

August 13, 2020

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Re: Growing Canada's Clean Economy with Critical Mineral & Material Supply Chains

We are pleased to present this briefing note in response to your invitation during our conversation on the morning of August 5th.

Overview

Formal discussions on critical minerals and materials and associated supply-chain development have been increasing worldwide, and future demand will only continue to grow as the world turns to these materials to support the clean technology revolution. A Canadian strategy, well-structured and informed by important stakeholders can inspire an economic revival and attract new investment unlike anything seen in the country for decades. Based on our members' active efforts over the past dozen years and our close collaboration with international colleagues and government officials, we see a time-sensitive window of opportunity for Canada to move forward and become a leader in creating new critical materials supply chains. Since many of these minerals and manufacturing capacity are vital for renewable energy and electric vehicle technology, this will also strongly support Canada's efforts on climate change.

The security of critical minerals and materials supply has become a significant concern for governments in light of COVID-19 disruptions to global supply chains, in addition to heightened geopolitical concerns — further underscoring the imperative for immediate action for Canada to establish a comprehensive critical materials supply-chain strategy, essential for its long-term economic security. **The time to act is now as Canada's window of opportunity is limited and closing fast.**

Similar macroeconomic and political considerations have already emboldened our allies and competitors into taking swift and decisive action. Australia, the European Union, the United Kingdom, United States, and even Russia are aggressively moving forward, making significant policy decisions, coupled with strategic investments and incentives to position themselves for success.

For Canada, this is a matter of national, economic and technological security. North America does not have the required supply chains needed for many new technologies – such as electric vehicles, energy storage, sensor and data processing applications and pharmaceuticals – although we do have all these minerals in the ground in Canada and access to advancing processing technologies in Canada and among allied partners. In addition to the raw minerals, it is equally important that Canada have the commercial ability to transform these minerals into the required, highly specialized technology materials that power green/clean-energy applications – at commercial scale. Currently, we have zero capacity. As such, Canada would also benefit from supporting and fostering related processing and application technologies. The

reality is that North America is woefully deficient in installed commercial capacity to produce what our future stated objectives will inevitably require.

We see the Industry Strategy Council as an indispensable ally in helping frame and articulate the importance of this work to the Prime Minister's team and impress upon them the need for a Canada-centric solution to reduce reliance on China as a sole source of supply for the vast majority of our critical materials.

In a letter addressed to Bill Morneau, the Minister of Finance, and Innovation, Science and Economic Development (ISED) and Natural Resources Canada (NRCAN) on February 7, 2020 (attached in **Appendix 1**), we made several specific recommendations to help position Canada for success, which we re-state below as *key recommendations*.

Our recommended approaches are completely aligned with the Prime Minister and Minister Bains' vision to re-invigorate the economy, while securing Canada's clean energy future. We also note the appointment of Mark Carney as a special advisor to the Prime Minister this week, and his stated position of the need to link climate action, economic recovery and long-term climate finance. **We therefore believe that urgent action as described can create an economic architecture that will make Canada a leading global clean technology hub and be a centerpiece of the government's post-COVID industrial strategy.**

Key Recommendations

In summary, it is strongly suggested that the Government of Canada establish a budget framework in the order of \$200 million over a 5-year period, focused primarily on developing and demonstrating advanced material processing technologies, trade promotion in attracting downstream supply chain demand to Canada, and education to ensure human resources are here to establish and grow these supply chains. This investment would take any number of forms including direct investment, academic research, tax incentives, loan guarantees, and other incentives. **The overriding mission is to ensure a full Team Canada approach to help expedite Canada's energy transition, clean technology leadership and economic competitiveness in a powerful manner on the world stage.**

More specifically, we recommend:

1. The establishment of a Canadian *Critical Minerals & Materials Office* under the leadership of an internationally-respected, federally-appointed, executive who is mandated to drive the development of critical materials supply chains in Canada with North American and global partners, as done by other nations.
2. That the Office report to and be championed by the Department of Innovation, Science and Economic Development (ISED) in collaboration with NRCAN. The primary mandate would be to coordinate across all federal departments, offices, public-facing industry stakeholder groups and be comprised of experts from government, industry, technical critical material and industrial sectors, and multidisciplinary academia to set near and longer-term goals and targets. The Office will focus on creating an enhanced supply chain, downstream technology and manufacturing in-and-for Canada, and its various trading partners. The rationale for this leadership recommendation is premised on the recognition that the probability of success in

capturing real value is significantly increased with ‘Demand Pull over Supply Push’ strategies and plans.

