The Australian Government Steps into the Critical Minerals Supply Chain Ring

written by Jack Lifton | March 14, 2024

A recent monumental development within the mining and rare earths sectors is the Australian government's financial endorsement of Arafura Rare Earths Limited's (ASX: ARU) rare earth mine and refinery project. This marks a significant step forward in the global pursuit of sustainable and secure Non-Chinese owned or operated sources for critical minerals. This move, underscored by an impressive A$840 million in loans and grants, signals a strong Australian governmental belief in the necessity and potential profitability of domestically sourced rare earth elements, vital for electric vehicle (EV) motors and renewable energy technologies.

Gina Rinehart's Hancock Prospecting, alongside other private equity interests, has seen a notable appreciation in value following this announcement, illustrating the private sector's growing confidence in rare earth ventures as a viable and lucrative investment avenue. This confidence is buoyed by government backing, which often acts as a catalyst for further private investment by demonstrating a commitment to the sector's success and stability.

Australia's strategic decision to support Arafura's project, situated near Alice Springs, showcases its ambition to become a frontrunner in the production of rare earth elements, crucial for EVs and wind turbines. This initiative not only addresses the immediate financial hurdles faced by the mining industry but also aligns with broader goals of establishing Australia as a key player in the global supply chain for renewable energy

technologies.

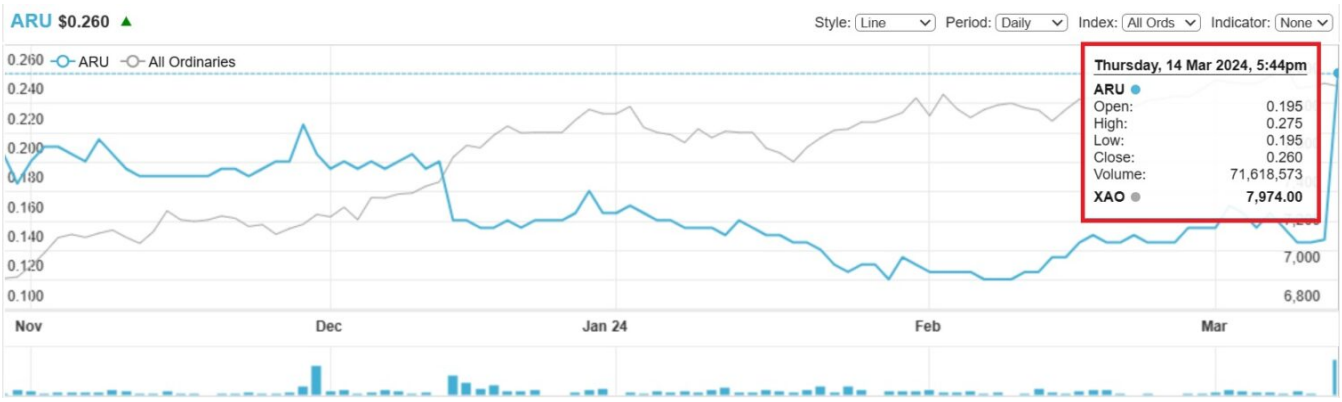
The involvement of figures like Gina Rinehart and Andrew Forrest, both of whom have substantial stakes in mining ventures, underscores a deeper shift towards mining as an investment that offers both substantial returns and strategic value in the context of the global green transition. Their investments in rare earths and the potential for vertical integration, as seen in the partnership between Forrest's Hastings Technology Metals Limited (ASX: HAS) and Neo Performance Materials Inc. (TSX: NEO), highlight a keen understanding of the sector's critical role in future technologies and energy solutions.

Australia's proactive stance, contrasted with the more cautious approaches of other Western nations, illustrates a deep understanding of the strategic importance of rare earths and the necessity for domestic processing capabilities. This is not just about securing supply chains but also about capturing more value within the country, creating jobs, and fostering technological advancements in green energy and EV production.

