MOUNT MURRAY INVESTMENT

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Source: Adobe Stock

As evidenced by the recent news that China is on its way to add by the end of the decade 225 solar parks, each having an area equivalent to 20 Central Parks[1], we observe that the world is on its way to extract a whole lot of stuff from the earth. Much has been said about the need for the commodities required for the transition to a greener economy. The IMF had written in 2021 that to reach Net-Zero by 2050 (i.e. the economy either emits no greenhouse gas emissions or offsets its emissions, which is expected to correspond to an increase in global temperatures of no more than 1.5 ℃ vs preindustrial times), we would need to increase sixfold the contribution of low-carbon technologies to the energy grid, which would require an eightfold increase in renewable energy investments and cause a strong increase in demand for metals. We have seen this begin to happen. Mine production capacity now requires accelerated investment and expansion to meet the critical mineral demand growth implicit in the Net Zero scenario. Any critical mineral supply bottleneck will present a binding constraint on the feasibility of achieving the Net Zero target. However, developing mining projects can take a very long time, often a decade, and presents various challenges, at both the company and country level.

[1] Bloomberg

Metals used in low-carbon technologies

	Wind	Solar Photovoltaic	Concentrated Solar Power	Hydro	Geothermal	Energy Storage	Nuclear
Cobalt						▪	
Copper	▪	▪	▪	▪	▪	▪	▪
Indium		▪					▪
Lithium						▪	
Manganese	▪			▪	▪	▪	
Molybdenum	▪	▪		▪	▪		▪
Neodymium	▪						
Nickel	▪	▪		▪	▪	▪	▪
Vanadium						▪	▪
Zinc	▪	▪		▪		▪	▪

Source: VanEck

Current and planned supplies are inadequate to meet future needs. Given the projected increase in metals consumption through 2050 under a Net Zero scenario, among critical minerals, lithium, graphite, cobalt, nickel, rare earth elements, copper, silicon and zinc require the largest percentage growth by 2050 to meet demand. Copper, necessary for nearly all of the required technologies, is estimated to see a demand growth to around 50 metric tons (Mt) in 2050 in this scenario[2]. Nickel, widely used not only for EVs and battery storage, but also in low-carbon generation and hydrogen infrastructure, will see its demand grow to almost 40 Mt by 2050. Collectively, the demand for these minerals is expected to increase almost 20-fold between 2020 and 2050, from less than 10 Mt to roughly 150 Mt. The numbers are staggering.

A recent table presented at the Responsible Investment Association annual conference which we attended in June shows the likely coming constraints.

