



# CANADA CARBON INC

V-CCB

## COMPANY SUMMARY

Project:	Miller
Location:	80 km west of Montreal, QC
Ownership:	100 %
Commodity:	Graphite
Status:	Exploration
Resource:	N/A
Catalysts:	Exploration results, pilot-plant scale metallurgical results

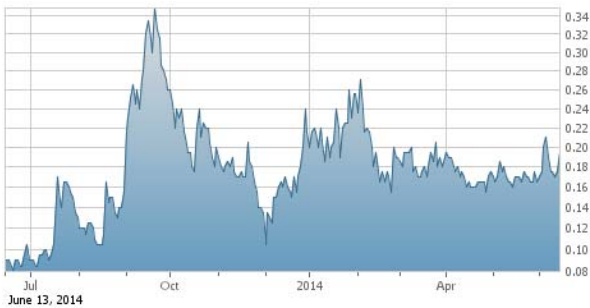
## MARKET DATA

Price:	\$0.19
Market Cap:	\$14.5 MM
Common Shares:	76.3 MM
Fully Diluted:	107.5 MM
52 Wk Range:	\$0.37 - 0.09
30 Day Avg Vol:	407,450



## TOP HOLDERS

AlphaNorth Offshore, Inc	15.74 %
Duncan, Robert Bruce	4.46 %



Source: Stockhouse

## Rock Talk: Bruce Duncan, CEO Discusses Hydrothermal Graphite

**Secutor Capital recently interviewed Canada Carbon's CEO, Bruce Duncan.** Mr. Duncan discusses common misconceptions and trends in the graphite space, as well as the advantages of hydrothermal lump vein (HLV) graphite. Canada Carbon is currently advancing its Miller HLV graphite project, which is capable of achieving up to 100% purity by flotation alone.

**SCMC:** What is Canada Carbon's strategy for the next 12 months? What milestones are you aiming to achieve?

**BD:** Canada Carbon has a very large land package, surrounding the historic Miller graphite mine. We will be actively exploring the property throughout the summer, using ground geophysics (graphite is an excellent conductor, so it responds well to electromagnetic stimuli), confirmatory stripping and trenching (the veins are exposed in bedrock), and subsequently, drilling to determine depth and strike extensions of confirmed graphite discoveries.

The Government of Quebec authorized Canada Carbon to remove up to 480 tonnes of material for metallurgical testing and processing. SGS Canada Inc. (Lakefield, ON) has recently completed a bench-scale flotation optimization program, so we are now ready to scale up to a pilot-plant scale flotation test program. This will provide us with a substantial quantity of hydrothermal graphite concentrate, which will be made available for end-user testing. The material will also be made available for sale.

**SCMC:** Graphite is still a relatively new commodity for investors. What do you think are some of the common misconceptions for the space?

**BD:** There are two main differences between graphite and other commodities. First, unlike gold or iron, as examples, graphite does not trade transparently. Pricing is not determined and tracked by public markets. Graphite is sold privately, so actual prices for the material

can only be estimated. Second, and again comparing graphite to gold and iron, as examples, every graphite producer's material will have certain unique defining characteristics, which include its overall purity and the precise profile of the actual contaminants present. For some applications, the impurity profile is not of great importance, but for others, it is critical. Gold is gold, no matter where it came from, but the same is not true of graphite.

**SCMC: Does hydrothermal vein graphite offer any advantages over flake graphite?**

**BD:** Yes, and these advantages could be very significant. Flake graphite forms from organic sediments trapped in sedimentary rocks, which have later been exposed to heat and pressure. Under these conditions, some of the impurities in the organics can cook out, providing the conditions for the remaining carbon to crystallize into flakes. Flakes form along the original layered beds of the sediments. Other impurities, which did not bake out of the sediments, can be trapped inside the flakes of graphite as they form. These impurities can be very difficult to remove, because the graphite surrounding them is resistant to acids, bases, and heat.