Moreover, the broad financial and strategic implications of this government support extend beyond the immediate economic benefits. They underscore a pivotal moment for the global rare earths market, emphasizing the critical need for diversified, reliable sources of these essential materials. As tensions and competitions intensify on the international stage, Australia's move represents a significant step towards greater independence and resilience in the face of geopolitical and market pressures.

In conclusion, this development is a clarion call to nations and investors alike to recognize the indispensable role of rare earths in the modern world. It is a testament to the vision and audacity of those like Rinehart and Forrest, who see beyond the

immediate to the immense potential that rare earths hold for the future of technology, energy, and national security. As Australia forges ahead, it sets a compelling example for others to follow, highlighting the comprehensive strategy needed to fulfill the burgeoning demand for domestic sourcing of rare earth magnets, especially among European and American EV automotive OEMs.



Setback for U.S. Rare Earth Industry: China Tightens Export Laws on Key Technologies, Impeding American Efforts to Gain Independence Despite Financial

Incentives

written by Jack Lifton | March 14, 2024

Bad news for those who think that the shortage of rare earth processing in America can be resolved by the injection of “free” money (A/K/A subsidies [also known as taxpayer’s money]) into the “free” market as, drum roll, please, “tax credits,” grants, and loans. The Chinese have decided not to give up their decades-long, learned by trial and error as much as by science and engineering, dominance in rare earth processing. China has announced a (further) tightening of its strict laws against the export of rare earth themed industrial technology. In particular, this means that technologies for producing rare earth metals, alloys and MAGNETS may not be shared with ANY foreign (to China) entity as a matter of national security!

Technology Metals Week-in-Review: The British Stake Claim in Quebec and the Uranium Boom in North America

written by Jack Lifton | March 14, 2024

Northvolt’s Innovative Financing in

Quebec: A Model of International Collaboration

The recent news about Northvolt AB's venture in Quebec is a testament to the power of international finance collaboration. This project, backed by a mix of private European and American financiers, alongside public funds from Ontario and Quebec, is remarkable. Notably, the involvement of major players like Volkswagen, BlackRock, Goldman Sachs, and Canadian provincial investment groups highlights a unique synergy. This contrasts sharply with the American approach, which often relies on tax breaks rather than direct investment. The Canadian model, with its subject matter awareness and understanding, is a commendable approach that others, especially in the U.S., should consider emulating.

Ucore's Dual Government Support: A Sign of Confidence

Ucore Rare Metals Inc.'s (TSXV: UCU | OTCQX: UURAF) recent acquisition of a $4.28 million funding agreement from the Canadian Government, in addition to support from the U.S. Department of Defense, speaks volumes about its credibility. This bi-national backing for a Canadian company with operations in the U.S. showcases the growing government recognition of the importance of rare earth elements and the technologies that Ucore brings to the table.

First Phosphate's Vision and Recognition

The acknowledgment of First Phosphate Corp. (CSE: PHOS | FSE:

KD0) by Professor Whittingham, a key figure in lithium-ion battery development, is significant. First Phosphate's strategy to leverage Quebec's phosphate resources for lithium iron phosphate batteries aligns well with current industry trends and Professor Whittingham's endorsement. This positions them as an underrated yet potentially influential player in the battery materials market.

The Uranium Boom: A New Era for North American Energy

The recent surge in interest and investment in uranium, highlighted by companies like F3 Uranium Corp. (TSXV: FUU | OTCQB: FUUFF) and Energy Fuels Inc. (NYSE American: UUUU | TSX: EFR), signals a major shift in North American energy priorities. The rapid market capitalization growth and the reopening of mines underscore a renewed focus on nuclear power as a crucial component of the future energy mix. This shift is a clear response to the growing need for sustainable and reliable energy sources.

Biden-Harris Administration's Push for Domestic Battery Manufacturing

The announcement of a $3.5 billion investment by the Biden-Harris Administration to bolster domestic battery manufacturing marks a significant step in America's clean energy journey. This investment aims to enhance the U.S.'s position in the global battery market, create jobs, and support the clean energy transition. It's a move that aligns with the growing realization of the importance of battery technology in the modern energy landscape.

