

# The U.S. Rare Earths Supply Chain Challenge – Part 3

In an ongoing series on how to solve the U.S. rare earths supply chain challenge, 3 Sr Editors from InvestorIntel and well-known Rare Earths Consultants begin the debate on what are the challenges in creating a rare earths supply chain in North America.

Participants include Tracy Weslosky, InvestorIntel's Sr Editor, Publisher and Rare Earths Consultant; Jack Lifton, InvestorIntel's Sr Editor, Host and Rare Earths Advisor; and Alastair Neill, InvestorIntel's Sr Editor and Rare Earths Expert.

Jack starts the debate with: "When you extract rare earths from ore you get a mixture of rare earths and other things that were in the ore that came out in the extract which is usually an acid. The first thing that you have to do is make a pregnant leach solution. What that means is that you put the metal values in the minerals into the solution. Then you separate out those things that are not rare earths or rare earths that you don't really want for example cerium. Now that solution which is normally a hydrochloric acid extract goes into a separation system which in the US has only been a solvent extraction for light rare earths."

Alastair added "There are other companies looking at novel ways to separate rare earths in an environmentally friendly process to tackle this and compete with the Chinese. The benchmark is the Chinese separation cost which is about \$2.50 to \$3 a kilogram."

The experts panel also discussed some of the major problems in the North American rare earths supply chain. The panel discussed that the problem in the North American rare earths

space is the absence of rare earth separation facility and metallization capability in North America.

- To access the complete discussion, [click here](#)
  - To access Part 1 of this rare earths series, [click here](#)
  - To access Part 2 of this rare earths series, [click here](#)
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## **The U.S. Rare Earths Supply Chain Challenge – Part 2**

In an ongoing series on how to solve the U.S. rare earths supply chain challenge, 3 Sr Editors from InvestorIntel and well-known Rare Earths Consultants begin the debate on what is the actual formula to create a supply chain in North America.

Participants include Tracy Weslosky, InvestorIntel's Sr Editor, Publisher and Rare Earths Consultant; Jack Lifton, InvestorIntel's Sr Editor, Host and Rare Earths Advisor; and Alastair Neill, InvestorIntel's Sr Editor and Rare Earths Expert.

Alastair starts the debate with: "First of all the key is to find a deposit that has a reasonable cost structure and also reasonable content particularly the magnetic four – neodymium, praseodymium, terbium, and dysprosium because those will drive 85-90% of the revenue of any deposit. Then you have to be sure that you can convert that deposit into a concentrate and after that you have to be able to separate it into the oxides. When you talk about magnets you then have to go to the subsequent steps of conversion to metal and then into alloy before you can even get to the magnet manufacturing stage."

Jack added, "The first thing you do is ask the customer what

he wants to buy. Then you can go upstream in the supply chain and find out what you need to do.”

The experts panel also discussed the exploration and extraction plays in North America. Tracy said that some of the exploration plays in North America include Avalon Advanced Materials Inc. (TSX: AVL | OTCQB: AVLNF), Search Minerals Inc. (TSXV: SMY), Ucore Rare Metals, Imperial Mining Group, etc.

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

To access Part 1 of this rare earths series, [click here](#)

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## **The U.S. Rare Earths Supply Chain Challenge – Part 1**

In an ongoing series on how to solve the U.S. rare earths supply chain challenge, 3 Sr Editors from InvestorIntel and well-known Rare Earths Consultants begin the debate on whether or not a rare earths supply chain can be built in the US.

Participants include Tracy Weslosky, InvestorIntel’s Sr Editor, Publisher and Rare Earths Consultant; Jack Lifton, InvestorIntel’s Sr Editor, Host and Rare Earths Advisor; and Alastair Neill, InvestorIntel’s Sr Editor and Rare Earths Expert.

Jack Lifton starts the debate with: “Yes we can if the money is put forth and all of the skills necessary are there and even deposits are there. If you want to have the total rare earths that you need, for example, rare earth permanent magnets, you will need more than what is produced in the

United States. You need to have Canadian content and Australian content. This is the base issue as the anchor of any supply chain is the raw material source. The issue here is money. No one in the United States, private or public, actually believes that the United States could produce rare earth permanent magnets competitively priced than those produced in China. I happen to believe we can.”

In this debate the experts address some of the misinformation and myths in the rare earths industry including the cost of separating rare earths and that the rare earths business is a mining business. To access the complete discussion, [click here](#)

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## **Lynas CEO on joining the billion dollar market cap club**

Amanda Lacaze, CEO and Managing Director of Lynas Corporation (ASX: LYC) (“Lynas”), the second largest producer of neodymium and praseodymium (NdPr) in the world, in an interview with InvestorIntel CEO Tracy Weslosky discuss Lynas *joining the billion dollar market cap club*. In the interview, Amanda discusses their recent record setting quarterly results for sales, cashflow and production of rare earths. She goes on to add how over the last 3 years, Lynas has progressively been improving their production results and are now performing at about 110% nameplate capacity, with a run rate of 500 tons of NdPr per month...to access the complete interview, [click here](#)

Disclaimer: Lynas Corporation is an advertorial member of InvestorIntel.

