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Francisco Batista Speaks Out on Brazil



Stock photo of the rainy season in Brazil

a) Energy: The rainy season came earlier, thus the reservoirs are way above average levels for this time of the year. Historically this time of year is usually the lowest. Forecasts are very positive for the entire rainy season which officially starts in late November, so the market is already pricing this over-offer of low cost energy and forward prices are very depressed. 2023 is now being traded at R$ 100/MWh ($20/MWh) with a downtrend trend. Adding the grid fees to that, the final cost of energy for commodity producers adds up to an average value of R$ 200/MWh ($40/MWh). This is for 2023 only, as 2024 will depend on another rainy season (2023-24) which is impossible to predict as of now.

b) Macroeconomics: The Brazilian Central Bank has indicated that the interest rate hikes are over and current level (13.75%) will remain in place until 1Q23 when a sequence of 50 bps decreases are expected. That's because inflation came negative in the last 3 months and the trend is now of stabilization in general prices. The overall outlook continues to be positive for the 2022 GDP (+2.7%) but 2023+ scenario is dependent on the outcome of the presidential elections and the impact of global recession on Brazil. On the positive side, Brazil seems to be perfectly positioned for the global challenges of the near future because of its very efficient hard and soft commodities industries plus the fact that the energy scenario has improved almost miraculously making Brazil arguably the lowest cost energy country in the world right now.

c) Commodities: news about increases in output are coming from everywhere in the hard commodity industries. Silicon and Manganese based alloys along with steel and aluminum are the biggest winners and the ones announcing the most relevant investments in new production sites. As global logistics start to return to normal these procedures are being able to meet the demand coming from those countries more affected by the constraints in China and the war in Ukraine. These industries are positively soaring right now.

d) General Elections 2022: Lula was elected president of Brazil in the runoff on Oct. 30th but with a much smaller margin than most polls predicted (50.9% against 49.1% for Bolsonaro). The new congress profile is now majority center-right/conservative. Allied to an extremely polarized society and the hard right willingness to follow closely every move of the new administration, indicates that Lula will have a very hard time implementing a truly progressive agenda that his party and supporters have been pontificating about. In economic terms, it is still too early to make any forecast as Lula has not named a single new secretary to his cabinet. All eyes are on the federal fiscal aspect because if Lula is to attend every promise made to allied parties, entities and interests who supported him during his campaign, the fiscal deficit for 2023 would more than double compared to 2022; fueling inflation (now on downtrend) and forcing the Brazilian Central Bank to start a new cycle of interest rate hikes impacting 2023 GDP very negatively. On the other hand, if Lula falls too short on his promises, he will rapidly lose support and his political capital forcing him to adopt a populist approach, which is also a very dangerous scenario for the country. On top of that, the highly probable economic recessions in US and Europe next year combined to a drop on Chinese demand (due to constant lockdowns) for Brazilian soft commodities will certainly not help Brazilian economy.

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The Stark Reality of Doing Business in Ukraine



Zaporozhabrasiv (ZAC) plant in Ukraine.

In issues #92, #93, and #94, ***SiC & More*** provided updates from Zaporozhabrasiv (ZAC) with emphasis on the struggle of doing business in the middle of a war zone.

In issue #94, ZAC's International Sales Director Kyryl Shapovalov told ***SiC & More***, "I can say that today we have enough electricity to produce both SiC and BFA though the price of kWh also increased a lot." Trying to do business under the conditions that currently exist in Ukraine are reflected in the following comments from Shapovalov, "We protect our energy system from terrorist attacks. Some parts of the power system were fired upon five or six and even seven times on different days. In general, shelling took place in almost all regions with few exceptions. The aggressor is trying to stop our power system. However, we remain optimistic and continue to work. ZAC keeps producing both BFA and SiC for our customers."

Shapovalov continued, "Thanks to ENTSO-E, the energy system in Ukraine can receive emergency assistance of up to 500 MW. The problem with energy imports is that European electricity prices are higher than Ukrainian indicators. During January through September of current year, the average price of electricity in the day-ahead market segment was 34% higher than in the same period las year."

Despite the menacing situation that employees at ZAC face each day, the company's commitment to their employees and customers has not wavered. Nevertheless, the threat is real. As told to ***SiC & More***, "Unfortunately civilians and personnel of power system facilities die from the shellings."

