

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.



Rare earths giant MP Materials invests heavily to rebuild a U.S. magnet supply chain

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Taking private companies public through alternative investment vehicles, such as special-purpose acquisition companies (SPAC), was a popular trend in 2020 and 2021. SPAC and other deals, such as Fortress Value Acquisition Corp (FVAC), have come under scrutiny by some parties as a cash grab. However, there are multiple success stories that have been able to secure investor trust.

One company who did not fall victim to this hype is [MP Materials Corp.](#) (NYSE: MP). In fact, MP Materials has continued to impress investors since the company went public through a FVAC in December 2020. Operating the only rare earth mining and processing facility in the United States, MP Materials is poised to continue to deliver rare earths (RE) to US customers whose appetite for these materials is nearly endless.

MP Materials primarily provides lanthanum, cerium, and neodymium-praseodymium oxide. Interestingly, MP Materials has both support from the commercial and military sectors. We reported back in [December](#) that General Motors (GM) struck a deal with MP Materials to supply U.S.-sourced and manufactured rare earth materials, alloy, and finished magnets for GM's electric vehicle programs. MP Materials plans to ramp up production to support this effort in 2023, but it remains to be seen if they can meet that aggressive timeline.

The Department of Defense will help contribute to the continued operation of the Mountain Pass facility. MP Materials was awarded a [\\$35 million contract](#) through the Industrial Base Analysis and Sustainment Program to support heavy rare earth elements (HREE) mining. These materials are critical to the development of permanent magnets that are key components in various products, from wind turbines to missile systems.

The Mountain Pass facility already has the capability to mine and process light rare earth elements (LREEs). The added capability to mine HREE will enable MP Materials to mine all rare earths for high-performance magnet production. The company will also be able to recycle all recoverable rare earths from end-of-life magnets and magnet production scrap.

The company is currently [building](#) a 200,000 sq. ft. greenfield metal, alloy, and neodymium-iron-boron (NdFeB) magnet

manufacturing facility in Fort Worth, Texas. This facility will also serve as the business and engineering headquarters for MP Magnetics. Materials mined at Mountain Pass will be processed and transformed into products at the Texas-based facility. Construction of this facility began in April 2022.

These exciting new developments and other macroeconomic forces have led to a positive outlook for MP Materials. The company had a promising [first quarter](#) of 2022 and beat market expectations. MP Materials posted revenues of \$166 million—surpassing the \$132 million expected—and boasted earnings per share of \$0.50 (as opposed to the \$0.38 expected).

Revenue increased 177% year-over-year from increases in the realized price of rare earth oxide from higher demand for rare earths. The increase in revenue was also in part due to the amount of rare earth oxide sold, which occurred due to higher production volumes and shipment timings.

MP Materials also had a significant amount of free cash flow in quarter one, but that will likely change throughout the rest of 2022. The company plans to continue to heavily invest in its assets this year. These investments could result in a negative free cash flow in 2022.

It remains to be seen whether MP Materials can meet the bold promises that management is aiming for. Improving rare-earth supply chains in the United States is a massive challenge, but currently, MP Materials has a chance to get there.

All Eyes on Australia in 2022 as a Global Rare Earths Production Leader

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The rare earths sector, particularly the rare earth magnet metals (such as neodymium (Nd)), had a great 2021; but given that the electric vehicle (EV) and clean energy booms are just getting started, 2022 should be another strong year. The most powerful electric motor magnets used today are known as permanent magnets, and they typically are made of neodymium iron boron (NdFeB). Dysprosium (Dy) and praseodymium (Pr) are also commonly [used](#) in permanent magnets.

As shown below, neodymium prices had a very strong 2021 reflecting a very strong demand for permanent magnets used in powerful electric motors. It is interesting to note the correlations of price and EV car sales from the chart below especially when considering that the peak months for global electric car sales in 2021 were [March](#), [June](#), [October](#), [November](#), and most likely December (usually the best month of the year).

If you think electric car sales will boom again in 2022 and throughout the decade (as I do), then there is a strong case for owning the rare earth miners of these key magnet metals.

Neodymium 1 year price chart – Currently at CNY 1,110,000/t (USD 174,134/t)



Source: [Trading Economics](#) (red arrows by the author to show peak e-car sales months in 2021)

Where is the opportunity in rare earths?

