CRITICAL MINERALS: A CRITICAL LOOK

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Northern Confluence

About the Northern Confluence Initiative

The Northern Confluence Initiative is dedicated to conserving the salmon watersheds that sustain our communities, economies and shared futures. We are rooted in northwestern British Columbia and draw together perspectives from across the region. We focus on solutions. Together, we are working to improve land use decisions that respect Indigenous laws and rights and are based on sustainability principles. Northern Confluence is a project on MakeWay's shared platform.

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Introduction

The concept of "critical minerals" is everywhere in the mining sector today. It's a buzzword that's broadly used to describe minerals that may be needed for the electrification of transportation, for the production of batteries, and to a lesser extent for technologies like smartphones that are at risk of supply chain disruption.

The term evokes a raft of feelings: urgency, nationalism, and greed among them, as well as questions of how and where to best mine these resources. But the biggest question of all — **is this really inevitable?** — is being ignored in the rush to capitalize on the hype of a new mining boom.

This report tackles some of the context for that question.

The Canadian government released a strategy document in late 2022 to set out its priorities to capitalize on what it expects will be a growing demand for "critical minerals" as the world transitions to lower carbon technologies. It identified 31 minerals, of which it considers 6 as priorities due to "their distinct potential to spur Canadian economic growth and their necessity as inputs for priority supply chains," the Canadian Critical Minerals Strategy document reads, listing lithium, graphite, nickel, cobalt, copper, and rare earth elements as the priorities.

"Simply put, there is no energy transition without critical minerals, which is why their supply chain resilience has become an increasing priority for advanced economies."

The "supply chain" part is where the investors' and mining companies' attention perks up. The growth in interest in "critical minerals" is widely seen as an opportunity to gain public buy-in for new mining exploration and development — and public money.

TULSEQUAH MINE / CHRISTOPHER MILLER - CSMPHOTOS.COM

The federal government is offering a 30 percent flow-through tax credit for critical mineral exploration and development, and spending up to $3.8 billion on associated initiatives like supply chain research and development, and geoscientific work to identify deposits.

British Columbia is embarking on its own process to develop a critical minerals strategy. According to the transition document provided to incoming Minister of Energy, Mines, and Low Carbon Innovation, the B.C. government is working on its own strategy in a few ways, including a $1.85 million, three-year program to understand the potential for critical minerals production, and $6 million set aside over the next three years for a critical minerals strategy "to leverage B.C.'s natural-resource advantages and continue to assess the critical mineral value chain potential."

B.C. does have reserves of some of the critical minerals named in the federal list, and has facilities that refine others. This report also looks at what B.C. currently mines to try to better understand what role B.C. mining has in the transition.

The growth in electric vehicles (EVs) is driving an unprecedented demand for more minerals and metals. Lithium demand for use in EV batteries is expected to grow 750% by 2030, while nickel demand could grow by 500%. But what is driving the demand for EVs?

Electric cars and trucks are being offered as the consumer-friendly solution to the problems of our current energy and transportation system, but it's clear from the sheer amount of mining that will be needed that Canada, and the world, is facing a choice between maintaining the status quo by churning up untold amounts of ground in search of raw materials, or altering the way we build our cities, get around, consume goods and handle our waste.

"Simply put, there is no energy transition without critical minerals, which is why their supply chain resilience has become an increasing priority for advanced economies."
— Canadian Critical Minerals Strategy document

SOLAR PANEL, GITANYOW FIRST NATION / NIKKI SKUCE

Critical minerals in Canada

What qualifies a mineral as "critical"?

All this excitement has drawn the attention of mining companies and their representatives in Ottawa. Critical minerals have been the subject of intensive lobbying by the mining industry. More than 200 lobbyists at the federal level count critical minerals as part of their portfolio, representing some of the largest mining companies and associations in the country. In B.C., the same pattern appears, with major players like Rio Tinto, the Business Council of Canada, and the Mining Association of B.C. lobbying the government on critical minerals.

There are competing definitions and wildly divergent lists from country to country. To a certain extent, that divergence is to be expected: every country has different resources, manufacturing priorities, and geographic advantages or disadvantages for their supply chains. However, the degree to which countries are willing to share how they landed on the minerals they consider critical also varies.

The United States Geological Survey has a transparent formula used to determine which minerals count as critical, taking into account supply, potential for disruption, trade exposure, and other factors. The European Commission published a paper in 2017 laying out its entire methodology for assigning "critical mineral" status.

