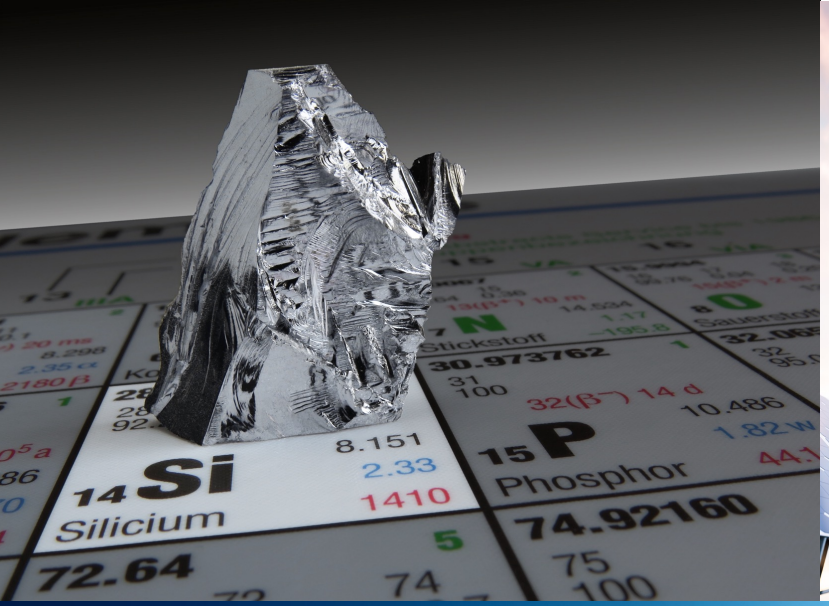




HPQ – SILICON
RESOURCES

# STRATEGIC SILICON SOLUTIONS

# POWERING THE CLEAN ENERGY TRANSITION

HPQ
LISTED
TSXV

OTCQX
THE BEST MARKET
HPQFF

# “NET ZERO” INVESTMENT EXPECTED TO REACH $6 TRILLION ANNUALLY

Goldman CNBC (OCT 20 2021)

## HPQ: DEVELOPING NEW PROCESSES TO MAKE THE CRITICAL ELEMENTS NECESSARY FOR NET ZERO

- **Ready to become the lowest cost producer of silicon nanomaterials needed for the renewable energy revolution:**
  - Spherical Silicon Nanopowders and Nanowires for Li-ion Batteries
    - ✓ ***Material potential, already generated multiple NDA’s with battery manufacturers and advance material companies***
    - ✓ ***Received a firm order for Si Nanopowders from major car manufacturer***
- **Ready to become the lowest cost producer of Pure Silicon (99.5% Si up to 99.99% Si) for specialty applications**
  - Silicon Micron size powders for Li-ion Batteries and other applications
    - ✓ ***Material potential, already generated an NDA by major players with request for material***
- **Supported by world class technology partners**

# DISCLAIMERS

This presentation includes certain

## "FORWARD-LOOKING STATEMENTS"

All statements, (other than statements of historical fact included herein), including, without limitation, statements regarding future plans and objectives of the company, are forward-looking statements that involve various risks, assumptions, estimates and uncertainties, and any or all of these future plans and objectives may not be achieved.

These statements reflect the current expectations or beliefs of HPQ-Silicon Resources Inc. ("the Company") and are based on information currently available to the Company. There can be no assurance that such statements will prove to be accurate, and actual results and future events could differ materially from those anticipated in such statements. All of the forward looking statements contained in this presentation are qualified by these cautionary statements and the risk factors described above. Furthermore, all such statements are made as of the date this presentation is given.

An investment in the Company is speculative due to the nature of the its business. The ability of the Company to carry out its plans as described in this confidential presentation depends on obtaining the required capital. There is no assurance that the Company will be able to successfully raise the capital required or to complete each of the growth initiatives described. Investors must rely upon the ability, expertise, judgment, discretion, integrity and good faith of the management and Board of the Company.

