

Search Minerals is coming off a great 2021 but 2022 promises to be even better

written by InvestorNews | January 12, 2022

[Search Minerals Inc.](#) (TSXV: SMY | OTCQB: SHCMF) (Search) stock price rose an impressive [223%](#) in 2021 and looks set for another strong year in 2022.

Search Minerals 2021 in review

There were several reasons for the rise including positive sentiment towards the rare earths miners, particularly those with projects containing the valuable magnet metals Neodymium (Nd), Praseodymium (Pr) and Dysprosium (Dy) used in powerful electric motors. All three rare earth metals prices have been rising strongly the past year on the back of surging demand from electric vehicle manufacturers as we saw EV sales rise about 100% in 2021. Search's flagship Port Hope Simpson ("PHS") property has many key rare earth elements including Nd, Pr, Dy, and Tb (Terbium).

Another key factor for Search's success in 2021 was that management delivered strong progress. This included a [non-binding MOU](#) with USA Rare Earth LLC for the future delivery of a rare earth mineral concentrate supply containing 500 tpa of NdPr. The MOU is part of a joint development plan to expand the collaboration to include discussions regarding separation, marketing and offtake of a portion of the future production at Search's Deep Fox and Foxtrot deposits. During 2021 Search was able [to purchase back a 2.5% Net Smelter Royalty \(NSR\)](#) from B&A Minerals Limited in return for 15 million common shares of Search Minerals, leaving just an outstanding royalty now of

0.5%. Other progress in 2021 included a successful 7,000m drilling program completed at Deep Fox as well as several successful capital raises including the most recent [C\\$15 million](#) and [C\\$5.3 million](#) equity raises. This leaves Search very well-funded to advance its plans in 2022.

Search Minerals has district scale rare earth deposits at Port Hope Simpson (PHS) property (flagship) (includes Foxtrot, Deep Fox, Silver Fox, Awesome Fox, and Fox Meadow deposits)



Source: [Search Minerals company presentation](#)

Search Minerals in 2022 and beyond

Q1 2022 should see Search deliver an updated Preliminary Economic Assessment (“PEA”) for the combined Deep Fox and Foxtrot deposits at their PHS Property. It is anticipated that this will potentially be a very significant improvement of the [2016 PEA](#), which only included the Foxtrot deposit. It resulted in a post-tax [NPV10% of C\\$48 million](#) and post-tax IRR of 16.7% over a 14 year mine life. The initial CapEx was [C\\$152 million](#), and a further C\$57 million in year 8 for the underground stage of the Project.

Search [quotes](#) some of the reasons why the 2022 PEA should be better:

- Increase production rate from 1000 tonnes per day to 2000 tonnes per day
- Increase recoveries from optimized pilot plant process
- Increase revenue from higher grades at Deep Fox
- Extend mine life with material from both Deep Fox and Foxtrot for a central processing facility
- Decrease costs with reduced capital and operating costs

- Upward trending price escalations for permanent magnet material.

In Q2, 2022, Search plans to submit an updated Environmental Impact statement based on the updated PEA.

In Q3 and Q4, 2022 Search will continue to drill Deep Fox to potentially further grow the Resource as well as drill Fox Meadow and Silver Fox and commence a Bankable Feasibility Study (BFS).

All going well Search hopes to make a Final Investment Decision (FID) in 2023 and commence production in 2025.

Search Minerals 2022 catalysts



Source: [Search Minerals company presentation](#)

More about Search Minerals

Search Minerals Inc. is an emerging rare earths developer with three properties in Labrador, Canada. The three are:

- The Port Hope Simpson (“PHS”) property (flagship) – Includes Foxtrot, Deep Fox, Silver Fox, Awesome Fox, and Fox Meadow deposits. PEA due in Q1 2022.
- The Henley Harbour Area in Southern Labrador.
- The Red Wine Complex located in Central Labrador.

Closing remarks

Search Minerals is coming off a great 2021 but 2022 promises to be even better. Certainly, it looks like Search can deliver an impressive 2022 PEA at PHS, given that the project economics will have potentially improved significantly. The PHS Project also has significant exploration upside and potential to further

grow the Resource in 2022.

Search Minerals trades on a market cap of [C\\$74 million](#). The next 3-4 years could be game changing for Search Minerals, if they can make it to production in 2025, or 2026.

Welcome to the Future, Critical Metals' Ventures Discover Reality

written by Jack Lifton | January 12, 2022

Way back in 2011 there were nearly 250 rare earth themed junior mining ventures looking at 400 “deposits” mainly in Canada and Australia. Today, just two of them are producing, [Lynas Rare Earths Limited](#) (ASX: LYC) and [MP Materials Corp.](#) (NYSE: MP) (the successor in interest to the bankrupt Molycorp of yore). These two ventures, even then, stood out from the pack by their common purpose of delivering a value-added product, individual separated (or blended) rare earth chemical forms, in the case of Lynas, and “magnets,” in the case of Molycorp. All of the others, without exception, stated that their saleable product would be a “mixed con.” This was the great “con” of the rare earths’ boom and bust of 2010-2013.

A concentrate of a mixture of all of the rare earths, from which the chemical elements that interfere with the separation of those rare earths into individual, or purposely blended combinations, of individual rare earth salts, is what is targeted to be produced at a mining operation where the ore is

“mined,” concentrated, cracked and leached, and then is chemically processed to remove elements that interfere with the next step, selective separation of the individual elements in a form required for the next step in the supply chain that ultimately results in a finished product for sale to consumers.