Canada has no such publicly available formula, making it more vulnerable to manipulation for political purposes. With no formal process announced so far in B.C., it's not clear how transparent or justified the inclusion criteria will be here.

$$SI_{SR} = \sum_{i} [(SP_i * SCr_i * SCo_i)^{1/3} * \sum_{a} (Sub - share_{i,a} * Share_a)]$$

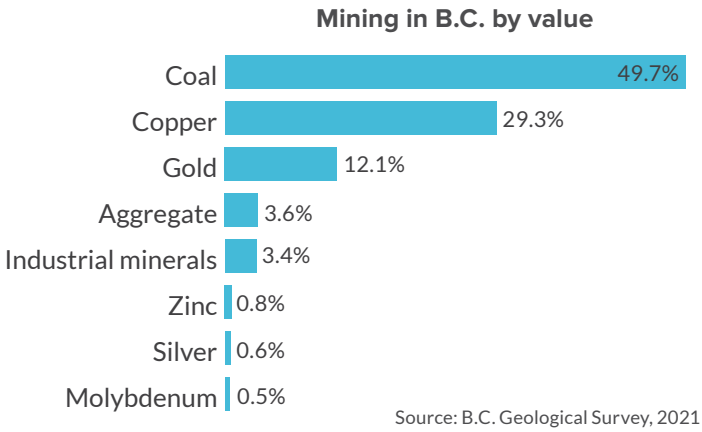
The supply risk formula, part of the larger EU process for determining whether a mineral should be considered "critical".

The key characteristics of "critical minerals" are that they are:

- Considered essential to a country's economic security, and
- Potentially face supply chain disruptions.

The "criticality" of a mineral will change over time, depending on society's needs (demand) and supply shifts. At the moment, "critical minerals" are mostly those that are being identified as part of those needed for the low-carbon transition (such as lithium for EV batteries), but also for military purposes (defense and aerospace), telecommunications, and medical devices. Future demand will be impacted by innovation (e.g. alternatives for cobalt in EV batteries have developed such as nickel-based lithium-ion batteries), technology development, city planning, reduced consumption (such that happened briefly during the COVID pandemic), investments in alternative transportation, policies created, as well as supply.

What are we currently mining?



Source: B.C. Geological Survey, 2021

In 2022, companies spent a record $740 million on mineral exploration in B.C., according to the annual exploration survey. More than half of those exploration projects are in the advanced stages.

Of the six priority minerals identified in the Canadian Critical Minerals Strategy (lithium, graphite, nickel, cobalt, copper, and rare earth elements) B.C. produces only copper and graphite. There are known reserves of the other four, and exploration is ongoing. Mining is already firmly established in B.C. — but more than 60% of that mining is for coal and gold, neither of which is considered a critical mineral in Canada — and mining impacts on the land are only growing.

According to the recent Dirty Dozen report on B.C. mining, there are already (conservatively) 2.5 billion cubic metres of tailings being stored in the province — much of which will need to be cared for in perpetuity. The report also included interactive maps showing contaminated sites and tailings facilities scattered across the province. These impacts are increasing exponentially over time.

Copper

There are 10 producing copper mines across B.C., including some of the largest on the continent. The province is by far the biggest producer of copper in the country, digging up more than 680 million pounds in total in 2021 — more than twice Ontario's production and accounting for nearly 60 percent of Canada's production. And it's probably only going to increase from here: copper was the driver of B.C.'s record year for mining exploration in 2022, nearly doubling from 2021 and more than doubling 2020's exploration spend, although more is spent overall on gold exploration.

In terms of value, in 2021, copper was expected to account for 29.3 percent of B.C.'s $12.6 billion mineral production. All told, the copper dug up in B.C. alone weighs two and a half times the CN tower — and yet, Canada accounts for just 2.6 percent of total global copper production.

Most of that comes from open pit mines. Looking at all of Canada from space, the Highland Valley copper and molybdenum mine is still easy to locate: the series of yawning open pits and a giant tailings pond stretches 20 km from end to end. More than 260 million pounds of copper is dug out of Highland Valley every year, more than twice the nearest competitor, Gibraltar. According to the B.C. Geological Survey, Gibraltar produces more than 110 million pounds of copper, an hour's drive from the infamous Mount Polley, a newly restarted gold and copper mine that was the scene of the biggest environmental disaster in B.C. mining history less than a decade ago. Further south, Copper Mountain stands out from even the highly logged landscape south of Princeton, where it produces just short of 100 million pounds of copper. Mount Milligan, Red Chris, New Afton, and Myra Falls together add more than another 200 million pounds to B.C.'s total copper production. For every ton of copper produced, there is at least 20 tonnes of waste.