SiC & More will remain in contact with ZAC management to provide readers with information regarding the Ukrainian struggle and ZAC's commitment to remaining a viable business supplying valued added products to its customers while sitting in the middle of a war zone.

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UGLY DUCKLING GRAPHITE JUNIOR PACING TOWARDS BECOMING A SWAN

By Paul Harris

Elon Musk said in July that refining lithium is a "license to print money" and the price performance of lithium this year is proving him correct. Lithium is one of a suite of four key battery metals and while much has been said about nickel and cobalt, graphite is the ugly duckling of the battery metals quartet, frequently overlooked despite it being as critical to a lithium-ion battery as lithium. Graphite is the primary material used for the anode in a lithium-ion battery as it is highly stable, resulting in batteries which last a long time. While other materials can store more energy, none can match graphite's stability. By weight, graphite represents 20-30% of the battery with a hybrid EV using around 22 pounds of graphite, while a fully electric EV uses around 220 pounds.

To be sure, graphite is a less well-known commodity than nickel and cobalt, in part because there are fewer projects around the world and partly because jumps in lithium, nickel and cobalt pricing cast a shadow over it. Graphite has never been "hot" in the market in the way the other battery metals have. Graphite is also more akin to lithium in that it is an industrial mineral or specialty chemical, which has a very different market dynamic to those the metals enjoy, less plug-and-play and more supplier qualification. But unlike lithium, it is a mineral whose supply really is dominated by China and therefore presents a strategic vulnerability for the development of a North American battery and electric vehicle market. China supplies about 700,000t of a 1.1Mt graphite market, according to the USGS.

The scramble to secure lithium supply has seen a number of junior explorers being acquired by Asian battery companies such as Millennial Lithium (US$400M deal, 51% premium) and Neo Lithium (C$960M deal, 36% premium) in 2021. S&P Global reported earlier this year that Geopolitical fears, soaring prices spur lithium M&A frenzy in China.

Graphite One (TSXV:GPH) is potentially a big winner having just announced a prefeasibility study (PFS) for its Graphite One project in Graphite Creek, Alaska with an after-tax net present value of US$1.4 billion and an internal rate of return of 22% following a $1.2 billion initial capital cost. The PFS features a parallel strategy to simultaneously develop a commercial scale battery anode materials manufacturing facility in Washington State. It aims to produce about 49,600 tonnes per year (TPY) of anode materials, 7,400tpy purified graphite products and 18,000tpy of unpurified graphite products. The PFS showed an after-tax net present value of $1.4 billion and an internal rate of return of 22% following a $1.2 billion initial capital cost.

What is likely to move the needle for the company and investors is the recently enacted US Inflation Reduction Act and other legislation which will improve project economics and provide alternative funding mechanisms.

The Inflation Reduction Act enacted in August gives a 10% tax credit to US producers of anode materials against the costs incurred for the production of anode materials and a 10% tax credit against the costs incurred for production of graphite purified to a minimum purity of 99.9% graphitic carbon by mass. Graphite One's production is expected to qualify under the Act for tax credits in both categories and will be reflected in the feasibility study economics due in early 2024.

"This could get very interesting moving forward and I think we will be able to show that in our feasibility study. We have some pretty strong, robust economics before the accounting for tax credits and we expect these to increase dramatically. We are going to be focused on that through the feasibility and then into production," Graphite One president, CEO and founder Anthony Huston told ***SiC & More.***

Even before getting into production, Biden administration initiatives are likely to ease the company's advancement towards feasibility and into development, making grants available to promote the development of critical minerals projects. The grants under the Inflation Reduction Act are for a minimum $50 million and the recipient then has six months to secure a similar additional amount. "The government has stepped up

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and created grants of July of this year for companies like ourselves to help create the domestic [battery metals] supply chain, which will allow us to partner with potential end users," said Huston.

Title III under the Defense Production Act of 1950 also includes provisions for energy and minerals "essential for the national defense" including grants towards the cost of feasibility studies and permitting in the US.

Recent months have seen automotive companies such as Ford and GM signing deals with minerals and metals development companies to secure the battery metals they need. Recent deals include Ford signing an offtake agreement for lithium carbonate from Ioneer's Rhyolite Ridge project in Nevada in July, Tesla signing with Talon Metals regarding the Tamarack nickel-copper-cobalt project in Minnesota in June and General Motors signing a multi-year cobalt sourcing deal with Glencore in April. In August, both Volkswagen and Mercedes signed agreements with the government of Canada to help source battery metals.

