

Energizer, Deveron and Great Lakes Graphite move north in spite of a sluggish market



Graphite Market Review – The Graphite & Graphene market remained sluggish for the graphite sector in general and, on average, the share price of InvestorIntel graphite members dropped 3.84% in the week ending on November 14. However, some companies bucked the trend and posted strong gains rebounded and the biggest gainer was **Energizer Resources** ('Energizer', TSXV: EGZ | OTCQX: ENZR), whose stock went up +13.33% in Toronto trading. Energizer's exploration and development joint venture partner, **Malagasy Minerals** (ASX: MGY) announced that it had begun drilling several graphite zones, formally launching its Maniry Graphite Project in Madagascar, where Energizer discovered a large region containing excellent graphite deposits. The Maniry project in southern Madagascar consists of 34 drill zones extended across an area of 6.5 by 2.5 km. Individual drill holes could reach depths of up to 350 meters over an area of 1.5 km. The early data suggests the graphite ore is of very high grade and that it has not been excessively contaminated by other minerals, which will other rocks which will facilitate its refinement into pure flake graphite.

Alabama Graphite ('AGC', TSXV: ALP | OTCQX: ABGPF), dropped slightly in Toronto trading, even as it announced that it would be exploring five new targets over the next few months based on identified 'anomalies' that hold significant promise for large flake graphite. At Coosa, AGC, has been evaluating new exploration targets identified during flight and ground survey activity. The results will be published as they become available but the trenching program should be

concluded by the end of November.

Great Lakes Graphite (TSXV: GLK), which enjoyed good result last week, continued to move up, gaining +7.14% as investors absorbed the significance of its new infrared (IR) graphite concentration test method, allowing it to ensure higher quality standards for prospective customers as it proceeds toward the delivery of a resource estimate in the next few months. Great Lakes has joined the graphite race late but it is one of the most ambitious companies in the sector. **Deveron Resources** (TSX: DVR) also showed some resilience, rising 8.11%. Deveron's Rockstone project in northwestern Ontario is being developed to deliver graphite as well as zinc. Recently Deveron signed an option agreement for up to a 100% stake in the Rockstone property (in northwestern Ontario) from Greencastle Resources. Zinc has been one of the few raw materials to rise in value because of a production deficit, which is expected to last for the next few years as many zinc mines have 'fizzled out', with some having been forced to shut down in Canada.

Kibaran Resources ('Kibaran', ASX KNL) issued an interesting report last week outlining favorable results from its Mahenge Graphite Project and specifically the Epanko deposit for which a feasibility study is being prepared and where the company has already established an inferred resource of 14.9 million tonnes grading 10.5% total carbon graphite and 1.56 million tonnes of contained graphite – and this based only 20% of the project area. Kibaran suggests that the technical evidence from Epanko suggests that it hosts a large flake deposit featuring material of the highest quality. Significantly, Kibaran and a subsidiary of the German industrial conglomerate Thyssen-Krupp have signed a Memorandum of Understanding for an offtake for an initial 20,000 tonnes of graphite per year. Thyssen was impressed by the optimal distribution of large fluffy material a longer mine life than previously expected, and the ability to increase production still should be an


increase in demand in the future.

Discovery Africa Ltd, (ASX: DAF) lost 15.79% even as it announced that it has secured an additional 103 square kilometer license for its Nachingwea graphite project in Tanzania. The rock sampling mentioned in in this new license, valid for four years, revealed levels of 7.22% and 5.55% of total carbon-graphite; Discovery also controls significant graphite assets in Uganda.

Graphite, while suffering the same price disease that has affected most resource stocks, promising or not, is easier to mine than other minerals. Because of its electrical and thermodynamic qualities, electromagnetic survey equipment picks it up easily and thus it makes for a far less costly exploration process than other minerals. Moreover, much of flake graphite deposits are located near the surface, which also reduces risks while allowing for open-pit mining, a much cheaper alternative than other methods.



Northern Graphite and Graphite One lead the graphite sector in the first week of November

 **Graphite Market Review** – Northern Graphite Corporation (TSXV: NGC | OTCQX: NGPHF) was one of the few market movers for the week ending on November 7, 2014, gaining 11.84% in Toronto

and 9.45% at the OTCQX. The gains contrast with the combined average performance for Graphite companies (members of InvestorIntel) of -2.19%. Graphite One (TSXV: GPH | OTCQX: GPHOF) rose 4.35% in Toronto and 16% at the OTC; Great Lakes Graphite (TSXV: GLK) gained rose 7.69%, Focus Graphite rose 5.88% in Toronto and 5.26% at the OTC while Deveron Resources gained 8.82%. Overall, the fundamentals of graphite demand have not changed and none of the cited companies published any significant news to warrant a shift in market performance, whether up or down. Indeed, the lukewarm performance had far more to do with falling industrial metal prices at the London Metal Exchange, reflecting weaker economic signals from China. Meanwhile, more jobs were created in the US, which strengthened the US Dollar, hurting commodities.