MOUNT POLLEY DAM BREACH DISASTER / CARIBOO REGIONAL DISTRICT

Copper is counted as a critical mineral only by Canada and South Africa. An ongoing political fight in the United States could help to explain how it made the Canadian list, with some of the world's largest copper mining companies gaining the support of powerful legislators — like Senators Kyrsten Sinema and Joe Manchin of West Virginia — to pressure the White House to add the mineral to the list. The USGS recently rejected adding copper to their list again despite the lobbying as there are no projected supply chain issues.

Gold

Gold is not featured on Canada's critical minerals list, but it is commonly mined in B.C.. The vast majority of gold that's mined, about 92 percent, is not used for technological applications, and yet gold represents a majority of the exploration going on in B.C. and in Canada right now.

About 790,000 oz (49,000 lbs) of gold was mined in B.C. in 2022 — primarily from the so-called "Golden Triangle" in the northwest on the border with the Alaska Panhandle. B.C. represents nine percent of Canada's total gold production. Gold makes up 12 percent of B.C.'s total mining by value, and nearly half of mining industry survey respondents to a 2022 B.C. government survey said gold was their primary commodity.

Gold is often found in conjunction with copper and other minerals, particularly in the kind of geological formations present in B.C.; in fact, in every operating B.C. gold mine, there's another metal being mined as well: copper, silver, lead, or zinc. Gold is never the primary metal by weight, although in some cases, like the Brucejack mine in northern B.C., it's the primary metal by value.

Metallurgical coal

More than 95 percent of the coal mined in B.C. is metallurgical coal, so named for its role in the creation of steel as well as other products, as opposed to thermal coal used in electricity production. Canada does not include metallurgical coal on its critical minerals list, although the EU and South Africa do.

The B.C. government emphasizes the fact that steel can be used to make green energy technologies like wind turbines and solar panels, but the fact is that according to the World Steel Association, buildings and infrastructure account for more than half of steel production, mechanical equipment (like cranes or bulldozers) for 16 percent, and the automotive industry accounts for 12 percent. All electrical equipment, which includes power generation but also power transmission cables, pylons, and transformers, accounts for just three percent of steel usage.

Twenty-three million tonnes of metallurgical coal is mined every year in B.C., by far the most of any mineral except for sand and gravel, and accounts for the most sales of any mined product — about $4 billion in 2020. Canada is the seventh-largest coal exporter in the world. But exploration has been plummeting for a decade, dropping by about 90% since the early 2010s.

HIGHLAND VALLEY COPPER AND MOLYBDENUM MINE / NIKKI SKUCE

“Looking at all of Canada from space, the Highland Valley copper and molybdenum mine is still easy to locate: the series of yawning open pits and a giant tailings pond stretches 20 km from end to end.”

Net Zero Industry, a group looking to reduce industry emissions, estimates metallurgical coal is responsible for seven percent of worldwide carbon emissions through steelmaking. There are proposals to eliminate the use of coal through a combination of hydrogen and syngas to make steel. Along with better carbon capture and use of electricity, the group believes net-zero steelmaking is possible.

Zinc

Zinc makes up 0.8% of B.C.'s mining by value, and is mined only in one place (Myra Falls), but by weight alone it's the second-largest metal commodity being produced in the province.

It's used primarily in galvanizing steel and iron to protect them from rust. It's also used for soldering electrical components, and in batteries.

Like copper — and unlike lithium or rare earth elements — zinc is not universally recognized as a critical mineral among other major world powers. Only Canada, Australia, and South Africa include it as a critical mineral (all three are major zinc producers). Neither the US, nor the EU, South Korea, Japan, UK, or India include it on their lists of critical minerals.

Graphite

Graphite is on the critical minerals list of Canada, the EU, the US, and others. The carbon-based mineral has been mined in the province's south-east, and there are several exploration projects underway to produce more. It's a huge part of EV batteries, and shows up in electrodes, lubricants, and even in the cores of nuclear reactors.

It is possible, however, to make graphite in a lab, and prices for the synthetic version of the mineral have been falling. Analysts expect more and more to be produced — but also mined.

