PyroGenesis Announces Successful Third-Party Validation of Fumed Silica from Lab-Scale Production

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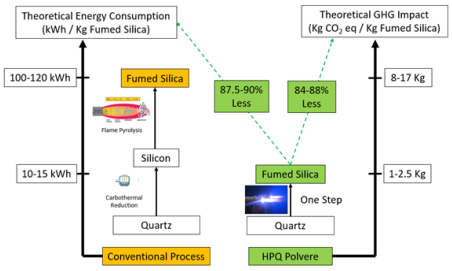
Company Continues Development of Pilot Plant for Unique Chemical-Free Process that Aims to Produce Fumed Silica with Significant Energy Savings and Carbon Emissions Reduction

MONTREAL, Nov. 09, 2023 (GLOBE NEWSWIRE) -- PyroGenesis Canada Inc. (http://pyrogenesis.com) (TSX: PYR) (NASDAQ: PYR) (FRA: 8PY), a high-tech company (the "Company" or "PyroGenesis") that designs, develops, manufactures and commercializes advanced plasma processes and sustainable solutions which are geared to reduce greenhouse gases (GHG) and address environmental pollutants, is pleased to confirm, further to HPQ Silicon Inc's ("HPQ" or the "Client") press release dated November 8, 2023 and the Company's news release dated October 3, 2023, that an independent structural and chemical analysis of fumed silica, produced in conjunction with HPQ Silica Polvere Inc. ("HPQ Polvere"), a wholly owned subsidiary of HPQ, has been successfully performed.

Figure 1



Benefits of HPQ FSR vs Conventional Processes

Separately, the Company announces that production of the fumed silica pilot plant is underway, which is intended to be in operation in Q2 of 2024.

The Fumed Silica Reactor ("FSR"), a plasma-based process, converts quartz into fumed silica (also known as Pyrogenic Silica) in a single and eco-friendly step. By eliminating the use of harmful chemicals generated by conventional methods the groundbreaking FSR approach, if successful, will help contribute to the repatriation of silica production to North America.

In collaboration with HPQ Polvere, PyroGenesis confirms that a third-party laboratory at McGill University has validated the commercial quality of the material, highlighting its (i) hydrophilic nature, (ii) high surface area of 135-185 m^2/g, and (iii) thickening efficiency characteristics, all of which are pivotal for its commercial applications. The detailed characteristics resulting from the tests can be found in the Technical Data Sheet generated by McGill University (refer to HPQ's press release for more information).

In addition to this analysis, the latest testing on the material produced with the FSR has demonstrated that HPQ's proprietary FSR technology as developed by PyroGenesis not only addresses the increasing market demand but also offers substantial benefits in terms of **energy efficiency** and **reduced environmental impact**. The test results indicate an expected reduction in energy consumption for the production of fumed silica using FSR. Theoretical estimates suggest a notable reduction in energy consumption ranging from 87.5% to 90% compared to conventional processes while CO_2 eq. emissions can be reduced by 84% to 88% compared to conventional processes.

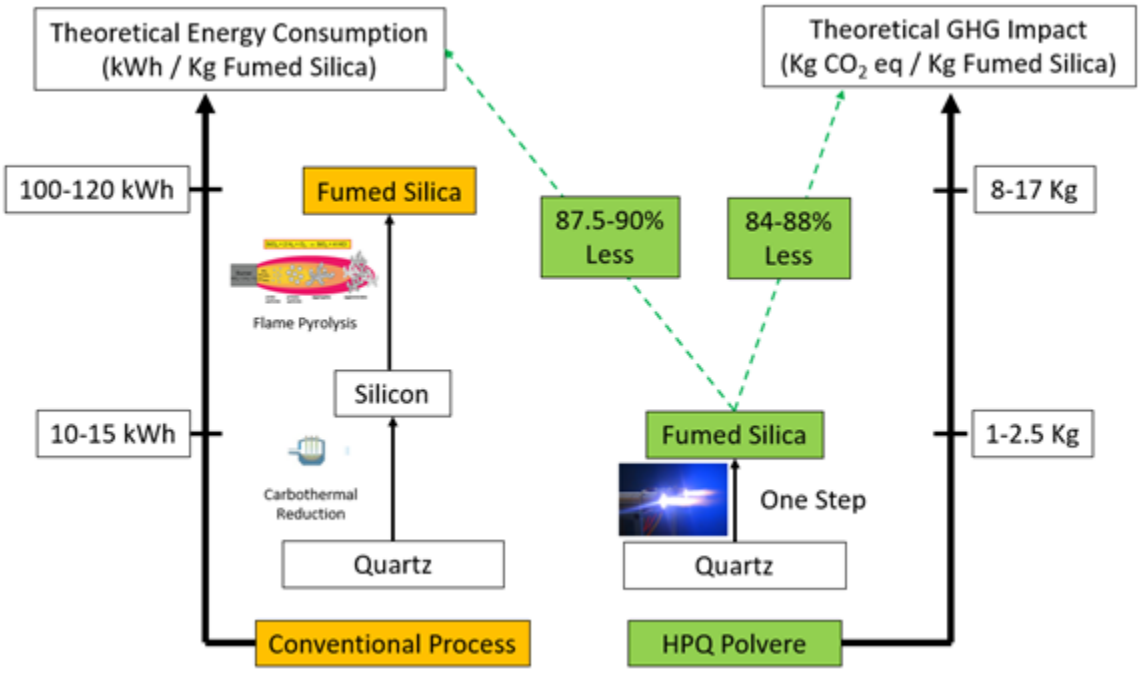


Figure 1 - Benefits of HPQ FSR vs Conventional Processes

"This latest development underscores, once again, the advantages of the fumed silica reactor we have developed for HPQ Polvere and aligns