3. That the Government move forward expeditiously and formally announce its intent in the Fall of 2020 with a phased-in approach:

a. Phase 1 would entail a formal announcement of the *Canadian Critical Minerals and Materials Office* with associated funds.

b. Phase 2 could be launched in the first quarter of 2021, with specific program and project initiatives identified. Phase 1 would have an initial mandate to provide specific recommendations on fiscal, regulatory and policy reforms required to make Canada competitive in the critical minerals and materials sector. The Office would complete any baseline analysis of all federal and provincial government policies affecting the sector and suggest short and longer-term improvements

4. Phase 2 could see certain pilot projects move forward through established mechanisms such as SDTC and NSERC to certain operations, technologies, including the potential retrofit of the underutilized automotive plants in either Oshawa or Oakville. This would also include easing access to established funding programs such as SDTC, possibly dedicating a pocket of funds for critical material supply chain-related initiatives – all perfectly aligned to the government’s stated mandate to be a global clean technology leader.

5. The proposed \$200M commitment by the government can be followed up with funds to match by industry and will provide adequate resources to allow for execution of the plan and demonstrate serious commitment to national and international stakeholders. Companies like Tesla, Honda, BMW, Hyundai, Ford and General Motors, and their suppliers and sub-suppliers typically prefer to locate close to sources of supply as well as downstream markets and where the policy and regulatory framework are clear. **With the confidence in demand, further upstream Canadian material and processing production in the supply chains will naturally be facilitated.**

6. Support construction of a demonstration-scale rare earth separation plant and support more advanced upstream projects by offering off-take commitments on the mineral product toward establishing a critical minerals strategic stockpile.

7. Champion a national program for electric vehicle incentives and leverage reliable Canadian-‘controlled’ rare earth element (REE) supply chains to encourage production in Canada.

8. Strongly encourage and where necessary appropriately facilitate, major downstream manufacturers (e.g. Magna, Linamar, Honda, Toyota), aerospace, bus and heavy equipment producers to participate, with an eye on plant relocations to Canada or longer-term commitments to demand. These companies should also be encouraged to invite/compel their suppliers/supply chain partners (e.g. motor producers such as Bosch, Brose, Valeo).

9. Introduce a form of ‘super flow-through’ shares to facilitate access to financial markets, structuring funds to permit allocation to downstream processing developments, demonstrations, environmental activities.

10. Extend and expand the current Canadian REE R&D Initiative, currently in its sixth year. The initial program, launched in 2015, was relatively small but broadly scoped such that it was inadequate to champion pilot plant and demonstration projects.
11. Lead and facilitate critical material supply chain trade missions to Japan, Korea & Europe where distinct advantages with certain supply chain links are already in existence, or in friendly jurisdictions nearby.
12. Full-scale regulatory modernization efforts in collaboration with provincial authorities, should recognize critical minerals as a distinct sector to better streamline and accelerate project and process development permitting.
13. Encourage, including incenting as needed, uranium, oil sands, and fly ash producers to process secondary streams (these sources have traditionally been seen as waste materials) for REEs and other critical elements, including addressing how best to address perceived and practical concerns.
14. Review policies around the importation and processing of REE-rich monazite ore and facilitate radioactive material storage; Canada has the regulatory framework in place.
15. Create flagship partnerships with Canadian universities and encourage a focus on mid and downstream processing, including sponsoring multi-discipline participation in research, workshops and conferences. Develop the educational programs and critical skills required within the rare earth supply chain.

Background

It is clearly recognized that Beijing has and continues to use state subsidies to build up its rare earths industry and plans to use its downstream industrial capacity as a geopolitical weapon against the West. China's dominance in critical material mining and metal & component making are critical to high-tech manufacturing has long been a focus of American, European and other Asian lawmakers -- concerned with the evidence that suggests that China values the industry for its potential for geopolitical dominance as equally as it does for its commercial value.

As noted earlier, other countries have taken nationally championed initiatives with a view to secure their economic and national security futures:

- In June 2019, the US federal government published *A Federal Strategy to Ensure a Reliable Supply of Critical Materials*, underscoring critical minerals as being essential to the country's economic and national security, and is prioritizing initiatives to streamline the permitting of listed critical mineral projects from the current seven to 10 years, to just two years. Last May, the US Senate introduced the *Onshoring Rare Earths Act of 2020* (ORE Act) legislation, a bill that would offer tax incentives to companies that develop critical minerals mines and processing facilities in the US; in addition, this bill would require the US Department of Defense to source minerals domestically.