The rise of battery metals is something Huston, a tech entrepreneur, has seen coming for years, having obtained the Graphite Creek concessions shortly after Elon Musk took Tesla public. "I followed Musk for years while he was at Paypal and when he went to Tesla I thought about what he was doing. I found the [Graphite Creek] project searching on Google, which had been held by one family for 140 years. We did a deal on a handshake and in January 2012 the deal was completed," said Huston.

The US currently produces no graphite and is completely import dependent but Graphite One aims to change that by producing a graphite concentrate in Alsaka and shipping it to Washington state to a processing facility it will develop. The World Bank estimates that that about 4.5 million metric tons of graphite will need to be produced annually by 2050 to keep up with demand in the energy sector, which is almost 500% more than 2018 levels. In 2020, the US imported 41,000t of natural graphite, a quantity Graphite One could more than supply.

While copper development projects like Artic (Trilogy Metals NYSE American:TMQ) and Pebble (Northern Dynasty NYSE American:NAK) have run into federal permitting issues, Graphite Creek is on state land and a state permitting regime. "I do see the political landscape wanting to create a US domestic supply chain and have it take less time than in the past [to pass through permitting]. I think you are going to see some parts of permitting get streamlined, taking out some of the bureaucracy so we do not find ourselves relying on countries that are not our allies," said Huston.

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Brown Fused Aluminum Oxide

Prices on BFA ordered from China have dropped by about 10% since issue #94. A trader told SiC & More, "Don't expect a freefall in BFA prices from China because domestic demand is way down. Several large BFA producers have already significantly scaled back production. Between issues related to COVID, environmental pressure, and lower steel production, the BFA industry is a bit upside down."

As with SiC, end-use markets around the world are unlikely to see any price decreases until well into 2023. As mentioned in issue #94 of ***SiC & More,*** "The most expensive material in recent history will be arriving in the U.S. and European ports during mid to late August." Considering the supply chain issues of late 2021 and most of 2022, the majority of processors are sitting on excess inventory and that high-priced material is going to take them well into 2023.

A trader told ***SiC & More*** in an interview for issue #94 that should resonate with most readers. "I expect to see some softening in Chinese FOB pricing as we progress through summer and into autumn. Beyond that, however, I will be keeping an eye on China's steel industry. I believe China's steel capacity utilization will have a profound effect on BFA supply and demand and pricing as we enter Q4 and another New Year."

In issue #96, ***SiC & More*** will report on BFA capacity utilization by Chinese province complimented by estimated energy costs.



Brown fused aluminum oxide furnace.

JLR & Wolfspeed Announce Strategic Partnership

Jaguar Land Rover and Wolfspeed have announced a strategic partnership for the supply of silicon carbide semiconductors. The technology is expected to increase powertrain efficiency and range for JLR's next-generation electric cars from 2024.

The partnership with Wolfspeed now announced builds on the existing cooperation with the Jaguar TCS Racing team, he said. Silicon carbide technology is already being used in Formula E, according to JLR, "where it provides greater efficiency and higher performance on the race track."

The newly struck agreement will see Jaguar Land Rover participate in the Wolfspeed Assurance of Supply Program, which is designed to secure the supply of the technology for future electric vehicle production needs. JLR sees access to silicon carbide semiconductors as an essential part of the electrification of next-generation Range Rover, Discovery, Defender and Jaguar vehicles.

Wolfspeed's technology encompasses all electric drive systems – across the entire voltage spectrum from 400 to 800 volts. The silicon carbide semiconductors for the inverters are manufactured at Wolfspeed's Mohawk Valley Fab in Marcy, New York. The production facility opened in April 2022. The fully automated facility expands Wolfspeed's production capacity to meet the growing demand for electric vehicles and other advanced technologies around the world. General Motors is also among Wolfspeed's customers. The US automaker uses Wolfspeed's silicon carbide components in the integrated power electronics of its Ultium Drive units – for both 400 and 800 volts.

