

# HPQ Partner Apollon Solar Delivers First Batch of Carbon Coated Nano Silicon Powders to INRS for Evaluation

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## Advances Its Silicon Materials for Batteries Development Program

- HPQ Silicon produces first batch of carbon coated nano silicon powders.
- HPQ Silicon is developing a portfolio of silicon-based products using proprietary innovative low cost and scalable processes. The target objective is to produce high value speciality Silicon products needed by batteries and electric vehicle manufactures.

MONTREAL, Nov. 19, 2020 -- Innovative silicon solutions provider [HPQ Silicon Resources Inc.](#) ("HPQ" or "the Company") (TSX-V: HPQ; FWB: UGE; Other OTC : URAGF), is pleased to announce that, in addition to manufacturing samples of porous Silicon nanopowders of different sizes (2 nm to 1 µm) and pore structures (Microporous (<5nm), Mesoporous (5nm &ndash; 50nm) or Macroporous (>50nm)), HPQ Silicon R&D consortium member Apollon Solar of France has also commenced evaluation of different carbon encapsulating processes for Silicon nanopowders. As part of this HPQ - led effort, Apollon has delivered a first batch of carbon coated nano silicon powders to Professor Lionel Roux team at the Institut National de la Recherche Scientifique (INRS) for evaluation. Other batches of silicon materials (coated and non-coated) are being prepared and will be sent the INRS for evaluations over the coming weeks.

## ACCELERATING R&D ON NANO SILICON POWDERS CARBON COATING

Apollon proposed that in addition to carbon coating their porous Silicon nanopowders they could use commercially available but expensive (US\$ 22,500 per Kg)<sup>1</sup> nano silicon powders to evaluate the efficiency of different carbon coating processes. Using powders with the same characteristic as the powders to be produced by *HPQ NANO PUREVAP*<sup>®</sup>; *NANO SILICON REACTOR* should reduce our R&D timeline and give us valuable insight moving forward.

*"Producing carbon coated nano silicon powders for testing this early in the process is another demonstration of the depth and flexibility of HPQ's R&D consortium. HPQ is committed to staying at the forefront of Silicon for batteries R&D. This latest effort is part of our plan to produce products for renewable energy storage participants and electric vehicle manufacturers who continue to search for cost effective ways of increasing the Silicon contained in their batteries,"* said Bernard Tourillon, President and CEO HPQ Silicon. *"Silicon's potential to meet energy storage demand is undeniable, generating massive investments, and serious industry interest. We are very confident that demand for the Silicon materials we will produce, with our low-cost scalable processes, will be high demand by batteries and EV manufacturers in this renewable energy revolution."*

## SILICON POTENTIAL FOR BATTERY ANODE MATERIAL BECOMES MAINSTREAM

Tesla's latest battery day presentation confirmed that the future of battery anodes will include Silicon. Tesla's "plans on removing graphite from the anode" <sup>2</sup>, points to the need for innovative silicon solutions which HPQ is focused on, to make Silicon - based anodes technically and economically feasible for the production of more efficient rechargeable Li-batteries.

Presently, Silicon is used in a blended form with graphite and typically only represents around 5% by wt, which explains the limited performance improvements achieved to date. The primary hurdle to increasing Silicon anode content in Li-ion batteries is the mitigation of Silicon swelling and cracking during the lithiation phase<sup>3</sup> in order to achieve a cycling stability comparable to graphite.

Ongoing R&D indicates that the two most promising avenues for resolving these issues are:

1. Nanosizing Silicon powders to eliminate cracking during the lithiation phase.
2. Encapsulating the Silicon in order to improve its swelling and cracking characteristics.

HPQ is in the forefront of addressing these issues with the *PUREVAP®*; *NSiR* process and our ongoing work on porous silicon nanopowders and carbon coating nano silicon.

About HPQ Silicon

[HPQ Silicon Resources Inc.](#) (TSX-V: HPQ) is a Canadian Innovative Silicon Solutions Provider.

Silicon (Si), also known as silicon metal, is one of today's key strategic materials needed for the decarbonization of the economy and the Renewable Energy Revolution ("RER").

Silicon is the most abundant element in earth's crust but does not exist in its pure state and must be extracted from quartz (SiO<sub>2</sub>) in what has historically been a capital and energy intensive process. HPQ is building a portfolio of silicon-based products using innovative scalable processes. The target objective is to produce high value speciality Silicon products using technologies that will reduce energy consumption, GHG's, and carbon footprint.

Working with PyroGenesis Canada Inc. (TSX-V: PYR), a high-tech company that designs, develops, manufactures and commercializes plasma - based processes, HPQ is developing:

- The *PUREVAP®*; "Quartz Reduction Reactors" (QRR), an innovative process (patent pending), which will permit the one step transformation of quartz (SiO<sub>2</sub>) into high purity silicon (Si) at reduced costs, energy input, and carbon footprint that will propagate its considerable renewable energy potential;
- HPQ believes it will become the lowest cost (Capex and Opex) producer of silicon (Si) and high purity silicon metal (3N - 4N Si);
- Through its 100% owned subsidiary HPQ NANO Silicon Powders Inc, the *PUREVAP®*; *Nano Silicon Reactor (NSiR)*, a new proprietary process that can use different purities of silicon (Si) as feedstock, to make spherical silicon nanopowders and nanowires.
- HPQ believes it can also become the lowest cost manufacturer of spherical Si nanopowders and silicon-based composites needed by manufacturers of next-generation lithium-ion batteries.
- During the coming months, spherical Si nanopowders and nanowires silicon-based composite samples requested by industry participants and research institutions' will be produced using *PUREVAP®*; *SiNR*.

HPQ is also working with industry leader Apollon Solar of France to:

- Use their patented process and develop a capability to produce commercially porous silicon (Si) wafers and porous silicon (Si) powders.
- The collaboration will allow HPQ to become the lowest cost producer of porous silicon wafers for all-solid -state batteries and porous silicon powders for Li-ion batteries.
- Develop the hydrogen generation potential of Silicon nanopowders for use with the Gennao®; system.
- Commercialize, exclusively in Canada, and non-exclusive in the U.S.A., the Gennao®; H<sub>2</sub> system and the chemical powders required for the hydrolysis production of Hydrogen ("H<sub>2</sub>").

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](http://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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<sup>1</sup> Price paid by Apollon

<sup>2</sup> NBCFM September 23, 2020 Research Flash

<sup>3</sup> The incorporation of lithium into an electrode in a lithium-ion battery [LINK]

A photo accompanying this announcement is available at  
<https://www.globenewswire.com/NewsRoom/AttachmentNg/c09f5369-e54c-43d7-be84-fef906778191>

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