Silver

Silver isn't just for tableware and jewelry: it's commonly used in electronics, particularly contacts, switches, heating elements and batteries, in mirrors, and in the health industry. It also didn't make the cut for the Canadian critical minerals list (or other countries' lists) but it makes up about 0.6 percent of B.C.'s mining production.

Molybdenum

Hard-to-melt molybdenum is most commonly used in steel alloys. B.C. is the only producer of molybdenum in Canada, which in turn is the fourth-largest producer in the world — making B.C. an exceptionally molybdenum-rich region. It makes up 0.5 percent of B.C.'s mining production by revenue.

There are two operating mines in B.C. that produce molybdenum among their metals: Gibraltar and Highland Valley, both in the South Central region. Seven more are proposed or under exploration, and one — the open-pit Endako mine, the only dedicated molybdenum mine in the province — closed in 2015, reportedly due to weakness in the metal's price. The company that owns the mine said it will re-evaluate as market conditions change.

Molybdenum is on the critical minerals list of Canada, South Korea, and Japan.

Lead

The Myra Falls mine — the only B.C. mine inside of a provincial park — is also the only lead mine in the province. Lead accounts for a tiny percentage of B.C. mining by value, just 0.01 percent. The Silvertip mine in the province's north was granted a permit in 2015, and would have mined lead among other metals, but construction is on pause.

Lead is not considered a critical mineral by Canada or any other country.

Nickel

Demand for nickel used in EVs is projected to grow up to 40-fold by 2040, according to figures from the International Energy Agency. Nickel is not currently being mined in the province although Turnagin in the northern part of the province is in advanced stages and has funding from Mitsubishi.

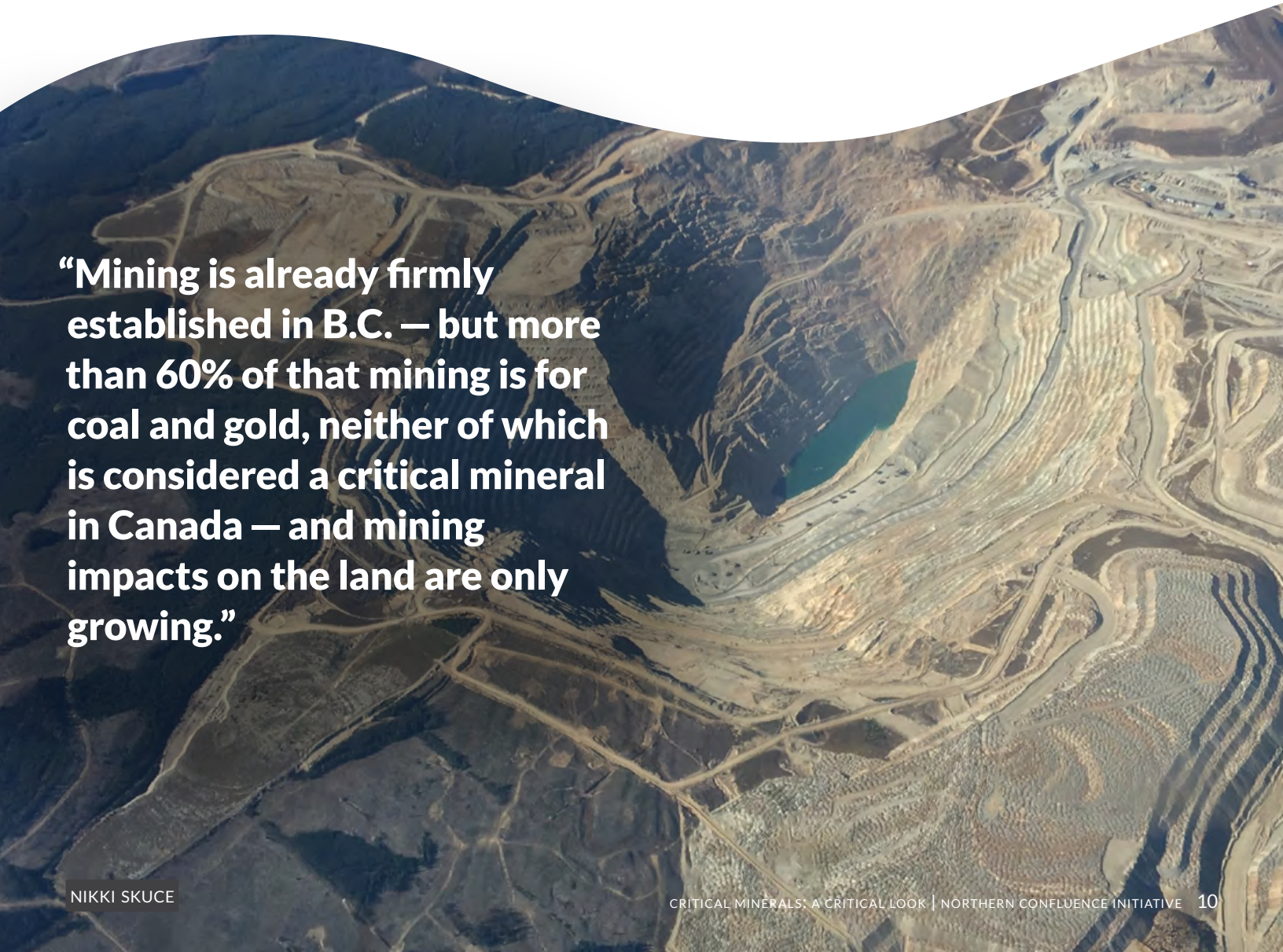
Nickel is considered a critical mineral by Canada, South Korea, the US, Japan, and South Africa.

