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**Ontario Critical Minerals Framework Discussion Paper ([ERO 019-3281](#))**

Dear Minister Rickford, Deputy Minister Rhodes, Mr. Head-Petersen,

On behalf of Vale, its 119-year history in the Province, and the 11,500 jobs that Vale sustains in the Province of Ontario, we welcome the opportunity to comment on the Critical Minerals Framework Discussion Paper.

Over the past decade, we have invested over \$25.3 billion to sustain and grow our Ontario operations. Vale's contribution to Ontario's GDP over the past decade has exceeded \$30.8 billion. We are proud to be an anchor industry and employment generator in the Sudbury and Port Colborne communities and we look forward to continued decades of employment and shared benefits with our Indigenous rightsholders and stakeholders.

Vale has a substantial profile in the production of identified critical minerals throughout its Ontario and Canadian portfolio. In 2020, Vale produced 89,600 tons of nickel representing roughly 50% of the country's nickel output and 99,600 tons of copper, which represents roughly 20% of Canada's copper output. Regarding other prominent critical minerals for the low carbon economy - Vale Canada produced over 2,100 tons of cobalt as well as 140,000 troy ounces of platinum and 186,000 troy ounces of palladium in 2020.

Vale has identified multiple areas within the Discussion Paper where there is alignment with the Government of Ontario and Vale's purpose and our shared ambitions to *improve life and transform the future*. The company appreciates the opportunity to provide comments and feedback on the discussion paper and the remainder of this submission highlights our perspectives and suggestions for further consideration.

**A shared commitment to deliver a low carbon future to the people of Ontario**

Vale shares the Province's determination to reduce emissions and create a greener, healthier future for Ontario and Canada. In 2019, our company set ambitious low carbon targets globally, announcing a 33 percent reduction in our Scope 1 and 2 greenhouse gas (GHG) emissions by 2030 (against a 2017 baseline) and to be carbon neutral by 2050, putting us in line with the Paris Agreement as well as Canada's ambitions of carbon neutrality. More recently, on December 4<sup>th</sup> 2020, we announced our goal to reduce our Scope 3 net emissions by 15 percent by 2035 (against a 2018 baseline).

These efforts will involve far-reaching efforts and have already generated results. In Ontario, Vale has already spent \$1.5 billion to help clean the air we breathe. The company’s Clean AER (Atmospheric Emissions Reduction) Project was the single largest environmental investment in the history of Greater Sudbury and resulted in an 85% reduction in sulphur dioxide emissions and a 40% reduction in metals particulate. This project, along with the decommissioning of the famous Super Stack have resulted in a 40% reduction in GHG’s emitted from our Copper Cliff Smelter Complex. Looking to the company’s present and future initiatives – we are focusing our efforts on electrifying our fleet, switching our fuels from diesel to biofuels and exploring the feasibility of storing carbon in tailings. This is an extensive effort to reduce our environmental impacts and deliver innovative and sustainable mining solutions that allow us to grow critical mineral production in Ontario for the long-term.

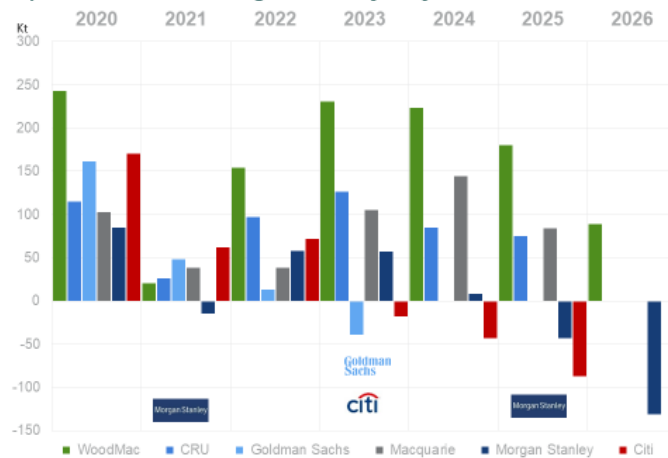
**Alignment on the important role critical minerals play in growing the Electric Vehicle sector**

COVID-19 has presented significant challenges and opportunities to global supply chains and every economy; however, new opportunities are emerging. One of the more exciting developments and opportunities that is rapidly generating momentum, in Ontario and elsewhere in North America, involves the potential development of an Electric Vehicle (EV) and battery supply chain. Minerals such as nickel, copper and cobalt will play a very important role in the ongoing development of this ecosystem and our base metals products are already at the heart of many clean energy solutions - powering renewable battery storage solutions and electric cars. Regarding the importance of nickel as a key enabler for the low-carbon EV battery industry, many external experts are predicting a supply deficit will emerge - as early as 2023 and more prominently in 2026.

