ENVIRONMENT

Quebec targets pole position in critical minerals circularity race

The circular economy is at the heart of Quebec's critical minerals plan

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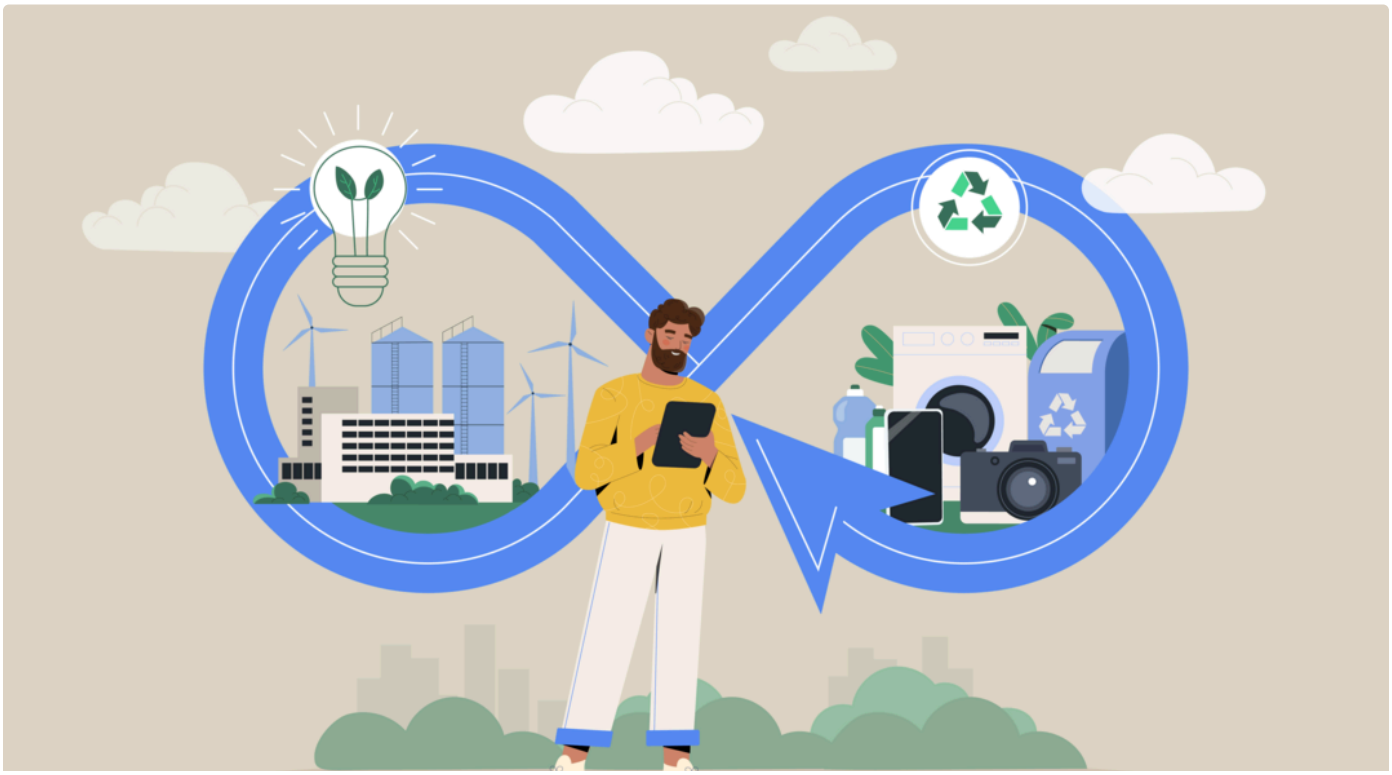

Quebec took an early stance on developing human resources and expertise in circularity Credit: mentalmind/Shutterstock

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Miners are hoping to capitalise on the need for what's now termed "critical minerals" – usually considered to include copper, nickel, cobalt – underlining at every opportunity that the construction of wind turbines, solar panels, and electric vehicles are nigh-on impossible without the mining of these materials.

