

Euro Manganese Announces Results of Life Cycle Assessment for the Chvaletice Manganese Project

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VANCOUVER, Aug. 02, 2022 - [Euro Manganese Inc.](#) (TSX-V and ASX: EMN; OTCQX: EUMNF; Frankfurt: E06) ("Euro Manganese", the "Company" or "EMN") is pleased to release highlights of the Life Cycle Assessment ("LCA" or "Study") recently completed for the Company's Chvaletice Manganese Project ("CMP" or "Project") located in the Czech Republic.

Euro Manganese engaged Minviro Ltd. ("Minviro"), a UK-based and globally recognized sustainability and life cycle assessment consultancy, and RCS Global Ltd. ("RCS Global"), a leading global auditor of battery material supply chains, to conduct a cradle-to-gate, critically reviewed study quantifying the environmental impacts, including the carbon footprint, of producing high-purity manganese products from manganese-rich historic mine tailings at the CMP.

The results of the LCA validate the environmental value proposition of the CMP and identify potential opportunities for further impact reduction. Delivery of the LCA is timely as Euro Manganese continues to engage with customers in the Electric Vehicle ("EV") battery/automotive space, each of whom are testing and qualifying both the chemistry and environmental credentials of EMN's high-purity manganese products.

Highlights

- Using 100% renewable electricity to power the processing plant significantly reduces the CMP's carbon footprint, measured in the LCA as Global Warming Potential ("GWP"). The Company is actively working to secure renewable power offtake contracts with a potential target mix of 50% wind and 50% solar to meet the plant's energy requirements. The Company's working assumption is the use of 100% renewable electricity, referred to as the Target Scenario in the LCA.
- Assuming the use of renewable electricity, the Project's GWP is expected to be 6.6 kg CO₂ eq. per kg of high-purity electrolytic manganese metal ("HPEMM") and 2.3 kg CO₂ eq. per kg high-purity manganese sulphate monohydrate ("HPMSM"). Assuming the standard Czech electrical grid mix, the total GWP impact is expected to be 13.9 kg CO₂ eq. per kg HPEMM and 4.8 kg CO₂ eq. per kg HPMSM.
- The results of the GWP impact analysis have been divided into three scopes, following the guidelines of the Greenhouse Gas ("GHG") Protocol, which provides the Company with a full GHG emissions inventory.
- The LCA confirms multiple environmental benefits from the remediation of the historic tailings area, particularly in terms of soil quality and freshwater quality. Both improve over the lifetime of the Project as remediation avoids the current leaching of metals and reduces the impacts of the historic tailings to soil and water streams.
- Opportunities exist to further reduce the CMP's carbon footprint by sourcing reagents from manufacturers with lower environmental impact than those assumed in the study. The Company is committed to identifying and selecting suppliers with commitments to decarbonization.
- The LCA was conducted according to the requirements of ISO-14040:2006 and ISO-14044:2006, which included a critical review by an independent LCA expert, and will provide Euro Manganese with an independently verified assessment for financiers and customers. RCS Global also reviewed and commented on the LCA study.
- Minviro is also undertaking a benchmarking exercise where the CMP's GWP will be compared against similar projects and operations producing high-purity manganese products. The Company intends to release the results of this analysis once complete.

Dr. Matthew James, Euro Manganese's President and CEO, said: "I am pleased the results of this Life Cycle Assessment confirm the environmental credentials of the Chvaletice Manganese Project, namely its low

carbon footprint and the net positive benefits of remediating the historic tailings area, where the quality of soil and freshwater actually improve over the lifetime of our Project.

These LCA results are a crucial part of customer qualification, as transparency into the origin and environmental footprint of battery metal production is increasingly important as automotive manufacturers use strategic procurement to meet their targets of lower carbon emissions across their supply chains.

Euro Manganese's plans to purchase 100% renewable electricity reduces the GWP to 2.3 kg CO₂ eq. per kg high-purity manganese sulphate. To put this in context, the Nickel Institute reports¹ a GWP of 5.4 kg CO₂ eq. per kg of nickel sulphate. I am confident the use of renewable energy will show our results are favourable against similar operations producing high-purity manganese products, to be confirmed in the benchmarking study currently underway.

Euro Manganese has the only known supply of manganese ore in the European Union, making our high-purity manganese products fully traceable from mine to market, and it is our duty to develop that resource in the most environmentally responsible manner."

Scope of the Life Cycle Assessment

The LCA evaluates the life cycle impact of the two high-purity manganese products that the CMP produces, HPEMM and HPMSM. The reported values are based on the production of 1 kg of HPEMM and 1 kg of HPMSM respectively from manganese-rich historic sulfidic mine tailings. The process assessed is from the point of tailings extraction (cradle) to HPMSM production (end gate) and is based on data and the production process outlined in EMN's Definitive Feasibility Study ("DFS"), the results of which were released on July 27, 2022.

The Study assesses two scenarios, a baseline, where electricity demands of the Project are met by the Czech grid, and a target scenario, where electricity demands are met by renewable energy sources. The transport of reagents, sourced from within Europe, is included in the scope.