Critical Minerals Institute's Masterclass: A Focus on Future Financing

The upcoming Critical Minerals Institute masterclass on charitable flow-through and critical minerals is a crucial event for those in the industry. Understanding the mechanics of flow-through financing is vital for the development of junior companies. This masterclass represents an invaluable learning opportunity for those looking to deepen their understanding of the financial landscape in the critical minerals sector.

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Jack Lifton brings his extensive knowledge and insight into the latest developments in the technology metals sector, offering a comprehensive overview of the current trends and future prospects. Jack is the Co-Chairman of the Critical Minerals Institute and is well known for coining the term #technologymetals in 2010.

Appia and the demand for the critical Heavy Rare Earths

written by Jack Lifton | March 14, 2024

The rare earths necessary for the manufacturing of the magnets needed for the type of electric motors that can drive electric cars fall into two categories, the basic critical permanent magnet rare earths, neodymium (Nd) and praseodymium (Pr), and

the critical, critical rare earths necessary for that purpose, dysprosium (Dy) and terbium (Tb). Without the addition of Dy and/or Tb to the alloy based on NdPr (a natural mixture called didymium) the magnetic material produced will not be able to maintain its (magnetic) strength at the high operating temperature and cycles of heating and cooling experienced daily by the electric drive motors to be used in EVs.

Sourcing Critical Minerals for the OEM Automotive Industry in 2023; a case of déjà vu all over again

written by Jack Lifton | March 14, 2024

The Western OEM automotive industry has begun to downshift its expectations of the speed at which it will be able to changeover its traditional powertrain from internal combustion engines to electric motors. This is primarily due to two factors, one is material, the sourcing of components the operation of which depends on critical metals and minerals being mined and processed by an unplanned total supply chain that in many cases does not (yet?) exist, and the other is the industry's reliance on customer demand coming from arbitrary government mandates requiring the EV transformation rather than on market forces.

It would seem that If the American Federal Government had good planning skills, its mandarins would, *prior to the attempted implementation of a policy*, look at the foreseeable consequences

to the necessary critical materials' supply chains of that policy. In the same vein you would assume that the management of American manufacturing corporations, looking at a radical product change, in the case of mass produced consumer products, would try to coldly estimate the true costs of such a project. Alas, this is not the case for the vast majority of governmental oversight and private manufacturing organizations. They, thus, careen from one totally foreseeable crisis to another due, in both cases, to their ignorance of the time and capital allocation required for the design, engineering and the construction of the mineral and processed metal products' supply chains critically necessary ***and sufficient*** for that radical product change.

Let's look at the need both for mined minerals and for the total industrial supply chains downstream of mining to convert those minerals into the end-user forms necessary for the manufacturing of OEM automotive components used directly on cars and trucks. We will focus only on the manufacturing of electrically powered vehicles, EVs.

It cannot be overemphasized, and it is painfully obvious after a few moments of reflection, that the OEM industrial world does not directly use the mined ores of the metals that constitute the structure of, or the appearance of, or enable the properties of the electrical or electronic components of its finished products. In the last generation or so, the number of steps in the widely variant supply chains that transform these ores into finished end-user ready components has been of little or no interest to the financializers who now dominate the management of Western manufacturing corporations. In fact, the legacy of managers, who are trained and have operated as engineers and scientists within the corporations and who understand these supply chains has all but vanished.

The America OEM automotive industry's move to electrification has placed its costs in intensive care [a/k/a margin collapse] The American Federal Government's only therapy is to offer to subsidize the costs of EVs to reduce the losses, *temporarily* while the OEMs figure out how to become competitive with their dual nemeses at home and abroad, America's Tesla and the growing Chinese EV behemoths led today by BYD, but we are assured that tomorrow the Chinese EV manufacturing industry will consolidate into just a few megacorporations making competition in the EV space in China all but impossible.

