Technology Metals Monthly: Where has all the Rare Earths News gone?

April 2016 may, hopefully, be acknowledged as the start of the rare earths recovery. Why? Because it's the first month for a long while where the month has closed and there has been two consecutive weeks of no falls and some raises in the suite of rare earths traded. May not be much; may not be statistically significant; but it's certainly a possibility worth watching. Also I promised to continue my thoughts into the financing "issue" that is surrounding not just rare earths developers but also in many other endeavours as well.

	FOB China (unless stated), US$/kg				
REO Oxides of typically traded quality	Q4 2015	Jan 2016	Feb 2016	Mar 2016	April 2016
Cerium Oxide 99.5 – 99.9%	1.91	1.91	1.91	1.83	1.78
Dysprosium Oxide 99.5% min	227.49	215.46	215.46	204.96	204.96
Erbium Oxide 99% min CIF Europe	31.50	29.00	27.50	29.00	29.00
Europium Oxide 99.9% min	106.20	96.64	94.46	82.79	80.43
Gadolinium Oxide 99.999% min	17.92	17.13	16.34	16.34	16.34
Lanthanum Oxide 99.5 – 99.9% min	2.14	2.06	2.06	1.98	1.98
Neodymium Oxide 99.5 – 99.9% min	40.74	40.24	40.24	40.24	40.75
Praseodymium Oxide 99.5 – 99.9% min	55.00	52.53	52.53	52.53	52.23
Nd-Pr Oxide 99% min	44.51	43.50	43.50	43.50	43.50
Samarium Oxide 99.5% min	2.05	1.95	1.95	1.95	1.95
Terbium Oxide 99.99% min	447.97	409.76	407.22	389.39	381.76
Yttrium Oxide 99.999% min	4.25	4.17	4.17	4.02	4.02

Tracking back to last month's introduction into the risk:reward conundrum and the apportioning of NPV, we discussed that:

"Rio Tinto funds its capital either from cash flow or by borrowing money. It can safely divert cash to new capital works (with an ROI of +15%) rather than directing that cash to dividends because the shareholders are long term dividend focussed and see long term value in growth. I repeat, note what is occurring here. Rio Tinto is risking either it's own money or is borrowing from banks. It is taking almost all of the risk. So what proportion of the profits (NPV) of that capital works should go to Rio Tinto. Well, all of it of course. They (Rio) risked it, they (Rio) deserve the reward.

Now look at a small cap exploration company looking to develop a REO project. Company capitalised at $25 million; has $5 million in cash; and needs $1 billion to develop a +20% ROI project. Things are very different. The money doesn't come from within; there is no chance of shareholder funding (public equity); there is no chance of borrowing the money; so what is the solution to the conundrum?"

Now I do not attest to being a financial/economic guru, but it would seem logical to me that the apportioning of the NPV should be different in the above two scenarios. A self-funding major should get the majority of the NPV, and, if so, could the converse be true? Would the small cap exploration company perhaps majority funded by a downstream user get a significantly lessened part of the NPV? I think the answer to this conundrum; the risk : reward apportioning of the NPV lies at the heart of the project financing situation. That is, you can't do a financing deal unless both parties share the same view of that risk : reward apportioning of the NPV.

I am trying to get an understanding of what the market (you) expects (is happy with) about the value (apportion of the NPV) that the downstream user (or private equity provider) should get if it provides some, or the majority of the project development capital. I would like your help. As residents of the investment space, I would like you to imagine small cap rare earth development company, ABC, has a good project – NPV $2 billion, but CAPEX $1 billion. ROI 20%. Downstream user, XYZ, has a lot of money and wants the REO output, and sees the only way to get that output is by taking a share in the project. Not in the ABC company, but the project itself. Query: in the following table are varying amounts of that $1 billion CAPEX paid by XYZ, please think about what the answers are to the empty boxes in the table.

XYZ CAPEX Payment	Proportion of output allocated	Proportion of NPV allocated to XYZ
$250 million		
$500 million		
$750 million		
$1 billion		

Important Events of the Period

Readers and researchers of the rare earth space would be dismayed at the minimal volume of materials going over the air waves in the last month or so, particularly when you only focus on outside of China.

Lynas reported a 10% decrease in sales which was to be expected due the price situation, but they have stated that the current "murky" outlook is expected to improve as the final commissioning of the increased capacity of line 5 comes up to full production. And if the price rises a little…….