"We are not strangers having collaborated together with the Jaguar TCS Racing team for the last five seasons," said Thierry Bolloré, CEO of Jaguar Land Rover, adding: "By developing that into a strategic partnership as part of our Reimagine strategy, we can integrate Wolfspeed's advanced Silicon Carbide technology into our next generation electric vehicles, delivering extended range and performance capabilities for our clients."

jaguarlandrover.com

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NEWS FROM NHQ IN VIETNAM



Raymond mill at NHQ's processing station in Vietnam.

SiC & More last visited with New He Qiao Shareholding Company (NHQ) in March of 2022. At that time, NHQ had planned to produce 40,000 metric tons of SiC during the 2022 calendar year with a separation of 50% metallurgical grade and 50% #1 SiC. During our recent exchange with NHQ management, ***SiC & More*** learned that the NHQ furnace plant will indeed produce 40,000 m/t in 2022 but with 55% being #1 grade and 45% metallurgical.

During early 2023, NHQ still intends to upgrade their second transformer line with a 110KVA transformer. Although this improvement would shut down SiC production off that line for two months, after the upgrade production would increase to as much as 50,000 m/t per year. In addition to the tonnage upgrade, the ratio of #1 to metallurgical grade would be 62% to 38% respectively.

Arguably, the key ingredient to an efficient and profitable SiC furnace plant is the cost of kWh. During 2022, the power costs for NHQ remained competitive with typical rates of about 5 cents per kWh. It was reported in issue #92, that during peak hours, kWh pricing could be as high as 8 cents, however, when benchmarking NHQ electricity costs against the rest of the world's producers, they enjoy one of the better rates. It is expected that the government will increase the cost of kWh by 10% during 2023 to offset the higher prices for coal.

It was also reported, "We have upgraded the pier, which is used for loading barges for some domestic customers and our export barges and for discharging anthracite and quartz from Malaysia. The embankment has also been rebuilt."

Like virtually all of the world's SiC furnace plants, NHQ faces environmental issues. NHQ is meeting the environmental challenge head-on by dedicating capital expenditure money to protecting the environment. As told to ***SiC & More***, "NHQ is spending millions of dollars to hire a construction company to install a de-dusting system in the workshop and re-installing the roof and outer walls to enclose the plant."

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DIGGING THROUGH THE ARCHIVES



Archeological dig. Stock photo

No doubt, it's an adventure locating old documents in your library and the process can often be enlightening. This is the fifteenth segment from the dusty but irreplaceable ***SiC & More*** archives. Most of the previous segments have been related to abrasive and refractory topics. The literature that has been pulled from the archives makes it apparent that the evolution of the business often goes unnoticed. These segments are also great reminders of the many years of tedious research done by those that came before us in this astonishing industry. The following excerpt does not bear the name of the author.

Continued from issue #94:

Property facts about Silicon Carbide:

♦Hardness: Silicon carbide was the first material entering the range of hardness between corundum and diamond or between 9 and 10 Mohs' hardness scale. With the advent of other hard material not occurring in nature, such as boron carbide, it has become increasingly important to investigate the degrees of hardness between corundum and diamond. The Knoop diamond indentation method, where the indenter is pyramidal in shape, has been used successfully for this purpose. F. Knoop and his co-workers obtained the following values for relative hardness: fused alumina 1635; silicon carbide 2000; boron carbide 2230; and diamond 8000-8500. Other workers have somewhat modified these figures, but the relationship remains about the same. Another test which has proved suitable for hardness measuring is the abrasion test.

♦Chemical Properties: Silicon carbide is quite stable chemically. The only violent reason recorded occurs when it is heated with a mixture of potassium dichromate and lead chromate. It is stable to acids, not reacting with fuming nitric acid, nor with boiling sulfuric, hydrochloric or hydrofluoric acid. Most of its reaction take place at relatively high temperatures. Sodium silicate attacks it above 1300 degrees C, calcium and magnesium oxides attack it above 1000 degrees C, and copper oxide reacts with it at 800 degrees C to form the metal silicide. It oxidizes slowly in air above 1000 degrees C and in oxyhydrogen blast. Fused lead chromate will oxidize it, but slowly. It decomposes in fused alkalis such as potassium or sodium carbonate chloride and carbon. This reaction is of importance commercially as a starting point for the silicone series. Silicon carbide disassociates in molten iron and the silicon reacts with the metal oxides in the melt. This reaction is of use in the metallurgy of iron and steel.

♦Chemical Analysis: A method for the analysis of silicon carbide is described by the U.S. National Bureau of Standards in connection with the preparation of its standard sample.