The October economic indicators from China were lower compared to September, suggesting that the People's Republic continues to struggle – relatively speaking of course – to meet economic growth targets. Analysts are betting that the government will ultimately take further measures to support the economy, as GDP predictions growth are at risk. Meanwhile, the economy in the Eurozone has remained under tremendous pressure. The EU Commission has lowered its growth forecasts for this year and the current year, the euro against the US dollar continued again under pressure. The US dollar index rose again significantly, making commodities more expensive for holders of other currencies, which in turn affects demand – lowering it. Even zinc, for which a demand bottleneck is expected in the coming years, suffered in the markets because of a demand problem in China – reflected by sharply lower sales of zinc intensive e-bikes.

Graphite is one of those raw materials that, even if needed in small amounts, are expensive because of the special property requirements. Graphite is still expected to experience strong demand growth in the coming years. Similar to rare earths, China is the market leader in the market for graphite, which

is there but mainly used in steel production. Graphite is also needed to make graphene. Such graphite requires a purity of more than 99% and a handful of producers can deliver it. Apart from graphene, graphite is generating considerable interest and demand because of its use in Lithium-ion batteries, better known as Li-ion batteries. Northern Minerals was, as noted above, one of the few market gainers last week. At the end of October, Northern launched a lithium ion battery ("LiB") research and testing facility to develop and test natural graphite based anode materials for LiBs aimed at improving battery performance, reducing costs and reducing the environmental impact of anode manufacturing. The facility will be available on normal commercial terms to any company, including Northern's competitors – so long as results are shared with the public.

One of those competitors is **Focus Graphite**, which last week signed a Pre-Development Agreement with the Uashat Mak Mani-Utenam First Nation with respect to the graphite Lac Knife project. This is very important because failing to secure such agreements can affect deeply affect a project, delaying or preventing governments from granting the relevant permits. Alabama Graphite, meanwhile, announced the conclusion of a warrants purchase in the amount of USD\$ 2.1 million.

Alabama Graphite now has a zero balance debt and it plans to use the remaining proceeds from the voluntary exercise of the Warrants for further exploration and development of the Coosa and Bama Mine Projects in Alabama (USA), initiating a preliminary economic assessment of the Coosa project to generate working capital.

Great Lakes announced the use of a more accurate "modified infrared (IR) graphite concentration test method to achieve a high level of accuracy. Great Lakes is moving aggressively and it has set some important targets for the next few months with the resource estimate being the immediate priority. The Company wants to move fast enough to overtake its peers to

become the first producer of graphite in North America.

Graphite One completed another drill campaign at its Graphite Creek deposit, which is claimed to be the largest flake graphite deposit in North America; certainly, it is one of the most significant large flake deposits in the United States. Having completed the drilling campaign, Graphite One can now proceed toward completing the preliminary economic assessment.

Australia's **Discovery Africa**, focused on developing graphite at its Nachingwea graphite project in Tanzania, announced the receipt of a mining license covering an additional 103 km² of exploration territory. The samples from this area are very promising, having revealed 7.22% and 5.55% of total carbon-graphite, as announced on October 30. The Company also has significant graphite assets in Uganda. Finally, **Deveron Resources** announced it would agree to option as much as a 100% stake in Greencastle Resources' Rockstone property in northwest Ontario, which is also said to contain zinc. Northern Ontario has surprisingly good grades and varieties of graphite to offer at its Albany deposit. There is good reason to believe that Deveron may find its own world-class deposit featuring the kind of grades and varieties that lend themselves well to battery and graphene production.



Graphite Market Review is a special weekly feature on **InvestorIntel** sponsored by **Alabama Graphite Corp.** (TSXV: ALP | OTCQX: ABGPF).

Grafoid enters the electric vehicle race with the Braille Battery acquisition

Grafoid Inc., part of Focus Graphite ('Focus', TSX.V: FMS | OTCQX: FCSMF | FSE: FKC), announced that it acquired 75% of Braille Battery (Braille), which has designs and manufactures lightweight Li-Ion batteries for the automotive market. The acquisition will allow Grafoid to gain a high profile platform through which to develop graphene, which will be used by Braille to improve the performance of their batteries. Braille has built its technology and reputation, supplying batteries to Formula One, NASCAR and Indy racing teams. Automobile racing subjects man and machine to high levels of stress. Apart from performance, these sports provide an ideal platform to test the limits of reliability for any given technology used in the cars. Braille's racing activity has given it an ideal experience to approach other sectors where reliability and performance are crucial, namely medical and military applications.