The Wall Street Journal recently wrote a review of the growth of BYD, which included the following paragraph:

"The investment bank, UBS, estimates BYD has a cost advantage of around 25% over traditional automakers in North America and Europe, **due in large part to its in-house manufacturing of parts[my emphasis]**. Analysts at UBS recently tore down a 2022 BYD model and found that around three-quarters of its parts were manufactured in-house."

The American OEM automotive industry ignored the mining and processing industries after Henry Ford taught it to break the commodity based manufacturing "trusts" (a/k/a "monopolies) of the 1910s, by vertically integrating his company upstream of his final products all the way to mining iron ore, shipping it, making steel, mining silicates, making glass, and even growing rubber for the making of tires. The surviving car makers, after the corporate bloodbaths of the teens and twenties of the twentieth century adopted this strategy of necessity in order to compete.

While I was a teenager, in the 1950s, car makers with names such as Hudson, Nash, Kaiser-Fraser, Studebaker and Packard vanished in bankruptcy leaving by the end of that decade just the Big

Three, Ford, General Motors, and the Chrysler Corporation, and a small fourth called American Motors, the remainder of the last attempt by France's Renault, to enter the American market.

The vertical integration of the American car makers continued until the final quarter of the twentieth century, and their production and service parts labeled as FoMoCo, Delco (GM), and Mopar (Chrysler) logos were familiar to the sourcing managers, and the manufacturing managers, not only of the OEM automotive assembly industry but also to those of the automotive maintenance and repair industry.

The biggest instance in one industry of financialization for profitability rather than innovation and productivity was the selling off by the Big Three of their internal parts and service organizations. The best example of this folly was the sale of GM's Delco to a private group that re-baptized it as Delphi and enriched itself even after filling GM's then emptying coffers with more than a billion dollars. NB: One of the miscellaneous parts of this sell-off was the by-then moribund Magnequench subsidiary of General Motors, the very entity that had been created to first produce rare earth permanent magnets for the OEM automotive industry-you see, by the late twentieth century the Chinese had mastered the technology for producing magnet rare earths from the short-sighted Molycorp executives that had gone to them to secure low cost skilled and unskilled labor in the early 1980s. Of course magnet making followed, and by the late 90s it was all over for both Molycorp and Magnequench.

For the record, a financializer first bought the Magnequench unit from GM and could not revive it. He sold it to a Canadian group headed by a CEO who was an experienced chemical engineer. The Canadians immediately moved the operations to China to cut costs and may have kick-started China's today dominance over Japan as the overwhelmingly largest manufacturer of rare earth

permanent magnets for the OEM automotive industry (and for everything else, also).

The American rare earth processing industry shut down in 1998 when Molycorp shuttered its once pioneering and for some time, world's largest solvent extraction plant dedicated to rare earth separation. As of today, October 24, 2023, twenty five years later, there is no solvent extraction plant dedicated to rare earths separation operating in North America. There is no operation in the Americas today making rare earth metals and alloys for magnets from rare earth chemicals. There is no operation in the Americas making rare earth permanent magnets for the OEM automotive, aerospace, or wind turbine industries.

I am now 83 and in pretty good health for my age-my mother lived to be 100. Why am I saying this to you? Because when I was asked at the Pentagon about 7 years ago how the USA could regain its footing in rare earth permanent magnets manufacturing I told them that they should scour the retiree communities and assisted care homes first to find the most experienced rare earth permanent magnet scientists and engineers and then provide oxygen, nursing care, and wheelchairs to those chosen to help.

Just since the closing of the original operations of Molycorp in 1998 and of Magnequech's move to China shortly thereafter, the Chinese have trained and utilized an entire generation of rare earth miners, processors, and end-use product fabricators. Simultaneously they have created the world's largest reservoir of specially educated rare earth scientists and manufacturing engineers(!). The total membership of these groups in China is believed to exceed 50,000 men and women. That means that while we, in the West, have been obsessed with financialization, the Chinese have already spent ONE MILLION MAN-YEARS on mining, refining, and producing and fabricating end user forms of rare earths for both the consumer and (their) military industries.