- In the UK, the British Government has earmarked £1bn to attract an EV battery gigafactory and kick start the lithium ion economy. They have also taken a multi-prong strategy including a £7million initiative under the banner SOS.
- The EU has established a broad range of initiatives under the banner of European Institute of Innovation and Technology (EIT). The EIT is an independent EU body created in 2008 that continues to strengthen Europe's ability to innovate. With a proposed budget of EUR 3 billion, which represents an increase of EUR 600 million or 25 percent compared to the current Strategic Innovation Agenda (2014-2020), the EIT funds activities of existing and new Innovation Communities and support the innovation capacity of 750 higher education institutions. Within this framework, including such initiatives as ERECON, EURARE and the (global) Rare Earth Industry Association (REIA).
- Both Japan and Korea have been active in taking positions in projects internationally, along the full supply chain.
- While being mining-centric and less industrialized than Canada but closer to Asian markets, Australia formally established its own *Critical Minerals Facilitation Office* tasked to be the central coordination point to assist with development of critical minerals projects and investments in the critical materials sector. This office also has a broader role to advise the government on national policy and strategy, including relevant foreign investment into the sector.

In response to your request for examples of actions taken by other jurisdictions and nationally championed initiatives, we have cited a myriad of recent initiatives in the **attached Appendix 2**. You will note that developments on upstream supply-side investment follow. There are significant other examples, but for the sake of the briefing note, we have kept it brief. We have also provided a few simple illustrations of where critical materials fit within advanced automobile and communication applications (**Appendix 3**)

We recognize that critical mineral & metal supply chains are complex, serving multi-dimensional applications and markets. We also recognize that the mission of the Industry Strategy Council is complex and multi-dimensional. In this regard, we would be pleased to provide a more extensive briefing for your Council members and their staff at your direction.

I trust that this responds to your initial queries. Thank you in advance for your interest and engagement. I would be pleased to discuss this further with you and explore ways we can work together.

Respectfully submitted,



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APPENDICES:

APPENDIX 1: COPY OF LETTERS TO MINISTER OF FINANCE and PREMIER FORD

APPENDIX 2: BRIEF DESCRIPTIONS OF MAJOR COMPETITIVE NATION INITIATIVES

Lynas to Advance U.S. Rare Earths Plan on Pentagon Funding Deal

Lynas Corp., the Australian & Malaysian-based is currently the key source of rare earths outside China, aims to complete planning work on a rare earths processing plant in Texas by mid-2021 after it won funding from the U.S. Department of Defense.

The contract will allow Lynas and partner Blue Line Corp. to carry out studies and finalize designs for the planned heavy rare earths separation facility. The producer's shares surged to a six-month high.

Lynas touts that it has the feedstock, intellectual property and track record to deliver a heavy rare earths facility in a timely and low risk manner. The firm didn't specify the amount of funding involved in the Pentagon contract. An initial phase of design and planning is likely to cost about \$30 million, per BloombergNEF said in a May report.

The U.S. government's funding push follows President Donald Trump's order in 2017 to reduce dependency on imports of critical minerals needed for products including missile systems, electric vehicles and consumer technology. China supplies about 80% of America's rare earths imports, according to the U.S. Geological Survey. Trade tensions and the impact of the coronavirus pandemic on supply chains have elevated concerns about China's grip on the market.

Currently, there are no rare earths processing plants in the U.S., and development of three new projects -- including the Lynas plant -- would add about 10,000 tons of processing capacity, That's less than the nation's total demand, but sufficient to meet military needs. Lynas will aim to complete in preparatory work on the plant this fiscal year

<https://www.bloomberg.com/news/articles/2020-07-27/lynas-to-advance-u-s-rare-earth-plant-on-pentagon-funding-deal>

Britain's first gigafactory serving energy storage and electric cars

A start-up company with plans to build Britain's first gigaplant to make batteries for electric cars has chosen a site in south Wales for the plant after discussions with the Welsh government.

Britishvolt, which in May launched an ambitious effort to create a £1.2bn factory, has signed a memorandum of understanding with the Welsh government ahead of signing a lease for a former Royal Air Force base at Bro Tathan business park, south Wales.