Braille is based in Florida and it has experience making both lead-acid batteries (AGM) of very high quality (not too heavy), studied for road racing competition and Li-ion batteries. In 2009, Nissan Motors recently chose Braille to develop a full on hybrid race car based on its popular family sedan, the Altima Hybrid. The standard car was trimmed in weight and the back seat replaced by a large big high-voltage battery. The mechanical engine was improved for power using a supercharger while the electric motor gained 20 kilowatts thanks to the larger capacity battery. The car was presented at the world famous SEMA Show in Las Vegas, taking part in other promotional events, including a crossing of the United

States (One Lap of America). The car has retained its safety equipment, its bumpers are those of the production car, and it has a legal exhaust. Braille modified the car with an ecological outlook, using special materials such as non toxic paint (by DuPont), a roof covered with solar cells and many parts made of carbon fiber, such as the rear diffuser and spoiler. The advantage for Grafoid is that Braille has already acquired a reputation in using novel materials, making them available to the wider public in high visibility events. Braille, therefore, offers Grafoid an ideal platform, or a veritable showcase, for its MesoGraf™ ('Mesograf') material.

MesoGraf') represents an ideal platform for the industrialization and commercialization of graphene, bringing to market and to the public the world of graphene research with actual commercialization of the material. Until very recently, graphene has been prohibitively expensive for industrial use. Graphene is composed of only one layer of carbon atoms which must be isolated and then arranged in a honeycomb structure, which is the key to its high strength. For years since the discovery of graphene in 2004, laboratories have been trying to come up with an economically viable method to produce the material. Many have claimed 'revolutionary' discoveries to bring this material into a mass production cycle but little has actually developed. MesoGraf, however, is much closer to becoming the elusive mass production graphene that so many have been trying to achieve.

MesoGraf was developed by Dr. Loh Kian Ping and Grafoid co-founder Dr. Gordon Chiu. The main difference between MesoGraf and all other attempts at developing a graphene material is that MesoGraf is finally able to offer the scalability that is needed to bring the material's potential to the market. A scalable graphene material implies that it can be made to address a large increase in users and applications without undue effort. Scalability has been the 'weak link' in graphene until now. MesoGraf will be derived using natural flake

graphite ore from Focus's Lac Knife deposit in Quebec in a patented one-step process. Even this process is 'scalable' because, it can use any graphite ore with 10% or higher purity. Graphene will make its way in many electronic devices such as smartphones, tablets, connected devices, batteries or flexible displays. But it will also be used in the manufacturing of extremely durable structures in the civil engineering, aerospace and automotive sectors. Braille can serve as the platform to research and develop lighter and more efficient Mesograp based batteries with direct access to the growing electric and hybrid automobile sector. Until recently, Grafoid and its parent Focus Graphite have been involved in advanced applications for lithium iron phosphate (LiFeP) battery materials in partnership with Hydro-Québec and the development of graphene-based repayment cancer therapies in partnership with Calevia Inc.

Graphene, despite its one atom thickness and chicken wire structure, is extremely strong, perhaps the strongest material available today, and extremely conductive, which renders it ideal for use in countless applications from batteries to airframe composites and as cooling agents. Graphene has the potential to be used in applications representing all industrial sectors and its potential is seen as rivaling the role of silicon. However, unlike silicon, the new miracle material is not mass produced yet, because it remains prohibitively expensive. MesoGraf has now filled this gap, setting the stage for all the various graphene innovations to come to market. Grafoid recently set up a special research facility in Kingston, Ontario, that was inaugurated on August 20. , Grafoid will promote – and benefit from – academic research and development through partnerships with other industries and academia, contributing to the growth of its business and benefit from the mutual transfer and of technology between universities and industry. While Grafoid develops the Mesograp and other graphene materials, its partner Focus Graphite is edging ever closer to the production

stage at the Lac Knife project.

Epstein Interviews Don Baxter of Focus Graphite

✘ The following exclusive interview of Don Baxter, President & COO of **Focus Graphite** (TSXV: FMS | OTCQX: FCSMF), was conducted on August 18-20 by phone and email. Focus Graphite is a leading contender to be one of the first graphite producers into action. According to Mr. Baxter, Focus could be up and running in 2016. A takeaway from this comprehensive interview is that Mr. Baxter believes that global demand for graphite could be stronger than currently forecast. I happen to agree. With China's exports in decline and demand for select graphite applications that could surprise to the upside, graphite prices are likely to move higher. Please continue reading for more information on Focus Graphite and on the graphite sector.

Can you please tell us a little bit about Focus Graphite?

Founded in 2010, Quebec based **Focus Graphite** has an advanced, high purity natural flake graphite project called Lac Knife with a completed Feasibility Study and we are now moving forward to the EPCM level. That alone differentiates us from most peers. Our aim is to reset the standard for high quality graphite, becoming the frontrunner for the clean technology economy through an innovative mine-to-market strategy. Focus also has an off-take agreement for 50% and up to 100% of our production and other interested parties with agreements pending. We believe that Lac Knife's operating cost per tonne of concentrate will be in the lowest quartile at \$441/tonne.