The Corporation is focused on developing the *PUREVAP™ processes. The PUREVAP™ Quartz Reduction Reactor (QRR),* (Patent Pending) a new carbothermic process to transform Quartz into Silicon, and the *PUREVAP™ Nano Silicon (Si)* Reactor (NSiR), (Provisional Patent applied) a new process to transform Silicon (Si) into Spherical Nano powders and Nano wires for Lithium-ion batteries. The terms Silicon, Silicon Metal and Si are used interchangeably. Metallurgical Grade Silicon or Mg Si refers to Silicon Metal of a purity between 98.0% Si and 99.5% Si.

Any monetary values given to end product produced by the equipment, projected capital or operating cost and savings associated with the development of process should not be construed as being related to establishing the economic viability or technical feasibility on any of the Company's quartz properties or more specifically the Roncevaux Quartz Project, Matapedia Area, in the Gaspe Region, Province of Quebec.

# INVESTMENT HIGHLIGHTS

## DEVELOPING NEW TECHNOLOGIES AND PRODUCTS FOR A GREENER FUTURE

- **HPQ PURE SILICON INITIATIVES**
  - **Developing Strategic Silicon solutions with proprietary low-cost transformation technologies**
    - **Transforming Silica into higher value products (ex: for the Battery sector, Silicon Nitride, and more)**
    - **Technologies protected by multiple HPQ owned patent applications**
- **HPQ FUME SILICA INITIATIVES**
  - **Developing a proprietary new low-cost green transformation technologies to make Fume Silica**
    - **Applications to a wide range of industries (pharmaceuticals, agriculture, and more)**
    - **Technology protected by at least 1 HPQ patent application**
- **Innovative technologies can support other verticals such a green hydrogen processing**
- **Measured and achievable 3-year growth plans for commercializing technologies**
- **Experienced management team and Board supported by tech partner PyroGenesis Canada Inc**
- **Strong institutional support from major shareholder IQ Investissement Quebec**

# SILICON AND ITS MARKETS

Silicon (Si) or Silicon Metal, is a semi-conductor material and the second most abundant element in earth's crust. Like all other energy metals (lithium, graphite, cobalt, nickel, etc.) it does not exist in its pure state, and is expensive to extract!

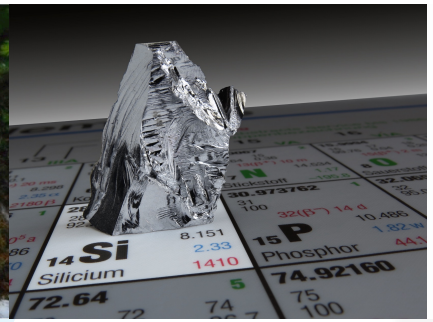
EU declared Silicon a critical raw material as a wide range of modern technologies depend on it to make various numbers of industrial and consumer products

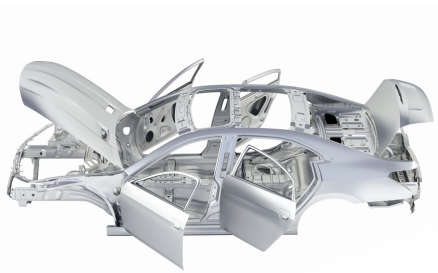
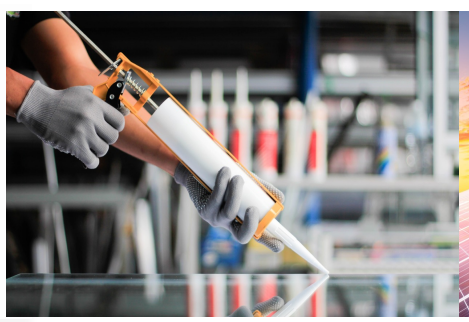
ESG aspect of its manufacturing and transformation are becoming crucial factors for end users