For the rare earths this concentrate is, for practical purposes of safety and economics, a mix of rare earth carbonate solids. This should have been the initial target of 2011's 250 rare earth juniors. It wasn't. They overwhelmingly (other than Lynas and Molycorp) did nothing to advance towards this target. That turned out to be a good thing, because the only non-Chinese customers for this “mixed con” before 2017 were Solvay in France (9,000 tpa capacity to produce individual rare earth salts), Silmet in Estonia (2,500 tpa), and assorted small operations in Asia, outside of China, with a combined capacity of perhaps 3,000 tpa. All of these bought their feedstock from China or (a tiny amount) from Russia at the time.

No 2011 junior sold a single gram of mixed con to the marketplace prior to 2017 (Lynas)

Why was the first 21st century, rare earth boom, such a bust?

Because none of them had the knowledge, education, experience or skill in processing or mineral economics to see that integration into a total rare earths supply chain targeted to a final product is necessary for **profitable operation**. Almost without exception the profitable part of the rare earth supply chain is concentrated in the metals, alloys, and magnet making end, and the only way to make a mine and separation system profitable is to distribute costs along a total supply chain. (America's [Energy Fuels Inc.](#) (NYSE American: UUUU | TSX: EFR), which is operating on a total supply chain model through magnet alloys, is an exception, because it is able to make a profit selling a

mixed carbonate due to the skill of its administrative and operation management and a unique, for North America, existing processing infrastructure).

If there is to be a domestic American, or European, total rare earth permanent magnet supply chain then there will have to be in place operating commercial rare earth separation systems, rare earth metals and alloys production, and rare earth permanent magnet production capability and capacity to support it.

In fact, if there are to be total domestic supply chains for any critical metals, then, not just a mine, but also all of the downstream elements of the supply chain have to be in place before that can happen.

I note that for the cobalt chemicals necessary for the production of lithium-ion battery cathodes, the Canadian integrated cobalt processing junior, Electra Battery Materials Corporation (TSXV: ELBM | OTCQX: FTSSF), has entered into a supply agreement for cobalt concentrates from the world's largest non-Chinese producer, Glencore, to process that concentrate into fine cobalt chemicals for the battery manufacturing industry in its existing Canadian facility. When and if Electra can produce cobalt concentrates from its company-owned deposits there will already be in place the downstream operations to support that. In the meantime, it will buy feedstocks from others, and/or also toll them for others. Electra's management looks also to have given considerable thought to pricing, so as to ensure profitability.

This business model, to have in-house as much of the total final product supply chain as is necessary to be profitable, is the only practical business model for the production of critical metals and materials.

As of December 31, 2021, America's Energy Fuels (rare earths) and Canada's Electra (cobalt) are setting the pace for the future development of a North American critical metals' industry by commencing operations.

Happy New Year!

Search Minerals is looking pretty foxy for 2022

written by InvestorNews | January 12, 2022

All I want for Christmas is money, is what [Search Minerals Inc.](#) (TSXV: SMY | OTCQB: SHCMF) must be saying after it recently announced plans to re-stock the treasury with a \$15 million non-brokered [private placement offering](#). For a Company with a market cap of roughly C\$69 million prior to the closing of this share issuance, that seems like a pretty good Christmas present. I'm sure there are a few other items on their Christmas wish list but things have been going along fairly well for this rare earths explorer in Newfoundland and Labrador.

As background, Search Minerals is focused on creating value through finding and developing rare earth mineral assets in SE and central Labrador, Canada. The Company is the discoverer of the Port Hope Simpson – St. Lewis Rare Earths District, a highly prospective belt located in southeast Labrador that is 62 km long and up to 2 km wide. Search owns 100% of two advanced rare earth resources called the [Foxtrot Project](#) and [Deep Fox Project](#), and the more recently announced Foxtrot-like prospects [Fox Meadow](#), Silver Fox and Awesome Fox. In addition, the Company has

identified more than 20 other Foxtrot-like prospects in the District. Several of the Foxtrot-like prospects require exploration drilling programs and may provide additional resources to a central processing facility that would be situated within the District.

The interesting thing about Search is that they have a little more going on than just exploring for rare earths. The Company has developed a breakthrough technology for the processing of its material called the Patented Direct Extraction Metallurgical Process. With the mining of many commodities, it's not as simple as taking the rock from the ground, crushing it up and sending it to market, and the mining of rare earths can create their own environmental nightmare if not addressed properly. Fortunately, Search has found an elegant answer with an environmentally conscientious solution for managing waste residue that also significantly reduces CAPEX and operational costs along with eliminating unnecessary steps, lowering capital and operating costs and producing a dry stackable waste residue that reduces the environmental footprint, pilot plant testing has clearly demonstrated the ability to produce a high purity mixed rare earth oxide (REO) concentrate. You can read more about the process [here](#), but this could be a big deal.

On the exploration front, Search had over 6000 assays from its 7000m drill program at Deep Fox that were [reported Nov 15th](#) with all 38 drill holes showing significant rare earths throughout the mineralized zone and mineralization observed in all levels (25m, 50m, 100m, 150m, 200m). At Fox Meadow, 500m of channel sampling work has been completed and samples are being logged and prepared for shipment to the assay laboratory in preparation for a preliminary drill program in 2022. Additionally, Silver Fox is drill ready for 2022 and the Company is preparing a preliminary drill program there as well. Lastly, the Deep Fox

drill data will be used to prepare a new resource estimate which will be incorporated into an upcoming preliminary economic assessment report expected in Q1 2022. The combination of the Deep Fox and Foxtrot resources will potentially allow for an increase in the production rate compared to the 2016 PEA on Foxtrot alone. Especially given assays from Deep Fox have shown higher grades of the key rare earth elements used in the permanent magnet market (Neodymium, Praseodymium, Dysprosium and Terbium) as compared to Foxtrot.

