



ALL MAJOR EQUIPMENT RECEIVED FOR HPQ FUMED SILICA REACTOR PILOT PLANT

FINAL ASSEMBLY ON TRACK FOR Q2 2024 COMMISSIONING

Montreal, Canada, March 12th, 2024 — [HPQ Silicon Inc.](#) (“HPQ” or the “Company”) ([TSX-V: HPQ](#)) ([OTCQB: HPQFF](#)) ([FRA: O08](#)), a technology company specializing in green engineering of silica and silicon-based materials, is pleased to update shareholders on the advancement of its Fumed Silica Reactor (FSR) Pilot Plant project.

Further to our [February 6th, 2024 release](#), HPQ Silicon’s wholly owned subsidiary, HPQ Silica Polvere Inc. (HPQ Polvere), received notification from its technology provider and equipment supplier, [PyroGenesis Canada Inc.](#) ([TSX: PYR](#)) ([OTCQX: PYRGF](#)) ([FRA: 8PY](#)) (PyroGenesis), that all the materials needed for the Fumed Silica Reactor (FSR) Pilot Plant project have been received.

HPQ’S FUMED SILICA REACTOR PILOT PROJECT: VALIDATING COMMERCIAL POTENTIAL OF THE TECH

Now that all major equipment’s needed have been received, the 50 tonnes per year (TPY) FSR pilot plant now moves to the final fabrication and assembly phase; with a scheduled commissioning in Q2 2024.

“Having successfully achieved the following key milestones:

- Made commercial grade Fume Silica directly from quartz at lab scale using HPQ FSR technology ([May 17th, 2023, release](#)),
- Attracted the interest of major industry players that signed 3 party NDA’S [1] to test our material characteristics ([May 25th, 2023](#), [August 24th, 2023](#), [September 14th, 2023](#), and [October 18th, 2023](#), releases),
- Received independent third-party confirmation that we made commercial grade Fume Silica directly from quartz at lab scale using HPQ FRS technology ([November 8, 2023, release](#)),
- Completed an internal technical and economic study that indicated HPQ FSR’s robust potential at commercial scale ([January 10th, 2024, release](#)) and
- Attracted the interest of an industrial group to explore the potential of creating a commercial FSR 1,000 TPT plant joint venture ([January 31st, 2024, release](#)).

We are about to start the most exciting part of the project, validating, at a pilot plant scale, our substantial, unique, and proprietary advantages, the ability to manufacture commercial-grade Fumed Silica directly from quartz in one step for significantly less than all traditional manufacturers,” stated Mr. Bernard Tourillon, President and CEO. “With commissioning scheduled to commence in Q2 2024, the time for third parties showing strong interest in our tech to stay on the sideline is getting shorter.”

A RECAP OF HPQ POLVERE'S DISRUPTIVE ADVANTAGES

The table below clearly illustrates the numerous disruptive advantages of HPQ Polvere's Fumed Silica Reactor (FSR) compared to traditional Fumed Silica Manufacturing.

	FUMED SILICA MANUFACTURING		
	USING TODAY CONVENTIONAL PROCESSES	WITH HPQ POLVERE FUMED SILICA REACTOR	HPQ POLVERE DISRUPTIVE ADVANTAGES
CAPEX (Cost per Kg of capacity)	US\$ 145.91	US\$9.50	93% Less ^[2]
Energy Consumption (kWh / Kg of Fumed Silica)	100 – 120 ^[3]	10 – 15 ^[4]	87.5 to 90% Less
EBITDA Margins	20%	61% - 65%	3X better ^[5]
GHG Impact (Kg CO2 eq / Kg of Fumed Silica)	8 – 17 ^[3]	1 – 2.5 ^[6]	84 to 88% Less
European Carbon Taxes (90€ per tonne released ^[7])	720€ - 1 530€	90€ - 225€	630€ to 1 350€ Less
HCl Production (Kg / Kg Fumed Silica)	2.4 ^[4]	0	NO HCl GAZ

Table 1) HPQ Polvere's FSR compared to traditional Fumed Silica Manufacturing.

"In emphasizing the significance of the upcoming pilot plant phase," Mr. Tourillon expressed, "One of the additional advantages is that we fully expect to further validate these numbers and improve them. This underscores our commitment to ongoing refinement and optimization as we move forward in the project."

THE PILOT PLANT

The construction of the FSR pilot plant is set to take place in a dedicated space within PyroGenesis' facilities, featuring tailor-made infrastructure to address the pilot plant's distinctive ventilation, safety, and access needs. An allocated 4,000 sq ft facility, with a height allowance of 30 feet, has been designated to accommodate the pilot plant, which boasts an approximate layout footprint of 50ft by 30ft.

"We are rapidly moving forward with the fumed silica reactor pilot plant construction, as we recognize that numerous industries will benefit from what we believe is a truly innovative approach to producing one of the most in-demand materials", said Mr. P. Peter Pascali, CEO and President of PyroGenesis. "Conventional fumed silica processes, which rely on silicon metal (Si) as raw material, not only have a significant carbon footprint of around 9.5 tonnes of CO2 equivalent per tonne of fumed silica, but also present complex process challenges which include, but are not limited to, using hazardous materials.[8] The technology developed by PyroGenesis for HPQ Polvere is designed to offer significant economic and environmental advantages over conventional manufacturers – improving profitability, but also reducing the environmental footprint and reducing the harmful chemicals associated with traditional fumed silica production."

REFERENCE SOURCES

- [1] PyroGenesis participation in the NDA agreements is done at HPQ's express request.
- [2] 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 (SiCl₄) with Hydrogen and Oxygen to produce Fumed Silica (SiO₂), 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. According to a rough order of magnitude study by PyroGenesis, our one-step process for making Fumed Silica is estimated to have an average Capex per kilogram of annual capacity between US\$9.00 and US\$10.00, which is approximately 93% less than traditional processes.
- [3] Frischknecht, Rolf, et al. "Life cycle inventories and life cycle assessment of photovoltaic systems." International Energy Agency (IEA) PVPS Task 12 (2020).
- [4] PyroGenesis Canada Inc
- [5] Average EBITDA margins of 20% are derived from two sources, [with Link #1 leading to Source #1](#) and [Link #2 leading to Source #2 \(Specialty Additives division\)](#). Management has calculated the EBITDA margins for the Fumed Silica Reactor (FSR) based on data derived from third party sources and publicly available information. These figures will be updated upon completion of the

pilot testing phase. The 5% range in HPQ Polvere's EBITDA margins considers PyroGenesis' option to convert its 10% royalties into a 50% ownership stake in HPQ Polvere's remaining equity.

- [6] The 1 Kg eq of CO₂ per Kg of Fumed Silica is based on [Hydro Quebec data](#) that indicate in Quebec 1.3 g of CO₂ 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.
- [7] The Wall Street Journal article, April 18, 2023, "[World's First Carbon Import Tax Approved by EU Lawmakers](#)"
- [8] 2012 – Executive summary: "SILICON-CHEMISTRY CARBON BALANCE, AN ASSESSMENT OF GREENHOUSE GAS EMISSIONS AND REDUCTIONS", Covering the Production, Use and End-of-Life of Silicones, Siloxanes and Silane Products in Europe, North America, and Japan. [Pages 20 to 21] (Commissioned by Global Silicones Council, Centre Européen des Silicones, Silicones Environmental, Health and Safety Council of North America Silicone Industry Association of Japan).

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

About HPQ Silicon

[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](#).

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Source: HPQ Silicon Inc.

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