A weighed quantity of crystals is fused with a mixture of potassium nitrite and sodium carbonate in a platinum crucible lined with sodium carbonate. The fusion is dissolved in water, acidulated, and evaporated and the silica is recovered and determined in the usual manner of high silica materials.

Total carbon is determined by ignition preferably at 1200 degrees C in a combustion apparatus with Pb304, and the carbon dioxide is collected in an absorption bulb. Ignition is continued for 45 minutes. The increase in weight of the bub gives the amount of CO2 and this is multiplied by .2729 gives the amount of total carbon. To determine the amount of combined carbon, the free carbon is next determined and this amount is subtracted from the figure for total carbon. To determine free carbon, a sample is ignited in oxygen at 900-915 degrees for 15 minutes. This is below the temperature at which the silicon carbide will disassociate and no Pb304 accelerator is added so that only free carbon is removed. The CO2 coming off is again collected in the absorption bulb and the amount of carbon is determined and the silicon carbide content is calculated.

Common impurities tested for include, iron, aluminum, calcium, magnesium, titanium, zirconium, free carbon and silicon. Spectrochemical analysis may show trace quantities of other elements originating from impurities in the raw materials used.

Issue #96 will be with Electrical Resistance.

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Global SiC Pricing Softens

In issue #92 of ***SiC & More***, a trader commented, "Generally, what goes up must come down. Many producers of commodities are suffering from bizarre costs and finding it impossible to operate their factories. When kWh prices are this high, operating at off-peak hours is the only avenue for survival. I cannot fathom this continuing into 2023, but I would have never imagined this is where we would be in 2022."

In issue #94, ***SiC & More*** pointed out that global prices had softened a bit. Over the past few months, prices have continued to slowly erode. When one compares the prices on tenders from March/April of 2022 to quotes from China during early November, there has been about a 20% drop in prices. However, the most expensive SiC in history is still sitting in warehouses across the globe. This begs the question, why are prices dropping?

One trader commented, the exchange rate of the yuan to the dollar has had a lot to do with softer Chinese commodity prices." In other words, the weaker exchange rate makes China's exports less expensive.

Besides currency exchange, demand for SiC in China remains soft. A trader said, "Chinese domestic demand for refractory and metallurgical grade SiC is down." That equates to supply outpacing demand, which also lowers prices.

A SiC producer commented, "The industry is reducing stocks, because they expect reduced demand and also expect better prices in short to mid-term." In this case, the sense of urgency has left the building creating less demand.

Another changing dynamic is the cost of kWh. A producer said, "Electricity has been at better levels as expected. Cannot say cheap prices but it has allowed us to produce stocks at relatively low prices." The energy variable is the one that can most dramatically affect the price to produce a ton of SiC. By a lower price for kWh, this producer is paying twice as much for energy as compared to 18 months ago but only 1/3 of what it cost 3-4 months ago.

The cost of ocean freight from China to North America and Europe has also softened a bit.

However, when it comes to FOB China prices on most any commodity, the Chinese suppliers will use the winter, environmental issues, and the Chinese New Year as reasons to increase prices. A trader told ***SiC & More***, "This will take place in late January and into February. However, with processors across the world currently sitting on excess inventory and already geared up for winter, I don't expect any effort to increase prices in February to be successful."

As we move forward, one can expect FOB China prices to continue to slowly soften with most of the world's producers following suit. A processor in North America commented, "End-use market prices for abrasive, refractory, and metallurgical SiC won't see price reductions during Q4 2022 and will only see them in Q1 2023 if processors get nervous holding high-priced inventory with demand being soft and interest rates continuing to climb. Many of us are sitting on the most expensive SiC units in history. Prices in the respective end-use markets will drop but I don't believe it will be over the short term. Look for some price erosion as we work our way through 2023."

Overall, what went up is, in fact, coming down. That can be said for virtually any commodity at this point.

In issue #96, ***SiC & More*** will publish estimates on crude SiC production costs with emphasis on kWh pricing.

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VISITING WITH CUMI'S MANAGING DIRECTOR



Pictured above is CUMI grinding wheel production in India.

We last sat down with Ananthaseshan Narayanan (Ananth) for issue #93 of ***SiC & More*** when Ananth provided a pragmatic global snapshot of business conditions. ***SiC & More*** recently had the pleasure of once again visiting with Ananth to get an update on Carborundum Universal Limited (CUMI) activities.