The sole driver today for the revival of a domestic American rare earth permanent magnet manufacturing industry is security of supply. But our institutional knowledge and inertia from excellence are extinct and have to be rebuilt.

If the United States actually were a free market economy then there would be no demand for domestic rare earth permanent magnets, since all potential domestically owned providers have openly said that they cannot match Chinese prices for such magnets. So, why are POSCO, Vakuumschmeltze, and JLMAG coming to North America to manufacture here such magnets? Its entirely due to the IRA, the Inflation Reduction Act, which grants subsidies, i.e., taxpayer giveaways, to those whose products have the majority of their value added domestically or in nations within which the USA has a “free trade” agreement, an FTA in Washington jargon.

The American OEM automotive industry has wisely embarked on a trajectory to become “involved” in a total domestic rare earth permanent magnet supply chain for its own needs. The U.S. Department of Defense has embarked on a similar mission. Neither group has much subject matter knowledge and may well waste quite a bit of time and effort on dead-ends, but both groups, the automakers and the military face an existential threat, the first being overwhelmed by Chinese made EVs and the second being overwhelmed by a Chinese military build up. Both would lead to restrictions on the sale of rare earth permanent magnets by China to the USA to give China a competitive advantage.

America is now robbing Europe of its remaining expertise in the manufacturing of rare earth permanent magnets. This is due to the subsidies to be provided to European manufacturers who relocate to the USA. Time will tell if this is going to be enough. I believe that we are entering a zero-sum game. Some companies and government departments will win and some will

lose.

There is simply not enough expertise to go around, and there certainly is not enough of the critical minerals and their processing either.

A Landmark Moment: U.S. Dept. of Defense Makes Bold Moves in Rare Earth Magnet Manufacturing

written by Jack Lifton | March 14, 2024

The world of rare earth permanent magnet manufacturing just received a jolt of excitement. A new announcement from the Department of Defense has revealed a significant investment in a domestic manufacturing plant, a move that holds implications not just for defense, but also for the wider commercial sphere.

The Chinese Rare Earths Monopoly Saga Continues

written by Jack Lifton | March 14, 2024

The blather in the media suggesting that China could or already

be weaponizing the export of their “rare earths” to the rest of the world is so one-sided that it must make the Chinese wonder if non-Chinese “analysts” and “experts” ever bother to see the world from the perspective of “others.” For more than a decade China has been aggressively acquiring outright or buying the output of non-Chinese rare earth sources. At this point in time, China is the overwhelming buyer, worldwide, for example of the mineral monazite, which is produced primarily as a byproduct of the processing of heavy mineral sands, which are the source of zircon and ilmenite, source minerals for, respectively, zirconium and titanium.

Insights on Lynas Rare Earths’ Fiscal Year Report and Expert Commentary

written by Jack Lifton | March 14, 2024

Lynas Rare Earths Ltd. (ASX: LYC) recently unveiled its financial statistics for the fiscal period culminating on 30 June 2023. The firm’s financial year was marked by significant operational feats, most notably setting new benchmarks in concentrate and NdPr production during the latter half.

Eyes on Korea: The Emerging Epicenter of the Rare Earth Supply Chain

written by Jack Lifton | March 14, 2024

To sum up, while the global discourse frequently orbits around China and the US, the Korean rare earth landscape is bustling. Their relentless quest to develop a comprehensive domestic supply chain for rare earth permanent magnets will invariably lead to a demand spike, which may catch many by surprise.

Critical Minerals in Bidenomics and Xiconomics

written by Jack Lifton | March 14, 2024

In a recent interview with InvestorIntel, Jack Lifton, a well-versed commentator on the economics of critical minerals and the co-founder of the Critical Minerals Institute, discussed his insights about the current state of the rare earth industry, the Biden administration’s approach to mineral economics, and the supply chain for critical minerals in the United States.