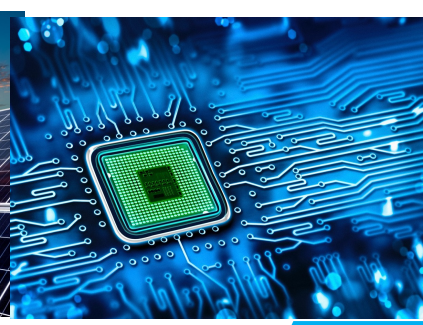
- To extract it commercially from Quartz ($SiO_2$) an expensive & energy intensive carbothermic process, first invented in 1899, is still used
- Depending on final application, (Solar, Electronics, Batteries) Chemical grade Silicon (99.5% Si) must either be purified & or engineered

**SILICON (Si) DEMAND TO REACH 3.8 MILLION TONNES, WORTH US$ 10 BILLION BY 2025** **(Source CRU)**

- The bulk of the growth will be driven by demand for chemical grade Silicon
- New plants will be needed to meet demand
- Traditional processes to make Silicon have a significant obstacle for new entrants: access to process know-how
- Most of the "low hanging fruit" have been picked and near-term alternatives to Chinese supply are limited



# SILICON CHALLENGES ARE HPQ OPPORTUNITIES

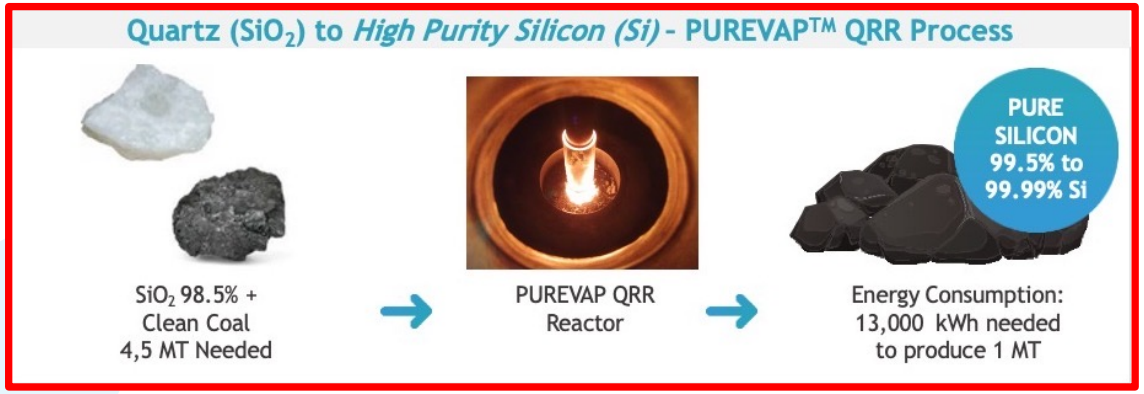
## THE SILICON MARKET IS RIPE FOR THE DEVELOPMENT OF DISRUPTIVE TECHNOLOGIES

## HPQ STRATEGIC SILICON SOLUTION INITIATIVES FOCUS ON DEVELOPING THESE DISRUPTIVE TECHNOLOGIES

## HPQ FIRST DISRUPTIVE TECHNOLOGY : LOW COST 4N+ (99.99%) SILICON

### The *PUREVAP™ Quartz Reduction Reactor (QRR)*

- *A new low capex, opex and carbon footprint process to make up to 4N+ Si in one step*
- *This technology is a unique proprietary process protected by patent applications*
- *Developing this technology, HPQ is gaining unique Silicon process know-how*
- *Commercial validation of this new process starting end of Q1 2022*
- *4N+ Silicon is HPQ's fundamental product that opens up many high value product lines*