Most [rare earths reserves](#) are found in China, followed by Vietnam, Brazil, Russia, India, Australia and the USA. Canada also has some rare earths. Most of the global [rare earths production](#) is from China followed by USA and Australia.

For Western investors, the two largest rare earths producing mines are owned by Lynas Rare Earths Limited (ASX: LYC) and MP Materials Corp. (NYSE: MP). A third smaller producer is [Energy Fuels Inc.](#) (NYSE American: UUUU | TSX: EFR), which, however, is a processor, not a rare earth miner.

For investors looking at the next potential rare earths producer then best to look to Australia and Canada. Today I will focus on Australia.

Australian rare earth miners

Lynas Rare Earths Limited (ASX: LYC) (Lynas)

Lynas is the second largest NdPr producer in the world. Lynas owns the Mt Weld rare earth mine and Concentration Plant in Western Australia (WA), one of the world's highest grade rare earths mines. Lynas ships concentrate from WA to their Malaysian plant for separating and processing into commercial rare earths' materials. As part of their 2025 plan, Lynas is progressing their new Kalgoorlie Rare Earths Processing Facility in WA as well as their LRE/HRE separation & specialty materials facility in the USA.

Boosted by strong prices and production ([5,461t of NdPr](#) in FY 2021), Lynas reported [record sales of A\\$498 million and a record profit of A\\$157 million](#) in FY 2021. I would expect this to continue in 2022.

Lynas is no longer cheap and trades on a market cap of [A\\$9.69](#)

[billion](#), and a 2022 PE of [24.9](#). A top tier Western rare earths (NdPr) producer.

Australian Strategic Materials Limited (ASX: ASM) (ASM)

Australian Strategic Materials is an emerging integrated producer of critical metals for advanced and clean technologies based in Australia and South Korea. ASM plans a “mine to metal” strategy to extract, refine and manufacture high-purity metals and alloys that they can then supply directly to global manufacturers. ASM plans to produce a range of high-purity metals, alloys and powders from their metals plant in South Korea. Products will include titanium, zirconium and rare earths, required for permanent magnet production with the raw materials initially sourced from the market. The plan is to later source some materials internally, notably from their flagship Dubbo Project.

The Dubbo Project deposit contains rare earths, zirconium, niobium and hafnium. The Dubbo Project is ready for construction, subject to financing. In December 2021 ASM announced an updated base case in which the 20-year life of mine is expected to achieve a [pre-tax NPV of A\\$2,361 million](#) and a pre-tax project internal rate of return of 23.5%.

In November ASM [announced](#) the commissioning of their Korean Metals Plant in Ochang Province, South Korea. In December ASM [announced](#) they had formed a JV with Resource Corporation (KOMIR) (formerly known as Korean Resources Corporation (KORES)) to enable the supply of critical minerals and metals into Korea.

Korea is a tech-based manufacturing powerhouse, and this JV is very timely as non-Chinese tech manufacturers try to wean themselves from dependence on China-centric supply chains.

ASM trades on a market cap of [A\\$1.34 billion](#).

Arafura Resources NL (ASX: ARU) (Arafura)

Arafura own the shovel ready Nolans rare earths (NdPr) Project in the Northern Territory of Australia. Arafura is aiming to be a trusted global leader for sustainably mined and processed rare earth products and plans to mine and process ore to separated commercial oxides at a single site at their Nolans Project. The main focus being to produce NdPr oxide. The Project has [all](#) Federal & NT Environmental approvals secured and Government and Minister support for [A\\$300 million](#) senior debt facility. Basically, the Project is ready to go subject to final project funding being secured. Subject to that funding, first production is targeted to begin [late 2024](#).

Arafura trades on a market cap of [A\\$333 million](#).

An interesting side note to end on is that Arafura quote:

- “EV market growth is exponential: 10 to 40 times in the next 20 years. This will require 6–15 times more rare earth elements.
- Most EVs need about 1kg of rare earths for their motor magnets.
- Just 0.05% of the vehicle cost: but it can’t run without it.
- Market analysts forecast a supply gap that represents 109% of global supply today and is in excess of 11 Nolans Projects.”