Other listed critical minerals and rare earth elements

B.C. also has notable reserves of niobium, which is used in steel alloys and in superconductors, among other high-tech uses. There are four proposed mines that would include niobium in the province, including the advanced Aley project (currently undergoing an environmental assessment) but none that are currently active. Niobium is almost universally considered a critical mineral by Canada's peer nations, according to the Canadian Critical Minerals Strategy document.

Tellurium is used in the manufacturing of solar panels, next-gen lithium-tellurium batteries, and a wide range of computer and electronic devices. A project near Smithers — Deer Horn, by First Tellurium — is currently in the test drilling stage.

Aluminum, indium, germanium, and bismuth are all refined in B.C., at the smelters in Kitimat and Trail, but not yet mined here.



"Mining is already firmly established in B.C. — but more than 60% of that mining is for coal and gold, neither of which is considered a critical mineral in Canada — and mining impacts on the land are only growing."

NIKKI SKUCE

Alternatives

The "critical minerals" push writ large is the first step toward that shiny mirage of a "clean energy" future, where fossil fuel energy sources and gas-burning cars are replaced one-to-one for renewable and battery equivalents. It acknowledges the economic and strategic opportunities for new mining without acknowledging the inevitable impacts that multiplication in mining would cause.

Mining is already a major source of environmental harm in B.C., causing ongoing problems like water pollution and impacts to sensitive species, while inadequate funding, insufficient reclamation, poor waste management, and risks of dam failures worsen the environmental liabilities.

Policymakers are having a difficult time with an important truth: the modern world isn't just unsustainable due to fossil fuels. Replacing every piece of energy infrastructure with a newly built, renewable equivalent and replacing every gas-guzzling SUV with an electric Hummer will not land us in a future that's much brighter than today — while locking in significant environmental degradation along the way.

Greenhouse gas emissions are just one facet of the environmental harm that our current way of life inflicts on the natural world. Many of the other harms — to wildlife, to water, to forests and soil, to name a few — could actually be intensified in a world where we tried to mine our way out of the problems caused by fossil fuels.

The Canadian strategy document does provide some ideas for mitigating the impacts — including waste stream capture, reclamation requirements, species-at-risk protections, and incorporating Indigenous practices — calling these "nature forward" approaches. However, Canada's mining sector at home and abroad is already largely failing to clean up its own messes, recycle its waste, protect species-at-risk, or engage productively with Indigenous communities, so it's hard to imagine a newly emboldened and driven mining sector suddenly embracing practices that have eluded it for centuries. In fact, the document also calls for a "review" of Canada's regulatory framework, to "identify opportunities for advancing clean growth projects (including critical minerals mines) in a timely and predictable manner." So while the strategy is calling for improved environmental standards, it undermines that effort by including a hint that the plan is actually to weaken them by streamlining the mine permitting process.

The mining sector is eagerly anticipating the diminishment of environmental assessments. A week after the federal strategy was rolled out, leading mining law firm Bennet Jones released a blog post cheering on the federal government's plan to reduce environmental assessments for mining projects, "[T]he federal government's commitment to reviewing the IAIC and related processes to increase the efficiency of mining project construction applications is a welcome sight to Canadian mining companies and foreign investors alike," the firm wrote.

