# HPQ Silicon and PyroGenesis Sign an Agreement to Develop a New Environmentally Friendly Process to Manufacture Fumed Silica

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- New process perfectly aligned with ESG principles sought by end buyers and investors:
  - Reduces the energy used to make fumed silica by a stunning 86%,
  - Does not use harsh chemicals, or release Hydrogen Chloride Gas (HCl)
  - Resolves ESG roadblocks to developing new markets for Fumed Silica.

MONTREAL, July 06, 2021 - HPQ Silicon Resources Inc. ("HPQ" or the "Company") (TSX-V: HPQ) (OTCQX: HPQFF) (FWB: UGE), is pleased to announce that HPQ Silica Polvere Inc ("HPQ POLVERE"), a 100% owned HPQ subsidiary, and PyroGenesis Canada Inc. (TSX: PYR) (NASDAQ: PYR) (FRA: 8PY) have signed a development agreement covering the *FUMED SILICA REACTOR* industrial pilot plant development program and the future commercialisation of fumed silica materials made with this newly developing green, proprietary and low cost manufacturing process. Figures 1 and 2, below, show the dramatic simplification of the new process compared to today's conventional process.

Figure 1) From to Quartz to Fumed silica - One Step New process from HPQ and PyroGenesis
Figure 1 is available at
https://www.globenewswire.com/NewsRoom/AttachmentNg/37d30151-3799-4f19-9502-e28186349464

Figure 2) From to Quartz to Fumed silica - complex conventional process and by-products
Figure 2 is available at
https://www.globenewswire.com/NewsRoom/AttachmentNg/3df3f917-6e5d-475e-affc-a14b98901698

THE NEW PROCESS: A LEAP FORWARD IN THE GREEN MANUFACTURING OF FUMED SILICA
As Figure 1 illustrates the new process, invented by PyroGenesis Canada Inc, represents a paradigm shift in the manufacturing of Fumed silica (Pyrogenic Silica). The new plasma-based process allows a direct Quartz to Fumed silica transformation, removing the usage of hazardous chemical in the making of Fumed silica and eliminating the Hydrogen Chloride Gas (HCl) associated with its manufacturing. Furthermore, the process requires 15,000 kWh to produce a MT of Fumed Silica, this represents a staggering 86% reduction in the energy footprint associated with manufacturing Fumed Silica. Finally, since the new process uses Quartz as feedstock, its capital requirements will only be a small fraction of what is required to build a traditional Fumed Silica plant.

ENVIRONMENTAL AND SOCIAL RISK ASSOCIATED WITH TRADITIONAL PROCESS TO MAKE FUMED SILICA
As Figure 2 demonstrates, conventional processes to manufacture fumed silica is a complex multi-step process that requires significant energy consumption (110,000 kWh to produce one Metric Tonne (MT) of Fumed Silica), involves many hazardous products and generates extreme by-products in the form of Hydrogen Chloride Gas (HCl), a highly regulated gas with stringent environmental constraints associated with its use. Traditional processes to make fumed silica are highly capital intensive, as the Silicon Tetrachloride feedstock necessary to the fumed silica manufacturing process can only be made by a Polysilicon plant, requiring > US$ 1.2 billion investment for 10,000 Metric Tonne per Year (MTA) capacity[1] to which you must add the > US$ 150 million cost to build a production line capable of producing 13,000 MTA[2] of fumed silica.

THE MARKET: FUMED SILICA ADDRESSABLE MARKET TO REACH US$ 2.2 BILLION BY 2022[3]
Fumed silica (Pyrogenic Silica) is a white microscopic powder with high surface area and low bulk density. Its commercial applications encompass various industries including personal care, pharmaceuticals, agriculture (food & feed), adhesives, sealants, construction, batteries and automotive to name a few. Demand for Fumed Silica is growing at 6% CAGR, with a global addressable market of US$ 1.5 billion in 2016 expected

to grow to US$ 2.2 billion in 2022, but present manufacturing processes are hindering its growth potential.

BUILDING AN INDUSTRIAL PILOT PLANT: PRODUCING FUMED SILICA FOR END BUYERS TESTING
The key areas covered by the agreement between HPQ POLVERE and PyroGenesis are:

1. *FUMED SILICA REACTOR 50 MT per Year* industrial pilot plant development program, schedule and cost assumed by HPQ POLVERE,
2. Acquisition of the *FUMED SILICA REACTOR PROCESS* Intellectual Property as it relates to the manufacturing of Fumed Silica by HPQ POLVERE,
3. Revenue distribution between HPQ POLVERE and PyroGenesis from the sales of Fumed Silica materials made with the *FUMED SILICA REACTOR PROCESS*.

The *FUMED SILICA REACTOR* industrial pilot plant development program is made of three phases.

1. Completing the engineering related to the fabrication of the pilot plant,
    1. To be completed by December 1st, 2021,
    2. HPQ POLVERE contribution to this phase of the program is $109,433,
2. Completing the fabrication, assembly, and Installation of the Pilot plant
    1. To be completed by July 15, 2022,
    2. HPQ POLVERE contribution to this phase of the program is $207,046,
3. Completing the commissioning, start-up, and operation of the Pilot Plant,
    1. This Phase is schedule to start on July 16, 2022, and run until March 1, 2023.
    2. HPQ POLVERE contribution to this phase of the program is $284,021.

FUMED SILICA REACTOR INTELLECTUAL PROPERTY AS IT RELATES TO FUMED SILICA MATERIALS
The agreement also covers HPQ POLVERE acquisition of the intellectual property rights to the Fumed Silica Reactor Process as it relates exclusively to the production of Fumed Silica (Pyrogenic Silica) (the "Field") from PyroGenesis. The acquisition cost of the Fumed Silica Reactor Process IP is CAD$3,300,000.