**Figure One: Nickel deficits are coming in the near-term**

**Total market balance through 2026 hides underlying Class 1 Nickel deficit**

Expectations on market falling into deficit by analyst



Some analysts are more bearish regarding the total market balance for Nickel

**Total market in deficit:**  
 WoodMac: 2028  
 CRU: after 2026 (forecast up to 2026)  
 Macquarie: after 2025 (forecast up to 2025)

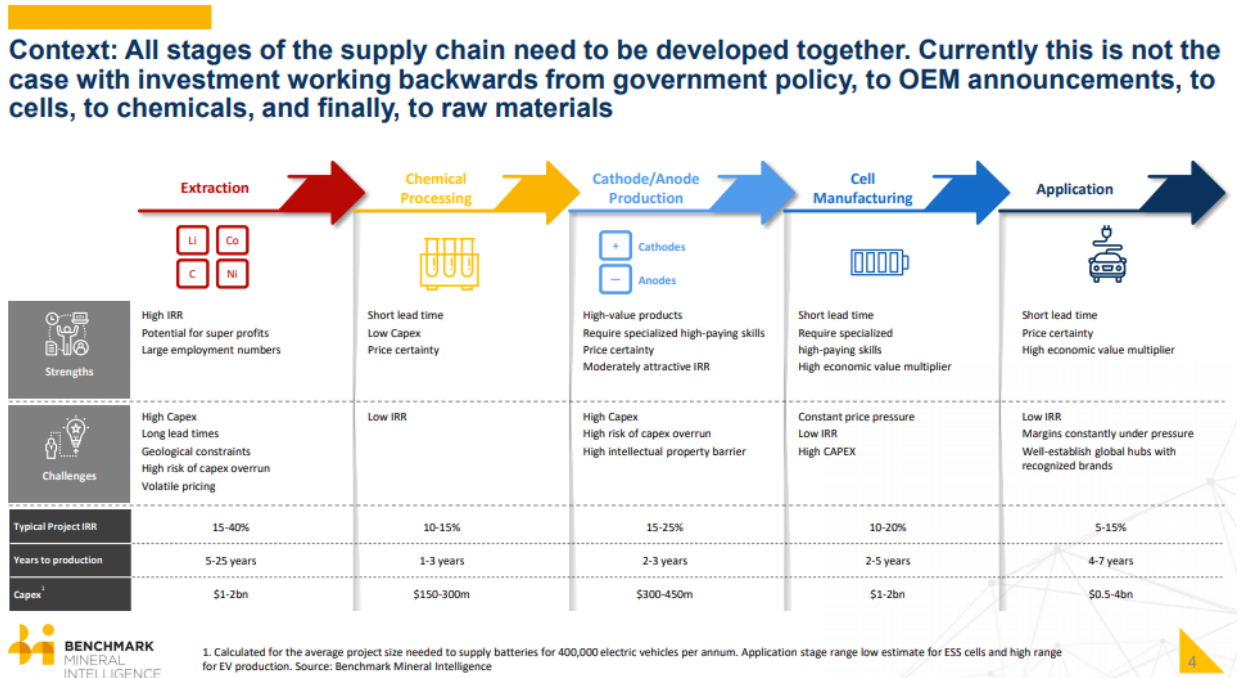
Sources: WoodMac, CRU, Goldman Sachs, Macquarie, Morgan Stanley, Citi (2019-2021)

Ontario is already positioned with a well-anchored automotive and automotive parts manufacturing base as well as upstream mining, processing and refining capacity – which offers numerous competitive advantage in seizing potential opportunities. However, the key to minimizing the supply-demand gap will be continued and expedited investment in exploration, mine development and production. Multi-stakeholder funding and collaboration driven ecosystems will be essential and new business models and funding mechanisms aimed at developing and dramatically increasing the supply of new nickel tonnage to the market should be actively explored and implemented. Many routes to increasing the tonnage and availability of nickel, copper and cobalt will require substantial support for projects to cross technical and financial feasibility hurdles in order to become reality. We encourage the Province of Ontario to be an active partner in driving such conversations with industry and to incentivize the industry in order to continue or ramp-up exploration as well as bring new tonnage to the market.