It has been an exciting few months for Search Minerals hence my suggestion that its Christmas wish list might be a relatively brief one. Maybe one wish is for a short, mild, winter so they can get back to drilling sooner than later after they replenish the bank account. Nevertheless, with the US, Canada and EU collaborating to build a secure rare earth supply chain, Search Minerals is in the right jurisdiction to participate in breaking global reliance on China. Assuming they are successful in raising the full \$15 million the Company will be in great shape to hit the ground running to start 2022.

Perhaps I'll finish the year with a bad pun before I wish everyone a happy and safe holiday season, but to me this looks like a pretty foxy investment. I hope they've at least seen a fox or two on their exploration properties.

Merry Christmas everyone and see you in 2022!

Neo Performance Materials looks to expand capacity as it rides the tailwind of growing rare earth permanent magnet demand

written by InvestorNews | January 12, 2022

Demand for rare earth metals and magnets has been very strong in 2021, boosted by an approximate [100%](#) surge in electric car sales so far in 2021. This means that companies that sell the valuable magnet metals such as neodymium and praseodymium (NdPr) are doing very well, as NdPr (the combination is called “didymium” in the trade) is used to produce high performance neodymium, iron, and boron (NdFeB) magnets, used in many electric cars today.

[Neo Performance Materials Inc.](#) (TSX: NEO) (“Neo”) is a rare Western company that processes natural rare earth mixtures to produce individual high value separated rare earth chemicals, then uses them to produce rare earth fine chemicals, metals, alloys, and “bonded” rare earth permanent magnets. Neo summarizes well when they [state](#):

“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.”

Neo operates globally with sales and production [across 10 countries](#) including: Japan, China, Thailand, **Estonia**, Singapore, Germany, United

Kingdom, Canada, United States, and South Korea.

Neo Performance Materials global operations



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

Neo explores a possible expansion, and new production of advanced rare earth element products in Estonia

As [announced](#) on November 17, 2021: “Joint Communiqué in Support of Expanding Valued-Added Rare Earth Product Manufacturing in Estonia. A joint effort between the Estonian Ministry of Economic Affairs and Communications and Neo Performance Materials has been launched **to explore a possible expansion of Neo’s current production of advanced rare earth element (“REE”) products in Estonia, and well as to potentially launch new manufacturing of REE-based metals, alloys, and magnetic materials** for use in electric vehicles and other green technologies.”

The timing to expand in Europe is perfect given the massive rise in European and global EV sales. For example, Europe’s electric car sales were [184,000](#) in October 2021, up 26% YoY, reaching 23% market share. Germany reached [30%](#) share, France [23%](#), and Netherlands [35%](#) share in October 2021. It also times nicely with Tesla beginning electric car production at Giga Berlin in 2022.

Only a day earlier on November 16, 2021, Neo [announced](#): “Completion of \$100.66 Million Bought Deal Treasury and Secondary Offering of Common Shares....The Company issued and sold from treasury an aggregate of 2,598,000 Common Shares at a price of \$19.25 per share for total gross proceeds to the Company of approximately \$50.01 million.”

The above announcement does not mention what the \$50.01 million

will be used for; however, it seems to me more than just a coincidence that only a day later Neo announced their Estonia expansion plans. I will let the reader draw their own conclusions.

Neo continues to produce strong financials in 2021

In 2021 Neo continues to deliver strong YoY revenue and income growth; albeit revenue and adjusted net income were slightly lower than last quarter.

As [announced](#) on November 8, 2021, Neo reported Q3 2021 revenue of US\$119.8 million, higher by 53.9% YoY. Volumes in the quarter of 3,523 tonnes improved by 16.1% YoY. Adjusted net income was US\$9.8 million, or \$0.26 per share.

This compares to [Q2 2021 results](#) of revenue of US\$135.1 million up 99.5% YoY and adjusted net income of US\$14.1 million, or US\$0.37 per share.

Neo Performance Materials financials summary quarter by quarter from Q2 2020 to Q3 2021



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

More about Neo

Neo is a processor and manufacturer of advanced industrial materials including rare earth metals, alloys, and “bonded” rare earth permanent magnets, specialty chemicals, technology metals, and alloys. Neo is well positioned in markets that are forecast to see robust, long-term growth driven by multiple global macro trends, such as vehicle electrification, industrial automation, consumer electronics, energy efficient lighting, air and water pollution control, and greater use of superalloys.

Global rare earths expert Jack Lifton's view on Neo:

"Neo Performance Materials is today, the only Western company that is vertically integrated with the capability and commercial scale capacity to separate the rare earths, manufacture rare earth metals and alloys, and manufacture rare earth permanent magnets. It is the non-Chinese model for any venture seeking to enter or assemble a total rare earths permanent magnet supply chain."

Closing remarks

While companies such as Tesla get all the headlines, did you know that Neo's stock price is performing better than Tesla in 2021. YTD in 2021 Neo Performance Materials stock price is [up 62%](#) compared to Tesla [up 46%](#).

The other key difference is Neo trades on a PE of [14.8](#) compared to Tesla on a PE of [302](#). Both stocks are being supported by the booming EV trend, just one is many multiples cheaper (based on current PE ratios).

Investors would be wise to take a deeper look at Neo Performance Materials especially now while they trade on a reasonable multiple and look set to expand in Estonia.

Magical Thinking about China, Lithium and the Rare Earths in

the ICE to EV Transformation

written by Jack Lifton | January 12, 2022

Rather than blocking China's ambitions, America's verbal theatrics about policies encourage China to continue hedging its bets, including by rethinking its national-security strategy and shifting more resources to its science and technology sectors. In the worst decoupling scenario, the world's two largest economies will end up controlling their own technology-supply systems, each with its own rules and standards. America, though, unlike China has no firm rules or standards in place on supporting key industries' basic needs, raw materials, and energy. At the moment America is not prepared to compete with a rising Chinese industrial economy.