Hydrothermal graphite forms from a water-based solution. Crystals of graphite only come out of solution when conditions of temperature and pressure cause the solution to become saturated with carbon. The impurities will tend to remain in solution, allowing much purer graphite to form than is possible for flake graphite. This purity difference alone sets hydrothermal graphite apart from flake graphite. Additionally, hydrothermal graphite also forms in discrete deposits containing much higher grade ore that are clearly visible to the naked eye. You can mine a lot less rock to obtain the same yield, when comparing hydrothermal to flake graphite.

**SCMC: Can you give a brief overview of the graphite market? Is supply and demand relatively in balance?**

**BD:** In recent months, China, the world's major supplier of graphite, has been imposing restrictions on graphite miners, due to environmental concerns. It is expected that its graphite exports might fall by 20-40%. At the same time, applications such as electric vehicles (e.g. Tesla), are expected to be driving up demand. If the projections hold true, this should be a good time to advance a graphite exploration project towards production. However, one project, Syrah Resources' Balama deposit in Mozambique, is projected to have annual production on a scale rivalling all of China's exports. Because of other credits from the same ore, they will also have very low costs, compared to other flake producers. This project is a wild-card in the supply/demand projections for flake graphite. None of these variables should affect markets for the Miller HLV graphite.



**SCMC:** Miller is a hydrothermal lump vein (HLV) graphite project. Given that this is a niche market, in terms of overall graphite demand, what market is Canada Carbon targeting? What are the conventional uses of HLV?

**BD:** *HLV graphite is more highly crystalline than flake graphite. Its electrical and thermal conduction properties tend to be closer to the theoretical limits of what is possible than flake graphite. HLV also tends to be denser, and less porous, than flake graphite. Additionally HLV graphite tends to be very pure. All of these criteria make it a candidate for nuclear and military applications, high-performance Li-ion batteries, and various electronic devices.*

**SCMC:** Canada Carbon recently announced that it can achieve up to 100% graphite purity by flotation alone. Can you explain the significance of the recent results and how they might impact the overall economics of the project?

**BD:** *All graphite milling begins with flotation concentration. This process removes the bulk of the waste material to produce a graphite concentrate, which typically then goes on to receive further processing to remove some of the remaining impurities. This can include hydrometallurgical processing (treatments involving harsh chemicals such as caustic soda, or strong acids), heat treatment (baking for extended periods at very high temperatures), or both. There are substantial environmental concerns and input costs associated with both approaches. Canada Carbon's high-purity flotation concentrate will not require any of those expensive post-treatments to prepare it for sale.*

**SCMC:** Canada Carbon intends to target the \$13 billion synthetic graphite market. However, can natural graphite be easily substituted into synthetic applications?

**BD:** *Synthetic graphite can be manufactured to emphasize certain chemical or physical properties, but often that occurs at the expense of other properties. Synthetic graphite also requires high-purity inputs (e.g. needle coke, binding resins), and expensive processing equipment with high energy consumption. These criteria lead to significant costs, which leads to market prices well above those of natural flake graphite. But end-users are willing to pay that premium, because synthetic graphite can have high purity and high crystallinity, as well as application-specific properties engineered into it.*

*Canada Carbon's HLV graphite has a significant competitive advantage, in that it is inherently of high purity and high crystallinity. Our costs are expected to be very low, when compared with synthetic graphite materials. We are working with a number of potential end-users to determine the performance characteristics of our HLV graphite, in a variety of applications. We have also made arrangements with academic and government researchers to further expand our understanding of its properties, and suitable applications for it. It may even be possible that new applications are developed, because of the HLV graphite characteristics.*



**SCMC:** Your presentation mentions a number of applications for graphite, including electronics, fuel cells, solar panels, and lithium ion batteries. From what I've read, only flake graphite can be used in these applications. Can Canada Carbon participate in these markets?