Source: [Arafura Resources October 2021 company presentation](#)

Closing remarks

We should remember that in 2021 the Morrison led Australian Government [announced a A\\$2 billion loan facility](#) for Australian critical minerals projects. These funds have the potential to help Australian rare earths juniors to move towards production.

Combine this with high magnet rare earths prices and surging demand, and we have all the ingredients for a strong 2022 from the Australian rare earths' miners.

Neo Performance Materials becomes the West's First Profitable Total Rare Earths' Supply Chain Company

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Investors love companies that under promise and over deliver. Today's company is a classic example as it continues to grow its highly valuable global advanced materials business that includes rare earth alloy powders and magnets.

[Neo Performance Materials Inc.](#) (TSX: NEO) ("Neo") is a profitable processor and manufacturer of advanced industrial materials including rare earth metals, alloys, and "bonded" rare earth permanent magnets, specialty chemicals, technology metals, and alloys. These are all critical to the performance of many everyday products and emerging technologies such as the high-powered magnets used in electric vehicles and in direct drive wind turbine electric generators. Neo operates globally with sales and production across 10 countries including Japan, China, Thailand, Estonia, Singapore, Germany, the United Kingdom, Canada, the United States, and South Korea.

Neo is the only company in the world that operates dual supply

chains inside and outside of China for rare earths, rare earths separation and the commercial production of rare earths advanced materials. Neo owns and operates the only operating commercial rare earth separation facility in Europe.

Furthermore, Neo's [Magnequench](#) unit is the global leader in bonded neodymium-iron-boron (NdFeB) alloy powder based magnets and their applications. Its powders and magnets are used in high-performance components for the OEM automotive, factory automation, high-efficiency motors, residential appliances, and in many other applications.

Neo Performance Materials global operations that manufacture advanced materials that incorporate rare earths and other rare element metals



Source: [Company presentation](#)

Establishing a new Western rare earths supply chain incorporating USA and Europe

As a reminder, in July 2021 Neo announced the commencement of commercial shipments of mixed rare earth carbonates produced from monazite from which the uranium and thorium had been removed by [Energy Fuels Inc.](#) (NYSE American: UUUU | TSX: EFR) in the USA, to Neo's rare earth separations facility in Estonia, Europe. This first shipment was a landmark for establishing a [new non-Chinese Western rare earths supply chain](#). Energy Fuels has been sourcing ore from third parties such as from Chemours' (NYSE: CC) heavy minerals sands operations in Georgia, USA; then processing the monazite residue at their White Mesa Mill in Utah, USA, to extract the rare earths, remove the radioactive elements, and then process the rare earths into a solid mixed carbonate form ready for delivery, in this case, to Neo's

operation in Estonia according to its specification. The news [stated](#):

“This new supply chain will initially produce rare earth products from monazite that is processed into mixed RE Carbonate at Energy Fuels’ Mill in Utah. This RE Carbonate is then further processed by Neo at its Silmet rare earth processing facility in Sillamäe, Estonia (“Silmet”) into separated rare earth oxides and other value-added rare earth compounds. Neo is the only commercial producer of separated rare earth oxides in Europe.”

Neo’s CEO, Constantine Karayannopoulos, [stated](#): “This innovative U.S.-to-Europe supply chain will supplement Neo’s existing rare earth supply from our long-time Russian supplier. It will enable Neo to expand value-added rare earth production in Estonia to meet growing demand in Europe for these materials.”

Neo’s financials keep getting stronger

As announced on August 12, 2021, Neo produced another stellar [financial result in Q2, 2021](#). Highlights included production volumes increasing 59.6% YoY, revenue reaching US\$135.1 million and up 99.5% YoY, adjusted EBITDA of US\$22.2 million massively up YoY (an increase of \$21.0 million), and adjusted net income of US\$14.1 million, or US\$0.37 per share. The chart below highlights the financial improvement in Neo’s financials over the past year.