Two hundred years ago, Napoleon Bonaparte famously said, "China is a sleeping giant. Let her lie and sleep, for when she awakens, she will astonish the world."

As a good sample of unpreparedness look at the politicians who support and the Ivy League MBA managers who run the global OEM automotive industry. They tell us that they are well on their way to solving the electric vehicle battery and infrastructure shortage in the non-Chinese OEM automotive world. At least that's what they think.

Last week, the White House launched an electric vehicle ("EV") charging action plan, designed to progress the USA towards the President's **goal of** 500k chargers nationwide, and ***50% of EV sales share by 2030***. [italics and boldfacing, mine]

This is a patently ridiculous, unobtainable, goal, for the United States, and it childishly ups the ante with China, which has published a serious, well thought out, do-able and government-supported 40% of EV sales goal by 2030.

A dispiriting record of misjudgment, hubris, and delusion has brought the global non-Chinese OEM automotive industry to the brink of chaos, which is the opposite of where an industry should be that makes complex end-user products based on carefully articulated robust supply chains (i.e.: one's where each link in the chain is critical and is multi-selected so that secondary sources [backups] are kept ready at all times).

It was not really disruptive technologies, nor climate change (then known as "global warming" and before that as "global cooling") that brought about the apparent suicide of the internal combustion engine (ICE) powered transportation industry, after more than 100 years of the mass production of ICE vehicles. It was, ironically, vastly improved quality, durability, fuel efficiency, emissions reduction, (domestic) market saturation, pricing ceilings, and shrinking margins on manufacturing in the most capital-intensive business in the world, the OEM automotive industry. This was coupled with the increasing reluctance of banks to support massive lines of credit at interest rates that the OEM automotive industry could afford. By the beginning of the 21st-century American carmakers were only making their profits from purchase and lease financing, and from the high priced, non-critical, comfort and entertainment options and gadgets on the vehicles they sold, which vehicles had, in their basic forms, become commodities.

The rise of the hedge funds at the end of the twentieth century was eclipsing wealth creation through manufacturing productivity improvements and replacing it with financialization, making money by financial manipulation. The most recent market crashes (even before 2008's giant size one), Black Monday of 1987, the 2001 dot-com bubble, the 2008 sub-prime housing crisis, and the 2020 Covid-19 pandemic crisis were increasingly the results of pure financialization. When Elon Musk, who made his money through the innovative online service PayPal, decided that he

wanted to tackle the idea of entering the multi-trillion dollar a year OEM automotive industry, by transforming it, the time, the early 21st century, was right.

International capital had robbed and pillaged through Black Monday, the dot-com bubble and then the sub-prime housing bubble. Low Federal Funds interest rates did not deter astronomical credit card rates and facilitated low (or no) cost buyouts, privatization, and then, after asset stripping, the resales of the “restructured” companies as IPOs to the public at ludicrous values. These transactions were lining the pockets of financiers, but there was still one more giant industry, the biggest, to churn, the low margin, but huge capital deploying and using, the OEM automotive industry. It was Musk who brought a method to the madness, the revival of the Electric Vehicle powertrain to supposedly help to stop climate change due to carbon dioxide being poured into the atmosphere by human activities, such as the burning of fossil fuels for transportation.

Tesla, founded in 2005, struggled for 10 years, but then the outside financializers, perhaps, not Musk, himself, caught on. They could hype Tesla’s shares and create a bonanza.

Institutional finance has made a sucker’s game out of Tesla. It has been bid up by the market to where its market capitalization is greater not only than VW and Toyota (combined), both of which sell 15 to 20 times the number of cars and trucks that Tesla does, but also of the entire Non-Chinese OEM automotive industry! But, so what, a company the shares of which could be traded for billions of dollars turnover per day! Thus, even tiny prices changes could mean millions of dollars in revenue and, better yet, profits, each day! The hedge funds’ dream.

On any given day, Tesla shares, priced around \$1,000.00, will

trade 10 million shares. That's \$10,000,000,000 of buy/sell per day! By comparison the entire TSX does less than half a billion on a good day.


But, unnoticed at the time by Musk or the financializers, Lithium and the rare earths are the irreducible minimum of critical materials necessary to produce the most efficient EVs, alternate energy production and storage, and the transformation of electrical energy to useful electronic, mechanical and optical energy, in general. Therefore, these chemical elements in various forms, such as metals, alloys, and chemical compounds will always be in demand to "combat" climate change. The mainstream media, the politicians, and the academics "get this," but, so long, as those groups are headed and staffed by individuals with no industrial or mining experience their predictions of the growth of EVs and the ultimate replacement of ICEs by EVs will be at best, magical thinking, and at worst just make-believe. There will be no complete EV transformation, so long as the, individually owned and operated, ground transportation conveyance operated by lithium-ion battery powered electric motors dominates the OEM automotive/rail/sea/aircraft transportation industries.

Why?

Until the decision-makers in government and the transportation industry discover the natural and economic limitations of the production of critical metals, the prices for those metals will remain strong. And so long as the managers of the global OEM auto/rail/aircraft/shipping industries refuse to analyze the situation or listen to the conclusions on supply from basic "informed" mineral economics, the OEM transportation industries outside of China, Japan, and Korea will descend into insolvency as their massive investments in vehicle electrification flounder without the critical metals to support them.

