

“Bold decision” on graphite pays off for Energizer

In 2012 Energizer Resources Inc. (TSX:EGZ | OTCQB:ENZR) (“Energizer”) took a bold decision to halt its vanadium prospects in south-central Madagascar and focus its efforts entirely on developing its nearby full feasibility-stage Molo graphite deposit. This decision is certainly paying off.

The location – a sparsely populated dry savannah grassland region, far away from any rainforests, endemic wildlife and villages, makes it as idyllic as any prospector can hope for to ensure low cost, open-pit mining. In my experience in working with mines in Africa, some of the biggest upfront hurdles and costs is the relocation of villages. This process too often becomes a long drawn out one that could hold up a mine’s development for years. Often mere rumour that a mine is underway and will be relocating people brings more people from outside the area in the hope of being able to get a free pass. For investors thinking about investing in African mining projects, the fact that the Molo project is situated in an scarcely populated area and at the same time far away from any natural reserves, cannot be underestimated.

As far as African mining jurisdictions go, Madagascar is a pretty sweet deal. It has an Indonesian-based culture with French and Malagasy as official languages whose government recognises mining as a key growth engine, and as such is a mining-friendly jurisdiction with codified mining laws, thanks to two major billion-dollar projects already established and operational in the country by Sherritt International and Rio Tinto. On November 27th of this year, Madagascar hosted the 2016 Francophonie Summit, where France and other Francophonie countries attended to promote bilateral trade and investment into the country. The Canadian government sent a large

delegation, headed by Prime Minister Justin Trudeau himself. The Molo project is regarded as one of top five mining projects in the country expected to reach production and I've even noted it listed on a few of Madagascar's tourism sites. Major countries are currently invested in Madagascar (U.S., France and China) and regard it as a strategic location for mineral wealth opportunity. Madagascar's laws on large scale mining investments incentivise mining companies with larger operations to invest in the country in return for various fiscal benefits. These benefits include a temporary exemption from minimum corporate tax and no VAT on imports. Furthermore, Madagascar's distance from all Africa's conflict zones provide investors with confidence in the project's stability.

Molo is home to one of the largest primary sources of crystalline flake graphite in the world. Those readers who have been following InvestorIntel for a while have seen the stellar projections for flake graphite over the next four years.

To satisfy the steel market alone, annual graphite demand is expected to rise 8% CAGR to 2020 from 1.1 million tonnes to 1.5 million tonnes. Batteries and high-tech application needs are projected to be dramatic enough to require a 600% increase in annual flake graphite production. Only flake graphite can be used in the over 200-known applications that require graphite as an additive and is the only natural form of graphite that can be used to make the spherical graphite used in lithium-ion batteries. Thus, purified, spherical graphite currently sells for between \$4-6,000/tonne, more than twice the price of high quality flake graphite. Furthermore, the British Geological Survey listed graphite, along with antimony and rare-earths, as most at risk of a global supply disruption.

To this end, Molo is well poised to take advantage of the highly anticipated demand growth in flake graphite. The project hosts one of the largest, high-quality crystalline

flake graphite deposits ever discovered and extensive independent testing by various third-party end-users verified that the flake graphite concentrates from the Molo deposit met or exceeded quality requirements for all major end-markets for natural flake graphite – namely refractories, lithium-ion batteries, specialty foils, and graphene ink applications.

The company announced last month a three-phased approach for the development of its world-class Molo project using a modular approach, which looks to significantly accelerate the company's original timeline to production. The first phase will be the construction of a 15,000 tonne per annum demonstration plant for the project, which is expected to commence in January 2017 and be completed in only 9 months time. As outlined in the company's November 7th, 2016 Front-end Engineering and Design ("FEED") Study, Energizer is taking a sensible phased approach to production, with phase one being the demonstration plant, thus providing a cost-effective solution to test and verify the mine flow sheet design process ahead of the planned expansion to the 53,000 tonne per annum mine as envisioned in the company's 2015 full feasibility study. Once the demonstration plant's process has been proven and optimised, phase two will include the development of additional sustaining infrastructure required to achieve the planned capacity, with phase three being the expansion to the 53,000 tonne per annum mine as market demand requires. As the company's feasibility study indicated, the Molo project is estimated to have one of the lowest graphite processing costs in the industry.

