



DEVELOPING NEW PUREVAP™ SILICON METAL NANO REACTOR FOR LOW-COST MANUFACTURING OF SPHERICAL SILICON METAL NANOPOWDERS & NANOWIRES FOR NEXT GENERATION LI-ION BATTERIES

Montreal, Quebec, Canada, (February 11, 2020): [HPQ Silicon Resources Inc.](#) (“HPQ” or the “Company”) [TSX-V: HPQ](#); [FWB: UGE](#); [Other OTC : URAGF](#); (“HPQ”) would like to update shareholders on the steps being undertaken by HPQ and [PyroGenesis Canada Inc.](#) ([TSX-V: PYR](#)) (“PyroGenesis”) to advance the development of a new low cost manufacturing process that can produce the Spherical Silicon Metal (Si) Nano-Powders and Si Nanowires needed for the next generation of Lithium-ion (Li-ion) Si batteries.

BUILT ON 5 YEARS OF PUREVAP™ QUARTZ REDUCTION REACTOR (QRR) DEVELOPMENT KNOW-HOW

After the successful GEN2 PUREVAP™ QRR [proof of concept test](#), PyroGenesis finalised the engineering designs and the plans required to upgrade a PUREVAP™ QRR into a PUREVAP™ reactor that can transform melted silicon metal into spherical Nano-Powders and Nanowires. As a result of this work, a new provisional patent application was filed to protect this new process.

DEVELOPING THE PUREVAP™ SILICON METAL NANO REACTOR (SiNR)

The new PUREVAP™ process is a Silicon Metal Nano Reactor, (PUREVAP™ SiNR), that incorporates the PUREVAP™ QRR (patent pending) unique capability of removing impurities from Silicon Metal (Si) into a novel proprietary process that allows different purities of Si feed stock to be melted into liquid Si. This liquid Si can then be synthesized into the Spherical Silicon Metal Nano Powders and [Nanowires](#) sought after by Corporations looking into building the next generation of Lithium-ion batteries.

“The PUREVAP™ SiNR opens up a unique multibillion-dollar business opportunity for HPQ and PyroGenesis. PyroGenesis has a long track record of taking high-tech industrial projects from proof of concept to global commercial scalability, so we are very confident about the prospect of being one of the first companies coming to market with a low cost process that makes the spherical Silicon Metal Nano-Powders and Nanowires that next generation Li-ion battery manufacturers are seeking,” said Bernard Tourillon, President and CEO HPQ Silicon. *“Silicon Metal’s potential to meet energy storage demand is undeniable and generating [massive investments](#), as well as, serious industry interest, so our timing could not be better.”*





GEN2 PUREVAP™ QRR CONVERTED INTO A PROOF OF COMMERCIAL SCALABILITY PUREVAP™ SINR

The quickest way to demonstrate the capabilities of the PUREVAP™ SiNR process is to upgrade the existing GEN2 PUREVAP™ QRR into PUREVAP™ SiNR test bed, run a series of tests to confirm the scalability, the low-cost nature of the process and its feedstock flexibility. During these tests, Spherical Silicon Metal Nano-Powders and Nanowires samples will be produced and sent to either research centers for independent valuation or made available to potential end users looking at manufacturing next generation Li-ion batteries. Successful tests will demonstrate the process flexibility in making a range of advanced Silicon Metal materials. The preliminary timeline is for the reactor conversion to be completed over the next coming months, with a goal of being able to have samples ready in this fiscal year.

SPHERICAL Si NANO POWDERS AND NANOWIRES KEY TO HIGHER ENERGY DENSITY LI-ION BATTERIES

Spherical Silicon Metal Nano-Powders and Si Nanowires have been [identified](#) as key elements that will allow the manufacture of high-performance Li-ion batteries using Silicon Metal (Si) anodes needed to deliver on the [research](#) promises of an almost tenfold (10x) increase in the specific capacity of the anode, inducing a 20-40% gain in the energy density of Li-ion batteries. Current manufacturing methods for Silicon Metal Nano-Powders are expensive, not very scalable and not commercially feasible with US\$ 30,000/kg¹ selling prices, while manufacturing Silicon Metal Nanowires is so prohibitive that only government funded special projects can afford them.

“The opportunities that are being developed with the PUREVAP™ process is nothing short of intoxicating,” said M. P Peter Pascali, President and CEO of PyroGenesis Canada Inc. “We never thought, when we first embarked on this project, that we would be developing game-changing technology sought after by the Lithium-ion battery market. We are looking forward to successfully incorporating and upgrading the PUREVAP QRR™ into the PUREVAP™ Nano reactor to produce Spherical Silicon Metal (Si) Nano-Powders and Si Nanowires needed for the next generation of Lithium-ion (Li-ion) Si batteries.”

About Silicon Metal

Silicon Metal (Si) is one of today’s strategic materials needed to fulfil the renewable energy revolution presently under way. Silicon does not exist in its pure state; it must be extracted from quartz, one of the most abundant minerals of the earth’s crust and other expensive raw materials in a carbothermic process.

About HPQ Silicon

[HPQ Silicon Resources Inc. \(TSX-V: HPQ\)](#) is developing, with [PyroGenesis Canada Inc. \(TSX-V: PYR\)](#), a high-tech company that designs, develops, manufactures and commercializes plasma base processes, the innovative PUREVAP™ “Quartz Reduction Reactors” (QRR), a truly 2.0 Carbothermic process (patent pending), which will permit the One Step transformation of Quartz (SiO₂) into High Purity Silicon (Si) at prices that will propagate its considerable renewable energy potential. The Gen3 PUREVAP™ QRR pilot plant that will validate the commercial potential of the process is scheduled to start during Q1 2020.

HPQ, working with PyroGenesis, is also developing the PUREVAP™ Silicon Metal Nano Reactor (SiNR), a proprietary process a that can use as feedstock different purities of Silicon Metal (Si), melted them into liquid Si that can then be synthesized into the Spherical Silicon Metal Nano Powders and Nanowires necessary for the next generation of Lithium-ion batteries. During H1 2020, the plan is to validate our game changing manufacturing approach by upgrading our existing Gen2 PUREVAP™ QRR reactor into a PUREVAP™ SINR to produce spherical Silicon Metal (Si) nano-powders and nanowires samples for industry participants and research institutions’.

¹ Source: Quotation from a producer (Confidential), [Media article](#)



Concurrently, HPQ is also working with industry leader [Apollon Solar](#) to develop a manufacturing capability that uses the High Purity Silicon (Si) made with the PUREVAP™ to make Porous silicon wafers needed for solid-state Li-ion batteries. The first Silicon wafer should be ready to be ship for testing to a battery manufacturer (under NDA) during H1 2020.

Finally, with Apollon Solar, we are also looking into developing a metallurgical pathway of producing Solar Grade Silicon Metal (SoG Si) that will take full advantage of the PUREVAP™ QRR one-step production of Silicon (Si) material of 4N+ purity with low boron count (< 1 ppm).

The focus of HPQ focus is to become the lowest cost producer of Silicon Metal (Si), High Purity Silicon Metal (Si), Spherical Si nano-powders for Next Gen Li-ion batteries, Porous Silicon Wafers for Solid states Li-ion batteries, Porous Silicon Powders for Li-ion batteries and Solar Grade Silicon Metal (SoG-Si).

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.

Disclaimers:

The Corporation's interest in developing the PUREVAP™ QRR and any projected capital or operating cost savings associated with its development should not be construed as being related to the establishing the economic viability or technical feasibility of any of the Company's Quartz Projects.

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 on-going 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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