The LCA measures five impact categories: the CMP's global warming potential, water scarcity footprint, land use, freshwater eutrophication potential and freshwater ecotoxicity potential. Results of these categories can be found in the Results Summary Table in Appendix I.

Global Warming Potential

The CMP's GWP is expected to be 6.6 kg CO₂ eq. per kg HPEMM and 2.3 kg CO₂ eq. per kg HPMSM assuming 100% renewable electricity is used. Assuming electricity from the standard Czech grid is used, the Project's GWP is expected to be 13.9 kg CO₂ eq. per kg HPEMM and 4.8 kg CO₂ eq. per kg HPMSM. The GWP can be subdivided into Scope 1, 2 and 3 GHG emissions, detailed in the Table below.

LCA Summary of Global Warming Potential Scope Emissions for HPEMM & HPMSM

Impact Category	Target Scenario: Renewable Electricity		Baseline Scenario: Czech Electrical Grid Mix	
	HPEMM	HPMSM	HPEMM	HPMSM
	(kg CO ₂ eq. per kg)	(kg CO ₂ eq. per kg)	(kg CO ₂ eq. per kg)	(kg CO ₂ eq. per kg)
Scope 1	1.2	0.4	1.2	0.4
Scope 2	2.1	0.7	9.5	3.3
Scope 3	3.3	1.2	3.3	1.2
Total	6.6	2.3	13.9	4.8

Note: Totals may not add exactly due to rounding.

- Scope 1: direct GHG emissions from owned or controlled sources; for example, emissions associated with the combustion of fossil fuels on-site, such as process emissions.

- Scope 2: indirect GHG emissions from the generation of purchased energy; for example, thermal or electrical energy that is imported and used at site.

- Scope 3: any other indirect upstream emissions; for example, from the impact of manufacturing

consumables and transport of reagents.

The contributors to GWP in the production of HPEMM are mostly associated with electricity use in the electrowinning stage and quicklime consumption in the Fe/P removal stage. The contributors to GWP in the production of HPMSM are mostly associated with the production of HPEMM, as HPEMM is a precursor product to the further-refined HPMSM product.

Water Scarcity Footprint

The CMP's water scarcity footprint is expected to be 29.2 kg water eq. per kg HPEMM and 11.0 kg water eq. per kg HPMSM assuming the target scenario and 35.2 kg water eq. per kg HPEMM and 13.7 kg water eq. per kg HPMSM assuming the baseline scenario. For both products, direct water use is the largest contributing factor to the Project's water scarcity footprint, while indirect water use stemming from water embodied in energy and reagents does not contribute much. The potential for water deprivation to humans or ecosystems is not considered significant as the Project is located in an area with a low water scarcity index and the water used in processing is intended to be from secondary sources.

Land Use Transformation

In four of the five categories evaluated to assess the CMP's impacts on land use, results showed a benefit to the environment of remediating the historic tailings area.

Categories showing a benefit included biotic production, groundwater regeneration, mechanical filtration and physicochemical filtration. An exception was in the soil erosion category as compaction and textures of the tailings area, processing plant and storage area will be changed after land occupation and transformation over the life of the Project. The likelihood of erosion is not considered significant. The total transformation impact is 4.2E-4 kg of increased soil loss per kg HPEMM, or 2.1E-4 kg of increased soil loss per kg HPMSM.

Freshwater Eutrophication

The CMP's freshwater eutrophication impact is expected to be 2.0E-3 kg P eq. HPEMM and -9.6E-4kg P eq. HPMSM assuming the target scenario and 9.7E-3 kg P eq. HPEMM and 3.5E-3 kg P eq. HPMSM assuming the baseline scenario. For both products, the main driver is the embodied impact of consuming material and energy inputs. Benefits to the environment were seen with the remediation of the historic tailings as further leaching of metals is avoided.

Eutrophication is the build-up of a concentration of chemical nutrients in an ecosystem which leads to abnormal productivity, such as excessive algae in rivers causing reductions in water quality and animal populations.

Freshwater Ecotoxicity

The CMP's freshwater ecotoxicity impact is expected to be 15.1 Comparative Toxic Unit ("CTU") eq. per kg HPEMM and 5.0 CTU eq. per kg HPMSM assuming the target scenario and 15.4 CTU eq. per kg HPEMM and 5.5 CTU eq. per kg HPMSM assuming the baseline scenario. The main driver for this is the use of chemicals in the purification process for HPEMM production, which has a large embodied upstream impact.

Ecotoxicity is the potential of a chemical substance to cause harm or damage to ecosystems, which, with respect to freshwater, is represented by the toxic effect on aquifer freshwater species in the water column.