The demonstration plant in Madagascar will have an estimated capital cost (CAPEX) of just US\$7,000,000 will provide a front-end processing capacity of 240,000 tonnes of ore per annum with an expected mine life of over ninety years, based on ore reserves alone. This will permit the company to provide off-takers with multi-tonne "run of mine" flake concentrate for final product testing and verification. Energizer will be

immediately initiating the required steps to implement the primary phase. During this time, the plant's capabilities will be assessed and a comprehensive costing review exercise undertaken to ascertain the possibility of utilising a similar modular build for the full-scale Molo mine. Energizer's implementation of a modular build plan and phased approach is truly unique to the industrial minerals industry and provides a significant competitive advantage in terms of speed to market and reducing overall financial risk. We expect to be hearing much more from Energizer in the months to come.

Madagascar – Energizing an Up-and Coming Region

Madagascar conjures up images of wild landscapes and an exotic ecosystem cut off from that of the rest of Africa. Long a French colony known as Malagasy, it has had a lively history since independence but is now on the rise as a mining destination due to its unique geology.

The country has not appeared on the radar screen of most mining investors but there are a few major developments, such as Sherritt's Amabartovy nickel/cobalt project, the coal project at Sakoa Asia-Thai Mining and at Imaloto of Lemur Resources (ASX: LMR) and Bushveld Minerals (LSE: BMV) and Rio Tinto's mineral sands project near Fort-Dauphin at the south-east tip of Madagascar. QIT Madagascar Minerals, which is 80% owned by Rio Tinto and 20% owned by the Government of Madagascar, intends to extract ilmenite and zircon from heavy mineral sands over an area of about 6,000 hectares along the coast over the next 40 years. Some of this development has relevance for Energizer Resources (TSX: EGZ | OTCQX: ENZR), as

larger projects bring infrastructure from which smaller projects can also derive benefits. In this note we shall look at Energizer Resources, an emerging graphite and Vanadium player and its symbiotic relationship with the ASX-listed Malagasy Minerals.

The Dynamics of Madagascar

From the political background Madagascar has been having a worse time of it recently after a long period of relative quietude. The current President came to power in April 2002 after a hotly contested election. Things were relatively quiet until the end of 2008.

There were riots starting in January of 2009 in the capital that left around 170 dead. After losing support of the military and under intense pressure from the mayor of the capital Andry Rajoelina, Ravalomanana resigned as President in mid-March 2009. Ravalomanana assigned his powers to a military council loyal to himself. Other parts of the military called the move by Ravalomanana a "ploy" and said that it would support Rajoelina as leader. Rajoelina had already declared himself the new leader a month earlier and assumed the role of acting President. The European Union, amongst other international entities, refused to recognize the new government, due to it being installed by force. The African Union, suspended Madagascar's membership however Rajoelina remained president until early 2014.

Presidential and parliamentary elections were held in Madagascar on 20 December 2013, following a first round of presidential elections on 25 October. The presidential elections in December were a runoff between Jean Louis Robinson and Hery Rajaonarimampianina, the top two candidates to emerge from the first round of voting in October. The official results of the second round were announced on 7 January 2014 with Rajaonarimampianina proclaimed the victor with nearly 54% of the vote. He assumed power in late January

2014. The new president is a trained accountant having received his higher education in Quebec.

Multiple Foci

Energizer Resources Inc. was called Uranium Star Corp. when I was first introduced to it a couple of years ago. Its prime focus is the exploration and development of its 100%-owned Green Giant Project located in the extreme south of the island nation of Madagascar off the east coast of Africa. This project is vast and thus encompasses different mineralisations. When we first came to look at Energizer a few years back it was primarily a Vanadium story with a sideline (maybe) in the then barely known graphite.