It is seeking to raise funds through equity, debt and government grants. The battery manufacturer is aiming to list on the London Stock Exchange, around the first quarter of 2021.

The UK government and car companies have called for the establishment of a gigafactory to ensure the sector holds on to the 168,000 manufacturing jobs as the global automotive industry moves towards electric cars. However, no company before Britishvolt has chosen the UK

to build lithium-ion batteries on a large scale. Tesla, the US electric car pioneer, chose a location near Berlin, Germany, for its first European battery factory, citing Brexit uncertainty as a factor counting against the UK, although this month it backed out of plans to build batteries at the plant. Britishvolt hopes to start building its factory during Q2 of 2021. The company also intends to build a 200MW solar power plant at the site to supply the factory and reduce its carbon footprint.

The Britishvolt plans represent another boost for Wales' automotive sector, as the sportscar maker Aston Martin started production of its DBX SUV at a factory on the same site. The company expects to provide 3,500 jobs in the area, which was recently impacted by Ford's decision to close its Bridgend engine plant in September

<https://www.theguardian.com/uk-news/2020/jul/17/battery-firm-chooses-welsh-site-for-britains-first-gigafactory>

Malaysia approves Lynas' application for waste treatment facility

After years of delays, Malaysia has approved Australia's Lynas Corp's application to build a permanent disposal facility for waste treatment. Lynas can build its facility in a waste disposal site identified by the Pahang state government, the science, technology and innovation minister, said in parliament. Identifying a location for the permanent disposal facility was part of the requirements set by the Malaysia government when it renewed Lynas' licence to operate in the country last year.

<https://www.businesstimes.com.sg/energy-commodities/malaysia-approves-lynas-application-for-waste-treatment-facility> August 4th, 2020

MP Materials, North America's Only Rare Earths Producer, Awarded Contract from DoD To Accelerate U.S. Production of Critical Materials;

MP Materials, owner and operator of California-based Mountain Pass, the only rare earth mining and processing site in North America, was chosen by the U.S. Department of Defense for a contract aimed at restoring domestic Heavy Rare Earths production to the U.S. The contract serves as Phase 1 of a DoD effort to reduce U.S. supply chain vulnerabilities by supporting detailed planning and design of a U.S.-based Heavy Rare Earth separation facility, a critical component for expansion of the U.S. rare earth and magnetics industry. Upon completion of Phase 1, the DoD may award further contracts in support of commercial scale production based on Phase 1 results.

MP is committed to restoring the full rare earth supply chain to the United States, paving the way for the onshoring of robust and diverse industries that will thrive through global competition, world-class products and sustainable environmental standards.

<https://www.prnewswire.com/news-releases/mp-materials-north-americas-only-rare-earth-producer-awarded-contract-from-dod-to-accelerate-us-production-of-critical-materials-to-support-national-defense-301045761.html>

MP Materials to go public in \$1.47 billion deal

U.S. rare earths miner MP Materials will go public in a \$1.47 billion deal by merging with a private-equity backed blank-check company, underscoring Wall Street's rising interest in efforts to boost production of the strategic minerals. The listing on the New York Stock Exchange would be the first for a U.S. rare earths company since Molycorp went public a decade ago. Molycorp filed for

bankruptcy in 2015 and MP Materials bought California's Mountain Pass mine and other Molycorp assets in 2017.

Reviving domestic rare earths production has become a priority in Washington as relations with China have become increasingly frayed and U.S. lawmakers warn of the dangers of relying on a competitor for critical components. China is the world's largest producer of these minerals and processed materials and has threatened to stop their export to the United States.

Hedge funds JHL Capital Group and QVT Financial will fold their ownership of MP into the special-purpose acquisition company (SPAC) Fortress Value Acquisition Corp. Fortress is controlled by Japan's SoftBank Group Corp. SPACs have been behind some recent high-profile public listings, including electric car maker Fisker. Retired U.S. General Richard Myers, who chaired the Joint Chiefs of Staff during the George W. Bush presidency, will join the company's board.

MP plans to use the funds to upgrade outdated and mothballed Molycorp-era processing equipment in California. MP had planned to process 5,000 tonnes per year of the two most common rare earth metals by the end of 2020, though the goal is now by 2022. MP is by far the most advanced player in the U.S. rare earths industry, given no rival project has even broken ground, but the company has to ship more than 50,000 tonnes of concentrated rare earths per year to China for final processing because its California equipment is not operational. Chinese customers account for all of MP's \$100 million in annual revenue.

