



HPQ GEN2 TESTING CONFIRMS PUREVAP™ PROCESS CAN SIGNIFICANTLY REDUCE THE COST OF MAKING SILICON METAL BY LOWERING RAW MATERIAL COSTS

MONTREAL, QUEBEC, CANADA (June 17th, 2019) HPQ Silicon Resources Inc. – (www.HPQSilicon.com) (TSX-V: HPQ), (OTCPink: URAGF), (FWB: UGE) is pleased to announce the receipt of a report from PyroGenesis Canada Inc (“PyroGenesis”) (TSX-V: PYR) comparing the performance of the *PUREVAP™ Quartz Reduction Reactor (QRR)* process using a low cost highly reactive carbon source, versus conventional processes used by all the Metallurgical Grade Silicon Metal (Mg Si) producers such as Ferroglobe, Dow-DuPont, Elkem, Rima and Rusal, which use high cost, higher purity carbon sources.

PUREVAP™ CAN MAKE 99+% SILICON USING ONE REDUCTANT: LOWER COST HIGHLY REACTIVE CARBON

Having a process that uses less feedstock to make 1 MT of Mg Si and allows the substitution of costly high purity Reductant with readily available lower cost material will reduce the cost of making Mg Si, giving that process a competitive advantage, which is what the *PUREVAP™ QRR* can offer.

As part of the ongoing R&D, PyroGenesis decided to push the envelope of the process by using only one Reductant, a highly reactive carbon source (92.1% Total Carbon) and HPQ off spec SiO₂ (98.839% VS 99.83%), Fe₂O₃ (0.121% VS 0.05%) and Al₂O₃ (0.182% VS 0.04%) in the Gen2 *PUREVAP™* reactor¹.

In this test, Gen2 *PUREVAP™* produced commercially viable 99.73% Si with 0.166% Fe and 0.0424% Al, representing chemical grade Mg Si², a product with great commercial value. By comparison, PyroGenesis calculated that similar material input in a conventional smelter would produce 96.95% Si, a product with little commercial value.¹

“These results are a testament to our methodical approach, the Gen2 PUREVAP™ QRR platform has allowed us to check off this tremendous major milestone. These spectacular results are not only further de-risking the project, they are also opening up additional segments beyond solar energy applications where HPQ PUREVAP™ QRR could have direct application,” stated Bernard Tourillon, President and CEO of HPQ Silicon Resources Inc. *“Market research indicates that demand for chemical grade Mg Si will drive demand for Mg Si from 2.8 Million MT worth US\$ 7.5 B in 2018 to 3.8 Million MT worth US\$ 12B by 2023³. HPQ is very well positioned to benefit from this increase in demand.”*

A PUREVAP™ QRR PROPRIETARY ADVANTAGE: REDUCING RAW MATERIAL COSTS TO MAKE SI

Depending on the producer, making Mg Si (98.0% to 99.5% Si) in 2018 cost between US\$ 1,450/MT and US\$ 2,000/MT⁴. More than 40% of that cost⁵ (US\$ 580/MT to US\$ 800/MT) is directly attributable to the 6+ metric tonnes of raw material (SiO₂ and Reductant) needed to produce 1 MT of Mg Si⁶.

The carbon reductant used in traditional processes to make Mg Si accounts for 30% of the total cost³. That cost is divided between two different sources, woodchip counting for 10% (US\$ 145/MT to US\$ 200/MT) and Carbon (low ash coal & charcoal) counting for 20% (US\$ 290/MT to US\$ 400/MT).

1 PyroGenesis TM-2019-024 (May 27 2019)

2 Balazs™ NanoAnalysis – ICP OES (Inductively coupled plasma - optical emission spectrometry) analysis results

3 CRU – Silicon Market Outlook – November 14 2018 (Page 20 - 23)

4 CRU – Silicon Market Outlook – November 14 2018 (Page 17)

5 Ferroglobe_Investor_Day_Presentation__17_Oct_2017 (Page 40)

6 GSM_Investor_Presentation_-_March_2014 (Page 3)



For conventional process producers, high purity coal procurement and cost have been identified as critical elements for their operations because: a) there are only 2 coal mines in the world that can supply it (the 100% Ferroglobe owned Blue Gem Coal and Colombian coal)⁷; and B) a US\$ 10/MT increase in its cost has a US\$ 13 per MT produced impact on the producer's bottom line⁷.

GEN2 TEST WORK INDICATES POTENTIAL SAVINGS, GEN3 PILOT PLANT WILL VALIDATE SCALE AND SCOPE OF SAVING

While being able to use lower cost raw material represents significant potential cost savings, the other biggest factor that differentiates the PUREVAP™ QRR is that it should be capable of using highly reactive carbon as Reductant, and therefore only need to process 4.5 MT of raw material⁸ (lower purity SiO₂ and cheaper Reductant) to produce 1 MT of Mg Si.

As more than 40% of the cost of conventional processes is directly attributable to the 6+ metric tonnes of raw material (SiO₂ and Reductant) needed to produce 1 MT of Mg Si³, it is possible to estimate that a PUREVAP™ QRR could cut in half raw material cost, representing a 20% reduction in the cost of making chemical grade Mg Si.

Gen3 pilot plant testing will allow us to refine and validate these numbers at commercial scale.

Pierre Carabin, Eng., M. Eng., Chief Technology Officer and Chief Strategist of PyroGenesis has reviewed and approved the technical content of this press release.

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.

About HPQ Silicon

HPQ Silicon Resources Inc. is a TSX-V listed resource company focuses on becoming the lowest cost producer of Silicon Metal and a vertically integrated and diversified High Purity, Solar Grade Silicon Metal (SoG Si) producer and a manufacturer of multi and monocrystalline solar cells of the P and N types, required for production of high performance photovoltaic conversion.

HPQ's goal is to develop, in collaboration with industry leader PyroGenesis (TSX-V: PYR) the innovative PUREVAP™ "Quartz Reduction Reactors (QRR)", a truly 2.0 Carbothermic process (patent pending), which will permit the transformation and purification of quartz (SiO₂) into Metallurgical Grade Silicon Metal (Mg Si) at prices that will propagate it clean energy potential.

HPQ's goal, working with industry leader Apollon Solar, is also to develop a metallurgical approach to producing Solar Grade Silicon Metal (SoG Si) that will take full advantage of the PUREVAP™ QRR production of high purity silicon metal (Si) in one step and reduce by a factor of at least two-thirds (2/3) the costs associated with the transformation of quartz (SiO₂) into SoG Si. The pilot plant equipment that will validate the commercial potential of the process is on schedule to start in 2019.

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

⁷ Ferroglobe_Investor_Day_Presentation__17_Oct_2017 (Page 46 -41)

⁸ PyroGenesis efficiency estimation for the PUREVAP™ process



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 securities 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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