[2] Center on Global Energy Policy at Columbia SIPA

Mineral requirements to reach Net Zero in 2050, projected to 2030

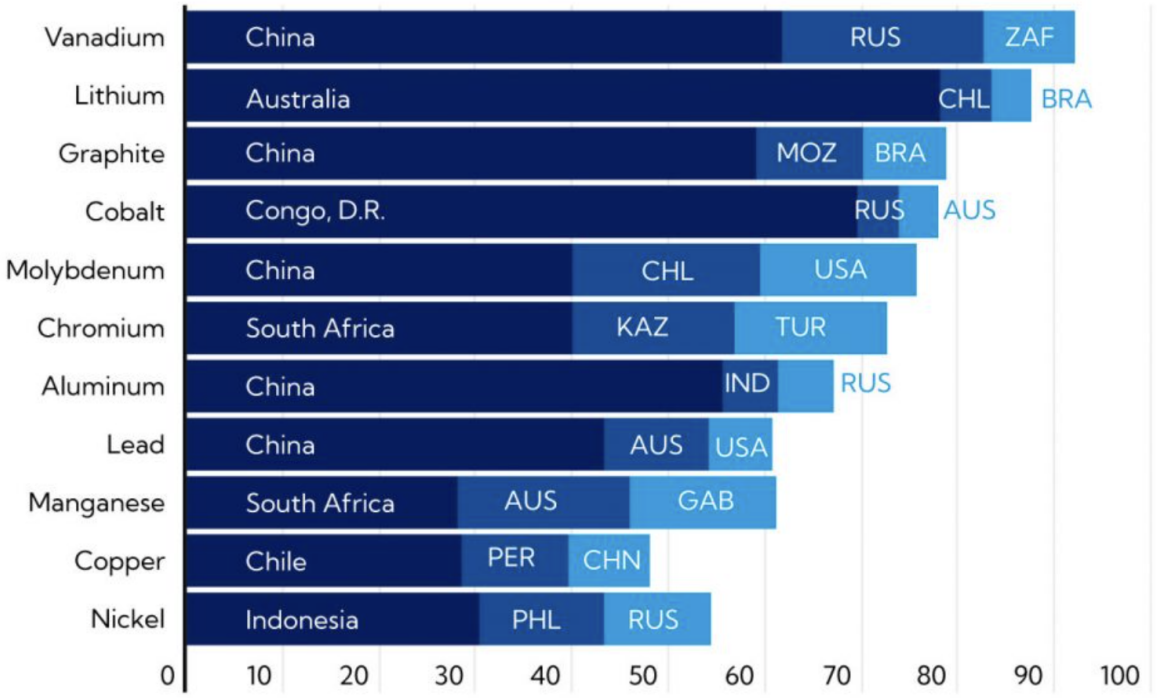
	2021 production (kt)	2030 projected additional production (kt)	2030 additional demand in a +1.5 ℃ scenario (kt)	2030 additional demand % of current production	2030 additional demand % of projected additional production
Boron	751	239	0.5	0.07%	0.21%
Chromium	20,300	6,923	134	1%	2%
Cobalt	13	4	122	936%	3,040%
Copper	12,410	3,942	5,120	41%	130%
Graphite	115	36	2,947	2,562%	8,185%
Lithium	90	28	282	313%	1,006%
Manganese	12,800	4,066	322	3%	8%
Molybdenum	162	52	31	19%	59%
Nickel	1,408	447	1,070	76%	239%
Selenium	1.5	0.5	0.25	16%	54%
Silver	15	6	33	223%	557%
Tellurium	0.17	0.05	4	2,419%	7,816%
Tin	151	47	260	173%	547%
Zinc	5,340	1,696	1,458	27%	86%

Source: RiA

As a portfolio manager asked at this conference, do we really need more consumer electronics and software at this point? We think of the vast opportunities available for able and responsible companies who can maintain or gain significant market share in this global race for commodities. For instance, here in Canada, a Critical Minerals Infrastructure Fund was just launched to provide up to $1.5 billion in federal funding for clean energy and transportation infrastructure projects necessary to enable the sustainable development and expansion of critical minerals. It seems that those very real needs could bring some sort of adjustment to current sector capitalizations once more investors realize the potential for increased commercial activity in producing those resources and improving efficiencies to provide them for the transition.

A few nations only supply those crucial minerals. There have been many advances in what proper practices represent in the industry to protect the environment, biodiversity and indigenous people. Miners have strong pressure to keep improving their methods. New practices and technologies are being developed. The coming demand also creates a sound economic backdrop for other actors operating in those regions. While the materials sector represents only 8% of the MSCI Emerging Markets Index, mining is a significant driver of economic activity in countries such as Chile, Peru, Indonesia, the Philippines and South Africa. Services such as distribution of equipment, leasing and banking stand to benefit, to name a few.

Biggest producers (% of market)



Source: IMF, 2021

Many minerals are found in areas that are environmentally sensitive, with important sources of water and biodiversity. The communities that live near mineral deposits are often poor and experience their own set of unique socio economic challenges. Closing the gap in mineral demand has to be carried out in a manner that empowers local communities around the mines and does not exploit natural resources. There should be careful consideration of ESG concerns. The international community has developed an assortment of toolkits to inform projects[3] and the private sector has also developed their own guidelines. The principles observed throughout such work strongly emphasize upstream planning, good governance, and enabling conditions. Consulting with local communities early on and

[3] Center for Strategic and International Studies

incorporating best practices throughout the mining process is not merely a nicety, but a cost-saving endeavor. Due to a lack of institutional capacity, local governments are often unequipped to enforce laws or combat illegal mining. For example, abandoned or improperly closed mines are attractive to illegal mining operations. Proper closure protocols have not always been common practice and remain underutilized today.

The companies and countries who embrace proper practices and combine them with operational efficiencies will come out on top of the green transition.

Best regards,

Mount Murray Investment