<https://www.reuters.com/article/us-mp-materials-ipo/rare-earths-miner-mp-materials-to-go-public-in-1-5-billion-spac-deal-idUSKCN24G1WT> Ernest Scheyder July 15, 2020

Elon Musk pledges 'giant contract' for sustainable nickel miners

Elon Musk, CEO of US electric vehicle and clean energy company Tesla, has promised a "giant contract for a long period of time" to any company able to extract nickel in an efficient and environmentally sustainable manner. Nickel is a key ingredient in the batteries that power Tesla's electric vehicles.

In February, it was revealed that China's largest battery manufacturer CATL will supply Tesla with lithium iron phosphate (LFP) batteries for the production of Tesla's Model 3 cars at its factory near Shanghai. LFP batteries are cheaper than batteries made using nickel and cobalt but have a reduced driving range. This can be cost-effective in the Chinese market, where LFP batteries already used to power almost all of China's electric bus fleet, and the batteries are suited to smaller city cars where the range is not an issue. In Western markets, particularly North America, a longer range is required – which is where nickel becomes necessary.

Demand for electric vehicles is forecast to grow astronomically through the 2020s, with developments in battery capacity set to further that demand, according to the International Energy Agency. Sourcing enough battery materials in sustainable, ethical ways is vital for the mass adoption of electric vehicles and the energy transition. Tesla's primary battery technology is based on a blend on nickel, cobalt and aluminium, but Tesla is said to be moving away from cobalt over ethical mining concerns as well as cost factors. Tesla's suppliers of nickel batteries indirectly buy nickel from mining companies in a long supply chain.

<https://www.mining-technology.com/features/elon-musk-pledges-giant-contract-for-sustainable-nickel-miners/>

BMW signs Eur100 million sustainable cobalt supply contract with Moroccan miner

The BMW Group has signed a Eur100 million (\$113.4 million) five-year sustainable cobalt supply contract with Moroccan miner Managem Group. The car manufacturer said that the contract would cover about a fifth of its cobalt needs over the 2020-2025 period for the fifth generation of its electric drive trains, with the remaining four-fifths of its cobalt needs to be sourced from Australia. The two companies had already signed a memorandum of understanding on the direct purchase of cobalt from Marrakesh in January 2019. BMW said the company's need for cobalt was expected to roughly triple by 2025.

BMW is systematically driving electrification of its vehicle fleet. By 2023, it aims to have 25 electrified models in our line-up – more than half of them fully-electric. BMW's need for raw materials will increase in line with this.

BMW has made moves to ensure full transparency for its battery raw materials, publishing the countries of origins for cobalt used in its products and restructuring the supply chains for its fifth generation of battery cells. From 2020, BMW has started ensuring it sources its lithium and cobalt directly, which it then makes available to its two battery cell manufacturers. At the end of June, the carmaker also announced that it would ensure its cell manufacturers only use green power to produce fifth-generation battery cells, a move that should save around 10 million mt of CO2 over the next decade.

<https://www.spglobal.com/platts/en/market-insights/latest-news/metals/070920-bmw-signs-eur100-million-sustainable-cobalt-supply-contract-with-moroccan-miner> July 9th, 2020

Canada's Magna International Building All-electric Cars in Europe

In August 2020, Fisker Inc. entered a memorandum of understanding with Canada-based Magna International to build its Ocean electric SUV—in Graz, Austria. A definitive agreement is expected 'in the next few months' allowing Magna Steyr to produce the Fisker Ocean starting as soon as the fourth quarter of 2022.

Magna Steyr already produces the Jaguar's I-Pace—heading for significant improvements for 2021. The I-Pace, aimed squarely at other electric crossovers like the Tesla Model X and Audi's Q6, was launched in 2018, uses LG Chem batteries, which Fisker has stated it also plans to use with the Ocean. Fisker has stated that it is also “evaluating manufacturing options for the United States and China.”

Magna has been expanding its production facility in Graz and works with a number of other automakers. Jaguar Land Rover's UK plants are already running close to capacity with limited room for expansion.