But with the International Energy Agency projecting that critical mineral demand will increase by 400% to 600% in the next 15 years, there are simply not enough mines in production to meet that demand. Recycling is critical, with one consultant at Boston Consulting Group estimating the industry will have to achieve a total recycling rate of 80-90% to meet critical mineral demands.

"The circular economy is the heart of the Plan," Quebec states in its official policy. "Recovery and recycling of critical and strategic minerals will be encouraged. The goal is to reuse or recycle tailings or asset components by giving them a second life."

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There are several projects which have received financial support from the government of Quebec, which include the Lithion project, led by Recyclage Lithion, to recycle lithion-ion batteries; a project led by Geomega to recycle magnets in order to produce rare earths; a project to build facilities to implement a thermal oxidation technology to improve tellurium recovery in tailings led by 5N Plus, and a project by ECO2 Magnesia to produce high-purity magnesium oxide from asbestos mine tailings.

Several lawyers told *Mining Magazine* that one of the reasons Quebec has been able to incorporate circularity into the plan was because the province has been working on it for so long.

"The critical minerals plan is very similar to what the Quebec government created 10 years ago, with its Plan Nord for the development of the northern part of Quebec," Lavery partner René Branchaud said. Having formulated this earlier plan, Quebec was ahead of the game in developing its critical minerals strategy.

Quebec has also been able to incorporate circularity due to its human resources and expertise, Branchaud said.

"Our expertise in our research centres, [electricity generation and transmission giant] Hydro Quebec, and our universities allow Quebec to not only produce but develop and recycle [materials], in conjunction with the help of First Nations," he added.

ECO2 Magnesia, which is developing high-purity magnesium from asbestos tailings, cites Quebec's research community as a major draw for companies to set up in the province.

Magnesia can produce high-purity magnesium oxide from asbestos mine tailings

"The greatest strength of Quebec is the human capital. I've been really impressed by the skill level of all different ranges of individuals and companies – starting with ENNS, but also engineering, electrical work, testing, a whole range of service providers, including specialised legal experts. Quebec has a very high human capital index."

Another reason why Quebec may find circularity and recycling slightly easier to develop is how mineral projects are funded in the province.

"'Patient capital' is part of the reason," David Massé, a lawyer with Stikeman Elliot, told Mining Magazine. "A number of recycling projects were initially funded by either the government itself or Investissement Quebec. These are entities that have the objectives of generating both economic returns and returns for the province of Quebec."

'Patient capital' also allows new technologies to be developed, even if they do not produce immediate returns.

Part of the reason the government is willing to fund these projects is because of the need for batteries to quick the province and its businesses running, Branchaud said.

Hydro Quebec is looking for additional sources of power, but doesn't plan to build any more dams in northern Quebec, he said. "The future [of electricity generation] is with solar panels. Every roof, everywhere in Quebec, would develop electricity, but we need batteries" and the metals that batteries require.

The focus on recycling also comes as more critical minerals projects are being considered closer to high-population areas of the province. Though the Quebec population has always been supportive of mining, many mining projects took place in remote locales. However, some new critical mineral projects – including Northvolt's battery electricity plant – have been met with protests due to its proximity to inhabited areas.

By focusing on recycling and circularity, Quebec is working on solidifying popular support for mining, Massé said.

"Quebec has been a strong destination for mining investment for a long time," he said. But as mining expands, the government needed to find a way to mollify communities who were frustrated with the perceived encroachment of mining activity near developed areas.

"The focus on recycling and circularity gives a new lens to mining," he said.

Such projects underline the heightened environmental awareness and scrutiny on mining processes than ever before. As communities, organisations, and investors become more cognisant of the environmental costs of extractive practices, more demands are placed on mining companies to "green" their operations.

Environmental-friendly mining needs to be front and centre for the industry's future, Dr. Elizabeth Steyn, an Assistant Professor at University of Calgary's law school told Mining Magazine. A long-time researcher of sustainable practices in mining, she believes the industry needs to abandon greenfield mining altogether.