Focus is one of only two companies who have successfully produced and tested, "battery ready" graphite. Therefore, I strongly feel that Focus has the most advanced project in North America.

Focus Graphite describes itself as having a vertically integrated, mine-to-market business model, please explain

Focus has the ability to retain virtually all of its run-of-mine concentrate for higher margin, higher value products. We have recently demonstrated that we can produce high purity spherical graphite with yields significantly higher than Chinese producers.

Can you tell us a little bit about your background and the technical team at Focus Graphite?

Since the question is on our technical team, I will only mention a few people, but I can assure you there are several more experts at our disposal. Focus has a true depth of technical expertise, not only in graphite mining and processing, but also in value added, secondary processing. As mentioned, we are one of only two companies who have successfully produced and tested "battery ready" graphite for use in Lithium-ion batteries. Focus can do this very cost effectively using an environmentally sustainable process. The economics of the project are strong, based on, "run-of-mine" concentrate. The tremendous upside potential from valued added graphite products, including "battery ready" graphite, are not yet included in these economics.

As for me, I am a P. Eng., hold a degree in Mining Engineering from Queen's University and am a Registered Professional Engineer and the company's Qualified Person under NI 43-101. I served as President of Northern Graphite Corporation between Feb. 2, 2011 and July 8, 2013, responsible for all technical aspects relating to their flagship Bissett Creek project, including the Bankable Feasibility Study, metallurgical test

work and environmental permitting. I also served as Mine Superintendent at the Kearney Graphite mine when it operated in the 1990s. And served as a Director of Mining at Ontario Graphite Ltd.

Dr. Doninger is the developer and co-developer of a number of U.S., European and Canadian patents related to carbon processing methodologies and processing equipment. As a chemical engineer, Dr. Doninger is the author and co-author of some two dozen technical papers and studies related to graphite composite anodes; carbon-based materials for electrochemical energy storage systems; advanced graphite for Lithium-ion batteries, among others. As a consulting engineer, Dr. Doninger served as President of Dontech Global, Inc. During his 17-year career with Superior Graphite Co., he held the posts of Senior Vice-President, Technology, Vice-President, Engineering and Product Commercialization, Vice-President, Manufacturing, and Vice-President, Technology.

George Hawley, Technical Adviser, specializing in the development and marketing of value-added products based on industrial minerals. Former R&D and Quality Assurance Chemist for Morgan Crucible Company, and has acted as consultant for Quinto and Northen Graphite Carbon.

When does the company expect to reach initial commercial production?

We are one of the most advanced development projects in North America, due to the favorable mining environment in Quebec, we believe we will reach production in 2016. Of course that is subject to project financing and obtaining required permits. However, we have the distinct advantage of already having an off-take partner for 50% or more of our annual production. Most peers need to find initial demand for their products, we don't. We are continuing discussions with other potential customers and associated off-take agreements.

Can you give readers the highlights of your Feasibility Study?

Sure. Let me remind readers that the Feasibility stage is significantly more advanced than a Preliminary Economic Assessment. Our study brings us to the stage now to start detailed engineering in preparation for construction. Just the headlines, 44,300 tonnes of concentrate per year, average selling price of \$1,713/tonne, operating costs per tonne of concentrate \$441/tonne. The key economic metrics are an initial capital cost of \$166 million, Net Present Value (NPV8%) of \$383 million and pre-tax IRR of 30.1%. To reiterate, at a greater level of accuracy than most of our peers, these metrics are highly competitive, especially the \$441/tonne of concentrate operating costs.

Please describe Focus Graphite's off-take agreement, the first of its kind at the time

Our first off-take agreement for up to 40,000 tonnes per year of graphite concentrate and value-added products from future production at Lac Knife, was signed with an industrial conglomerate comprised of heavy industry, manufacturing and technology companies located Dalian City, Liaoning Province, China.

How will you fund \$166 million in upfront cap-ex?

We are currently developing our project financing structure with interested institutions and are working on various options. We expect to complete the project financing in 2014 that will include straight debt, project level debt, equity, equipment financing, forward sales or supply chain financing to our off-take partner(s) or others. This includes possible investments by both strategic and financial partners. In addition there are numerous instances of the province of Quebec participating in project financing of mining projects. Many Canadian projects will require more than \$100 million of upfront capital, we think we are well positioned to achieve

are required funding.

Can you give us a snapshot of Focus Graphite's capital structure? Will you need to raise capital anytime soon?

Our capital structure is quite simple. We have zero debt. We have 107 million outstanding shares and 10 million options and warrants for a fully-diluted share count of 117 million. Based on today's share price, our market cap at the current price of 62 cents is 66.4 million.

Lac Knife has one of the highest known in situ grades at 15% Cg, and is near surface, are those the main reasons for the project's very low estimated operating costs?