It doesn't have to be this way. Racing to meet demand will yield more of the same problems that are already created by mining, but reimagining how we build cities and get around them, incentivizing the capture of some of the waste that's generated by current consumption, and demanding that mines use "waste" more efficiently are just a few of the ways to reduce the demand before it overwhelms our ability to meet it. The benefits

to reducing demand don't end with protecting landscapes from destruction, a report from the UC Davis Climate and Community Project found. Prioritizing transit and reducing car dependency "can also ensure transit equity, protect ecosystems, respect Indigenous rights, and meet the demands of global justice," the authors wrote.

Instead of taking the necessary transition away from fossil fuels as an opportunity to mine more intensively, we should be reevaluating our production and consumption of energy and minerals. Norway — famous for its quick transition to EVs from gas cars — is already rolling back its EV incentives and encouraging public and active transportation instead. We need to rethink how we get around, and whether personal vehicles are the best or only way to have freedom of mobility; how much new material we mine versus making the most of what we have already mined; and how much valuable material is currently wasted along the supply chain. Only then should we start talking about how the mining sector can expand while doing as little harm as possible.

Re-mining

In April 2021, more than 200 European scientists and industry representatives gathered online for a symposium organized around a single question: can waste rock from mining still offer valuable minerals?

Waste rock presents a huge and often intractable problem, with piles of rock growing during a mine's life and persisting forever, sometimes leaching heavy metals into groundwater. That rock can still contain minerals that were overlooked or not economically worthwhile to extract when the mine was active.

The scientists at the symposium came up with a five-point answer to the question. First, it's not new — this is already happening in some places. Copper smelting was brought up as a particular example of an industry in which valuable metals can be salvaged from waste products; another example featured reused waste from a copper and molybdenum mine. One Finnish mine could provide about 10 percent of the EU's cobalt needs from re-mining alone, one scientist claimed.

ALBERTA TAR SANDS / NIKKI SKUCE

Second, there is significant potential; re-mining could reduce landfill size, help with gaining or maintaining social license to operate, reduce environmental harm, and the opportunity to get access to new materials. They also realized there would need to be subsidies and a dedicated regulatory structure to deal with re-mining if it were to go ahead.

Some government intervention is needed to regulate and ensure that one of the main drivers and results of re-mining is clean-up of the site. The Canadian Critical Minerals Strategy makes no mention of re-mining.

Urban Mining

Electronics and construction waste

When talking about a recycling facility, a demolished home, or even a landfill, there is often — quite literally — gold in them thar hills. More, in some cases, than even a gold mine.

"The average concentration of some metals (e.g. gold) in [waste from electronic and electrical equipment] shows that it is higher per ton of electronic product compared to the amount in mining ores," reads a recent paper in the journal Frontiers in Sustainable Cities. That comparison leads to the evocative neologism, urban mining: mining cities' waste streams for the heaps of valuable metals that otherwise need to be mined and refined from rock.

We haven't quite caught on to the value of those materials yet. According to data from the Capital Regional District in B.C., metals account for three percent of what enters the landfill — 5,000 tonnes of material. Worldwide, the journal article states, the rate is worse: less than a third of construction waste is recycled, and even less for electronic waste, at just one fifth.

A report from the Center for Strategic and International Studies showed mining electronic waste has become cost-competitive with traditional mining in China for copper and gold. However, the same report notes that e-waste recycling is associated with enormous environmental risks, in particular when it happens informally — as has often been the case worldwide. To make sure e-waste is being captured for recycling, and that that is happening in an environmentally sound way, the report recommends governments invest in training and technology for e-waste processing to reduce impacts and improve worker safety. On top of that, there should be more regulations and criteria to have products designed to be disassembled and greater transparency of the metals and minerals used in products, as well as mandatory recycling of things like disc drives that may contain rare earth minerals.

Reducing battery demand

Recycling EV batteries

Batteries are at the centre of all of this hype, with their production driving the demand for many of the critical minerals. The Union of Concerned Scientists reported that global production of lithium, nickel, manganese, cobalt, and graphite — specifically for lithium-ion batteries — could increase 5–17 times over the next two decades.

But that demand doesn't need to be met only through new material. "The United States could meet about 30 to 40 percent of the anticipated material demand for lithium, nickel, manganese, cobalt, and graphite in passenger BEVs [battery electric vehicles] with recycled battery materials by 2035," they wrote in a 2021 report. That same year, Earthworks found similar potential for recycling

to reduce demand for mining: 25% for lithium, 35% for cobalt and nickel and 55% for copper.