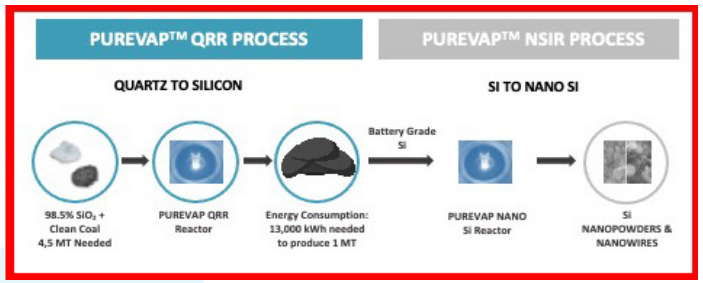

# HPQ SILICON MARKETS & APPLICATIONS

## Industrial demand for *PUREVAP™ QRR* Silicon is large and will be driven by the following factors:

- Auto and EV manufacturers use Metallurgical Grade Silicon (98.5% Si) to make vehicles lighter & stronger
- Demand for Chemical Grade Silicon (99.5% Si) as feedstock to make:
  - Silicones, an end market growing at a 10.7% CAGR, expected to reach US$ 23 B by 2025 (Source marketsandmarkets.com)
  - Polysilicon for solar & electronics, an end market growing at 20% CAGR expected to surpass US$ 200 B By 2026 (Source Facts and Factors Research)
- Demand for High Purity Silicon (99.99% Si) as feedstock to make:
  - Micro size silicon powders for battery applications and other high value applications
  - Nano silicon powder and Nano wires for battery applications

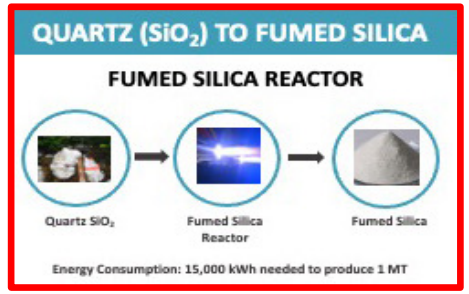
## HPQ ALSO DEVELOPING OTHER DISRUPTIVES TECHNOLOGIES NEEDED FOR A GREENER FUTURE