Yes, a near-surface deposit is of paramount importance to a successful low cost mining project, the 15% Cg doesn't hurt either. Consider this— all else equal, a project with 5% Cg would need to mine, move and handle 3 times as much ore as our 15% Cg project. So, yes grade and depth are key attributes to our anticipated lowest quartile operating cost. Equally important to grade and depth is the fact that we have a proven economic mix of large, medium and fine flake that can be produced at very high carbon grade and that we are close to Hydro Quebec's electrical power lines to get electricity at C\$0.04-C\$0.05 per kWh. This is not only low cost power by Canadian standards, it's low cost on a global scale.

Located in northern Quebec, do you anticipate any infrastructure challenges?

Nothing out of the ordinary, we are surrounded by giant iron ore projects with ready access to rail, power, skilled labor and a port for export to the U.S., Europe and even Asia if warranted. We are 400 kilometers by rail to the port. Lac Knife will be a year-round operation. Some have asked about rail capacity, we're only shipping 44,300 tonnes of finished product vs. iron ore giants shipping millions of tonnes. Access to infrastructure is strong in Quebec, another reason

why it's a top mining jurisdiction in the world.

How about on the permitting front, is there still a lot to do there?

It's important to understand that work on Lac Knife has been going on for years. The most important permitting that still needs to be done is an Environmental Impact Assessment. We expect to submit that application in the fourth quarter of this year.

Roughly 80% of your resource is upgradable to 98%. What does that initial upgrade entail?

Yes, Focus has a tremendous competitive advantage in this regard. Being able to upgrade to a concentrate containing 98% Cg by simple floatation (or polishing) is hugely important and another key factor in our anticipated \$441/tonne cost. In addition, once at 98% Cg, the cost of continuous purification for upgrading to the 99.95%+ grade needed for lithium-ion batteries, is far less than peers that need to upgrade from 91-92% or 94%-96%.

Are there end uses for graphite that could really take off?

Graphite is a key material in the clean energy technology economy, which is being driven by increasing demand for products such as batteries for electric vehicles, energy storage, photovoltaics and consumer electronics from smartphones to laptops. I believe that energy storage for the burgeoning global renewables markets could surprise to the upside. It should be noted that growth in EVs and Hybrid vehicles could be even greater than pundits realize. Tesla is far from the only maker of EV and hybrids; there's the Chevy Volt, Nissan Leaf, 2 Toyota models and BMW has the i3 and i8 models. Our business model is designed to reflect not only what's going on in the burgeoning clean tech economy, but to be one step ahead.

How do you feel about annual production of 44,300 tonnes per year? Do you wish it were greater? If so, can you expand production?

Our current NI 43-101 Measured & Indicated compliant resource is 1.4 million in situ tonnes of graphite. That alone is enough for a 25 year mine. If we included our entire resource we could potentially have a 42 year mine life. Over time, if warranted, we will delineate more graphite and grow beyond 44,300 tonnes/year if the market demands it. We also have several exploration properties in Quebec that we are evaluating. Since the U.S. & EU governments named graphite a, "critical mineral" for industrial and national security reasons, attention on this mineral is high.

If the world needs 25 new 40k tonne graphite mines by 2020, where will all that supply come from?

I honestly don't know. China dominates the graphite market accounting for something like 76% of supply, but China's production for export is in decline. China has implemented a Value Added Tax and issued export licenses to only larger mining complexes. As I referred to earlier, between EV and Hybrid vehicles, demand could surprise to the upside. And, demand for wide-scale energy storage for renewables, most notably wind and solar, could be a wildcard as well. Therefore, I'm frequently quoted as saying that graphite prices will move higher in coming years. We have a slide on that in our corporate presentation.

Would you like to leave readers with some parting thoughts?

As an investment, Focus Graphite remains dramatically undervalued.

Grafoid joins global technology leaders at 'science park' in Kingston

✘ Focus Graphite (TSXV: FMS; OTCQX: FCSMF; FSE: FKC) is developing one of the most important graphite projects in North America at Lac Knife, Quebec. Focus has already signed a 10-year strategic agreement for up to 40,000 tons per year (400,000 ton total) of graphite concentrate with a Chinese-based industrial consortium located in the port city of Dalian, Lianing Province, China; one of the China's most important centers for trade and industry, and home to many of high-tech companies. Grafoid Inc. is Focus Graphite's graphene research and development partner, which has been cooperating with a number of companies worldwide to achieve a commercially viable graphene material.

It is not surprising, therefore, that Grafoid will join other Canadian and international (i.e. Thales, a major French aerospace and electronics conglomerate) advanced technology companies in setting up a research facility in Kingston, Ontario, to be inaugurated on August 20.

Why Kingston?