APPENDIX I - LCA Results Summary for HPEMM & HPMSM

Impact Category	Target Scenario: Renewable Electricity		Baseline Scenario: Czech Electrical Grid Mix		Units HPEMM, kg wa kg eq. kg eq. m3 eq. m3 eq. mol eq. kg C
	HPEMM	HPMSM	HPEMM	HPMSM	
Global Warming Potential	6.6	2.3	13.9	4.	
Water Scarcity Footprint	29.2	11.0	35.2	13.7	
Land Use - Biotic Production (Transformation)	-1.3E-2	-6.7E-3	-1.3E-2	-6.7E-3	
Land Use - Biotic Production (Occupation)	-1.3E-3	-6.7E-4	-1.3E-3	-6.7E-4	kg eq.
Land Use - Erosion Resistance (Transformation)	4.2E-4	2.1E-4	4.2E-4	2.1E-4	
Land Use - Erosion Resistance (Occupation)	9.7E-6	4.9E-6	9.7E-6	4.9E-6	kg eq.
Land Use - Groundwater Regeneration (Transformation)	-7.7E-4	-3.9E-4	-7.7E-4	-3.9E-4	
Land Use - Groundwater Regeneration (Occupation)	-1.7E-4	-8.6E-5	-1.7E-4	-8.6E-5	m3 eq.
Land Use - Mechanical Filtration (Transformation)	-5.8	-2.9	-5.8	-2.9	
Land Use - Mechanical Filtration (Occupation)	6.1E-1	-3.1E-1	-6.1E-1	-3.1E-1	m3 eq.
Land Use - Physicochemical Filtration (Transformation)	-8.4E-1	-1.7	-8.4E-1	-1.7	
Land Use - Physicochemical Filtration (Occupation)	-8.8E-2	-3.3E-2	-8.8E-2	-3.3E-2	mol eq.
Freshwater Eutrophication	2.0E-3	-9.6E-4	9.7E-3	3.5E-3	kg
Freshwater Ecotoxicity	15.1	5.0	15.4	5.5	C

About Euro Manganese Inc.

Euro Manganese Inc. is a battery materials company focused on becoming a leading, competitive, and environmentally superior producer of high-purity manganese for the electric vehicle (EV) industry and other high-technology applications. The Company is advancing development of the Chvaletice Manganese Project in the Czech Republic, which is a unique waste-to-value recycling and remediation opportunity involving reprocessing old tailings from a decommissioned mine. The Chvaletice Project is the only sizable resource of manganese in the European Union, strategically positioning the Company to provide battery supply chains with critical raw materials to support the global shift to a circular, low-carbon economy.

About Minviro Ltd.

Minviro is a London-based and globally recognized consultancy and technology company specializing in carrying out life cycle assessments in the raw material sector and technology minerals and metals space. The company provides quantitative environmental and climate impact data for mineral resource projects and operations, battery manufacturers and the EV industry to make environmentally informed decisions. (www.minviro.com)

About RCS Global Ltd.

RCS Global is a world leading, vertically integrated ESG audit, consulting, and data solutions provider with a specialisation in battery material supply chains.

<https://nickelinstitute.org/media/4901/lifecycledata-summary-update2020.pdf>

Authorized for release by the CEO of Euro Manganese Inc.

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Certain statements in this news release constitute “forward-looking statements” or “forward-looking information” within the meaning of applicable securities laws. Such statements and information involve known and unknown risks, uncertainties and other factors that may cause the actual results, performance or achievements of the Company, its projects, or industry results, to be materially different from any future results, performance or achievements expressed or implied by such forward-looking statements or information. Such statements can be identified by the use of words such as “may”, “would”, “could”, “will”, “intend”, “expect”, “believe”, “plan”, “anticipate”, “estimate”, “scheduled”, “forecast”, “predict” and other similar terminology, or state that certain actions, events or results “may”, “could”, “would”, “might” or “will” be taken, occur or be achieved. Such forward-looking information or statements relate to future events or future performance about the Company and its business and operations. Further, it should be noted that no production decision has been made with respect to the Project and that such a decision will only be made based on permitting and financing having been secured.

Readers are cautioned not to place undue reliance on forward-looking information or statements. Forward-looking statements and information involve significant risks and uncertainties, should not be read as guarantees of future performance or results and will not necessarily be accurate indicators of whether or not such results will be achieved. A number of factors could cause actual results to differ materially from the results discussed in the forward-looking statements or information, including, but not limited to, the factors discussed under “Risks Notice” and elsewhere in the Company’s MD&A, as well as the inability to obtain regulatory approvals in a timely manner; the potential for unknown or unexpected events to cause contractual conditions to not be satisfied; unexpected changes in laws, rules or regulations, or their enforcement by applicable authorities; the failure of parties to contracts with the Company to perform as agreed; social or labour unrest; changes in commodity prices; and the failure of exploration programs or studies to deliver anticipated results or results that would justify and support continued exploration, studies, development or operations.

Although the forward-looking statements contained in this news release are based upon what management of the Company believes are reasonable assumptions, the Company cannot assure investors that actual results will be consistent with these forward-looking statements. These forward-looking statements are made as of the date of this news release and are expressly qualified in their entirety by this cautionary statement. Subject to applicable securities laws, the Company does not assume any obligation to update or revise the forward-looking statements contained herein to reflect events or circumstances occurring after the date of this news release. The Company’s actual results could differ materially from those anticipated in these forward-looking statements as a result of the factors set forth in the “Risks Notice” section and elsewhere in the Company’s MD&A for the year ended September 30, 2021 and its Annual Information Form.

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