



HPQ SILICON AND PYROGENESIS ACTIVELY EVALUATING JOINT VENTURE TO MANUFACTURE NANOSCALE STRUCTURE SILICON POWDERS FOR NEXT GENERATION Li-ion BATTERIES

Montreal, Quebec, Canada, (November 25, 2019): [HPQ Silicon Resources Inc.](#) (“HPQ” - “The Company”) [TSX-V: HPQ](#); [FWB: UGE](#); [Other OTC : URAGF](#); (“HPQ”) announces that HPQ and [PyroGenesis Canada Inc.](#) ([TSX-V: PYR](#)) (“PyroGenesis”) are actively evaluating a joint venture to manufacture Nanoscale Structure Silicon (Si) powders for next generation Li-ion Si batteries.

NANOSCALE STRUCTURE SILICON POWDERS SELLING FOR US\$ 30,000/Kg¹

While Nanoscale Structure Silicon Powders improve Li-ion battery performance, high performance Silicon (Si) anodes are not presently commercially feasible due to high manufacturing costs. Specifically, two (2) major issues have been identified as major impediments to commercial feasibility. The cost of the high purity Silicon feed material needed, and the cost of transforming Silicon into Nanoscale Structure Silicon Powders for Li-ion batteries.

Combining the HPQ *PUREVAP™ Quartz Reduction Reactor* (“QRR”) technology with PyroGenesis Plasma Atomization knowhow to manufacture Nanoscale Structure Silicon (Si) powders, could potentially resolve these 2 issues and lead the way to full commercialization of Nanoscale Structure Silicon Powders. If successful, that should subsequently lead to their wide scale adoption in the battery space. If this occurs, HPQ and PyroGenesis would then be well positioned to assume a market leadership position.

THE RACE IS ON TO BUILD A BETTER BATTERY: NANOSCALE STRUCTURE SILICON POWDERS NEEDED

Presently, Silicon powders is used in a blended form with graphite but its content is typically [less than 5 wt%](#), which reflects the infancy of Si anode technology and explains the limited performance improvement achieved to date. Even at these levels, however, this is estimated to represent an addressable market of US \$ 1B by 2022² expanding at a [CAGR of 38.9% between 2019 – 2024](#).

The addressable market growth could be exponentially higher than projected as [research suggests](#) that replacing graphite materials with Nanoscale Structure Silicon (Si) powders in next generation Li-ion Batteries promises 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.

“PyroGenesis, the inventor of Plasma Atomization, has more than 20 years of experience manufacturing plasma atomized metal powders, so if anybody has the knowhow to use silicon materials produced from HPQ PUREVAP™QRR and manufacture Nanoscale Structure Silicon (Si) that can be used as high-capacity anode materials for next generations Li-ion batteries, it is them,” said Bernard Tourillon, President and CEO HPQ Silicon. *“Silicon’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.”*

“We are taken by the potential of this joint venture as it checks all of the boxes we consider before evaluating a new business line: It relates to our current activities, the market although niche is potentially massive, our expertise would be game changing, and the risk is low,” said Peter Pascali, President and CEO of PyroGenesis Canada Inc. *“We are equally excited about the market drivers for this product. The potential from the battery and energy storage markets alone is estimated, on first review, to be in the multi-billions of dollars. I look forward to evaluating this opportunity more closely.”*

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

² Source Marketandmakerts.com



RENEWABLE AND EV DEMAND INDICATE GLOBAL ENERGY STORAGE MARKET READY TO EXPLODE

At current growth rates of 2% per year, [global energy consumption](#) will be an estimated 125,000 Terawatt-hours 2020, which is 800,000 times more than the estimated storage capacity. A [recent report](#) by Wood Mackenzie Power projects that energy storage deployments are estimated to grow 1,300% from a 12 Gigawatt-hour market in 2018 to a 158 Gigawatt-hour market in 2024. An estimated US\$71 billion in investments will be made into storage systems where batteries will make up the lion's share of capital deployment.

As [reported by CNBC](#), private Venture Capital backed firms are also exploring the use of silicon in batteries and are positioning to provide the auto industry with the solutions needed to substantially improve vehicle performance.

About Silicon

Silicon (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. is a TSX-V listed company developing, 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 (Mg-Si) at prices that will propagate its significant renewable energy potential.

HPQ is also working with industry leader Apollon Solar to develop: Porous silicon wafers manufacturing using *PUREVAP™ Silicon (PVAP Si)* that can be used as anode for all-solid-state and Li-ion batteries; and a metallurgical pathway of producing Solar Grade Silicon Metal (SoG Si) that will take full advantage of the *PUREVAP™ QRR* one-step production of high purity silicon (Si) and significantly reduce the Capex and Opex associated with the transformation of quartz (SiO₂) into SoG-Si.

HPQ focus is becoming the lowest cost producer of Silicon (Si), High Purity Silicon (Si), Porous Silicon Wafers and Solar Grade Silicon Metal (SoG-Si). The pilot plant equipment that will validate the commercial potential of the process is on schedule to start in 2019.

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 the Company's Roncevaux Quartz Project, Matapedia Area, in the Gaspé Region, Province of Quebec.

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.

Neither the TSX Venture Exchange nor its Regulation Services Provider (as that term is defined in the policies of the TSX Venture Exchange) accepts responsibility for the adequacy or accuracy of this release.

For further information contact

Bernard J. Tourillon, Chairman, President and CEO Tel (514) 907-1011

Patrick Levasseur, Vice-President and COO Tel: (514) 262-9239

<http://www.hpqsilicon.com> Email: Info@hpqsilicon.com