The increasingly superficial education of America's bureaucrats and their lack of real-world qualification based upon actual experience has rendered America's national government incapable of understanding the day-to-day details and problems of establishing and maintaining a secure supply chain. Offshoring was done not for greed, but for retaining competitive advantage, a concept seemingly unknown to America's left-leaning "elites" and their unthinking followers who proselytize equality for the masses overseen by a class of highly paid bureaucrats living in isolation and relative luxury and serving an oligarchy itself based on monopoly state control of market segments primarily for their own benefit.

Let's look at a conservative version of the 2030 car market. It's likely that China would be the largest global producer by volume, at a rate of 30,000,000 cars and trucks that year (this is the official "goal" articulated by the Chinese government itself). The Chinese gov't has recently also said that it requires 40% of 2030 auto production to be New Energy Vehicles (Battery alone, hybrid, and hydrogen types). To achieve this goal, the Chinese OEM automotive industry has been actively pursuing the strengthening of its battery and rare earth permanent magnet supply chains for at least the last decade. A very good example of this is the activity of the Chinese for securing supplies of lithium apparent from the chart below:

 lithium ion

What "expert" analysts don't seem to understand is that China is acquiring these lithium sources not to corner the global supply market, in the manner of a global capitalist enterprise, but to secure sufficient resources to meet the Chinese government's mandated EV production goal by 2030. Price and profit, the sole drivers of capitalism's interest are secondary to security of supply for the Chinese.

China has also built, as part of its dedicated industrial policy, the world's largest lithium processing and lithium-ion battery manufacturing industry. Today China processes to battery grade 60% of the world's lithium production and manufactures 82% of all lithium-ion batteries.

China operates without a junior mining market, and it has realized that the identification of accessible, mineable, deposits of lithium in brines, hard rock, or clay is just the beginning of a process to complete a supply chain for the critical battery component for lithium-ion batteries. Such a total supply chain consists of mining, extracting the desired elements from the minerals, selectively separating and purifying the desired elements, transforming them into end-user forms, such as metals or fine-chemicals, and supplying them to the component and finished product manufacturers, who deliver the products to the end-use product consumer.

China has now built up a highest capacity in the world domestic lithium-ion battery manufacturing supply chain to match its highest capacity in the world total rare earth permanent magnet components supply chain.

It should be noted that Western analysts' predictions of enough increased production of lithium to support a transformation of the ICE powered vehicle industry to battery EV powertrains, even though they are wildly and ignorantly optimistic, simply ignore the fact that most of the new lithium production over the next decade will be owned or operated by the Chinese for their domestic benefit not that of the Non-Chinese market.

China has a well thought out industrial policy and a technically proficient mandarin that carries it out. The goal is being well on the road to absolute independence in key critical technologies beginning in 2025. To do this China will need

absolute security in its supply of critical metals for the 10 technologies enumerated in its China 2025 plan.

A dynamic America could challenge China in this arena. Instead, our senescent “leaders” have gone to sleep bickering about pronouns while a giant arises that has already astonished the world.

General Motors engages with MP and Germany's Vakuumschmelze for Rare Earth Permanent Magnets

written by Jack Lifton | January 12, 2022

General Motors (NYSE: GM), has announced supplier agreements with both U.S. Based, [MP Materials Corp.](#) (NYSE: MP), and with Germany's Vakuumschmelze (VAC). This is very significant news, I think, because it means that GM will engage to support (financially, most likely,) Germany's Vakuumschmelze to enter the U.S. market and to expand its existing sintered rare earth permanent magnet (REPM) production by adding (unspecified) capacity in the USA. It's unlikely that VAC will drop any German (EU) customers, so to supply GM, it will add U.S. capacity. VAC says that it will add that capacity and begin U.S. production of REPMs for GM by 2024. America's MP Materials is also to be engaged by GM as a REPM supplier, and I suspect, as a future supplier to VAC of NdPr metal as raw material for VAC domestic American REPM production for GM. The UK's Less Common Metals

(LCM) is the only non-Chinese (perhaps also non-Japanese) supplier to VAC of rare earth metals now, but LCM can only produce 120 tpa of Nd metal at this time, and thus can support only 400 tpa of domestically produced (in the UK or EU) REPMs of the sintered Neodymium-iron-boron (NdFeB) type. LCM's customer is VAC, whose customer for REPMs is most likely Daimler, for its (Daimler's) in house electric motor production (in Germany now but to be expanded to the UK).

I think it very likely that Daimler is supporting VAC to also expand its capacity, in Europe, for its needs for sintered REPMs of the NdFeB type. Daimler and VAC also need to find additional Nd metal supplies for VAC in Europe. I won't be surprised if LCM is bought by Daimler or financed by Daimler to expand its rare earth metals production capacity.

No OEM car maker wants to single-source a critical production part, so that this announcement doesn't mean that GM is going to rely on just VAC or MP Materials for REPMs. It's not unusual that GM will support MP Materials also at the same time as VAC to ensure that it has a principal supplier and at least one second source. This has long been the automotive industry's standard sourcing procedure. In this case, the experienced and existing VAC is to be the principal supplier, and MP Materials will be a second source.

I suspect additional future suppliers of REPMs chosen by GM are undergoing due diligence right now.

VAC is really the Western World's (outside of Japan) largest, perhaps only, OEM of REPMs for automotive production use. It is thus the only choice currently for a non-Chinese Western OEM automaker who wants "domestic" REPMs. But its capacity, currently only in Europe, is probably sold out to EU-based OEMs. This is the reason that to expand into the domestic American

market it needs to add capacity, and this is the reason that GM is “supporting” VAC in building an REPM plant in the USA dedicated to the supply of GM. Magnet makers can only make magnets if they have secure supplies of raw materials, at competitive prices, and dedicated customers who will pay for finished goods by an indexed (to raw material costs) price. This is NOT the traditional pricing agenda in the OEM automotive industry. Fixed prices over the life of the contract are standard, and, in fact, the wild ride of neodymium prices in the last year has made REPM manufacturing for the OEM automotive parts industry a nightmare for those with the traditional fixed-price-for-the-life-of-the-contracts with OEM automotive. It’s very unlikely that VAC would commit to building a (just-in-time[?]) U.S. plant for a customer without financial assistance and guarantees and an indexed price. I hope that both GM and VAC will let us know if GM has “broken” protocol. This will have a lot to do with achieving any government subsidies for domestic REPM manufacturing.

