Factors that could affect the outcome include, among others: the actual results of development activities; project delays; inability to raise the funds necessary to complete development; general business, economic, competitive, political and social uncertainties; future prices of HPMSM or project costs could differ substantially and make any commercialization uneconomic; availability of alternative manganese sources or substitutes; actual manganese recovery; conclusions of economic evaluations; changes in project parameters as plans continue to be refined; accidents, labour disputes, the availability and productivity of skilled labour and other risks of the mining industry; political instability, terrorism, insurrection or war; delays in obtaining governmental approvals, necessary permitting or in the completion of development or construction activities; Mineral Resource estimates relating to the Project could prove to be inaccurate for any reason whatsoever; additional but currently unforeseen work may be required to advance to the feasibility stage; even if the Project goes into production, there is no assurance that operations will be profitable; and risks related to the interpretation of the gross metal royalty ("GMR") set forth in the Company's option agreement dated April 22 2016 with [Globex Mining Enterprises Inc.](#) (the "Option Agreement", including with respect to: (i) the brevity and potential challenges the Company and other parties may face in regard to interpreting the terms of the GMR; (ii) determination of the reference prices that are to be used to value the metals and products that are produced from the Project; and (iii) the stage of production in the processing and value chain of deliverable metals within a production facility whereby the GMR becomes payable, all of which could have a significant impact on the determination of the GMR payable by the Company. The Option Agreement has not been the subject of any litigation to date and accordingly no findings or decisions have been made by any court or arbitrator regarding the specific interpretation of the Option Agreement.

Although Manganese X has attempted to identify important factors that could cause actual actions, events or results to differ materially from those described in forward-looking statements, there may be other factors that cause actions, events or results to differ from those anticipated, estimated or intended. Forward-looking statements contained herein are made as of the date of this news release and Manganese X disclaims any obligation to update any forward-looking statements, whether as a result of new information, future events or results or otherwise, except as required by applicable securities laws.

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