Neo’s consolidated revenue and adjusted EBITDA keep rising due to a very strong operational performance



Neo’s revenue by segment and geography is led by Magnequench and China



Source: [Company presentation](#)

Neo's CEO, Constantine Karayannopoulos, [stated](#): "We had an outstanding second quarter that exceeded our expectations, with record revenue and robust profitability, while our plants operated at near-record output.....With the organic growth we are seeing across all business units, the significant macro tailwinds boosting the entire rare earths sector, and a number of strategic growth opportunities on the radar screen, we remain confident in the sustainability of our long term vision and growth strategy."

Looking ahead to the rest of the calendar year 2021 analyst's forecasts remain strong with CY2021 revenue forecast at [US\\$503 million](#), net income US\$39 million, and 7.82% net profit margin. These estimates may soon need to be increased given Neo has already achieved US\$266 million in H1 2021. In terms of multiples, they are also appealing with Neo trading on a 2021 PE of [16.7x](#) and an EV/Revenue multiple of [0.92x](#).

Closing remarks

Neo is currently riding a wave of demand for its advanced materials as we move to a greener economy, especially for the high-value rare earth alloy powders and magnets made with neodymium. These magnets are key to achieving greater power and efficiency from electric motors, the demand for which in the large drive motors for electric vehicles is surging.

Neo Performance Materials trades on a market cap of C\$670 million and a very reasonable 16.7x PE. One to definitely consider.

Energy Fuels and Neo Performance are creating a new U.S.-European rare earths supply chain

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Many in the market may have not realized that the U.S and Europe now have a new rare earths and rare element materials supply chain. Up until now the only rare earths producer of significance in the US was MP Materials Corp. (NYSE: MP). [Energy Fuels Inc.](#) (NYSE American: UUUU | TSX: EFR) has begun to produce a rare earths carbonate in the US and has teamed up with [Neo Performance Materials Inc](#) (TSX: NEO) ("Neo"), who makes the final rare earth materials in Estonia Europe.

According to rare earths expert Jack Lifton: "Energy Fuels is today, June 30, shipping the first 20 tonne container load of MRECs (mixed rare earth carbonate), extracted from Chemours' monazite and processed to remove uranium and thorium and other interfering (with solvent extraction) ions, to Neo Performance' dedicated SX facility in Estonia. Both Mark Chalmers and Constantine Karayannopoulos will be present at the processing plant in White Mesa, Utah."

Jack Lifton also states that this is "the first production of a clean MREC derived from monazite in the USA since 1998" and "the restoration of a domestic rare earth supply chain beyond the mine has begun and Energy Fuels is leading the way."

As reported by Energy Fuels in May 2021, the Company update [stated](#):

“...the Company, along with Neo Performance Materials, announced the joint launch of a U.S.-European REE production initiative under which the parties plan to produce value-added REE products from natural monazite sands, a byproduct of heavy mineral sands mined in the southeastern United States. Pursuant to this initiative, in late-March 2021 Energy Fuels commenced ramping-up commercial production of a mixed rare earth carbonate (“**REE Carbonate**”) from natural monazite sands at the Company’s White Mesa Mill. Under an agreement in principle signed on March 1, and subject to completion of definitive agreements and successful ramp-up of production, Energy Fuels will ship a portion of its REE Carbonate production to Neo’s REE separations facility in Sillamae, Estonia (“**Silmet**”). Neo will then process the REE Carbonate into separated REE materials for use in REE permanent magnets and other REE-based advanced materials.”

Energy Fuels is an emerging U.S producer of rare earth element products, plus an existing uranium & vanadium producer (on standby) at their White Mesa Mill in Utah, USA



Source: [Energy Fuels](#)

The [monazite ore is supplied](#) to Energy Fuels’ White Mesa Mill in Utah, USA by The Chemours Company’s Offerman Plant in Georgia, and potential future supply of additional natural monazite sands is contracted via a non-binding MOU from the Titan heavy mineral sand project in Tennessee owned by Hyperion Metals Limited. All of this means that a new USA supply chain for rare earths carbonate has begun.

