‘There is no current domestic purity manganese in the Euro

Benchmark spoke with Matt James, president and chief executive officer of Euro Manganese, about the company’s Chvaletice project, the impact of European and US policy, and the capital intensity of bringing operations online.

Benchmark: What does the European Critical Raw Materials Act mean for manganese and its use in the battery industry? What about the Chvaletice project?

Matt James: CRMA is great news for Euro Manganese. Not only is battery-grade manganese now recognised as a strategic raw material under the Act, but the proposed legislation also establishes the concept of “Strategic Projects”, which are projects that will contribute to the EU’s security of supply of strategic raw materials. Strategic Projects will qualify for priority permitting status and support for both access to funding and facilitating offtake agreements.

There’s no current domestic source of high-purity manganese in the European Union. The Chvaletice Project is expected to deliver almost 50,000 tonnes of high-purity manganese metal per year when in full production. That’s forecast to meet 25% of European demand and will help the EU reduce its trade reliance on this strategic raw material. As the only known manganese resource in the EU, we believe the Chvaletice Project meets the criteria for recognition as a Strategic Project and our application should be prioritised. We intend to submit an application for Chvaletice to be recognised as a Strategic Project as soon as the application process opens.

It’s great to see high-purity manganese getting the attention it deserves as an essential battery metal. This legislative support for the development of critical raw material projects in Europe is essential. We’ll need many different metals to meet the decarbonisation goals we’ve set out for ourselves. I’m proud that Euro Manganese will be meaningfully contributing to Europe’s energy transition.

Benchmark: What else needs to be done to support the buildout of the supply chain?

MJ: Financing. The capital cost of building EU-based refining capacity to process raw materials to the purities required by battery makers is significant. We’ll be producing an almost pharmaceutical-grade product at Chvaletice. Our high-purity manganese metal (HPEMM) and sulphate (HPMSM) have extremely low impurities, which is essential for the safety of the battery. Equally, designing projects to minimise their carbon footprint and operating to high environmental standards also comes with a price tag. It is the right thing to do but there must be support to level the playing field with the current incumbent industry, which is largely China-based.

The Commission has recently adapted State Aid rules to allow further flexibility for member states to grant aid, including for the production of critical raw materials related to key net-zero technologies. However, CRMA was light on outlining any sort of subsidies or tax incentives at the EU level to support the build out of raw material projects. We’re working together with the European Battery Alliance (EBRD) to put forward suggestions for how the Commission could better financially support the development of the supply chain.

In the absence of formal subsidies and incentives, which have only been introduced recently in the US, Canada, and Australia rather than Europe, the EV industry has had to find innovative ways to finance the development of resource and processing projects. To secure supply of critical raw materials, we’ve seen automotive OEMs invest into battery metal companies. That has mostly been in the lithium and nickel space, but we’re keen to be the first manganese company to also benefit from a strategic partnership with an OEM.

As I mentioned earlier, the energy transition will be raw material intensive, so we require an all-hands-on-deck approach when it comes to financing both the extraction, processing, and recycling of battery metals.

source of high-
pean Union’

“The EV industry has had to find innovative ways to finance the development of resource and processing projects,”

Matt James, Euro Manganese

Matt James, president and chief executive officer of Euro Manganese
Credit: Euro Manganese

Benchmark: What financing is needed to bring the Chvaletice project to production? What are your timelines?

MJ: Our feasibility study for the Chvaletice Project, that we published last year, outlines a capital cost of approximately US$750 million. That figure includes over US$100 million of contingency and reflects the high-price environment we were seeing in mid-2022 for concrete, steel, reagents, and equipment. We may have an opportunity to reduce costs once we’ve completed front-end engineering and via a structured EPCM procurement process for long-lead items.

We’re currently working with our financial advisors on a project financing strategy. We anticipate this being a mixture of debt and equity, in the region of 65% debt and 35% equity. That’s what we’re currently modelling.

We believe a substantial portion of the debt could be covered by European Institutions. Both the European Bank for Reconstruction and Development and the European Investment Bank have expressed interest in being significant debt providers. EBRD is one of our largest shareholders, so they’ve already done comprehensive due diligence and know us well.