Breaking down the value chain for battery development, the following five components provide an overview of the vital components that are necessary for the government to consider:

- 1) Exploration and extraction of new sources of feed for existing smelters and refineries
- 2) Chemical Processing
- 3) Cathode/Anode Production
- 4) Cell Manufacturing
- 5) Application

**Figure Two: The key components and stages of the battery supply chain**



Source: Benchmark Mineral Intelligence (2021)

Each component has opportunities, investment horizons and challenges to address. Given the various dimensions of the value chain; Vale recommends that the Province of Ontario engage upstream, midstream and downstream participants as well as leading financial, academic and research institutions. Inviting domestic, international companies and leading experts to contribute to this policy process will enable broader support and leveraging of our home-grown resource base and expertise to best position Ontario regarding future opportunities. There is also high value in looking at inter-Provincial, Provincial-Federal as well as multinational partnerships that may also provide Ontario and Canada with opportunities to further develop its supply chain ambitions.

### **Responsible & Sustainably Mined Metals**

Vale is committed to delivering sustainably and responsibly mined critical minerals. We are committed to progressing our low carbon agenda and to reducing our social and environmental impacts, aligning our practices with international standards and norms. This includes undertaking human rights impact assessments at all Vale sites aligned with the UN Guiding Principles on Business and Human Rights, and a commitment that all Vale operations will be ISO 14001 certified by 2022. In addition, we are committed to building strong and lasting partnerships with local Indigenous communities around our Ontario operations. Specifically, in 2021, we are developing a procurement program to enable further collaboration and opportunities for Indigenous businesses to participate in mine contracts. More generally, we share the Province's desire to unlock new opportunities for Indigenous communities to better participate and share in the benefits of critical minerals projects - from greater workforce participation, to supplier capacity-building programs and stronger Impact and Benefit Agreements, and beyond.

In addition to the core principles presented in the Critical Minerals Framework, we would also like to share feedback on opportunities to further enhance the strategy for the community, industry and producers alike.

### **Enhancing the investment climate for mineral exploration & development including policy and regulatory reform**

Vale is encouraged by the Province's commitment to identify opportunities that will allow for responsible long-term resource development in Ontario. We have likely crossed an inflection point for the auto industry, as EV related investments and production plans are well formed for many of the progressive auto producers. Some original equipment manufacturers (OEM) are now playing a game of catch up. To date, major auto producers have committed over \$300 billion, globally, in investments towards the development of EV models and battery producers have contributed roughly \$130 billion of investment to expand cell and battery materials production.

Hundreds of billions of dollars have been spent on developing the battery supply chain, from cathode production to battery cell production; however, Ontario and Canada have not significantly developed nor anchored this important midstream industry. This is an area of

opportunity that Ontario and other like-minded Provincial and Federal governments should incentivize. Having world-class domestic and international enterprises develop and locate facilities in Ontario or other Canadian locations in the near term is of significant value.

Related to the mining sector, significant investments in developing the resources to expand the raw material supply of battery metals are also immediately required. And this supply related challenge requires responses and decisions to start in 2021. Without the battery metals, in the right form, creating battery hubs will be difficult and potentially challenged with sourcing non-domestic raw materials. And this will also create a knock-on effect for the OEM and auto producers who are also trying to predict their respective supply and demand aspects for future production planning.

According to the 2020 Fraser Institute's Annual Survey of Mining companies – Ontario is currently a Top 20 global destination for mining investment and a top 35 destination for policy perception. This positioning presents a great opportunity for the Province, industry and other stakeholders to work together in creating meaningful policy reforms that will result in a higher position for Ontario as a top destination for exploration, development and investment attraction. We encourage the Province to 'think big' and continually benchmark its investment attraction, red-tape reduction and business attraction policies to ensure that it remains a competitive and preferred destination for mining and related supply chain investments throughout Canada and North America.

The other element that will be critical to enabling success for Ontario is moving with speed and being synchronized with the global marketplace. Markets and society's demands for a low-carbon future are moving at a significant pace and industry and governments will have to adapt to this reality. The investment cycle and decision-making frameworks for mining and the automotive sectors are quite different as they have different technical and financial requirements, risks and opportunities that have to be studied and addressed. With this in mind, we need the Government of Ontario to ensure frameworks are quickly established with respect to the strategic minerals policy that takes this into account. By having more efficient and pragmatic systems, funding vehicles and approval related mechanisms, industry will be in a better place to make quicker decisions.

Other key recommendations that can maintain and enhance Ontario's attractiveness for investment:

- **Energy:** As the largest consumer of energy in the province, Vale is encouraged by the proactive and collaborative approach the province took in engaging industrial partners in the electricity pricing discussion and is hopeful that this type of engagement around critical issues that impact investment decision-making will continue. As we progress new projects maintaining the ICI and NIER programs is critical, as they allow for continued confidence in our investments in Ontario and a predictable cost structure. In the upcoming roundtables organized by ENDM, Vale would welcome the opportunity to discuss additional programs and other

alternatives that can continue to drive greater certainty on energy rates in the province.