perfectly with our commitment to environmental responsibility," said Mr. P. Peter Pascali, CEO and President of PyroGenesis. "PyroGenesis continues to contribute to sustainable solutions that reduce greenhouse gas emissions and environmental pollutants. We have now moved towards the long-awaited next phase: a pilot plant scheduled to start operations in the second quarter of 2024, as previously anticipated. The technology developed by PyroGenesis for HPQ Polvere offers significant economic advantages over conventional manufacturers. Its unique capability not only improves profitability, but also reduces the environmental footprint associated with fumed silica production, thus contributing to greenhouse gas emissions reduction and enabling the industry to move towards a more sustainable and environmentally friendly future – all key criteria that we feel will be of great interest to the parties who have already requested samples under NDA with HPQ. As a reminder, as part of the terms on the FSR projects, PyroGenesis benefits from a royalty payment representing 10% of the Client's eventual sales, with set minimums. This royalty stream, can, at any time, be converted by PyroGenesis into a 50% ownership in HPQ Remaining Equity Stake in HPQ Polvere."

In the FSR project, PyroGenesis is the exclusive supplier of a technology capable of using quartz (SiO_2) as a raw material to produce commercial-grade fumed silica, in a single step.

PyroGenesis' involvement in developing fumed silica from quartz is part of PyroGenesis' three-tiered solution ecosystem that aligns with economic drivers that are key to global heavy industry. High-purity silicon is part of PyroGenesis' Commodity Security & Optimization tier, where the recovery of viable metals and the optimization of production to increase output helps to maximize raw materials and improve the availability of critical minerals. Silicon has been identified as a critical mineral by many governments worldwide.

About PyroGenesis Canada Inc.

PyroGenesis Canada Inc., a high-tech company, is a proud leader in the design, development, manufacture and commercialization of advanced plasma processes and sustainable solutions which reduce greenhouse gases and are economically attractive alternatives to conventional "dirty" processes. PyroGenesis has created proprietary, patented and advanced plasma technologies that are being vetted and adopted by multiple multibillion dollar industry leaders in four massive markets: iron ore pelletization, aluminum, waste management, and additive manufacturing. With a team of experienced engineers, scientists and technicians working out of its Montreal office, and its 3,800 m^2 and 2,940 m^2 manufacturing facilities, PyroGenesis maintains its competitive advantage by remaining at the forefront of technology development and commercialization. The operations are ISO 9001:2015 and AS9100D certified, having been ISO certified since 1997. For more information, please visit: www.pyrogenesis.com.

Cautionary and Forward-Looking Statements

This press release contains "forward-looking information" and "forward-looking statements" (collectively, "forward-looking statements") within the meaning of applicable securities laws. In some cases, but not necessarily in all cases, forward-looking statements can be identified by the use of forward-looking terminology such as "plans", "targets", "expects" or "does not expect", "is expected", "an opportunity exists", "is positioned", "estimates", "intends", "assumes", "anticipates" or "does not anticipate" or "believes", or variations of such words and phrases or state that certain actions, events or results "may", "could", "would", "might", "will" or "will be taken", "occur" or "be achieved". In addition, any statements that refer to expectations, projections or other characterizations of future events or circumstances contain forward-looking statements. Forward-looking statements are not historical facts, nor guarantees or assurances of future performance but instead represent management's current beliefs, expectations, estimates and projections regarding future events and operating performance.

Forward-looking statements are necessarily based on a number of opinions, assumptions and estimates that, while considered reasonable by the Company as of the date of this release, are subject to inherent uncertainties, risks and changes in circumstances that may differ materially from those contemplated by the forward-looking statements. Important factors that could cause actual results to differ, possibly materially, from those indicated by the forward-looking statements include, but are not limited to, the risk factors identified under "Risk Factors" in the Company's latest annual information form, and in other periodic filings that the Company has made and may make in the future with the securities commissions or similar regulatory authorities, all of which are available under the Company's profile on SEDAR+ at www.sedarplus.ca, or at www.sec.gov. These factors are not intended to represent a complete list of the factors that could affect the Company. However, such risk factors should be considered carefully. There can be no assurance that such estimates and assumptions will prove to be correct. You should not place undue reliance on forward-looking statements, which speak only as of the date of this release. The Company undertakes no obligation to publicly update or revise any forward-looking statement, except as required by applicable securities laws.

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