At the time the company's strategy was to aim production towards an end-product suitable for the Vanadium Radox battery market with production being projected for the end of 2014. However in a somewhat seamless process the company has morphed into a graphite contender.

Green Giant

This concession is located 145 km SE of the city of Toliara in the Tulear Region. The company's land position consists of 36 licenses covering around 225 km².



The property is located in an area that has good access via a network of seasonal secondary roads from the village of Fotadrevo, which in turn has access to a regional road system that leads to the regional capital of Toliara. Unlike the typical image of Madagascar as lush jungle the part of the island where the property is located in the rain-shadow and thus a dry semi-desert climate subjected to seasonal cyclonic rainfall characterizes the region.

Geology & Exploration

The region around the Green Giant property has primarily been explored historically for base metal-type occurrences although colonial geologic services highlighted a wide range of mineral potential in the region. The Besakoa base metal mineral occurrence, located 9 km north of the Green Giant property hosts the Besakoa polymetallic prospect, which was discovered by BRGM (the State Mining Bureau).

There were no known historic mineral occurrences on the property.

Molo – Putting Vanadium in the Shade

Interestingly I had been presented with a pair of past-producing graphite mines in Madagascar several years back and thus I was not especially surprised to see that Energizer claimed to have discovered that its Green Giant project also contained a viable grade of graphite. However to put this in perspective, past production in Madagascar had never exceeded 12,000 tpa of graphite.

The identification of graphite as a potential credit to the company's vanadium resource led its geologists to conduct a reconnaissance exploration program in September 2011, with the goal of delineating new graphitic trends, and comparing them to those associated with the vanadium mineralization. In the course of this exploration, graphitic trends were identified, which were visually determined to be of both higher carbon content, and larger flake size than those associated with the vanadium mineralization.

The company signed a Joint Venture Agreement in mid-December 2011 with an Australian company, Malagasy Minerals Ltd (ASX: MGY) for the exploration and development of industrial minerals. EGZ originally held 75% of the JV, and MGY held the balance. MGY also owned 7.5mn shares of EGZ. This deal prompted an additional reconnaissance exploration program in December 2011.

The Molo Geology

The purpose of Energizer's exploration program was to ascertain the industrial mineral potential of the JV property, in addition to further drill testing of graphitic trends. During the course of this reconnaissance exploration, Vanadium trends were confirmed to extend off the Green Giant Property, and multiple graphitic trends were identified. In total, 19

diamond drill holes (totaling 2,701 metres) were completed during the course of this exploration.

The Molo deposit exists within a folded sequence over a 2 km strike length. In the north, it is between 50 to 60 metres wide then flares to over 500 metres in width. From this point, the Molo deposit tapers down to a width of approximately 250 to 350 metres. Finally, the deposit splits into two 'arms' of between 50 and 100 metre widths, respectively, which continue for tens of kilometres in length in either direction.

Mintek provided analytical results of these samples to Energizer in December 2010 and January 2011. The QEMSCAN analysis of these head samples quantified a graphite composition of 4.09%, while the head chemical analysis quantified a graphitic carbon content of 3.87%.

Based on drill and trench data, as well as mapping, prospecting, and geophysical surveying, graphite mineralization is confirmed at surface and over an area of at least 250,000 m². Drilling consisting of 47 holes (totalling 9,246 metres) and 19 trenches (totaling over 2,100 metres) confirmed that the mineralization is open at depth in excess of 300 metres. The current NI 43-101 resource estimate (with a 2% cut-off) stands at 84.04 million tonnes of indicated resources @ 6.36% C, and 40.34 million tonnes of inferred resources @ 6.29% C. The company ran a pilot plant producing 13 tonnes of graphite concentrate. Of this a high percentage (43.5%) came out as premium extra-large and large flake with up to 97.7% purity achieved with simple flotation.