Reliable, carbon friendly and low-cost energy options for industry are key enablers for the emerging EV supply chain and its overall competitiveness. Ontario is positioned to take advantage of some of these key variables, and we look forward to continued dialogue on how we can collectively improve.

- **Research & Development (R&D):** Vale is committed to furthering research and development within the mining sector to drive more efficient, environmentally responsible approaches to mining, refining and reclamation. Importantly, Vale has been a key contributor to Laurentian University's Living with Lakes Centre, which has provided significant R&D contributions that have helped pave the way for ESG gains for the industry. Research at this facility has also vastly improved our knowledge of low energy metal extraction from waste materials such as mine tailings. Vale remains committed to the University and hopes the province will continue to support the vital research contribution it makes to the critical minerals sector. Vale encourages the Province to become a leader in supporting and actively participating in the development of green technologies to help transform mining in Ontario.
- **Incentives for major projects:** We encourage the Provincial and Federal government to look at providing additional capital cost allocation reduction incentives that could also help attract investment in facility expansions, greenfield development related to the EV/critical mineral space.
- **One window, electronic based coordination protocol:** Vale applauds any current and future initiatives where electronic-based tools and coordination mechanisms are introduced that can ensure greater efficiency across departments involved in the assessment and approval aspects of permits. The reduction or streamlining of any overlap between Ministries – even between areas within a single Ministry – as well as with federal departments would be of significant benefit to industry. This could lead to the removal of duplication, foster greater collaboration and coordination for reviews while also avoiding conflicting advice, disconnected timelines, and multiple engagement requirements.
- **Reduce permit review timelines and uncertainty:** Vale encourages the Government of Ontario to ensure that they have sufficient resourcing and capacity for permit review functions. We also encourage the timely development of concise policy and guidance to support both proponents and regulators in implementation of regulatory and permitting requirements. As the largest producer of nickel, copper and cobalt in the province, Vale is encouraged by the Province's ongoing commitment to minimize regulatory uncertainty and ensure long-term investment in the industry continues.

- **Financial assurance:** Vale would request that the government assess the impacts of their current financial assurance regulations, which present a challenge for large cap companies. Current regulations require companies to procure credit for asset retirement, at significant cost, from Schedule 1 banks. Given the limited availability of Schedule 1 banks, who have limits on credit exposure risk; large cap companies can be challenged to acquire enough credit to fully meet regulatory obligations. Our request is that the Province consider additional ways of meeting financial assurance requirements, such as allowing Schedule 2 & 3 banks to provide credit and/or allowing parent guarantees to meet financial assurance obligations. All of these options would improve Ontario's competitiveness and help maximize exposure to future capital investment.

Even in the most stable and favourable mining investment jurisdictions, it still takes at least 7-10 years from the discovery of a viable deposit until you have commercial production. Ensuring a predictable regulatory and policy framework will enable a higher level of confidence from investors and a greater likelihood of Ontario realizing its stated critical minerals objectives.

### **Supply Chain & Manufacturing Opportunities**

The localization of supply chains will require a critical and coordinated effort for the Province of Ontario, like-minded Canadian Provinces and the Canadian Federal government. The battery supply chain is still in the formulation phase in North America. However, one thing is clear, automakers prefer more localized supply that helps them lower their Scope 1 and 2 emissions, improve their carbon footprint and provide security of supply. In addition, some battery materials have a finite shelf life, so it is just a matter of time before the battery supply chains develop in and around auto production hubs.

In fact, we are already seeing the rise of battery and cathode production hubs in Germany and Northern and Eastern Europe, the UK, Canada and the US. 2020 highlighted the pressure of reducing supply chain risk, brought about by global trade wars and Covid-19 production bottlenecks. We believe that this pressure has had a lasting impact on the emerging battery supply chains.

Critical minerals will play an essential part in meeting this demand, and thus ensuring a stable level of supply locally is a key consideration for the province. Vale is supportive of the commitments outlined in the framework to work with industry to further enable future investment as ensuring access to resource will require a long-term outlook on capital investment in upstream projects that have long-cycle times.

### **Conclusion**

In conclusion, Vale appreciates the opportunity to submit comments on Ontario's Critical Minerals Framework discussion paper and looks forward to participating in future engagement and discussions on the issues mentioned in this submission. We are highly encouraged and



supportive of the long-term goals outlined in the Province's framework and look forward to being actively involved as this process moves forward.

We greatly welcome further dialogue and engagement on this exciting policy initiative and for any further information or requests, please contact:

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