



HPQ FUMED SILICA REACTOR HAS THE POTENTIAL TO REDUCE CO₂ EMISSIONS IN FUMED SILICA PRODUCTION BY OVER 50%

MONTREAL, Canada, July 13th, 2023 — [HPQ Silicon Inc.](#) (“HPQ” or the “Company”) ([TSX-V: HPQ](#)) ([OTCQB: HPQFF](#)) ([FRA: O08](#)), a technology company specializing in green engineering processes for silica and silicon material production, is re-issuing an amended version of its May 24, 2023 press release at the request of L’AUTORITÉ DES MARCHÉS FINANCIERS.

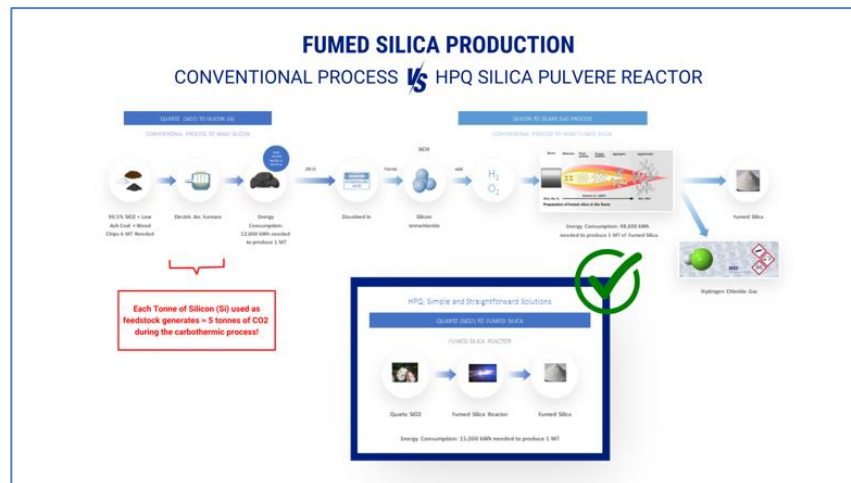
This release focuses on the environmental benefits of the Fumed Silica Reactor (“Reactor”) currently being developed by its wholly-owned subsidiary, HPQ Silica Polvere Inc. (HPQ Polvere), in collaboration with technology provider [PyroGenesis Canada Inc.](#) ([TSX: PYR](#)) ([NASDAQ: PYR](#)) ([FRA: 8PY](#)) (PyroGenesis).

[On May 17th, 2023, HPQ Polvere announced](#) that its proprietary reactor technology successfully produced, at lab scale, Fumed Silica using quartz (SiO₂) as feedstock only, thereby opening the door for this process to allow a reduction of over 50% in the direct CO₂ e (CO₂ equivalent) emissions associated with fumed silica production [1].

A Technology Reducing Direct CO₂ Emissions in Fumed Silica Production by Over 50% [2]

Conventional fumed silica manufacturing processes rely on Silicon Metal (Si) as a feedstock, involving complex steps, high energy consumption, hazardous materials, and Hydrogen Chloride Gas (HCl) production as by-product. These processes result in a carbon footprint of 9.5 tonnes (t) CO₂ e/t of fumed silica ± 2.5 t CO₂ e, with over 60% [1] of emissions stemming from the use of silicon metal as feedstock.

By contrast, the HPQ Polvere Fumed Silica Reactor enables a direct transformation of quartz into fumed silica, eliminating the need for the conventional carbothermic process to convert quartz into silicon metal. This innovation could potentially reduce direct CO₂ e emissions associated with fumed silica production by more than 60%, equivalent to a reduction of approximately 5 t CO₂ e/t of fumed silica produced [2 & 3].



"The Fumed Silica Reactor developed by HPQ Silica Polvere Inc. perfectly embodies HPQ's commitment to green engineering [4] processes. We are dedicated to developing innovative processes that minimize the environmental footprint while meeting the material demands of the industry," said Mr. Bernard Tourillon, President and CEO of HPQ Silicon and HPQ Silica Polvere. *"This release specifically highlights the direct CO₂ emissions reductions achieved by the Reactor and does not encompass the additional substantial indirect environmental benefits. Work to date strongly suggests the potential for HPQ Polvere to develop commercial grade fumed silica with greatly reduced carbon footprints relative to today's commercially available technologies."*

Unlocking CO₂ Reduction Potential: Exceeding 500,000 Tonnes Per Year (t/y) In Key Markets

The CO₂ reduction potential of the HPQ Polvere Fumed Silica Reactor is exemplified by the following key markets examples:

- In Canada, where approximately 24,000t of fumed silica is consumed annually [5], the adoption of the HPQ Polvere process would result in a reduction of 120,000t/y in CO₂ emissions,
- The United States, with an annual fumed silica consumption of around 29,000t [5], stands to benefit from a reduction of 145,000t/y in CO₂ emissions through the implementation of the HPQ Polvere process, and
- European countries, consuming approximately 92,000t/y of fumed silica [5], could achieve a reduction of 460,000t/y in CO₂ emissions by utilizing the HPQ Polvere process.