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# **Earner on new role at Alkane and Dubbo Project update**

Nic Earner, Managing Director of Alkane Resources Ltd. (ASX: ALK | OTCQX: ANLKY) (“Alkane”) in an interview with InvestorIntel Senior Editor, Peter Clausi discuss one of the most substantial evolving rare earths project in the world – the Dubbo Project in North Western Australia. Virtually an entire supply chain source alone for battery materials, the Dubbo Project has zirconium, hafnium, niobium, yttrium and many of the prized rare earth metals such as neodymium. In this interview, Nic explains how Alkane has completed all required government permits for this project to proceed and Nic’s focus towards production as he transitions from COO to Managing Director...to access the complete interview, [click here](#)

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# **Arafura MD on the rekindling of market interest in the looming rare earth shortage**

Gavin Lockyer, Managing Director of Arafura Resources Ltd. (ASX: ARU) (“Arafura”) in an interview with InvestorIntel CEO, Tracy Weslosky discuss the global rare earths market and more specifically, the rising demand for magnetic metals neodymium

(Nd) and praseodymium (Pr). Discussing increasing demand for more efficient lithium batteries in motor vehicles, Gavin explains how rare earth magnets are required in the motors to make them efficient. Having just completed a \$1.6 million capital raise that is being focused on Arafura's feasibility study, Gavin provides an update on Nolan's NdPr pilot program in Northern Australia.

**Tracy Weslosky:** It seems like there seems to be a rekindling of interest in the looming rare earth shortage. What do you think is happening right now?

**Gavin Lockyer:** I think there is many things going on. We are seeing the effects of the Chinese consolidation of the industry really starting to impact on supply and that has had a flow through impact on the NDPR our price in particular which has been well received by the markets. We are also starting to see that the Chinese are actually using more and more of their own domestic production for Chinese magnet manufacturing. This is going to start putting some real pressure on the rest of the world in the next few years. We are starting to see ourselves a bit of a renewed interest in the whole technology metal space.

**Tracy Weslosky:** In the last month Gavin we have noticed you have had an onslaught of basically news releases. One news release after another, every other day it is Arafura. Of course, your stock price is really getting the support from the shareholders. Can you talk to us about your recent private placement announcements and what you are planning on utilizing the funds for? ...for the rest of the interview, [click here](#)

**Disclaimer:** Arafura Resources Ltd. is an advertorial member of InvestorIntel Corp.

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# Permanent Magnet Usage to Bolster Lynas

We're no strangers to Tesla's announcements making waves in resource markets, but the most recent decision to use permanent magnet based motors in the new Model 3 RWD in order to increase performance and reduce costs benefits one organisation in particular; not only are neodymium (Nd) and praseodymium (Pr) the highest value products coming out of Lynas Corporation (ASX: LYC | OTC: LYSDY) ("Lynas"), but this year the company became the top global producer of these rare-earth elements outside of China, and as such, are perfectly positioned to take advantage of increasing prices throughout 2017.

Powertrain motors featuring permanent magnets provide numerous benefits: lower weight, higher torque density and improved efficiency when compared to induction motors, making them perfect for hybrid electric (HEV) and full electric vehicles (EV). This means they provide faster acceleration, reduced vehicle weight and additional space for other components. It is therefore conceivable that NdPr motors will become the dominant EV technology in years to come.

Some EV models do already use permanent magnets in either the traction motor or generator, including the Chevrolet Bolt, but it is expected that a much higher proportion of future models will incorporate permanent magnet motors as the market becomes more competitive. Sales of HEV/EVs totaled 3.2 million units in 2016, with HEVs and plug-in HEVs forming 76% of sales. By 2020, sales of HEV/EVs are forecast to reach 9.4 million units, with EVs forming 42% of sales. These forecasts are bolstered by the fact that France and the UK recently declared that they will both ban the sale of petrol and diesel vehicles by 2040, and Volvo claiming that they will manufacture only electric vehicles from 2019.

Following from the climbing popularity of permanent magnet motors, demand for rare earth elements used in their manufacture is forecast to increase by 10.5% annually through to 2020. Nd/Pr types form the vast majority of rare earth permanent magnets, and have seen prices increase significantly in 2017 as a result of continuing closures of mining operations in China. China have stuck closely to their commitment to gaining control over the sizeable industrial complex, resulting in large scale shutdowns of illicit operations across the entire country.

China once produced almost 100% of the world's rare earths, but a more recent estimate puts this figure closer to 80%. This has been the black swan for which Lynas were waiting so long; the company consistently stated that their biggest challenge was protracted poor market conditions, which miraculously evaporated throughout this year. Having the highest grade rare-earth mine in the world will only get you so far; if the right market conditions are absent for whatever reason, the product sells at a loss and the 25 year mine life collapses into a year or two.

However, prices are going up, and Lynas have recently completed a second mining campaign at their Mt Weld site, increasing available ore by another 240,000 tonnes at a grade of 17.6% rare-earth oxide. The performance of company stocks so far this year may have been impressive, but the near-perfect conditions that have materialised in 2017 lead me to believe that Lynas will be enjoying expanding margins for many years to come. The rare earth buy window is far from closed, and, for me at least, Lynas are the producer-of-choice for investors looking for exposure.