Alkane Resources Limited has announced one of my success factors! They have signed a toll processing deal with a Vietnam separation plant for their REO upgrading. Now together with the arrangement for zircon and niobium previously reported, the production AND marketing model is now complete. Well done to all involved. Cannot wait to see the time line to production.

The debate around lithium-ion batteries, cobalt cliffs, and zinc – manganese oxide batteries is gaining heat. I will not debate individually, the articles are available on InvestorIntel, but it does show how technology evolves. The fundamental, though, is that advances in technology need advanced materials. And the more widespread the expansion of the uses of that technology, again, the more of those advanced materials are required. So technology metals continues to improve when looking at medium to long term fundamentals.

I have been asked to provide comment on China where I can say the volume of information is considerably more that ROW. The following (for April) are searchable via Google.

1. China announces North Korea trade restrictions, bans rare earth import
2. China outlines plans for rare earths production controls and storage
3. Chinese rare earth prices to increase
4. China to set new Standards for rare earth producers

Now these four reports do not show anything too significant until you read into the detail. Now number 4 is newsworthy, needs highlighting and can be learnt from. Standards for REO products will be no different to standards in other fields. They provide clear data on what the product has to achieve. But when you control the majority of the supply chain, as China does, there are some important issues to be noted. The Chinese REO products have been improving in quality year on year to meet their own specific product quality development needs. For example, as the phosphor powder specification in LED lighting has become more stringent, so the specification on the source yttrium has become more quality targeted. Why is this important, or should I say of concern? It is that as a developer you cannot sell a 2016 produced REO with a 2011 quality. At least not to a 2016 user at a 2016 price. The 2011 version is 5 years behind in its technical development (because of the change in the downstream need and hence change in specification). It also means that if you are thinking about going into the LED business outside of China you had better be sure what quality of REO you designed around, and is it available. So for anyone in REO project development keep an eye on the customer standards as they will change your process flow sheet, both in terms of CAPEX and OPEX. And for anyone in the investment analysis space keep an eye on the prices used in the NPV calculations. They need to reflect both the current product standards and relevant price, and the flowsheet capability of the project under review.

The above paragraph discusses those articles available outside of China accessible via Google. It appears that not a great deal is happening in the REO space. But when you look at what is happening inside China, it's a completely different story. Believe me, "Where has all the Rare Earths News gone"? It's alive and well, and it's inside China. Let's look at Research and Development.

1. Real time detection system based on rare earth nanometer up-converting phosphor technology and it's multidisciplinary applications.
2. Clean separation of bastnasite and rare earth sensitized organic light emitting device.
3. "State key laboratory of Research and comprehensive utilization of Baiyun Obo rare earth resources" of Baotou Research Institute of Rare Earths approved.
4. Baotou Rare Earth Research and Development Centre of Chinese Academy of Sciences was established.
5. "Rare earth industrial pollutants emission standards" and "Heterogeneous catalytic oxidation treatment of VOCs in rare earth industry and the equipment" were awarded the first prize of China Non-ferrous Metals Industry Science and Technology award.
6. "Development of high performance rare earth luminescent material for white LED" by Fujian Institute of Research on the Structure of Matter.
7. High coercive sintered NdFeB with trace content of heavy rare earth.
8. Popularization of preparation technique of Ce-rich and Ce magnet.
9. Effective extraction of ion adsorption rare earth resource and green preparation of rare earth materials.
10. Guangdong Province opens Research and Development Center of Special Fiber Optic Materials and Device Engineering Technology.

Ten clear indications that R&D is alive and well in China. And let's look at rare earth business news.

- Two rare earths projects with investment over 100 million yuan will be constructed in Damao County of Baotou.
- A rare earth lithium-ion battery project will be built in Xinjiang.
- Baotou puts forward the "rare earth +" strategy to promote healthy development of the rare earth industry.
- Production of new energy automobiles exceeded 100,000 units in December 2015 (read as EV or hybrid)
- Corun together with Chang'an Automobile and other two companies invested in hybrid vehicles.
- Baogang Tiancai put into production and produced for its first LED order in 2016.
- Ganzhou Municipal Bureau of Land Resources took ten measures to build Ganzhou rare earth valley and to promote the upgrade of rare earth new materials and the application industries.

Most certainly, rare earths is a full steam ahead industry in China. I will keep you posted as the months go by.

Remember to give me your views on the apportioning of NPV.