According to the company the Molo has a potential deposit size of between 80-120 million tonnes, at a grade range between 5% and 8% C. Energizer has ventured that Molo will be the "world's largest known single source deposit" of high-grade graphite. The company claims that Molo's size and scalability will be a barrier to entry for other producers. This is

essentially a reiteration of the same idea I have propagated in lithium and REEs that the first few sizeable projects through the gate effectively kill off the prospects of latecomers (no matter what their virtues might be).

Potential Crystallises

With the switch of focus to graphite the company de-emphasized the process of moving the Vanadium forward and instead came up with a NI 43-101 graphite resource which was completed by November 2012. The PEA study, contemplating open-pit mining, was completed February 2013 with the main metrics being:

- Recovery: 89%
- Average Head Grade: 8.5%
- Annual Production Graphite: 84,000 tpa
- Strip Ratio 1.65
- Capex of \$162mn
- Operating Costs: US\$418.45 per tonne
- Average Selling Price: \$1,526 per tonne
- NPV @ 10% discount: US\$421M
- IRR: 48%
- Payback: Three Years

Energizer is targeting a production start-up in 2015, with an output capacity of between 50,000 and 150,000 tpa. Energizer's technical partner DRA is designing the mine with three 50,000-tonne modules, whereby the Molo mine will begin initially at 50,000 tpa, but can expand to produce additional graphite as the market requires.

Cleaning up the Malagasy Relationship

In late March 2014 it was announced that Energizer had acquired the residual 25% stake in the Molo project that was owned by Malagasy Minerals. The core components of the agreement between the companies are that Energizer will:

- Pay Malagasy the sum of CAD\$400,000 cash;

- Issue 2,500,000 EGZ shares (held in escrow for 12 months)
- Issue 3,500,000 EGZ warrants (based on a 5 day VWAP prior to date of signing).

Then on completion of a Bankable Feasibility Study, Energizer will:

- Pay Malagasy the sum of a further CAD\$700,000 cash
- Issue 1,000,000 EGZ shares

On the commencement of commercial production Energizer will:

- Pay Malagasy the sum of CAD\$1,000,000 cash
- Commence payment of a 1.5% Net Smelter Return on all production.

Malagasy are including an additional tenement previously not part of the Molo Joint Venture. The transaction is limited to industrial mineral rights only, which includes graphite.

This agreement enhances the potential funding and development pathway of the project with Energizer now being able to seek funding support on a 100% basis.

Infrastructure Advantages

As mentioned Madagascar is a country with a number of world-sized mining projects under way but little else in mining (at least until the last decade). As a result infrastructure is very thin in many parts of the country. The semi-arid southwest corner of the country where the Green Giant Project is located is currently infrastructure poor. Thus the move to production will require the upgrading of existing roads, ports, and water supply routes and the importation of diesel power.

One big plus is the relative proximity to the Sakoa coal project (located only 30 kms away), which is under development and raises the possibility of infrastructure-sharing

opportunities for the two projects. To this end, Energizer initiated discussions a couple of years back with Asia-Thai Mining, one of the owners of the Sakoa coal project as well as the mine construction company retained to develop the coal project, to identify potential infrastructure sharing opportunities and other synergies. A coal project implies a rail connection (more important for bringing fuel in than taking ore out in EGZ's case). In addition, a coal source nearby raises the likelihood of the construction of coal-fired electricity generation facilities and high tension power to the Green Giant site. Lemur Resources is positioning itself to be the one to get a power plant up and running.

The Vanadium Resource

The former main event that is now relegated to second priority is the Vanadium deposit at Green Giant, a sedimentary-hosted deposit. This has now been restyled as the Manga project to avoid confusion with the graphite on the same concession.

Based on exploration efforts, a 21 km continuous Vanadium trend has been identified, of which only 25% has been drilled.

The Vanadium deposits have been categorized as oxide and primary. The rocks in the region are oxidized to a shallow depth, usually less than 10 m. The chief contrast here is that, unlike most vanadium deposits which are magnetite hosted, the sedimentary nature of this deposit calls for a metallurgical process that is different from that used by other vanadium producers.