Energy Fuels’ President and CEO, Mark S. Chalmers, [stated](#):

“Without a doubt, Energy Fuels is making major strides toward restoring critical U.S. rare earth supply chains, while also

maintaining our position as the leading U.S. uranium producer....On rare earths, our efforts over the past several months culminated in the announcement on March 1 that Energy Fuels and Neo Performance Materials were creating a new, U.S.-European rare earth supply chain.....However, as I've said many times, **we have much bigger rare earth plans**, and the momentum is building rapidly as we execute our purposeful strategy. **We are now taking real steps toward designing and building fully integrated, U.S. rare earth production capabilities."**

It seems the mass media is yet to realize the significance of CEO Chalmer's statement, especially given Energy Fuels trades on a market cap of just [US\\$873 million](#). When comparing to MP Materials on a market cap of [US\\$6.08 billion](#), Energy Fuels looks cheap, but it should be noted that Energy Fuels is not yet a fully integrated rare earths carbonate producer and has less capacity (up to 2,500 tons per year of monazite) than MP Materials (noting mining in USA and processing in China). Of course, the plan is for this to change in coming years, plus Energy Fuels has uranium and vanadium on standby production awaiting better prices and/or to supply uranium into the U.S. Uranium Reserve once it is established by the U.S. government. You can read more on Energy Fuels rare earths plan [here](#).

In the case of Neo Performance Materials, they are further along the supply chain specializing in advance materials including rare earths magnet materials. Neo trades on a market cap of [C\\$616 million](#) (US\$497 million). Neo [states](#):

"Neo is the only company in the world that operates dual supply chains inside and outside of China for REE separation and REE advanced materials. Neo owns the only operating commercial rare earth separation facility in Europe."

You can read more on Neo [here](#).

Neo Performance Materials produces rare earths advanced materials (magnet materials etc) and sells globally



Source: [Neo Performance Materials company presentation](#)

Closing remarks

For investors wanting to get involved in western based rare earths and rare earth magnet materials companies then it would be sensible to consider both Energy Fuels (intermediate rare earths carbonate materials) and Neo Performance Materials (advanced rare earth materials).

Both companies appear to be moving in the right direction with a large runway of growth ahead. Demand for their products looks to be exceptional in the years ahead, thanks to the electric vehicle and renewable energy booms, which should support strong pricing and margins.

As a result of all of this, the West's sustainable future looks brighter thanks to increasing rare earths products supply from Energy Fuels and Neo Performance Materials.

Jack Lifton and Pini Althaus on USA Rare Earth's mine to

magnet strategy

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"You have formally announced a mine to magnet strategy. In the rare earths business, we have seen this before, in the round one of the rare earths boom in around 2011 or 2012. A company no longer in existence called Great Western Minerals announced a mine to magnet strategy. Then Molycorp announced a mine to market strategy. Neither of those companies ever achieved anything like that and neither of them advanced to where you have advanced which is the separation of the heavy and light rare earths. I would like to know if you are planning a vertically integrated company which would be not only mining and refining but producing metals and alloys and fabricated magnets" Asked Jack Lifton, critical materials expert and Technology Metals Show host, in an interview with Pini Althaus, CEO and Director of [USA Rare Earth LLC](#).

Pini replied, "The difference here is between announcing strategy verses implementing strategy and we have been very careful to annouce things as they actually take form and become a reality."

To access the complete interview [subscribe](#) to the [Technology Metals Show](#) and get exclusive access to member only content through this exclusive site! Or [Log-In Here](#) for the latest conversations, debates, updates and interviews with the leaders, thought leaders and investors focused on issues relating to sustainability in the critical materials sector.

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Search Minerals' Greg Andrews on establishing a safe and secure rare earths supply chain in NA

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"Canada has a very good auto market and as it transitions from internal combustion vehicles to electric vehicles, the supply chain of the EV market is not here in Canada. That needs to be established and it starts with rare earths...That is what we want to provide." States Greg Andrews, President, CEO and Director of [Search Minerals Inc.](#) (TSXV: SMY), in an interview with InvestorIntel's Peter Clausi at [PDAC](#) 2020.

Greg went on to say that Search Minerals is drilling for key rare earth magnets like neodymium, praseodymium, dysprosium and terbium. The rare earth permanent magnets are very important for the electric vehicle industry because an average electric car needs about a kilogram of the magnets. Greg also spoke on Search Minerals' patented Direct Extraction Technology. The technology successfully eliminates many stages of a conventional extraction process, thus reducing cost and increasing efficiencies in processing.

To access the complete interview, [click here](#)

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