Kingston is the home of Queen's University, which runs the 'Innovation Park'. The Park is intended to promote and enhance internationally recognized research programs, and new research in scientific activities that will also benefit from the contribution of doctoral students and postdoctoral fellows. The Park is designed such as to encourage opportunities for collaboration and interdisciplinary initiatives, building support for research and improve the execution of the search for national and international stakeholders and partners at local and global levels. This should ideally lead to securing

funding and resources that will increase Grafoïd's capacity and collaborative support research. Having established a presence at what the Canadian Government describes as a 'science park', that is by definition a business based on a university property, Grafoïd will actually have the opportunity to promote – and benefit from – academic research and development through partnerships with other industries and academia, contributing to the growth of its business and encourage its development, benefiting from the mutual transfer and of technology between universities and industry. While Grafoïd develops the mesograf and other graphene materials, its partner Focus Graphite is edging ever closer to the production stage at the Lac Knife project.

Grafoïd is working with Altamat, a material specialist, to produce readily available 3D printing materials based on Grafoïd's proprietary 'MesoGraf' product, which consists of chemically treated graphite. The material has the highest tensile strength value ever calculated, boasting a structure that is comparable to that of diamonds. MesoGraf was developed by Dr. Loh Kian Ping and Grafoïd co-founder Dr. Gordon Chiu. The main difference between MesoGraf and all other attempts at developing a graphene material is that MesoGraf is finally able to offer the scalability that is needed to bring the material's potential to the market. A scalable graphene material implies that it can be made to address a large increase in users and applications without undue effort. Scalability has been the 'weak link' in graphene until now. MesoGraf will be derived using natural flake graphite ore from Focus's Lac Knife deposit in Quebec in a patented one-step process. Even this process is 'scalable' because, it can use any graphite ore with 10% or higher purity.

Improved metallurgical results from the Lac Knife Pilot Plant suggest that Focus Graphite has the potential to become one of the lowest-cost producers of graphite in the world, competitive – and appealing enough – even to Chinese end

users. Indeed, Focus recently announced recently an upgrade to their PEA, such that a more efficient metallurgical process as has allowed the Company to reduce operating cost to 458 dollars per ton, leaving ample margins for profit , considering that graphite is costing about USD\$ 1,600-1,800/ton to produce, which falls within the range of Chinese suppliers. On August 8, Focus Graphite presented the technical report for the feasibility study. This means that Focus has further de-risked the Lac Knife Project, allowing the Company to work and complete detailed engineering, project financing, working toward the approval process. Moreover, the feasibility study gives Focus access to further funding levels, being in an even better position to negotiate with potential partners and vendors to put together financing packages for the technical equipment. The company's goal is to reduce the initial investment and to expand the range of available financing options. One alternative project financing solution may include stocks and low interest loans, strengthening economic fundamentals for the Project.

Scandium – the Outlier Rare Earth

✘ When the Rare Earth boom was in full flight the universe was dictated to be the Lanthanide series plus Yttrium PLUS Scandium. This was generous of the promoters as Scandium was nowhere to be seen in their mineralisations so they were essentially giving a free plug for someone else's product. However it was a bit of safe bet as no-one we can recall was making any claims to having a Scandium resource. The metal was regarded as something that was produced "somewhere in Russia" and thus not something to easily wrap one's brain around let

along get one's hands on a deposit. With the global trade estimated to be around 100 pounds of pure metal per annum, it was not something to hold one's breathe over. Intriguingly though we have heard Scandium described as a "spice metal", which is a new one for us!

A Bit of Background: Scandium is a chemical element with symbol Sc and atomic number 21. A silvery-white metallic element, it has historically been sometimes classified as a rare earth element, together with yttrium and the lanthanoids. It was discovered in 1879 by spectral analysis of the minerals euxenite and gadolinite from Scandinavia, hence its name. In terms of earth's crust, Scandium is not particularly rare. Estimates vary from 18 to 25 ppm, which is comparable to the abundance of cobalt (20–30 ppm). Scandium is only the 50th most common element on earth (35th most abundant in the crust).

Usage: The main application of scandium by weight is in aluminium-scandium alloys for minor aerospace industry components. The positive effects of scandium on aluminium alloys were discovered in the 1970s. These alloys, composed of as little as 0.5% scandium, make a significant difference in strength. Scandium-stabilized zirconia enjoys a growing market demand for use as a high efficiency electrolyte in solid oxide fuel cells.

One area that intrigues us is the Sc₂O₃ that is used annually in the United States to make high-intensity discharge lamps. Scandium iodide, along with sodium iodide, when added to a modified form of mercury-vapor lamp, produces a form of metal halide lamp. This lamp is a white light source with high color rendering index that sufficiently resembles sunlight to allow good color-reproduction with TV cameras. About 80 kg of scandium is used in metal halide lamps/light bulbs globally per year. This would seem to be an application where a greater, more reliable supply of the metal might result in a significant expansion in usage, particularly into more

household applications. We could also see potential in sports arena lighting.

Scandium also has uses in sports equipment, guns and dental inputs. Some of its applications can be substituted with Titanium.