The mineral deposits on this property have been divided into three separate zones, totaling approximately 5.3km in strike length. These are referred to as the Jaky, Manga, and Mainty deposits. The mineral resource estimate utilized approximately 18,832 m of diamond drill hole data from the 2008, 2009, and 2010 drill program and was supplemented by approximately 5,928 m of trench data from the 2008 and 2009 exploration programs.

The resource, dating from November 2010, was prepared by the consulting firm, AGP. The Jaky, Manga, and Mainty resource estimate is comprised of Indicated and Inferred resources reported as vanadium pentoxide mineralization at a base case cutoff grade of 0.5% V₂O₅. Within the oxide and primary zones of the Jaky, Manga, and Mainty deposits, the total Indicated resource is shown below:

Classification (at 0.5% V ₂ O ₅ cut-off)	Tonnage (million tonnes)	V₂O₅ (million pounds)	Grade (%V ₂ O ₅)
Indicated	49.5	756.3	0.693
Inferred	9.7	134.5	0.632

In the opinion of the company, the characteristics of the Green Giant vanadium would allow the company to produce a high-purity V₂O₅, which is required in battery power and in battery storage for both automotive and large-scale applications. One potential byproduct would be FeV, which is the usual end product from magnetite-hosted deposits, and can only be used for steel applications.

Production outlook

As the Manga Vanadium deposit is sediment-hosted, and not magnetite-hosted like the majority of other known Vanadium deposits, the Vanadium would need to be processed differently than the magnetite-hosted deposits. A proven process, called alkaline press leaching, would be utilized to process the vanadium and this would be expected to naturally produce a battery-grade form of V₂O₅ (99.5%+ in purity) directly from the process. Advanced metallurgical test work was undertaken at SGS Lakefield to optimize the process flow sheet. Energizer expected to produce a clean liquor requiring less processing to produce the high purity (99.5%), battery-grade vanadium.

A preliminary economic assessment on Manga was initiated with DRA Mineral Projects but has been put on hold pending the evolution of the graphite business. .

Whither Malagasy?

Malagasy seem pretty pleased with the transaction to sell the last 25% of Molo, though one would not know it from the static stock price on the ASX. The company claims that the transaction crystallizes significant value and allows the company to focus on gaining further exposure to high quality graphite deposits on the company's 100%-owned tenements at the Maniry Project. It also intends to advance its core focus of exploring for nickel-copper-PGM deposits across the wider project area. Malagasy looks like an option upon Energizer, with a rather derisory market cap (AUD\$3mn). Maybe bringing the two together at a future date makes sense.

Conclusion

Energizer is now vigorously promoting graphite over its main asset in vanadium. The switch to graphite over Vanadium, in a tough financing environment, was a smart one as wannabe producers should use whatever bucket one has at hand to catch the rain.

In the process Energizer has become more financeable by appealing to investors' enthusiasm for graphite and this has allowed the company to reap the graphite whirlwind. According to Energizer, amongst its closest peers, it has a percentage of its deposit at 44% with large flake that is only second to Northern Graphite (60%) but has an advantage over Northern Graphite that its operating cost per tonne at \$418 is substantially lower than Northern's \$795 per tonne. Only Mason Graphite has a lower operating cost per tonne (at \$390).

It is always best though to eschew comparisons for as we know from the REE space this can end up in negative backbiting that rebounds on everyone in the space.

The main focus now must be on capex, which at \$162mn is at the daunting end of the current financing environment. Except for Flinders, which took over a plant that was already extant,

there are no examples we can think of with a standing start financing of *de novo* graphite operation. As the largest part of the capex is plant cost at \$68mn (to which then construction indirects and contingencies depend) the downsizing of the output in the short term might be one way of making this more bite-sized from the financing point of view.

Madagascar is clearly evolving as a diversified mining space with the potential to become a source of a variety of disparate minerals and avoiding the “mono-focus” of some mining jurisdictions. Energizer is a graphite play with a very doable and advanced project, with no challenging geography to deal with, and comes with a Vanadium “option” embedded within it for future consideration or spin-out.