Globally there's a need for batteries to be designed with recycling in mind, as well as transparency of the battery make-up to maximize the recycling process. So what is happening to make sure the batteries themselves aren't on a one-way trip to a landfill? Some of the $1.5 billion earmarked in the Critical Minerals Strategy is intended for recycling projects, though the pathway to developing this new industry in Canada isn't laid out. The EU will soon be requiring an increasing amount of recycled material to be included in new batteries, and requiring that about two-thirds of batteries be recycled. B.C. is home to Retriev, a battery recycling firm, while Quebec and Ontario also have facilities — but Canada lags behind Europe and Asia, according to a report from Pembina. There is no federal strategy, nor does any province have a strategy, to increase battery recycling.

Some of the recycling doesn't even need to be what we consider to be "recycling" at all, according to the Union of Concerned Scientists report. Many batteries found in vehicles that are at the end of their life could simply be refurbished to return more of their original capacity, then returned to the market, even for other uses like utility energy storage. But the report points to an ongoing dearth of companies able to take on that recycling.

"EVs and battery storage account for about half of the mineral demand growth from clean energy technologies over the next two decades."
— International Energy Agency

Improving battery efficiency and fighting giants

Recognizing the increase in demand and an opportunity to take advantage of existing and potential government subsidies all along the supply chain, the automotive industry is entering the era of electric vehicles. Whereas early EVs, like the Nissan Leaf, were designed to be relatively small and light to defeat range anxiety, as of late the industry has swung in the opposite direction: make them heavier than even their gas counterparts, and make up for the difference with giant batteries. The forthcoming electric SUVs and trucks are pushing 10,000 pounds, about the weight of an ambulance.

This is not an environmental win. Not only do these tanks pose a danger to other road users like cyclists and pedestrians (and those in smaller vehicles), and add to the wear on infrastructure, but they also demand several times the battery materials of smaller EVs. The Hummer EV battery

ELECTRIC CAR CHARGING / NIKKI SKUCE

will weigh about three times that of the Leaf — taking up three times as much of the critical minerals countries are scrambling to secure. But that's not the right comparison to make: an analysis by the UC Davis Climate and Community Project found that in terms of lithium use relative to the rider capacity, the Hummer battery may vastly overshoot the average EV, but even that comparison looks silly when considering other transportation options like a bus or an eBike. A bus is more than nine times more efficient in lithium, while an eBike is a jaw-dropping 240 times more efficient.

The B.C. government announced $100 million in new funding for active transportation network in its 2023 budget and recently announced rebates for e-bikes — both great initiatives. But in order for buses and e-bikes to become the norm, cities will need to become friendlier to those modes of transportation, through investment in infrastructure and better city-planning policy. This would be a win for the environment, but also for healthier communities, the UC Davis report says. "Making bus routes, metros, [and] electric bikes faster, safer, and more convenient will disproportionately support low-income and non-white community members," the UC Davis report says, "who are more likely to live near high traffic areas and bear the environmental health burdens of relatively poorer air quality compared to higher income and white counterparts." There is also the shifting nature of work with more support for home offices, as well as city planning aimed at reducing commuting and making services more accessible.

There are also considerable human rights implications to ramping up mining to meet the demand for bigger and bigger batteries. Lithium mining is concentrated in Latin America, where, the OECD admits, "Instances of social conflict have marked the history of extractive activity." Attacks against land defenders in Latin America are on the rise, and Global Witness found more than half of global killings of land defenders (most of which are tied to the mining sector) occur in Latin America.

Nickel, copper, and cobalt will also need to be mined in enormous quantities to meet expected EV battery demand if we continue to replace gas cars with EVs instead of reducing the need for personal vehicles overall. The combined amount of ore and waste rock that will be required by 2030 to meet the demand for nickel in batteries will be equivalent to 371 Great Pyramids, according to the Dutch research organization SOMO.

ELECTRIC BICYCLE CHARGING / NIKKI SKUCE

In these early stages of the shift toward new technologies, it's morally critical to start reducing the coming demand pressure on resources that can't be easily produced. The best way to do that will be to shift away from reliance on personal vehicles of any kind — not simply replacing every gas car with an electric one. "By reducing lithium demand relative to the most alarming forecasts, [adopting better transportation options] provides a clear alternative to prevailing transportation scenarios, which rely on fast-tracking new mines, intensifying environmental pressures on landscapes subject to mining, destroying Indigenous lands and livelihoods, or increasing pressure on

globally fraught supply chains in order to power an expansive, electrified car fleet," the UC Davis report reads.