Production: Scandium is distributed sparsely and occurs in trace amounts in many minerals. Rare minerals from Scandinavia and Madagascar such as thortveitite, euxenite, and gadolinite are the only known concentrated sources of this element. Thortveitite can contain up to 45% of scandium in the form of scandium oxide.

Scandium is present in most of the deposits of rare earth and uranium compounds, but it is extracted from these ores in only a few mines worldwide. Because of the low availability and the difficulties in the preparation of metallic scandium, which was first achieved in 1937, it took until the 1970s before applications for scandium were developed.

World production of scandium is in the order of two tonnes per year in the form of scandium oxide. The primary production is 400 kg while the rest is from stockpiles of Russia generated during the Cold War. These stockpiles are bound to be exhausted within the foreseeable future, and alternative sources are therefore likely to be needed.

In 2003, only three mines produced scandium:

1. the uranium and iron mines in Zhovti Vody in Ukraine
2. the rare earth mines in Bayan Obo, China
3. the apatite mines in the Kola peninsula, Russia

In each case, scandium was a byproduct from the extraction of other elements. It should be noted that the Kola peninsula mines were the main source of product for Molycorp's Silmet facility in Estonia and also that these mines are now in terminal decline (if not already shuttered).

Prices: The current price of the metal is somewhat murky (like

so many of the minor specialty metals) with indications that its trades at around US\$3,700 per kg.

Some Names to Conjure with –

Focus Metals (TSXV: FMS, OTCQX: FCSMF) has a substantial stake (40%) in Grafoid Inc., which recently announced it was acquiring ALCERECO Inc., which is involved in advanced composite materials, alloys and coatings focused on the development, testing and production of advanced materials. Grafoid purchased ALCERECO in exchange for 250,000 common shares of Grafoid for CAD\$1,250,000.

Based in Kingston, Ontario, ALCERECO has a global customer base in aerospace, automotive, electronics, sporting goods, infrastructural and mining sectors. It is involved in the development of aluminum-scandium alloys, specialty ceramics, rare earths and advanced composite materials. Its facility includes a five-ton foundry, casting, rolling, a wide range of development laboratories, and analytical equipment for the development of prototype production.

Recently EMC Metals (TSX: EMC) was brought to our attention as a Scandium play. It had been the owner until September of last year of the Springer Tungsten mine and other assets in Nevada which it vended away to American Bullion Royalty Corp. Now its theme is as a specialty metals mining group with its operational focus is on scandium project holdings, specifically the Nyngan Scandium project in Australia and the Tordal Scandium project in Norway. However, EMC is not the only way to play Nyngan because it's an earn-in from Jervois Minerals (ASX: JRV).

The Nyngan scandium resource is located approximately 500 kilometers northwest of Sydney, Australia. It has in its time been trawled over by such substantial (now disappeared) players as Selection Trust, North Broken Hill and Anaconda. The property consists of two exploration licenses encompassing

over 9,000 hectares, and is accessible via a 25 km sealed road from the local town of Nyngan.

The deposit is large and the grades are fantastic. Nyngan might be described as the "Bayan Obo of Scandium". The JORC-compliant resource estimate at Nyngan consists of a Measured Resource of 2,718,000 tonnes at 274 ppm Sc and an Indicated Resource of 9,294,000 tonnes at 258ppm Sc. Preliminary mine plans are musing about a CapEx of under US\$100M and an OpEx of under US\$1,000/kg (overall recoveries of >80%). This would produce around 15-30 tpa of Scandium with a product grade based on customer need (97-99.9%). The company hopes to make the plant scalable upwards.

The licenses, the mineral rights and the surface rights are controlled by Jervois Mining until final payments are made by EMC as per the 2013 settlement agreement. The terms of the settlement require EMC to pay Jervois AUD\$2.6M cash over 18 months, for a 100% position in the Nyngan project, including the land and mineral license rights. The first of those two cash payments have been made, with the second AUD\$1.4M payment due in June 2014. In production, EMC must additionally pay Jervois a 1.7% NSR on scandium produced, for 12 years from first production. Jervois is one to keep an eye on also in case EMC cannot make the final payment and the asset reverts to Jervois.

Then there is Metallica Minerals (ASX: MLM) which holds the SCONI Project located in North Queensland, approximately 250km roads from Townsville. This consists of a number of scandium-rich lateritic deposits. The three main deposits in the southern area of SCONI are Greenvale, Lucknow and Kokomo.

Metallica Minerals completed a Pre-Feasibility Study in early 2013 to produce over 50 tpa of high-purity scandium oxide over a 20-year mine-life. The resource on the deposit consists of a Measured Resource of 539 tonnes of Scandium Metal, an Indicated Resource of 2,560 tonnes and an Inferred Resource of

728 tonnes. This is equivalent, in total, to 5,741 tonnes of Scandium Oxide.


