



Pre-Commissioning of Fumed Silica Reactor Pilot Plant Underway

Montreal, Canada, June 5th, 2024 — [HPQ Silicon Inc.](#) ("HPQ" or the "Company") ([TSX-V: HPQ](#)) ([OTCQB: HPQFF](#)) ([FRA: O08](#)), a technology company specializing in the green engineering of silica and silicon-based materials, is pleased to announce that its subsidiary, HPQ Silicon Polvere, has achieved another milestone in the commercialization pathway of its Fumed Silica Reactor (FSR) technology. The Company would like to update shareholders on these developments.

The Company technology provider [PyroGenesis Canada Inc.](#) ([TSX: PYR](#)) ([OTCQX: PYRGF](#)) ([FRA: 8PY](#)) ("PyroGenesis") has informed HPQ that HPQ Silica Polvere Inc.'s ("HPQ Polvere") 50 tonnes per year (TPY) FSR Pilot plant has begun pre-commissioning work, and all is progressing as expected for a Q3 FSR start.

COMMERCIAL VALIDATION OF THE FUMED SILICA REACTOR PROCESS

Initially, the system will operate using a batch protocol to produce fumed silica material with targeted specific surface areas ranging from 150 to 200 m²/g, similar to what we've achieved at the lab scale. The system will then transition to semi-continuous operations to produce 5m³ (200kg) of commercial-grade fumed silica.

In the next phase, the pilot plant operations will be optimized to focus on producing food/pharma-grade fumed silica material with specific surface areas exceeding 300 m²/g.

"The materials produced will be sent to several potential clients under nondisclosure agreements (NDA) for qualification," said Bernard Tourillon, President and CEO of HPQ Silicon and HPQ Silica Polvere. *"These potential clients, who have expressed keen interest in our material, could become strategic partners in our journey. We aim to negotiate offtake agreements for our low-carbon fumed silica material with them, potentially covering both the material produced by HPQ Polvere's inaugural 1,000 TPY commercial-scale plant and the material produced by the pilot system."*

This strategic approach ensures an early supply of our product, with the pilot system running at full capacity, operating multiple production cycles throughout the day. Assuming 20 hours of operation per day, the system could produce approximately 161 kg/day, equivalent to about 50,000 kg/year (50 TPY).

UPDATING HPQ POLVERE TECHNICAL AND ECONOMIC STUDY

The process improvements mentioned in HPQ's [April 11, 2024](#), release, and the conversion of the royalty discussed in our [May 30, 2024](#), release, are positively impacting the economic potential of the project, in an industry where EBITDA margins for traditional Fumed Silica manufacturers average only around 20% ^[1].

"Considering this new data, we believe it important to update investors on the changes to the project potential of the FSR since our [January 10, 2024](#), release," Added Mr. Tourillon.

To update the internal economic study, HPQ Polvere management and PyroGenesis revised the rough order of magnitude study regarding the cost of building and operating a commercial FSR plant (1,000 TPY) capable of producing Fumed Silica with specific surface areas ranging from 150 – 300 m²/g, using selling prices for the material from information derived from third party sources and publicly available data.

The salient points of the revised rough order of magnitude study indicate that the HPQ Polvere Fumed Silica Reactor will have:

- Capex around the US\$ 10^[2] per Kg of annual capacity versus the US\$ 146 per Kg of annual capacity for traditional producer, reducing the capital cost to enter the Fumed Silica market by about 93%^[3].
- Energy consumptions between 10 – 15 KWh per Kg of Fumed Silica produced^[4] versus 100 – 120 KWh per Kg of Fumed Silica produced by traditional producer^[5], reducing the energy consumption by about 90%.
- Revised EBITDA margins associated with making material with a surface area of 150 m²/g now at between 72% and 80%^[6].
 - Between 3.6 to 4 times higher than traditional producer margins,
 - Payback period per 1K TPY FSR making 150 m²/g material between 2.7 and 2.5 years.
- Revised EBITDA margins associated with making material with a surface area of 200 m²/g now at between 83% and 88%^[6].
 - Between 4.2 to 4.4 times higher than traditional producer margins,
 - Payback period per 1K TPY FSR making 200 m²/g material between 1.5 and 1.4 years.
- Revised EBITDA margins associated with making material with a surface area of 300 m²/g now at between 85% and 90%^[6].
 - Between 4.25 to 4.5 times higher than traditional producer margins,
 - Payback period per 1K TPY FSR making 300 m²/g material between 1.16 and 1.11 years.
- Green House Gas emissions associated with making Fumed Silica with the FSR estimated at between 1 – 2.5 Kg of CO² per Kg of Fumed Silica^[7] versus 8 – 17 Kg of CO² per Kg of Fumed Silica for traditional producer^[5].
 - Green House Gas reduction between 84% to 88% versus traditional producer,
 - Potential European Carbon advantage between 630€ to 1,350€ per tonne sold^[8].

“The Fumed Silica Reactor technology as the potential to change Fumed Silica manufacturing for the better and HPQ Silica is uniquely positioned to be the sole provider capable of supplying the materials required to meet the increasing demand for low carbon Fumed Silica products,” added Mr. Tourillon. *“This demand is anticipated to necessitate the deployment of numerous 1,000 TPY Fumed Silica Reactors in the future.”*

HPQ Polvere management plans to update and further validate these projections when more data is collected from an upcoming pilot plant testing phase later in the year. This will be achieved with the completion of an engineering cost and feasibility study that will be conducted by an independent party at the appropriate time.