Now for the bad news. A typical GM EV using the Ultium(TM) platform power train (a lithium-ion battery and an electric motor), if it uses a REPM based motor (REPM) will need between 2.5 and 5 kg of NdFeB magnets. A 1000 tpa REPM facility can thus supply the needs for REPMs of between 200,000 and 400,000 new cars. GM has consistently been making about 3,000,000 cars and trucks per year in the USA (forget 2020. It’s an outlier). So, to convert its domestic production to EVs entirely GM would need a maximum of 10,000 tpa of sintered NdFeB, REPMs. There is today no domestic REPM production capacity in North America. It will take a long time, if it even ever can be done, to achieve such a REPM capacity in the USA. But even if it is possible, it would only be possible with guaranteed pricing for the feedstock raw materials (separated rare earths, rare earth metals, and magnet alloys), and a guaranteed competitive REPM price for a break-

even capacity.) This is not just a monumental supply chain cost management problem; it is a complete break with legacy OEM Automotive sourcing cost structure management, because it makes REPM and REPMM costs unpredictable!

In my opinion, GM is not solving the domestic REPM supply chain problem; it is addressing it, rather than just talking about it as politicians are wont to do. GM is putting its money where its mouth is.

But, GM is not the only OEM car maker that produces or sells products into North America's nearly 20 million unit per year market. Total conversion of that market to EVs that use REPMMs would need 60,000+ tpa of REPMs annually. Europe's car market is larger than North America's, and China's domestic market is larger than Europe's. Today, China alone has the existing capacity in REPMs, REPMMs, and Lithium to transform its domestic car market production entirely to EVs, and it has announced that it will reach 20% of that goal by 2025 and 40% by 2030.

Projections of near-term EV production proportions for the American and European markets are wildly unrealistic, just based on the necessary critical raw materials and components capacity needed to achieve those goals. The build-out of the non-Chinese EV industry is just beginning in the West, and I think a long steep, very expensive, learning curve is ahead of us. I'm going to begin to address the critical raw material dilemma for EVs next week.

How the Chinese dominance in the rare earths space creates a barrier for non-Chinese companies to enter the supply chain

written by InvestorNews | January 12, 2022

In this episode of the **Critical Minerals Corner with Jack Lifton**, Jack interviews Ed Richardson, President of American's oldest magnet maker, [Thomas and Skinner Inc.](#), and a longtime veteran himself of the permanent magnet manufacturing industry, about the possibility of the revival of an American rare earth permanent magnet industry capable of supplying the needs of the North American market.

In this InvestorIntel interview, which may also be viewed on YouTube ([click here to subscribe to the InvestorIntel Channel](#)), Ed went on to explain how the Chinese companies are competitive in the rare earths space and how the Chinese dominance in the rare earths space creates a barrier for non-Chinese companies to enter the supply chain. Jack and Ed also discussed how China is using rare earths raw materials from other countries to expand its magnet-making capacity to satisfy its own local demand.

To watch the full video, [click here](#)

About Thomas and Skinner Inc.

Thomas & Skinner is the world's leading manufacturer of cast and sintered alnico magnets, magnetic assemblies, and transformer laminations. Through its wholly owned subsidiary, Ceramic

Magnetics, Inc., Thomas & Skinner is also a leading manufacturer of soft ferrite magnets. They are committed to providing our customers with the highest-quality, highest-performing magnetic materials available.

To learn more about Thomas and Skinner Inc., [click here](#)

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If you have any questions surrounding the content of this interview, please email info@investorintel.com.

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

written by InvestorNews | January 12, 2022

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.

Critical Materials for the Two American Economies, The Military and the Consumer

written by Jack Lifton | January 12, 2022

Today's demand for critical technology enabling materials was originally brought about by (industrial) policy driven military procurement during, after, and since World War II. The continuing production of these relatively scarce materials is only made economically today possible by the additional and much larger demand of the consumer economy based not on an industrial policy but on the (regulated) free market model of capitalism. Pentagon procurement of its needs for critical materials [through policy](#) can bend the law of supply and demand, but it cannot break it. The demands of the free market economy (in the USA) drive the creation of it's critical material's supply. The present (2021) needs of the Department of Defense (DoD) for rare earths, mainly as permanent magnets, for example, are "classified," but are around 3,000 tons, measured as magnets per year. This is not enough demand for private capital to make an investment in a project that requires an entire supply chain to be (re) established.

The American consumer market from which 80+% of the domestic American rare earth demand arises has well established supply chains and has not experienced credible politically driven supply constraints. The largest single user of rare earth permanent magnets in the USA, the domestic [OEM automotive industry](#), is faced with the need for a fundamental shift in its use of capital if it attempts to restore a total domestic rare earth permanent magnet supply chain for its demand. The best way for such restoration would be vertical integration, the

antithesis of today's just in time system of sourcing components. For any individual automotive OEM the costs would be prohibitive and not only is the expertise not available in-house, but also the lack of suitable domestic personnel to carry out such a project, or to manage, or to engineer it is palpable.