The year began on a sombre note in the shadow of the Ukraine-Russia conflict that has had a global impact. The war had spill-over effects not only to neighbouring countries but across world in terms of all-time high inflation, availability of critical materials, supply chain disruptions, forex rate fluctuations, higher cost of capital and currently, fear of recession across economies.

Volzhsky Abrasives Works (VAW), Russia displayed remarkable resilience, delivering on Silicon Carbide volumes, and taking on the challenge of establishing new legal routes to ship material outside Russia. Although sales volume to Europe has decreased a bit due to demand side challenges, VAW managed to sell more within domestic market. There has been little impact on operations and the installed capacities are being utilized at same level as it was before the war. Other mineral businesses including Indian operations which manufactures a full range of fused aluminas and Foskor Zirconia (Pty) Limited, South Africa the producer of monoclinic and stabilised zirconias are also on a growth path and taking advantage of the China plus one trend and the disturbances in the Chinese supply chain caused by the persistent covid occurrences.

Since, CUMI is much more than just a minerals company, other business including Abrasives, Ceramics and Refractories have been pursuing growth ambitions. The performance in abrasives segment has been impacted by the slowdown in key markets due to inflationary pressures and availability of critical raw materials, which was compensated by strong performance in Ceramics supported by strong trends in electric mobility, alternative energy, and green hydrogen and also, increased demand of refractories in steel, glass and carbon black industries.

CUMI has been expanding its footprint across geographies through inorganic growth opportunities in abrasives and materials for thermal storage solutions and these businesses are in the process of being integrated into the CUMI system. Apart from strengthening and improving its core businesses, CUMI is working towards addressing future trends and emerging areas like high purity silicon carbide for semiconductors, graphene, synthetic graphite, ceramics for electric vehicles, energy storage solutions in cold chain logistics, building cooling and thermal protection for EV batteries.

CUMI is part of the 120-year-old Murugappa Group, one of India's leading business conglomerates. CUMI started as an Abrasives company in 1954. With value chain integration, CUMI has expanded its portfolio to become a Mines to Market Company with integrated operations including mining, power generation, fusion, manufacturing, marketing, and distribution. CUMI operates as a global player – a global vision that preserves the local ethos. Whether in India or around the world, long-standing relationships and networks have enabled CUMI to become what it is today – a leading materials science engineering company.



CUMI high purity SiC for growing single crystals for the hi-tech industry.

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More News from Leonardo Cuimbaba & Sublime in South Africa



Pictured above is the final layer of raw material being loaded on a Sublime furnace using a sophisticated rotating loading conveyor.

Leonardo Curimbaba has kept ***SiC & More*** updated regarding the restart of Sublime's #1 transformer group. During May in issue #93, Leonardo said, "Furnace #1 will resume by the end of June, beginning of July. The idea is to start it right away."

The unit was restarted in July just a few weeks later than the original project estimate. According to Leonardo, "The optimal conditions were not achieved due mainly to the problems with Eskom." Nevertheless, from afar, the restart went amazingly well and that is not always the case when it comes to SiC furnace plants.

Leonardo commented, "The major problem that Sublime encounters is the availability of electricity. For several weeks all South Africa has been subject to load shedding for individuals and load curtailment for companies. This resulted in reductions in the availability of electrical power involving a more complex production management. This is the reason we were not able to operate the furnace in optimal conditions."

The electricity hurdles facing Sublime might not be a worldwide issue, but they are certainly a problem for the majority of the world's SiC furnace plants. Leonardo added, "There are days in the month that Eskom's coal based thermoelectric power plants are operating at less than 50% of capacity."

Regarding other Curimbaba activities, the company is seeing a softening in demand in the fused oxide market for Q4 2022. According to Leonardo, "Both domestic and overseas demand has dropped. Mainly in Europe. Most of our customers had too much inventory and are adjusting it. Freight also continues to be a big problem. Although there have been freight cost reductions, rates remain much higher than historical values."

Contrary to what is happening in South Africa and what occurred in Brazil during recent droughts, Leonardo said, "Brazil does not face electricity supply problems. For high electricity consumers, long term contract rates can vary from US$30 to US$60/MWh."

Silicon Carbide & More

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