These figures highlight the environmental impact that can be achieved by utilizing the HPQ Polvere Fumed Silica Reactor in key markets. Furthermore, there is a potential for a per-tonne reduction in carbon taxes in these markets:

- In Europe, the current price per tonne of CO₂ emissions for manufactured and imported goods is approximately 90 euros [6]. This implies that traditional producers of fumed silica could potentially reduce their carbon tax by around 450 euros per tonne by upgrading to the HPQ Polvere process.
- In Canada, the price per tonne of CO₂ emissions for manufactured goods is approximately CAD\$50 [7], and in Quebec [8], it is around CAD\$27 per tonne. This indicates that traditional producers of fumed silica, if they adopt the HPQ Polvere process, could potentially reduce their carbon tax by about CAD\$250 per tonne in Canada and CAD\$137 per tonne in Quebec.

These potential reductions in carbon taxes underscore additional financial advantages and environmental benefits of embracing the HPQ Polvere Fumed Silica Reactor in these markets.

OTHER NEWS: HPQ NEW INTELLECTUAL PROPERTY ACQUIRED FROM PYROGENESIS

As disclosed in our June 27, 2023, release and in our most recent Management Discussion and Analysis reports, HPQ has acquired a new Intellectual Property (IP) from PyroGenesis for \$3,600,000, pertaining to a "Low Carbon Emission Process for the production of Silicon."

PyroGenesis and HPQ are still negotiating a complementary agreement focusing on the research and development phases necessary for implementing this IP. As a result, the parties have signed on July 11, 2023, an Addendum to the original agreement pushing back the in-cash payment of \$3,600,000 date from no later than by June 30th, 2023, to no later than by December 31st, 2023. The effective date of the Addendum is June 30, 2023

SOURCE

- [1] 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).
- [2] Direct quote from the scientific publication mention in point #1 : "*The main raw materials used to produce the most common siloxanes and silanes are silicon metal, methanol and HCl. The GHG emissions to produce silicon metal are the most relevant contribution to the cradle-to-gate GHG emissions of silicones and fumed silica (66 %).*"



- [3] August 31, 2021 – Saevarsdottir, G., Magnusson, T. & Kvande, H. “[Reducing the Carbon Footprint: Primary Production of Aluminum and Silicon with Changing Energy Systems.](#)” [Pages 850-851] Journal of Sustainable Metallurgy (2021) 7: 848–857.
- [4] Definition from [The United States Environment Protection Agency web site](#) : “Green engineering is the design, commercialization, and use of processes and products in a way that reduces pollution, promotes sustainability, and minimizes risk to human health and the environment without sacrificing economic viability and efficiency”.
- [5] Sales data per regions from MarketsandMarkets 2017 "[fumed silica market – global forecast to 2022](#)".
- [6] The Wall Street Journal article, April 18, 2023, "[World’s First Carbon Import Tax Approved by EU Lawmakers](#)"
- [7] Government of Canada: [The Federal Carbon polluting pricing benchmark.](#)
- [8] Quebec Government: [The Carbon Market: Auctions](#)

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. \(TSX: PYR\)](#) ([NASDAQ: PYR](#)) 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 five (5) pillars:

- 1) Becoming a green low-cost (Capex and Opex) producer of High Purity Silicon (2N+ to 4N) using our proprietary **PUREVAP™ “Quartz Reduction Reactors” (QRR)** being developed by PyroGenesis.
- 2) Becoming North America’s first producer of micron size High Purity Silicon (3N & 4N) powders with the assistance of NOVACIUM SAS.
- 3) Working to become the first producer of nano silicon materials from High Purity Silicon chunks using our proprietary **PUREVAP™ Nano Silicon Reactor (NSiR)** being developed by PyroGenesis.
- 4) Becoming a green low-cost (Capex and Opex) producer of Fumed Silica using our proprietary **FUMED SILICA REACTOR** being developed by PyroGenesis.
- 5) Developing a small and compact process for the on-demand production of hydrogen via hydrolysis of Silicon and other materials.

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

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.

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Source: HPQ Silicon Inc.

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