The American administration's latest announcement on how it will address the supply chain "crisis" is wrongheaded and misguided. The related bill in the U.S. Senate to promote "innovation" is another misguided use of taxpayer borrowing ability. This, "borrowing ability" is, in fact how the US government is financed; its debt so far exceeds its revenues that to speak of spending in Congress is to describe moneyholics, drunk on their power, and putting the future on a tab.

Washington's aging and apparently permanent lawmakers, such as Senator (D-New York) spout drivel written by their jejune staffers about innovation as science, which, of course, means funding of University and internal government "grant mills." The urgent need in America is for manufacturing "technology," the engineering of science to, modernize, rebuild, and utilize specialized legacy technologies. We do not do endless laboratory work to invent new ways to do things that industries can already do as efficiently as possible while remaining competitive. This particularly applies to capital intensive industries such as mining, automotive, and electronics.

The lithium-ion battery manufacturing industry is a good example of something completely misunderstood by Washington's insulated, isolated, and commercially illiterate mandarins. From Xanadu on the Potomac, the Biden administration decrees that it will bring lithium-ion battery production to the USA by aiming a money missile with a 19-billion-dollar warhead at the "problem."

But investment money is not the problem in commercializing

science; it is the projection of positive returns on investment that drive new consumer industries, not innovation on its own. A good example is the American OEM automotive industry. That industry's dominance peaked in the 1950s when a completely [vertically integrated](#) General Motors was the number one industrial firm in the world. It was not "innovation" that drove GM to the top; it was superior management that knew how to manufacture, finance, and deliver the company's products to the consumer who either desired that product or could be manipulated into thinking they did. The position of Chief Engineer of a successful OEM automotive company, once held by Henry Ford in his own company, evolved into Vice President, Engineering, perhaps the second most important position in a manufacturing company's management, and the one individual in any company who must know the limitations of his company to develop and manufacture its products.

Today's, so-called, "tech" companies deliver specialized software (computer programs) as brainless toys to infantile adults using the throw-away model of consumer capitalism. Apple, for example, unconsciously mimicking the marketing ploy developed by GM to differentiate itself from Ford, has a new iPhone and Mac every year with "innovations" that only fit into their existing manufacturing supply chains. In order to maintain sales, existing customers must discard their existing products and buy the "new" ones. GM's marketers decided in the early 1920s that the next Chevrolet would be called the 1922 Chevrolet and that thereafter all GM cars would be named by the year they were produced. Other car makers continued to name models, such as Ford's Model T, but the success of the model-year naming ploy soon caught on. Car makers became fixated on the car's exterior appearance and its passenger compartment and experimented with drive and power trains mostly out-of-sight of the buying public, so that the enormous research, development, and manufacturing

engineering processes needing time for development in power trains could be done and tested before being offered for sale.

Safety regulations have contributed a great deal to the fall of the American OEM automotive industry to its present state, where all (both) of the domestic American OEMs have less market cap than just a couple of Wall Street's flavors-of-the-moment "tech" companies that make no profit and never will.

To sell a car or truck in the USA it must meet rigorous safety standards that have forced car makers to produce much more robust and therefore long-lived products. In 1970 GM predicted that the domestic car market in 2000 would be 26 million units per year and that it would need 28 domestic assembly plants to supply its share of that market. What has come to pass is a "mature" (aka, saturated) car market in which there is a vehicle on the road for every American citizen. The prediction of a 26 million unit year is long gone down the memory hole and the total number of assembly plants in North America does not equal what GM predicted for its own 2000 model year needs.

The Defense Department's investments were father and mother to the American technology boom that took place between 1941 and 1973 (The initial funding of the Manhattan "district" and the cancellation of the Space Shuttle). After that, innovation, slowed down considerably as private industry resumed its pre World War II internal funding of science and engineering that brought about the ascendancy of American consumer capitalism and global military dominance. Industries created before World War II, and without government support, included the telegraph, mass produced uniform quality steel and aluminum, the telephone, the light bulb, radio, the automobile, the airplane, television, the mechanical computer (OK, adding machine), miniaturized electronics, mechanical electric refrigeration, and many others in the life sciences, such as x-rays, insulin, and, originally,

penicillin. Although we pay lip service to the inventors of the above “technologies” as intentional promoters of higher living standards, in fact, their driving motive was almost always profit. The scientists whose discoveries led to the technologies listed above are long forgotten or known only to historians; they rarely sought fame or fortune.

It was Franklin D. Roosevelt who kicked off the great age of American innovation in 1941, not just by authorizing the Manhattan Project, but primarily by bringing in the CEOs of GM, Chrysler, Ford, GE, and Westinghouse to oversee the transformation of American free enterprise manufacturing and innovative product development into the industrial policy driven global powerhouse that crushed Nazi Germany, Fascist Italy, and Imperial Japan, all of which began a war to capture the raw materials and land their society’s desperately needed to manufacture the weapons of war and feed their armies.

After World War II a subset of American manufacturers soon known as the “military industrial complex created itself in order to produce products required by the industrial policy, and power to execute it, created by the War (now Defense) Department during the war. The civilian, soon to be known, as the consumer, economy decoupled itself and followed the free enterprise model of capitalism, but it was spillover from military spending that created the miniaturization of electronic switching into the integrated circuit, aka, the “chip,” which sparked a consumer product revolution the basis of which was further inspired by the rare earth permanent magnet the development of which was itself inspired by stylists in the OEM automotive industry who wanted slimmer doors on cars with power windows.

The Ford Scientific Laboratory was working on a sodium sulphur battery in 1964. I was a “helper” on that project. I didn’t work for Ford but I was being recruited by Ford Scientific for its

materials sciences group. I had been working with the electronic properties of Lithium and it's salts since 1962 at Energy Conversion Devices, my first employer, where we made a molten salt version of what is now known as a lithium ion battery in 1963. These molten salt power train batteries proved extremely inappropriate for automotive use, but my point is that there isn't much new under the sun other than different ways to do desired things such as energy storage more efficiently and safely. And these today are really engineering problems more so than scientific ones.

