How to evaluate a rare earths opportunity

written by Tom Wilson | September 14, 2020

The race is on for rare earths investment, but what should you look for?

So where do we go from here? That is, what are the criteria investors should consider when they are looking for rare earth/zirconium investment opportunities?

At this early stage of developing a domestic critical minerals supply chain, and as mentioned previously, one of the most important criteria for investors to consider with rare earths is whether the resource offers potential to recover other commonly associated critical minerals such as zirconium/hafnium and scandium, that are also largely controlled by China. These may offer better opportunities than rare earths for quickly finding domestic market outlets for the processed forms of these elements.

The rare earth elements neodymium, praseodymium and dysprosium are well known for application in high strength permanent magnets, now in increasing demand for electronics, wind turbines and electric vehicle motors. There are also opportunities in aircraft construction, where aluminum and titanium have been the traditional metals of choice. Zirconium and hafnium can be used in various combinations to make certain titanium and aluminum alloys that are perfectly suited for the high-temperature regions of jet engines. Similarly, scandium is in increasing demand as an additive to aluminum alloys to increase their strength and reduce their weight. When all of these

elements are recoverable from the same resource, it becomes a much more attractive investment opportunity.

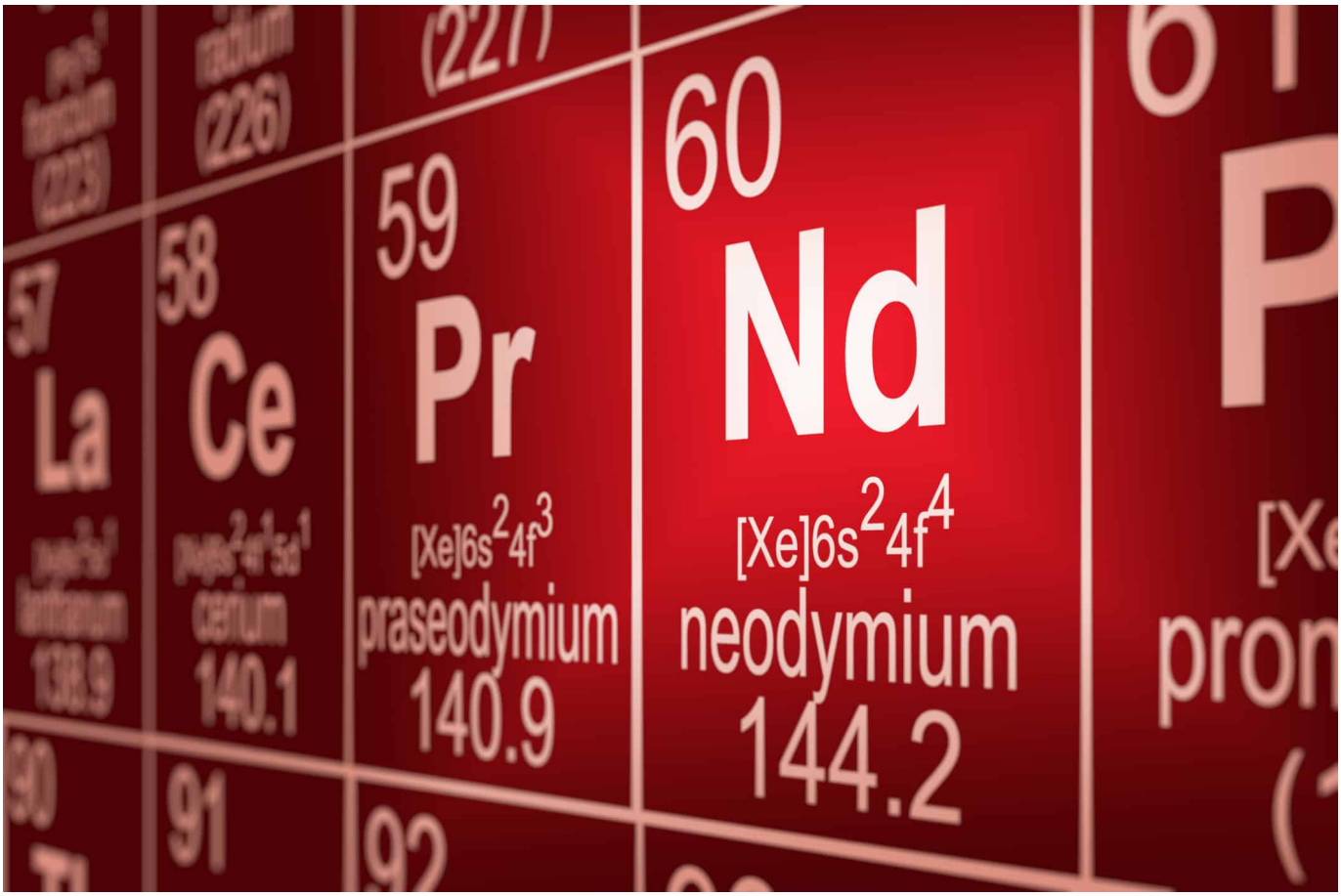
A couple of North American rare earth projects that meet most of these criteria, are Avalon Advanced Materials' Nechalacho Basal Zone Heavy Rare Earth project in the Northwest Territories and Imperial Mining's Crater Lake Scandium project in northern Quebec. The Nechalacho resource contains the critical elements zirconium/hafnium as well as both the light and heavy rare earth elements. The Crater Lake Project is a rare earth resource with exceptional scandium enrichment and is now being looked at mainly as a scandium project. It also contains concentrations of zircon as well as the rare earths.

Another factor to keep in mind is the balance between the Light Rare Earths (Lanthanum through Samarium) and the Heavy Rare Earths (Gadolinium through Lutetium), plus Yttrium. Most rare earth resources are dominated by the light rare earths, but having recoverable heavy rare earths as well can further enhance the overall value proposition as demand for these will grow as new supply becomes available.

Once the investor has identified a rare earth project that also contains other critical elements like zirconium and scandium, the next step is to assess whether they occur in minerals that are amenable to economic processing and recovery. The feasibility study (FS), Pre-feasibility Study (PFS) or Preliminary Economic Assessment (PEA) are the best sources of this type of information. Many early stage projects are focused on defining the largest potential size and grade of resource without focusing on whether the elements of interest occur in minerals that are amenable to economic recovery. These projects should not be considered as attractive investment opportunities until an appropriate economic extraction process has been identified. The next step is to be certain that the recovered

products will meet the specifications required by the consumer.

Other important points to consider when considering new rare earth project investment opportunities is the content of radioactive elements uranium and thorium which often occur with rare earths. High levels of uranium and thorium can be problematic from an environmental regulatory standpoint. Some jurisdictions are more challenging than others. Personal experience has shown that regulations in Canada are better than in the U.S. by providing an appropriate level of environmental regulation while not causing any unnecessary burden on industry.



Rare Earths

Finally, regardless of the balance of critical elements contained in a rare earth resource, the operation will need a well-qualified team to perform the development and product marketing work. So, the most important requirement at this

early stage of creating a new supply chain is finding the people with both the appropriate skill sets and experience. Companies with these assets will have a greater chance of success.

In summary, an investor looking for a rare earth project with the best prospects of success should be one that has the following attributes:

1) a resource that also contains significant recoverable quantities of zirconium/hafnium, scandium or heavy rare earth;

2) contains low level of radioactive elements or is located in a region that has less-burdensome environmental regulations;

3) has a defined a viable extraction process flowsheet; and,

4) has the appropriate, key people available for the early stage of development.

Now the trick is to find them.