<https://www.motor1.com/news/128947/jaguar-i-pace-built-austria/#:~:text=The%20Jaguar%20I-Pace%20electric%20crossover%20will%20be%20built,under%20which%20Magna%20would%20build%20two%20future%20models.>

https://www.greencarreports.com/news/1129181_report-magna-might-build-fisker-ocean-electric-suv-in-austria

Russia invests heavily, breaking China's monopoly on rare earths

The Russian government is planning to invest more than \$ 1.5 billion in rare earth mining to reduce its dependence on China. Russia's initiative is in line with other countries, such as the United States, which are also trying to curb their reliance on China. Russia has reserves of 12 million tonnes, or 10% of the global total, and its government is willing to back any foreign investment.

<https://theworldnews.net/vn-news/russia-invests-heavily-breaking-china-s-monopoly-on-rare-earths#:~:text=Russia%20invests%20heavily%2C%20breaking%20China%E2%80%99s%20monopoly%20on%20rare,the%20Mountain%20Pass%20mine%20in%20the%20United%20States>

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APPENDIX 3: CRITICAL MATERIALS KEY TO VALUE CREATING, KNOWLEDGE WORKER-PRODUCED CLEAN END USE PRODUCTS

Rare Earths enable a wide range of advanced clean technologies across the automotive, communications, display, computing and renewable energy technologies.

Rare earth minerals

Group of 17 elements used in a wide range of consumer products

Features:

- ▶ Gray to silvery metals
- ▶ Soft, malleable and ductile
- ▶ China supplies at least 95 percent of world's rare earths

Some products that contain rare earth elements:

- iPods** - dysprosium, neodymium, praseodymium, samarium, terbium
- Wind turbines** - dysprosium, neodymium, praseodymium, terbium
- Hybrid vehicles** - dysprosium, lanthanum, neodymium, praseodymium
- Fibre optics** - erbium, europium, terbium, yttrium
- Energy-efficient fluorescent light bulbs** - europium, terbium, yttrium

Source: USGS



ELEMENTS OF A SMARTPHONE

ELEMENTS COLOUR KEY: ALKALI METAL, ALKALINE EARTH METAL, TRANSITION METAL, GROUP 13, GROUP 14, GROUP 15, GROUP 16, HALOGEN, LANTHANIDE

SCREEN

- Indium tin oxide** is a mixture of indium oxide and tin oxide, used as a transparent conductor in the screen that conducts electricity. This allows the screen to function as a touch screen.
- The glass used on the majority of smartphones is an aluminosilicate glass, composed of a mix of alumina (Al₂O₃) and silica (SiO₂). This glass also contains potassium ions, which help to strengthen it.
- A variety of Rare Earth Element compounds are used in small quantities to provide the colour in the smartphone's screen. Some compounds are also used to reduce UV light penetration into the phone.

ELECTRONICS

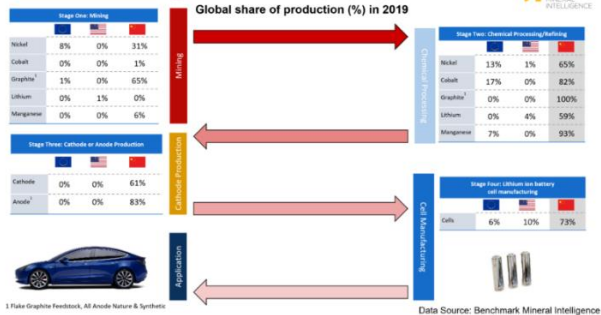
- Copper is used for wiring in the phone, while copper, gold and silver are the major metals from which microelectronic components are fabricated. Tantalum is the major component of micro-capacitors.
- Nickel is used in the microphone as well as for other electrical components. Alloys including the elements vanadium, palladium and molybdenum are used in the magnets in the speaker and microphone. Neodymium, terbium and dysprosium are used in the loudspeakers.
- Rare earths are used in manufacturing the chip in the phone. It is oxidized to produce non-conducting regions, then other elements are added in order to allow the chip to conduct electricity.
- Tin & lead are used to solder electronics in the phone. However, lead-free solders use a mix of tin, copper and silver.

BATTERY

- The majority of phones use lithium ion batteries, which are composed of lithium cobalt oxide as a positive electrode and graphite carbons as the negative electrode. Some batteries use other metals, such as manganese, in place of cobalt. The battery's casing is made of aluminium.
- Magnesium compounds are alloyed to make some phone cases, which may also be made of plastics. Plastics will also include flame retardant compounds, some of which contain bromine, whilst nickel can be included to reduce electromagnetic interference.

CASING

The Lithium ion battery to electric vehicle (EV) supply chain in 2020



Critical Mineral and Material Supply Chains tend to be longer with some complex process chains.