"We have a vast amount of metals that are in circulation already," she said. "I'd so much rather that we not waste these, that we maximise to the Nth degree what we have in circulation, before we break ground and have another greenfield project – and absolutely before we go into the ocean and mine that."

Beyond maximising metal extraction from existing mines, Steyn advocates for an increase in circularity in mining, by recycling existing mined metals and extracting metals from tailings ponds and wastewater, as well as embracing net-zero challenges and implementing them more widely.

Steyn recognises that the technology has not yet been developed to fully meet demand for metals.

"We should be investing in research and development to get the science there," she said. "People are saying that it takes between 15 and 20 years to build a mine – but if we invest in research and development, maybe we can have fewer of these polluted areas, maximise the entire life cycle of mining and minerals, and not have so many waste products."

Net-zero mining has also been strongly advocated by industry observers and associations, including ICMM. In 2021, the organisation announced its goal to achieve net zero emissions among member companies by 2050 or sooner.

It also embraced the principle that emissions-reducing initiatives and technologies should be prioritised, and emphasised the role of a circular economy in "reducing emissions associated with the extraction and use of mining products by increasing resource efficiency in production, and promoting the re-use and recycling" of metals and minerals.

In-demand mining jurisdictions across Canada have joined the race for critical minerals, jockeying for mining investment and projects. However, of the three largest mining jurisdictions of British Columbia, Ontario, and Quebec, only Quebec has specifically mentioned circularity, recycling and reuse in its official Critical Minerals Policy.

The BC and Ontario approaches

The key thing to keep in mind, mining lawyer Alan Hutchison with Osler told *Mining Magazine*, is that Quebec has had a big head start in the development of its Critical Minerals Policy.

Quebec released its first five-year Critical Minerals plan in 2020, and issued a 2023-2025 updated plan earlier this year. Other mining provinces have only just released their first iterations of their critical minerals development policies.

BC has released what it's termed "Phase 1" of its critical minerals approach, underlining that its territory contains deposits for 16 of Canada's 31 critical minerals.

The first phase of the plan explicitly focuses on further developing the province's working relationship with its First Nations population.

"The B.C. Critical Minerals Strategy lays the foundations for strong partnerships between First Nations, government, and industry that will encourage investment and sustainable economic growth that advances climate action," the province stated in the policy.

Its other stated goals include "increasing business certainty to attract investment" and establishing funding partnerships to advance critical minerals projects. While the first phase of this plan does make some mention of BC's support for ESG principles and its existing carbon tax and 2050 net-zero commitment, it provides little detail about further steps to ensuring mining projects would follow these guidelines.

"I was struck by the [Critical Minerals policy] not being a comprehensive critical minerals strategy, but an exercise in First Nations reconciliation," Vancouver-based Hutchison said. "It didn't really strike me as all that ambitious with respect to giving First Nations more prominence in the industry, as this process has already been happening."

Earlier this month, First Nations in BC released their own Critical Minerals strategy, which prioritises net zero principles above all else.

"The climate emergency is upon us, and we need to accelerate our transition away from fossil fuels in order to reduce global warming," Grand Chief Stewart Phillip said. The First Nations plan includes recommendations on environmental protections, socio-economic issues, clean energy related to projects, and land rights.

Ontario's critical minerals strategy focuses on the extraction of nickel and cobalt, as well as lithium and graphite, with particular emphasis on the ever-elusive development of the Ring of Fire nickel-copper-platinum-chromite mine in northwest Ontario.

While the Ontario plan calls for improving critical minerals exploration, investing in research and development, working with First Nations populations, and developing a skilled labour force, the overriding theme of the critical minerals plan is to develop a robust supply chain for electric vehicle production.

Ontario has invested C$5.8 million to help junior miners explore for battery metals for use in electric vehicles, as part of a four-year plan to invest C$12 million in the sector.

"A recent advertisement for the Ontario critical mineral strategy zeroed in on the automative sector," Hutchison said. "The plan is very oriented around the automotive sector, and traditional mining."

By producing its own critical minerals, Ontario is hoping to avoid supply chain instability, and risks to its primary manufacturing industries, the province outlined in its plan.