The Canadian Critical Minerals Strategy acknowledges that "Indigenous peoples have not always benefited from natural resource development on their traditional territories, and some developments have caused adverse environmental and social impacts on communities." But the strategy goes on to laud the progress the mining sector has made in hiring, partnering with, and consulting people from Indigenous communities, and to call for more economic opportunities within the sector — rather than calling for real reform to land rights.

Fortunately, some First Nations are doing that work themselves. At the time of writing, the Gitxaała Nation is in court fighting to reform the B.C. *Mineral Tenure Act* and prevent mining companies from unilaterally staking claims within its territory. A win in court would send a strong message that this colonial-era legislation needs to be modernized in line with the BC government's legal commitments under the UN Declaration on the Rights of Indigenous Peoples (UNDRIP).

Similarly, Blueberry River First Nations' recent win in B.C. Supreme Court led to an historic agreement that is helping the First Nations dig out of more than a century of cumulative industrial impacts on their lands. These kinds of agreements should be the priority for governments — not simply doubling down on the harms that led to them in the first place.

"A win in court would send a strong message that this colonial-era legislation needs to be modernized in line with the BC government's legal commitments under the UN Declaration on the Rights of Indigenous Peoples."

HUCKLEBERRY MINE / NIKKI SKUCE

Conclusion

We can't mine our way out of the climate crisis.

The world is in desperate need of solutions to the worsening effects of climate change, and electrification of transportation will undoubtedly be one of the contributors to mitigating our emissions. But this is not the moment when we need to imagine how to replace all current consumer consumption and transportation one-for-one with electric "alternatives."

The "critical minerals" push is a move devoid of imagination, and would mean locking in the problems that cheap fossil fuels have created, like the disastrous urban sprawl and traffic gridlock most Canadian cities experience. It would mean accelerating the devastation that accompanies mining in remote places, from harm to wildlife to poisoning of water through acid rock drainage. It would mean international conflict, and conflict with First Nations, over the vast quantities of minerals that will be needed to replicate our current fossil fuel-dependent world in a shinier but no less destructive form.

The question we're facing is much bigger — and offers much more in the way of opportunities for improvement — than simply forging ahead as though fossil fuels were the only villain in this scenario rather than one key player among many. A much more enticing question that could actually solve some of these problems for good rather than exacerbating them is, how do we reimagine our cities and ways of life to use less?

That's the question we hope policymakers will challenge themselves to ask in the months ahead as mining corporations line up to ask for support for a destructive new wave of extraction. Not "how can we get the minerals more quickly?" but "do we need them at all?"

We're not so naïve as to expect that to be the case, however. That's why we've compiled a list of questions we can all be asking over the coming months and years as the term "critical mineral" becomes lodged in our collective psyche.

ELECTRIC BUS TRIAL, VANCOUVER / STEPHEN REES VIA FLICKR

Questions for policymakers, journalists, and the public to ask as B.C. pursues "critical mineral" strategies and extraction:

- Where is the transparency around what is labeled a "critical mineral"? How will B.C.'s list be made? Who will be at the table making the list?
- Will B.C.'s mineral tenure regime require free, prior and informed consent of First Nations, and ensure Indigenous rights are respected in the pursuit of mining critical minerals?
- How will the integrity of environmental assessments be maintained amidst the rush to permit "critical mineral" mines?
- Will B.C. continue to invest in alternatives for transportation and other resource uses? And will B.C. develop policies and programs to support re-mining, recycling and urban mining?
- How will B.C.'s critical minerals strategy aim to reduce consumption as well as link to its circular economy strategy?
- If we can expect more mining for these minerals, should mines for the energy transition be prioritized over new gold mines? Over new coal mines?
- Would subsidies and government support directed towards "critical mineral" mining be better spent elsewhere, to increase energy efficiency and reduce demand for metals?
- What is B.C.'s plan to deal with abandoned and orphaned mine sites littered throughout the province? Can the potential for re-mining add to opportunities to reclaim and close some of these legacy sites?
- How will governments ensure that mining pressures do not undermine other priorities such as critical water resources, biodiversity protection and major carbon sinks?
- Should we approve new mines that we know will require water treatment in perpetuity (i.e. forever)?
- What steps are being taken to improve B.C.'s regulatory regime to have more responsible mining that minimizes environmental harms and risks?

"The critical minerals push is a move devoid of imagination, and would mean locking in the problems that cheap fossil fuels have created."

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