The US Defense Department on its own and without subsidies cannot catalyze the reshoring of a total domestic American, lithium, cobalt, or rare earth permanent magnet supply chain. It's time for the White House to call in the managers of the manufacturing part of the domestic consumer products industry for a chat about the creation and implementation of a national industrial policy.

Only through a Secure Supply of EV Metals (Rare Earths) can a Hegemony Be.

written by Jack Lifton | January 12, 2022

It has been reported today that the Biden administration is looking to allied nations as primary sources of critical mined raw materials, and that it, the administration, will focus on supporting the domestic American processing of such imported ores into useful products focused on domestic production of EVs,

their batteries, and components. This is an example of a complete disregard by the Biden administration for America's competitive advantage, safety, and, ironically, its economy to placate a loud anti-mining luddism that pervades the American left. It is in two words, hypocritical and stupid. It's hypocritical because it assumes that out-of-sight, out-of-mind, will placate the left's "greens" into thinking that pollution in Australia, Canada, or Brazil and its attendant costs doesn't exist. It's stupid, because it makes no economic sense. Transporting raw material concentrates to the USA for processing is rarely cheaper than mining and processing them domestically. In the case of cobalt, for example, its "ore" is mostly a byproduct of copper or nickel production, and there is no cobalt mine in the USA and there is only one facility in North America (Canada) capable of processing the ore concentrate into "battery grade" cobalt. In the case of the rare earths almost all ores are radioactive and thus have to be "cleaned" at licensed and specialized facilities. Only one such private facility exists today in the USA.

There is today no commercial rare earth separation, metal making, alloy making, or rare earth permanent magnet manufacturing in the USA. The combined annual demand of the military and consumer industries in the USA for rare earth permanent magnets is between 10,000 and 15,000 tons per year. Never in American history has so much of any of these forms of rare earths been produced in a single year.

Yet Washington believes that the annual processing into fine chemicals and metallurgical forms of 170,000 tons each of lithium and cobalt (the amount required annually for 17 million BEVs if each has a 60 kWh battery [the smallest battery now offered by Tesla]) and of 50,000 tons per year of rare earth permanent magnets (the amount required by 17 million EVs annually if each uses one rare earth permanent magnet motor)

could be accomplished by 2030.

The Biden administration's plan for sourcing critical materials for EVs is also an indication of the end of American dominated natural resource globalization and the acceptance of the fact that China has already constructed and is operating a global sourcing system for critical materials for China's domestic economy, which includes an emphasis on domestic Chinese processing of the ores of critical materials and a total domestic Chinese supply chain for the end-use products that depend on downstream forms of the critical materials for their operation and use both in the civilian and military markets. China today processes 60% of the world's lithium and 80% of the cobalt as well as 90% of the rare earths!

China has published its China2025 plan to become independent in 10 key technologies by 2025. Its globalization of secure sources of technology materials to ensure the success of China2025 is for all practical purposes already complete, as planned.

It is said that we live in the age of technology, and that we are all enjoying the fruits of applied science (aka, technology), but we have to ask "What is the purpose of a technology, in human terms?" Is it the jobs and spin-offs from the manufacturing and distribution of high-tech, consumer-oriented, and quality-of-life-improvement -goods to the general population through the economies of miniaturization, which alone makes them economically available? Is it primarily for military uses? Is it for both, the civilian and military markets, needs, and satisfaction?

For the fifty years from the successful conclusion of the manned [**lunar landing program**](#) in 1969 until today the target of technology has been upon making economically available business and leisure travel (civilian jet passenger and freight

airliners), making individual wireless mass communication, both audio and video, cheap and available, and making electrical energy universally available and affordable.

The last of these, the universality of cheap available electric power, is now the basis of our technological civilization!

Unquestionably it was military patronage of science and engineering from 1940 to 1970 that brought about the discovery of deposits, production, and processing of the technology metals that enable the [miniaturization](#), and thus widespread consumer availability, in today's society, of high-tech goods and services. But since President Nixon canceled the Space Shuttle Program in 1973 original research for product development in the USA has been the purview of private industry.

We are now at a turning point.

There are two directions to go for the need to have secure supplies of **technology enabling metals**.

One is to let the free market system as practiced in the USA make sure that items are always available through demand driven supply. The USA maintains a (ridiculously) small supply of critical materials for the Defense Department in case of emergencies, and private industry balks at inventory costs.

The other is to formulate and act upon an industrial policy, with which the State mandates a supply agenda and sets production quotas for all companies involved in a particular technology enabling metal supply chain. The Chinese government maintains large stocks of technology enabling metals to smooth out both demand spikes and prices.

The United States' financial system, known as free market capitalism, operates as if profit is the sole purpose of the

existence of any manufacturing or service enterprise. China has adopted a Capitalism with Chinese Characteristics in which the sole purpose of any Chinese venture is to do something which is good for China. Private enterprise is allowed, and individuals may accumulate enormous wealth if and only if this purpose, the good of China, is the goal.

A hegemon is the first among equals. Athens was the first to be known as a hegemon, followed by Alexander's Macedon, then Imperial Rome, and more recently, the British Empire, and the United States. In 1947 America had half of the world's gold, produced half of the world's steel, the most powerful military in history, and was embarking on an unparalleled era of technological brilliance.

There can only be one hegemon, by definition.

Globalization of the sourcing of critical materials with American characteristics (Neoliberal, free market, economics) can't work. It's too late.

To paraphrase the poet: This is how hegemony ends. Not with a bang but with a whimper.