The PFS demonstrated that SCONI Phase 1 to be technically and operationally viable with positive economics. Metallica planned to move into the Definitive Feasibility Study but due to tough market conditions in late 2013 and early 2014 the DFS has been deferred until appropriate funding is in place.

In both the cases of Metallica and EMC, to get the ducks to line up the companies will need to find an offtaker and frankly we suspect they will need to downsize (right-size as Jack Lifton would say) the production to fit to global demand. In both cases the companies are talking of annual production equal to or greater than global demand so they could easily sink the price of the metal in the absence of new applications. Then again they might prove to be a stimulus for higher usage considering that supply has been so tough to secure in recent years in guaranteed quantities.

Conclusion: The absence of reliable, secure, stable and long term production has limited commercial applications of scandium. Despite this low level of use, scandium offers significant benefits. The potential for substantial expansion in usage and demand clearly exists and to an extent it is one of those “rare” metals stories where the supply could potentially generate the demand rather than the other way around.

Focus Graphite proves they

can deliver Tesla-grade graphite

Tesla Motors, the electric car manufacturer Tesla is  planning a massive expansion of its production and wants to build its very own USD \$5 billion dollars battery factory. Tesla expects such demand as to not be able to rely on current availability. Tesla is scoping four possible States to build the so-called 'battery gigafactory': Nevada, Arizona, New Mexico and Texas. The factory should be productive by 2017 in time to launch the new Tesla economy model and will be using exclusively North-American resources. This is not because Tesla is patriotic; it may well be, but the Company is managed to succeed in business not nationalism. Rather, Tesla wants to stress the environmental process and therefore reduce the pollution deriving from distance and transportation that will be required if the materials are sourced beyond the North American continent. Sourcing the right kind of graphite will be one of Tesla's main sourcing challenges. There are no current producers of battery grade flake graphite in North America; however, Focus Graphite is an example of a graphite company moving from exploration to production in North America while offering a superior quality mineral. Focus Graphite ('Focus', TSXV: FMS | OTCQX: FCSMF | FRANKFURT: FKC) meets all the requirements to become a supplier to Tesla's planned battery Gigafactory. In a recent test, Focus announced that it has managed to produce very high-performing coated Lac-Knife spherical graphite (SPG) for lithium ion batteries. Lac Knife SPG coin battery tests evaluate three proprietary formulations that responded very well to CR2016 coin cell performance testing. The test provides a 'model' of for the graphite electrodes used in Li-ion batteries. The cells are made using the graphite and a simulation is designed to test the impact of uniaxial pressure on the galvanostatic charge/discharge limitation and path dependence of the electrode in the coin

cell, predicting its behavior in commercial cells/batteries.

Focus said its passed the tests, exceeding the benchmark performance targets of current commercial grades by significant percentages. Indeed, the tests have confirmed Focus' potential to deliver the most suitable lithium ion battery anode grade graphite matching Tesla's specifications. The SPG grade graphite developed by Focus has also overcome the frequent problem of how to increase cycling capacity. Graphite, like other carbon based materials in Li Ion batteries, leaves a Solid Electrolyte Interface ("SEI") layer "which produces an irreversible capacity loss (ICL) which generally ranges between 5 and 10% for benchmark SPG grades currently available in the market place". ICL translates to capacity loss and waste, reducing efficiency and taking away from Tesla's pursuit of efficiency to meet its ambitious environmental goals. Focus' battery grade graphite showed a capacity loss of 365.08 Amperes/hour (AH) per kilo or an extremely low irreversible capacity loss of 1.01%

The Li-ion batteries used by Tesla cars are one of the components that make electric cars so much more expensive than internal combustion ones. In order to make electric cars more affordable for the masses, Tesla's planned facility, which will employ over 6,000 people, will produce more lithium -ion batteries than all the battery factories in the world put together. Tesla, meanwhile, plans to go from selling 22,500 cars to 500,000 cars in the next few years. Tesla's current flagship, the Model-S, sells for over USD 90,000. Graphite is the essential material for battery production and batteries are the products slated for the highest demand growth in the area of "green" technologies. More significantly, where Focus is concerned, Li-ion batteries use 10 times more graphite than lithium. The market for electric cars is growing annually by 20% and Tesla Model S needs about 96kg of graphite for its batteries boosting demand at an almost exponential rate.

In 2013, Focus Graphite issued a very favorable economic

assessment, underpinning the robust and economic viability of its Lac Knife project with a projected mine construction cost of CAD\$ 126 million – 20 % of which represents a buffer to absorb possible surprises during construction. Based on a conservative sales price of USD \$ 1,886/ton and an annual production of 44,200 tons, the annual operating profit could be around 52 million CAD. The cost of construction could be paid back within 2.8 years after taxes. Focus plans to publish a final feasibility study to confirm the figures from the PEA in the next few months. Production in Quebec is expected to start in the Q3 2016; the processing plant should be ready by the end of 2015.