On the equity side, we have a phased strategy in place to reduce dilution. Ideally, this would start with a strategic investment at the project level by an industry or OEM; we’ve recently engaged BMO to assist with this process. This would then be followed by a private placement and a subsequent public offering, potentially at a re-rated stock price, making the equity raise less dilutive for current shareholders.

We’ve formally kicked off our project financing with the aim of having it complete by the end of Q1 2024. We would then be able to make a final investment decision. Our construction schedule is currently 2.5

years, which puts us in production at the start of 2027. We'll see if we can shorten that build time as we go through the engineering process.

Benchmark: What have been the main challenges in developing the Chvaletice project?

MJ: We're lucky to not have had many challenges at the project level. Chvaletice enjoys significant local community and municipal support. That's due to early and frequent engagement by our Czech team and the environmental benefits of remediating the currently polluting tailings area.

In fact, our Life Cycle Assessment study shows a net positive effect on local soil and water quality due to removing the historic tailings and properly lining the future storage facility. There are few projects that can claim to be both an environmental rehabilitation project and an economic project simultaneously.

On the commercial front, one of the challenges we're coming up against is associated with being a first mover in the high-purity manganese space. Our project is one of the most-advanced in our peer group which means we're trail-blazing when it comes to negotiating offtake contracts for western-produced high-purity manganese. Our product demands a higher price point than the current incumbent industry due to product purity, ESG credentials and being a local source of supply. Overlay this with the recent advent of manganese-rich chemistries, where battery makers are still refining their volumes and timeframes for delivery.

What we're seeing is a longer negotiation period as discussions with potential customers require education on both sides. However, if battery makers and OEMs want a local, secure source of supply that has a carbon footprint that's one third of the current incumbent industry, then we're the only game in town. That puts us in a strong position to meet both the current and future demands of the EV battery supply chain.

Benchmark: The Chvaletice project will use tailings from a decommissioned mine. Can you talk us through your production process?

MJ: Chvaletice is a unique waste-to-value project that involves reprocessing historic mine tailings to produce high-purity manganese. We intend to build a processing plant adjacent to the tailings area that can produce 15,000 tonnes of HPEMM and 100,000 tonnes of HPMSM per year for 25 years. Our process uses proven, conventional, and commercial technologies and leverages best-available technologies to minimise

the project's environmental footprint. We intend to use 100% renewable energy to power the plant and recycle our CO_2 and hydrogen process emissions. We will not use selenium or fluorine in our process and will use industrial wastewater from a neighbouring power plant for our process make-up water.

We're testing our flow sheet right now in our newly installed and almost fully commissioned demonstration plant. The process is five key steps: ore to slurry; magnetic separation; leaching and purification; electrowinning, which produces selenium-free HPEMM flakes; and finally, dissolution, purification, and crystallisation, which produces HPMSM powder.

Our reasoning for producing sulphate (HPMSM) via metal (HPEMM) is it guarantees the consistency of our HPMSM specification. It also provides us with optionality, which has several commercial advantages. For example, metal can be processed into other

Aerial image of the Chvaletice historic tailings area
Credit: Euro Manganese

"We've seen European-based firms shift investment to North American-based projects as a result [of the Inflation Reduction Act] and it has certainly accelerated our growth plans in North America,"

Matt James, Euro Manganese

derivatives of high-purity manganese, which we are currently discussing with various potential customers.

Metal can also be processed at alternate locations, close to customer plants, thereby reducing transport costs and potentially avoiding the costs associated with crystallisation, drying and packaging. And lastly, metal can also be used as feedstock for innovative technologies such as Nano One's metal to cathode (M2CAM) One-Pot process.

Benchmark: This year you announced an offtake with battery developer Verkor. Can you talk us through what led to the deal?

MJ: Sure. We began a structured offtake tender process in Fall 2022 where we engaged with potential customers we've been in discussions with for a while as well as new interested parties. We ran site visits and hosted a data room. That led to an offtake term sheet with Verkor, a low-carbon battery manufacturer for Renault, for a portion of our HPMSM on a take or pay basis. The term sheet also outlines a western price, which is benchmarked to a published HPMSM index. The western price is at a premium versus the HPMSM benchmark which is ex-works China due to ESG performance and the other criteria I mentioned earlier. We're now advancing that term sheet into an offtake contract.

Benchmark: How important are ESG factors to the supply chain? Has there been an increase in interest in ESG?