**BD:** *It is a little too early to define specific applications for HLV graphite, but we are proceeding with the necessary tests to determine the highest and best use for it.*

*Lithium-ion battery anodes do use a significant amount of graphite, but it is not quite true that flake graphite is the only suitable form of graphite that can be used in this application. It is a very competitive commercial space, and companies producing these batteries use proprietary techniques, but it is quite clear that synthetic graphite, and heavily processed amorphous and vein graphite are also used, often blended with flake graphite materials. In fact, flake graphite requires substantial processing to make it suitable for this application.*

*For any natural graphite, the larger particles tend to have higher purities. The flotation concentrate is generally sorted by particle size, which serves as a crude discriminant of the grade as well. For most flake producers, it is their large (approximately 200 micron and above) or jumbo (+300 micron) flake fraction which has the best grades. But those particles cannot be packed densely together, which is required for an efficient anode. Typically, a graphite powder with an average particle size of about 20 microns is specified by the end-user.*

*To accomplish this, the flakes need to be chopped up (called micronizing), sorted by particle size once more (called classification), and then rounded off in a further milling step, yielding what is called spherical graphite. Often, immediately following the chopping step, the graphite is leached with strong acid, to remove some of the internal impurities exposed by the chopping of the particles into smaller pieces. The "dirty" acid arising from the impurities leaching from the graphite is a significant environmental risk, and is one of the contributors to the decline in production from China. The environmental damage was excessive, and the government closed a number of operations altogether, as a result.*

*In order to convert flake graphite to a form (i.e. spherical graphite) suitable for lithium-ion electrode applications, the highest quality fraction(s) of the mill output are heavily processed, not only at significant added expense, but also with relatively low yields. The processing also damages the crystal structure of the particles. Li-ion anode performance is dependent on the precise crystal structure of graphite, so any reduction in crystallinity due to processing is detrimental.*

*Canada Carbon's HLV graphite begins with a higher crystallinity, and will require minimal processing to produce the desired particle sizes. We will soon begin the process of determining how HLV graphite performs in lithium-ion cells.*



**SCMC:** There is a lot of excitement about graphene. Is graphene a consequential market for graphite, or is it still too young of an industry?

**BD:** At present, the largest market in the graphene sector is researchers and developers buying and selling to each other. However, with billions of dollars of research being conducted on graphene worldwide, the market for graphene-based products could develop rapidly.

*In preliminary laboratory work, our HLV graphite spontaneously exfoliated in a common industrial solvent. Given the high crystallinity and high purity of HLV graphite, this observed quality was a very positive outcome, as it could suggest that a graphene product could easily be produced. Our research partners are investigating the potential.*

**SCMC:** Canada Carbon's graphite has exceeded the purity threshold for Nuclear Grade. What is the significance of this achievement?

**BD:** This is probably one of the most significant findings, so far. By international agreements arising from the Nuclear Non-Proliferation Treaty, nuclear grade graphite is defined by purity criteria, and is restricted in international trade. Nuclear grade graphite could be diverted to be used in nuclear bombs, or for other military applications such as missile nosecones, or rocket motor nozzles, so international trade in it is strictly monitored and controlled. Canada Carbon has met with numerous Canadian government agencies, to ensure that we are in full compliance with all applicable legislation.

*We have learned that the vast majority of what is defined as nuclear grade graphite is sold for and used in non-nuclear applications, because of its purity.*

*In October, 2013, Canada Carbon publicly disclosed that our HLV graphite had exceeded the nuclear purity threshold. Of particular note, though, is that the sample being tested had not been optimized in any way. We subsequently reported that, following brief thermal treatment, 99.9978% purity had been achieved, which is substantially purer than the nuclear grade threshold.*

**SCMC:** Your presentation mentions that you have numerous confidentiality agreements signed. Have you gotten any feedback from any potential customers?

**BD:** Yes we have. We are receiving requests now for larger sample sizes for third party testing. We continue to receive cold calls from entities around the world, who recognize the significance of our unprecedented purity results.