REFERENCE SOURCES

- [1] Average EBITDA margins of 20% are derived from two sources, [with Link #1 leading to Source #1](#) and [Link #2 leading to Source #2 \(Specialty Additives division\)](#).
- [2] According to PyroGenesis, the equipment supplier, the rough order of magnitude cost for 1K Fumed Silica Reactor is estimated at about CAD\$13 million, which equals an average Capex per kilogram of annual capacity of US\$10.00.
- [3] Traditional Fumed Silica manufacturing involves a complex three-step process. Step 1: Conversion of Quartz to Silicon Metal (Si), with an average Capex of around US\$9.38 per kilogram of annual capacity ([for reference, the PCC BakkiSilicon Plant in Iceland cost US\\$300 million for an annual capacity of 32,000 tonnes](#)). Step 2: Conversion of Si to Silicon Tetrachloride (SiCl₄), with an average Capex of approximately US\$125.00 per kilogram of annual capacity (e.g., [Wacker](#)

[Chemie AG Polysilicon's US production plant cost US\\$2.5 billion for an annual capacity of 20,000 tonnes](#)). Step 3: Burning Silicon Tetrachloride (SiCl_4) with Hydrogen and Oxygen to produce Fumed Silica (SiO_2), incurring an average Capex of around US\$11.54 per kilogram of annual capacity ([Wacker Chemie AG's US Fumed Silica plant cost US\\$150 million for an annual capacity of 20,000 tonnes](#)). The combined Capex for these three steps averages at US\$145.92 per kilogram of annual capacity, which is approximately 93% more than with the FSR processes.

- [4] PyroGenesis Canada Inc.
- [5] Frischknecht, Rolf, et al. "Life cycle inventories and life cycle assessment of photovoltaic systems." International Energy Agency (IEA) PVPS Task 12 (2020).
- [6] Management has calculated the EBITDA margins for the Fumed Silica Reactor (FSR) based on data derived from third party sources and publicly available information for material with specific surface areas ranging from 150 – 300 m^2/g . These figures will be updated upon completion of the ongoing pilot testing phase through the year. The ranges represent the cost variation between an optimal scenario and a worst-case scenario.
- [7] The 1 Kg eq of CO_2 per Kg of Fumed Silica is based on [Hydro Quebec data](#) that indicate in Quebec 1.3 g of CO_2 are generated eq per KWh. While the 2.5 is based on the Canadian average for electricity generation carbon intensity of 150 g per KWh.
- [8] The Wall Street Journal article, April 18, 2023, "World's First Carbon Import Tax Approved by EU Lawmakers"

Cautionary Statements

There can be no assurance that the economic projections upon which this Study is founded will be realized. Not limited to the viability of mass production scale-up, product optimization, financial considerations, and macroeconomic and environmental factors, several risks and uncertainties are inherently associated with any nascent technology commercialization. The Study is intended to be comprehended as a cohesive whole, and individual sections should not be interpreted or relied upon in isolation or without the accompanying context. Readers are duly advised to consider all assumptions, limitations, and exclusions that pertain to the information provided in the Study.

Other news, Asset Acquisition

The company announces that it has acquired rights lost in the Pact of Partners signed when the French company Novacium SAS was formed. The lost occurred following the Company failure to fulfill its commitment to increase its shareholding in Novacium as stipulated and provided for in the Pact of Partners, agreed and signed, with its three co-shareholders, within the granted deadlines.

The company buys the rights in accordance with an agreement signed with its three co-partners which provides that the company will pay an amount of one million euros (C\$1,483,100) which will be distributed between them. Such payment will be made by means of the issuance by the Company of units of its capital stock, issued at the price of \$0.215 and consisting of one common share and one-half of a warrant, each full warrant entitling the holder thereof to purchase one common share of the capital stock of the Company at a price of the \$0.30, for a period of four years following the closing date of the transaction. All shares issued in connection with this transaction will be subject to a hold period of four months and one day from the closing date of the transaction. In doing so, the company regains all of its rights in the Pact of partners and in Novacium and by avoiding costly and perilous legal proceedings.

This agreement is subject to the approval of the TSX Venture Exchange and the regulatory authorities having jurisdiction.



About HPQ

[HPQ Silicon Inc. \(TSX-V: HPQ\)](#) is a Quebec-based TSX Venture Exchange Tier 1 Industrial Issuer.

HPQ is developing, with the support of world-class technology partners [PyroGenesis Canada Inc.](#) and [NOVACIUM SAS](#), new green processes crucial to make the critical materials needed to reach net zero emissions.

HPQ activities are centred around the following four (4) pillars:

- 1) Becoming a green low-cost (Capex and Opex) manufacturer of Fumed Silica using the **FUMED SILICA REACTOR**, a proprietary technology owned by HPQ being developed for HPQ by PyroGenesis.
- 2) Becoming a producer of silicon-based anode materials for battery applications with the assistance of NOVACIUM SAS.
- 3) HPQ SILICON affiliate NOVACIUM SAS is developing a low carbon, chemical base on demand and high-pressure autonomous hydrogen production system.
- 4) Becoming a zero CO₂ low-cost (Capex and Opex) producer of High Purity Silicon (2N+ to 4N) using our **PUREVAP™ “Quartz Reduction Reactors” (QRR)**, a proprietary technology owned by HPQ being developed for HPQ by PyroGenesis.

For more information, please visit [HPQ Silicon web site](#).

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 three 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 m² and 2,940 m² R&D and 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

Disclaimers:

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 security's regulatory authorities, which filings can be found at www.sedar.com. 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.

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This News Release is available on the company's [CEO Verified Discussion Forum](#), a moderated social media platform that enables civilized discussion and Q&A between Management and Shareholders.

Source: HPQ Silicon Inc.

For further information contact:

Bernard J. Tourillon, Chairman, President, and CEO Tel +1 (514) 846-3271

Patrick Levasseur, Director Tel: +1 (514) 262-9239

Email: Info@hpsilicon.com