MJ: That's a great question. The short answer is yes, we've seen a rapidly evolving and sustained effort from battery makers and automotive OEMs who are increasingly doing their own supply chain due diligence, particularly around GHG emissions and human rights.

HPEMM flake from the Chvaletice Project
Credit: Euro Manganese

They have made commitments to customers and are looking to their supply chains to help deliver on their promises. Just this past week, we were asked to complete the Carbon Disclosure Project (CDP) questionnaire by one of our potential customers. While I support frameworks such as the CDP that help companies put in place measures to reduce their carbon emissions, there needs to be a level of pragmatism around what non-operational companies such as ours can realistically report on at our stage of development.

That said, we're ahead of the pack in having measured what we expect our carbon footprint to be through the completion of a Life Cycle Assessment Study. We also have a good understanding of our material ESG issues and are on the right path in taking steps to address areas of high importance to our stakeholders such as environmental stewardship and mitigating climate change.

What's also worth noting is that certain ESG factors are now being mandated. With the launch of the European Battery Passport, batteries sold in the EU from 2026 will have to report their overall carbon footprint and that their raw materials have been sourced responsibly, safeguarding human rights.

Benchmark: Looking to other policy developments how does the USA's Inflation Reduction Act (IRA) affect you?

MJ: The IRA has been such a significant piece of legislation for everyone in the EV supply chain. The subsidies it offers, the access to funding, and political support for onshoring supply chains for battery raw materials are game-changing. We've seen European-based firms shift investment to North American-based projects as a result and it has certainly accelerated our growth plans in North America.

The recent clarification that any batteries or vehicles containing manganese extracted, processed, or recycled in a foreign country of concern would disqualify that battery or vehicle from the available subsidies is particularly important. High-purity manganese processed in Canada would be eligible to receive the EV subsidies, making our products highly desirable.

Benchmark: You're also looking to expand in North America and have been looking at a site in Bécancour Quebec. Why did you choose Bécancour? It's developing into an interesting battery cluster in the region.

MJ: You're right, Bécancour is fast becoming a leading battery metals hub in North America. The area benefits from excellent industrial infrastructure, low-cost green energy, an extremely supportive government, and a qualified workforce. Our land parcel is strategically located between two cathode plants currently under development and is adjacent to potential nickel and

HPMSM crystallization module at the Chvaletice Demonstration Plant
Credit: Euro Manganese

cobalt sulphate plants. We bring the manganese component to the industrial park.

We've just finished our scoping study to evaluate the development of a plant at Bécancour that would take HPEMM as feedstock and produce HPMSM or a high-purity manganese sulphate solution. The HPEMM produced at Chvaletice could initially supply the Bécancour dissolution plant.

The Bécancour opportunity positions us to take advantage of forecast market growth in North America, which has been accelerated due to the IRA. It also provides us with first-mover advantage in supplying the North American EV supply chain with local and responsibly produced high-purity manganese.

It is incomprehensible, but there are no high-purity manganese processing facilities in North America today. The opportunity also advances our vision of building a multi-asset high-purity manganese business in strategic locations to supply the rapidly growing EV market.

Benchmark: What are your thoughts on future battery technology trends such as the rise of LFP or early signs of sodium ion development? How do you think this will affect manganese demand from the battery sector?
MJ: The projected growth of the EV sector is so significant that it is my view there will be a place for all battery chemistries. LFP has a shorter range than NMC, which is why it has not been as popular in European and North American markets – people drive longer distances in those locations.

That said, CATL recently announced it would be adding manganese to LFP chemistries, making them LMFP, and increasing their range, so it will be interesting to see whether that chemistry becomes more popular going forward. I do not see NMC chemistries reducing in market share anytime soon. It's important to note that sodium-ion chemistries essentially replaces the lithium; manganese and other cathode metals will still be in use.

What's driving battery technology trends is not only improved power, range and charging capability, but also affordability for customers. Typically, the cost of an electric vehicle has been prohibitive for the mass market – a result of the cost of the battery. Batteries make up approximately 30% of the cost of an electric vehicle. If you can reduce the cost of the battery, you can reduce the cost of the car.

How you do that is by using more lower-cost materials, such as manganese, in place of higher-cost materials. It's this drive towards making EVs more affordable that is underpinning the proliferation of manganese-rich chemistries, some of which have up to 70% manganese (NMC-370).