



HPQ PUREVAP™ GEN3 QRR PROJECT UPDATE

MONTREAL, Canada, September 28th, 2023 — [HPQ Silicon Inc.](#) (“HPQ” or the “Company”) ([TSX-V: HPQ](#)) ([OTCQB: HPQFF](#)) ([FRA: 008](#)), a technology company specializing in green engineering processes for silica and silicon material production, would like to provide shareholders with an update on the latest developments for the ongoing PUREVAP™ Gen3 Quartz Reduction Reactor pilot plan project (“Gen3 QRR”) since [our August 9th, 2023 release](#).

The work completed so far has successfully validated approximately 80% of the project's key milestones, which include:

1. Achieving 99.5% Silicon purity (2N+) from the outset, a level that exceed best commercially available purity threshold.
2. Scaling up production by 2,500X from PUREVAP™ Gen2 QRR.
3. Demonstrating the semi-continuous batch production capability of the reactor.
4. Achieving one-step production of 3N+ Silicon or battery-grade Silicon.
5. Production of silicon using 25% **less feedstock** than conventional carbothermic processes that use a ratio of 6 tonnes (t) of raw materials to produce 1 ton of metallurgical grade silicon (MG Si – 98.5% to 99.5%) [1].

To successfully achieve the Silicon pour, [PyroGenesis Canada Inc.](#) ([TSX: PYR](#)) ([NASDAQ: PYR](#)) ([FRA: 8PY](#)) — the project's technology provider – completed essential upgrades to enhance the Gen3 QRR design in September 2023. These modifications were implemented to improve the fluidity of liquid silicon at the reactor's base. This was an issue that has prevented successful silicon pour during previous tests.

Also, PyroGenesis made some additional upgrades to the system, like improving the QRR crucible design to minimize silicon contamination during the pouring process.

Furthermore, Pyrogenesis informed HPQ that the modified crucible will be delivered to the testing facility this week and that, if all goes according to plan, the silicon pour should be completed the following week.

“The key milestones reached to date by Gen3 QRR are demonstrations of how the HPQ PUREVAP™ QRR process is progressing and is on the path to modernize the production of high-purity Silicon,” stated Bernard Tourillon, President & CEO of HPQ Silicon. *“Our technology has the potential to transform a century-old industrial process—known for its significant CO₂ emissions – into an efficient, scalable, and low carbon manufacturing process.”*

During the past month, HPQ's three key initiatives – Silicon, Fumed Silica, and Autonomous Hydrogen Generation via Hydrolysis – have all achieved significant milestones as we diligently executed our business plan.

HPQ SILICON INITIATIVE:

The demand for silicon is projected to surpass 3.8 million tonnes, valued between US\$15 billion and US\$20 billion, by 2025 [3]. These numbers do not take into consideration the 300,000 t of Silicon-based anode material demand projected by 2030, representing another market estimated to be worth about US\$ 15 billion [4] that will need 3N+ Silicon as feedstock.

The conventional silicon manufacturing processes, with purity ranging from 98.5% to 99.5%, are both expensive and energy intensive. The process, invented in 1899, is still utilized today, making Silicon production the largest CO₂ emitter among all metals and non-ferrous metals. This information is based on the Intergovernmental Panel on Climate Change (IPCC), a United Nations body dedicated to climate change research [5].



“According to the plan, with the upgraded GEN3 QRR crucible back at the plant, we can anticipate that a successful Silicon pour is within our reach,” added Mr. Tourillon.

REFERENCE SOURCES

- [1] From Ferroglobe PLC investor presentation dated October 17, 2017 (Page 11).
- [2] July 31, 2023, US DOE release: [U.S. Department of Energy Releases 2023 Critical Materials Assessment to Evaluate Supply Chain Security for Clean Energy Technologies](#)
- [3] Data was compiled from information found in the presentations made by CRU International Limited (“CRU”), a world-leading metal market research firm, during their Silicon Market Outlook conferences of November 2018, November 2020, and October 2022. Information further validated by Straits Research Silicon Metal Market: Information by Product Type (Metallurgical and Chemical), Application (Aluminium Alloys, Silicone, and Semiconductors), and Region — Forecast till 2030, report that indicated that the global silicon metal market size was valued at USD 12.4 billion in 2021, and is expected to reach USD 20.60 billion by 2030, growing at a CAGR of 5.8% during the forecast period (2022–2030).
- [4] QY Research, SNE Research, Shinhan Securities / NBM June 2023 Deck page 11
- [5] Bernstein L, Roy J, Delhotal KC, Harnisch J, Matsuhashi R, PriceL, Tanaka K, Worrell E, Yamba F, Fengqi Z (2007) Industry. [In: Climate change 2007: Mitigation. Contribution of working group III to the fourth assessment report of the intergovernmental panel on climate change.](#) Cambridge University Press, Cambridge, UK and New York, USA.

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 providers [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) manufacturer of Fumed Silica using the **FUMED SILICA REACTOR**, a proprietary technology owned by HPQ being developed for HPQ by PyroGenesis.
- 2) 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.
- 3) Becoming a producer of silicon-based anode materials for battery applications with the assistance



of NOVACIUM SAS.

- 4) HPQ SILICON affiliate NOVACIUM SAS is developing a low carbon, chemical base on demand and high-pressure autonomous hydrogen production system.
- 5) Working to become the first producer of nano silicon materials from High Purity Silicon chunks using our proprietary **PUREVAP™ Nano Silicon Reactor (NSiR)**, a technology owned by HPQ being developed for HPQ by PyroGenesis.

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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Source: HPQ Silicon Inc.

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