PyroGenesis will retain a royalty-free, exclusive, irrevocable worldwide license to use the process for purposes other than the production of Fumed Silica (Pyrogenic Silica). Should PyroGenesis be approached by any other parties for any research and development or commercial purposes outside of the Field, HPQ POLVERE shall have a right of first refusal, provided that, however, HPQ POLVERE exercise its right of first refusal within thirty (30) days of PyroGenesis receiving a bona-fide offer.

REVENUES SPLIT BETWEEN HPQ POLVERE & PYROGENESIS FROM SALES OF FUMED SILICA MATERIALS
The autonomous potential of this project is such that it was deemed more efficient for HPQ Silicon to create, from the start, a fully own subsidiary, HPQ Silica Polvere Inc, to be the stand-alone Corporation that would finance HPQ contribution to the pilot plant program, through loans from parent company HPQ, the acquisition of the IP and manage the future commercialisation of Fumed Silica (Pyrogenic Silica) materials made with the Fumed Silica Reactor Process.

As with all our other transactions with PyroGenesis, HPQ POLVERE agrees to pay PyroGenesis, on an annual basis, a minimum royalty (Pyrogenic Silica Royalty), with PyroGenesis being granted the right to convert, at any time and at its sole discretion, its Royalty into a 50% equity stake in HPQ POLVERE.

As a result of this, HPQ POLVERE agrees to pay PyroGenesis, on an annual basis, and until conversion, the following minimum royalty (Pyrogenic Silica Royalty), on the gross sales of Pyrogenic Silica, excluding samples and testing products, produced with any Systems incorporating the Reactor and Process IP and/or the Optioned Rights:

1. For 2023, the greater of 10% of HPQ POLVERE gross sales or fifty thousand Canadian dollars (CDN$50,000),
2. For 2024, the greater of 10% of HPQ POLVERE gross sales or one hundred thousand Canadian dollars (CDN$100,000),
3. For 2025, the greater of 10% of HPQ POLVERE gross sales or one hundred and fifty thousand Canadian dollars (CDN$150,000),
4. For 2026 and beyond, the greater of 10% of HPQ POLVERE gross sales or two hundred thousand Canadian dollars (CDN$200,000).

"*With over 25 years of expertise in torch plasma applications, PyroGenesis is a market leader in green deployment of plasma technologies. As the project enter the industrial Pilot Plant development phase, we are very excited to have been chosen to participate in this new venture with PyroGenesis. The business opportunity that this represent should not be underestimated and could be as significant as the ones represented by the PUREVAP™ family of processes we are developing with PyroGenesis,"* said Bernard Tourillon, President and CEO HPQ Silicon. *"Over US$50 billion in capital flowed in US ESG funds in 2020, and these are the types of investment they are looking for, so our timing could not be better. Our market research has identified several sectors wishing to improve their environmental footprint, and HPQ's innovative silicon solutions is prepared to meet this demand."*

*"This Agreement represents another significant milestone in our relationship with HPQ and, once again, underscores the many hidden opportunities within this partnership," said M. P Peter Pascali, President and CEO of PyroGenesis. "This Contract is another testament to PyroGenesis' solid position as an emerging leader in GHG emissions reduction. In fact, this opportunity is a natural extension of what is being targeted by the Company, and aligns itself well with environmental initiatives currently taking place worldwide."*

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 products. The Company provides its engineering and manufacturing expertise and its turnkey process equipment packages to customers in the defense, metallurgical, mining, advanced materials (including 3D printing), and environmental industries. With a team of experienced engineers, scientists and technicians working out of its Montreal office and its 3,800 m2 and 2,940 m2 manufacturing facilities, PyroGenesis maintains its competitive advantage by remaining at the forefront of technology development and commercialization. The Company's core competencies allow PyroGenesis to provide innovative plasma torches, plasma waste processes, high-temperature metallurgical processes, and engineering services to the global marketplace. PyroGenesis' operations are ISO 9001:2015 and AS9100D certified. For more information, please visit www.pyrogenesis.com.

About HPQ Silicon Resources
HPQ Silicon Resources Inc. (TSX-V: HPQ) is a Quebec-based innovative silicon solutions company that offers innovative silica ($SiO_2$), silicon (Si) based solutions and is developing a unique portfolio of high value-added silicon (Si) products sought after by battery and electric vehicle manufacturers.

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"). However, silicon does not exist in its pure state and must be extracted from quartz ($SiO_2$) in what has historically been a capital and energy-intensive process.

With PyroGenesis Canada Inc. (TSX: PYR) (NASDAQ: PYR), HPQ is developing the *PUREVAP™ "Quartz Reduction Reactors" (QRR)*, an innovative process (patent pending), which will permit the one-step transformation of quartz ($SiO_2$) into high purity silicon (Si) at reduced costs, energy input, and carbon footprint that will propagate its considerable renewable energy potential. Through its 100% owned subsidiary, HPQ NANO Silicon Powders Inc., the *PUREVAP™ Nano Silicon Reactor (NSiR*) is a new proprietary process that can use different purities of silicon (Si) as feedstock, to make a wide range of nano/micro spherical powders of different sizes and nanowires. For more information, please visit HPQ Silicon web site.

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 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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For further information contact:
Bernard J. Tourillon, Chairman, President and CEO Tel +1 (514) 907-1011
Patrick Levasseur, Vice-President and COO Tel: +1 (514) 262-9239
Email: Info@hpqsilicon.com

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[1]https://www.pv-tech.org/hemlock_reveals_scale_of_new_polysilicon_plant/
[2]https://www.rubbernews.com/article/20170117/NEWS/170119962/wacker-to-add-fumed-silica-plant-at-tennessee-cam
[3] Source Marketandmakerts.com