### The *PUREVAP™ Nano Silicon Reactor (NSiR)*



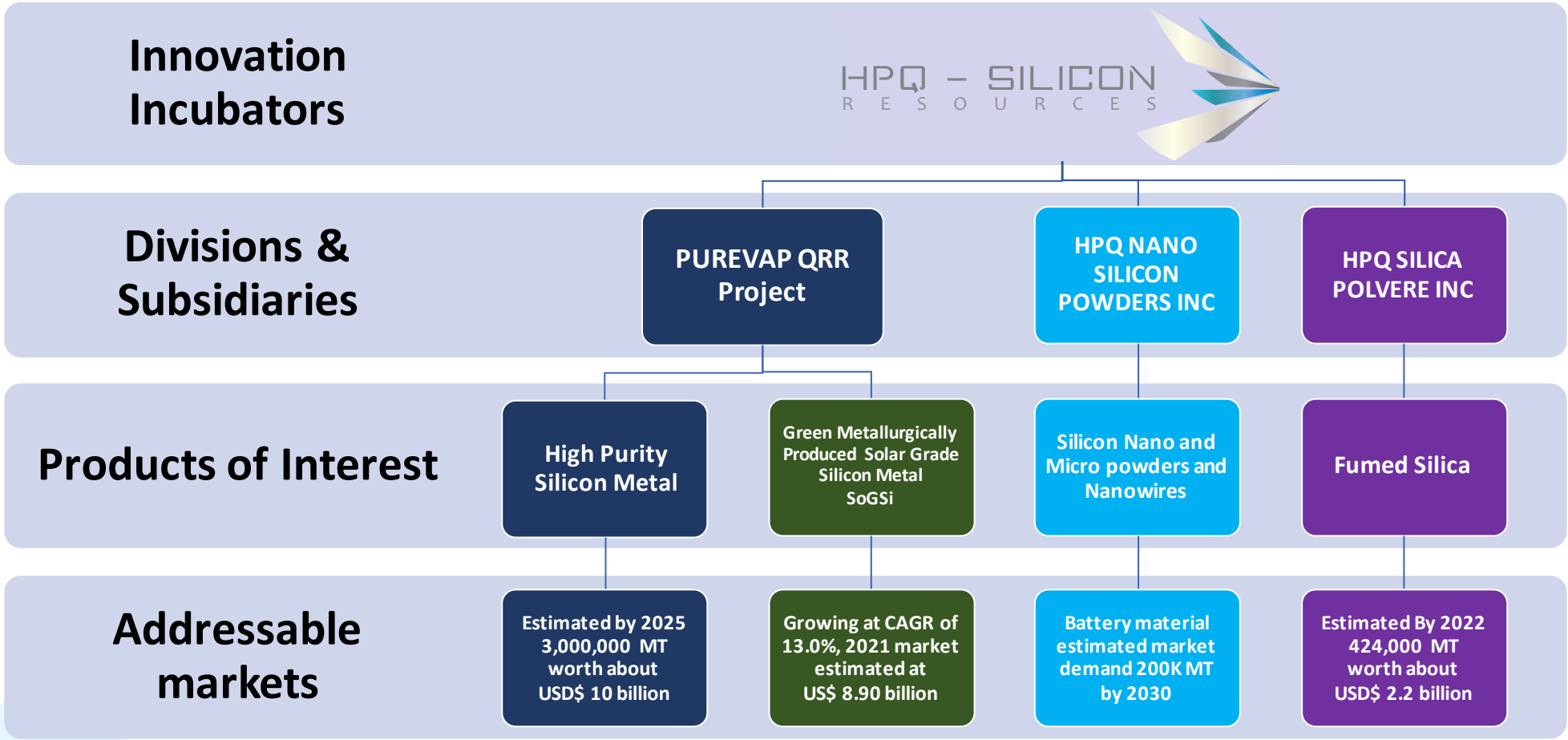

*Low-Cost process to transform PUREVAP™ QRR Si into Nano Materials for Batteries*