**SCMC:** What is your current cash position?

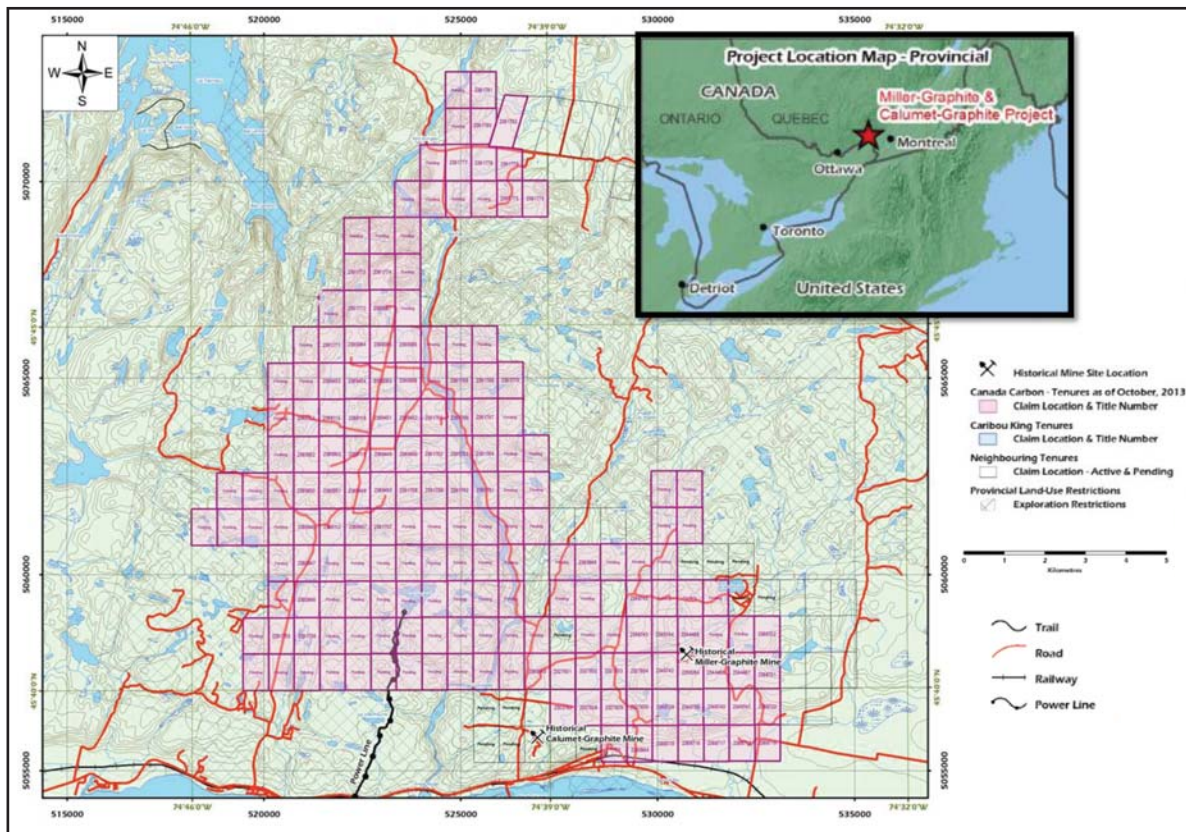
**BD:** We currently have approximately \$900k in the treasury.

**SCMC:** In closing, is there anything that you would like to add?

**BD:** So far, we have been talking about our HLV graphite, and what differentiates it in the marketplace. Canada Carbon has the great fortune to have excellent supportive infrastructure at the Miller site. The property is served by year-round roads, and is within a few kilometres of a large community, where all services are readily available. We're also on a main highway connecting Ottawa and Montreal. Electrical lines and railway cross the property. We have secured the support and services offered by Uniroc, a quarry operator with facilities less than 2 km from the property. They can provide us with heavy equipment/operators, portable crushing services, and transportation logistics, at favourable rates. An exploration drilling operator is also nearby. Our exploration costs are about as low as they could possibly be.

**SCMC:** Thanks Bruce.

**Map of the Miller Graphite Property**



Source: Company Filings



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