

## PyroGenesis Announces Successful Operational Testing of the PUREVAP™ QRR Pilot Plant for HPQ Silicon Inc

November 8, 2022

### System Proven at Maximum Temperature; Quartz Processing to High Purity Silicon Can Now Begin

MONTREAL, Nov. 08, 2022 (GLOBE NEWSWIRE) -- PyroGenesis Canada Inc. (<http://pyrogenesis.com>) (TSX: PYR) (NASDAQ: PYR) (FRA: 8PY), a high-tech company (hereinafter referred to as the "Company" or "PyroGenesis"), that designs, develops, manufactures and commercializes advanced plasma processes and sustainable solutions to reduce greenhouse gases (GHG) and address environmental pollutants, is pleased to confirm, that, [further to HPQ Silicon Resources Inc's \("HPQ" or the "Client"\) press release of earlier today](#), and further to the Company's [news release on October 6, 2022](#), the Company has successfully completed the high-temperature operational testing phase of the Gen3 PUREVAP™ Quartz Reduction Reactor (QRR) pilot plant (the "Gen3 PUREVAP™ Pilot Plant" or the "Pilot Plant").

The GEN3 PUREVAP™ QRR pilot plant, the first state-of-the-art prototype of its kind, includes multiple systems that must operate at extremely high temperatures, under vacuum, and under harsh conditions.

An operational test phase, which consisted of a series of optimization and repeatability tests of the production process, were conducted over the past several weeks. Specifically, the system was operated at increasingly higher temperatures (> 2000 °C), with each test examining the impact on a carbon liner substance within the reactor. In simple terms, if during the test the carbon liner substance was combusted and eliminated, a faulty test had occurred, as the system was not maintaining vacuum – due to oxygen entering the internal atmosphere and causing a "burn" of the material – or the various reactor components were not functioning correctly. However, if the carbon liner substance remained intact after testing, despite the ultra-high temperatures, the internal atmosphere was correct, the vacuum maintained, and the reactor performed as desired. The Company is pleased to announce that the carbon liner substance remained intact, signifying that the system performed beyond expectations. This test included a final continuous operational period of 72 hours at high power.

Based on these results, reactants can now be introduced into the pilot plant for the purpose of creating high purity silicon test & sample batches for distribution to potential buyers.

"Advancing the PUREVAP™ project to this stage has been one of the great achievements of the Company. From initial idea to lab tests, to design and build, and now with the successful operational testing of the pilot plant, our efforts to introduce plasma technology to the high-purity silicon industry is yet another example of how we are putting our scientific and engineering expertise to use in solving some of heavy industry's most pressing issues," said Mr. P. Peter Pascali, CEO and Chair of PyroGenesis. "As we have stated before, we firmly believe that the PUREVAP™ process will prove to be a game changer in the production of a metal as strategically important to future energy goals as silicon. We are proud to be on this journey together with HPQ."

The PUREVAP™ process is an innovative process that will enable the one-step conversion of quartz (SiQ) into high-purity silicon (Si) at reduced costs, energy input and carbon footprint that will propagate its considerable renewable energy potential. As part of the terms of the contract with HPQ, PyroGenesis benefits from a royalty payment representing 10% of the Client's sales, with set minimums.

### About HPQ Silicon

[HPQ Silicon Inc. \(TSX-V: HPO\)](#) is a Quebec-based innovative silicon solutions company that offers innovative silica (SiO<sub>2</sub>), silicon (Si) based solutions and is developing a unique portfolio of high value-added silicon (Si) products sought after by battery and electric vehicle manufacturers.

Silicon (Si), also known as silicon metal, is one of today's key strategic materials needed for the decarbonization of the economy and the Renewable Energy Revolution ("RER"). However, silicon does not exist in its pure state and must be extracted from quartz (SiO<sub>2</sub>) in what has historically been a capital and energy-intensive process.

With [PyroGenesis Canada Inc. \(TSX: PYR\) \(NASDAQ: PYR\)](#), HPQ is developing:

1. the **PUREVAP™ "Quartz Reduction Reactors" (QRR)** an innovative process (patent pending), which will permit the one-step transformation of quartz (SiO<sub>2</sub>) into high purity silicon (Si) at reduced costs, energy input, and carbon footprint that will propagate its considerable renewable energy potential.
2. Through its 100% owned subsidiary, HPQ NANO Silicon Powders Inc., the **PUREVAP™ Nano Silicon Reactor (NSiR)** is a new proprietary process that can use material produced by the QRR as feedstock, to make a wide range of nano/micro spherical powders of different sizes and nanowires.
3. Through its second 100% owned subsidiary, HPQ Silica POLVERE Inc., HPQ is developing a new plasma-based process that will allow a direct Quartz to Fumed silica transformation, removing the usage of hazardous chemical in the making of

Figure 1



Picture of PyroGenesis' Gen3 PUREVAP™ Quartz Reduction Reactor (QRR) pilot plant

Figure 2



Plasma Arc (>2000C) in Reactor

Fumed silica and eliminating the Hydrogen Chloride Gas (HCl) associated with its manufacturing.

#### **About PyroGenesis Canada Inc.**

PyroGenesis Canada Inc., a high-tech company, is a leader in the design, development, manufacture and commercialization of advanced plasma processes and sustainable solutions which reduce greenhouse gases (GHG) 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<sup>2</sup> and 2,940 m<sup>2</sup> 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](http://www.pyrogenesis.com).

*This press release contains certain forward-looking statements, including, without limitation, statements containing the words "may", "plan", "will", "estimate", "continue", "anticipate", "intend", "expect", "in the process" and other similar expressions which constitute "forward-looking information" within the meaning of applicable securities laws. Forward-looking statements reflect the Company's current expectation and assumptions and are subject to a number of risks and uncertainties that could cause actual results to differ materially from those anticipated. These forward-looking statements involve risks and uncertainties including, but not limited to, our expectations regarding the acceptance of our products by the market, our strategy to develop new products and enhance the capabilities of existing products, our strategy with respect to research and development, the impact of competitive products and pricing, new product development, and uncertainties related to the regulatory approval process. Such statements reflect the current views of the Company with respect to future events and are subject to certain risks and uncertainties and other risks detailed from time-to-time in the Company's ongoing filings with the securities regulatory authorities, which filings can be found at [www.sedar.com](http://www.sedar.com), or at [www.sec.gov](http://www.sec.gov). Actual results, events, and performance may differ materially. Readers are cautioned not to place undue reliance on these forward-looking statements. The Company undertakes no obligation to publicly update or revise any forward-looking statements either as a result of new information, future events or otherwise, except as required by applicable securities laws. Neither the Toronto Stock Exchange, its Regulation Services Provider (as that term is defined in the policies of the Toronto Stock Exchange) nor the NASDAQ Stock Market, LLC accepts responsibility for the adequacy or accuracy of this press release.*

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