### The *FUMED SILICA Reactor (FSR)*

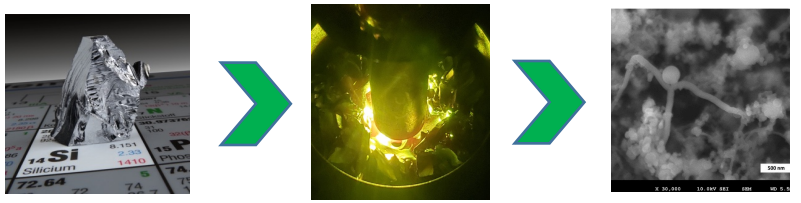



*Low-Cost process to make Fumed Silica without using hazardous chemical*

# VALUE PROPOSITION: DEVELOP & MONETIZE

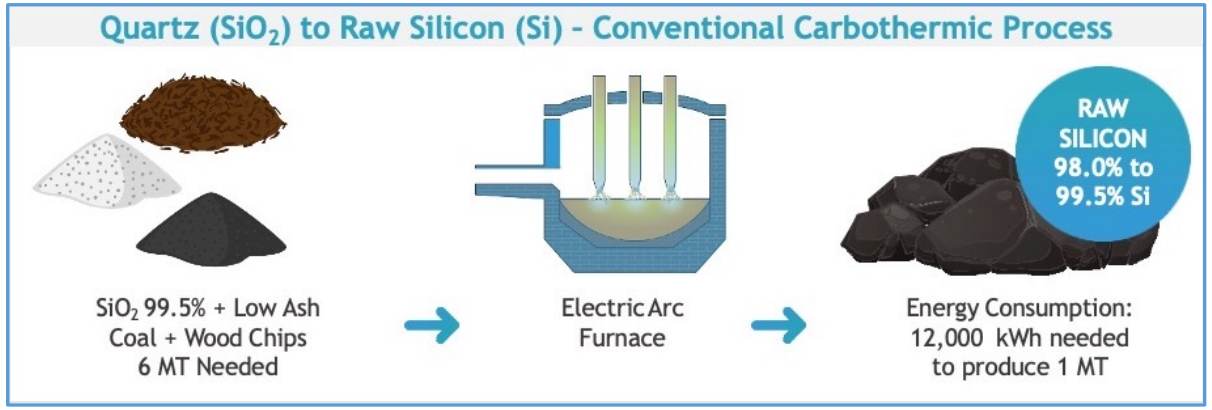


# HPQ DISRUPTIVE TECHNOLOGIES

| PROJECTS | DEVELOPING GAME CHANGING TECHNOLOGIES WITH PYROGENESIS SINCE 2015 | |
|---|---|---|
| ***PUREVAP™ QRR***<br>***50 MTY Pilot Plant***<br>***startup end of Q1 2022*** | *From Quartz to High Purity Silicon in one step* |  |
| ***PUREVAP™ NSiR***<br>***Ongoing bench testing*** | *From High Purity Silicon to Nano Materials for Li battery anodes in one step* |  |
| **FUMED SILICA**<br>***50 MTY Pilot Plant***<br>***startup Q2 2023*** | *From Quartz to fumed silica in one step* |  |
| **DOWNSTREAM APPLICATIONS** | *Deploying Silicon & Nano Silicon materials in high value applications* |  |

# *PUREVAP™ QRR* – OUR FUNDAMENTAL DISRUPTIVE TECHNOLOGY

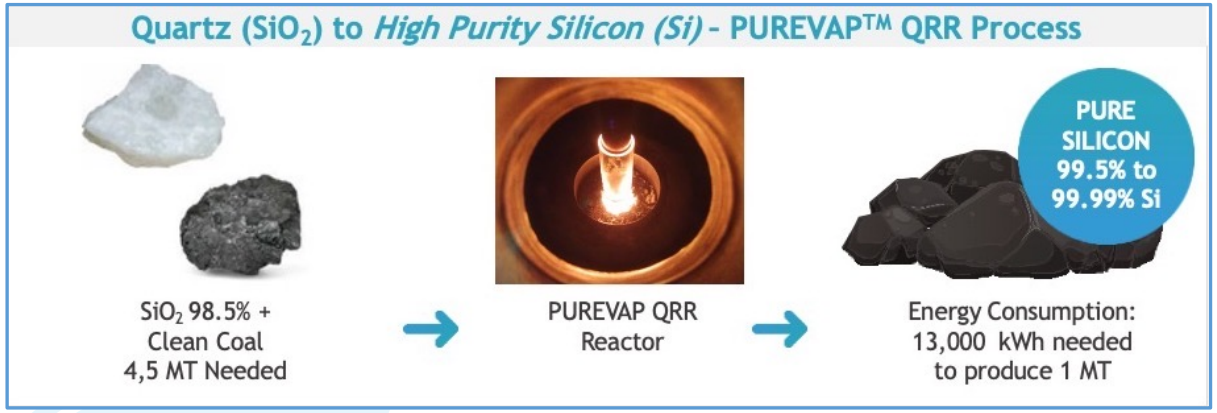
## ➢ GAME CHANGING VERSATILITY VERSUS CONVENTIONAL PROCESS DATING FROM 1899




**Conventional plants produce 98 to 99.5 Silicon (Si):**

- Scalable by minimum increments of 30,000 MTY
  - Minimum investment > US$ 200 M
- 2N+ Si production limited at 40% of plant output
- Requires additional purification steps for Battery use
- Need 6 MT of Feedstock to produce 1 MT
- On average, it costs > US$ 1,800/mt to make 98% Si (Mg Si)

## ➢ *PUREVAP™ QRR:* THE BEST OPTION FOR NEW PLANTS NEEDED TO MEET SILICON DEMAND




***PUREVAP™ QRR* process to produce up to 99.99% Si:**

- Scalable by minimum increments of 2,500 MTY
  - Minimum investment 85% - 90% less than conventional plant
- 4N+ Si production in one step
  - Perfect for Battery applications for less than raw silicon
- Need 4.5 MT of Feedstock to produce 1 MT
- New process expected to make 4N Si for < US$ 1,400/mt

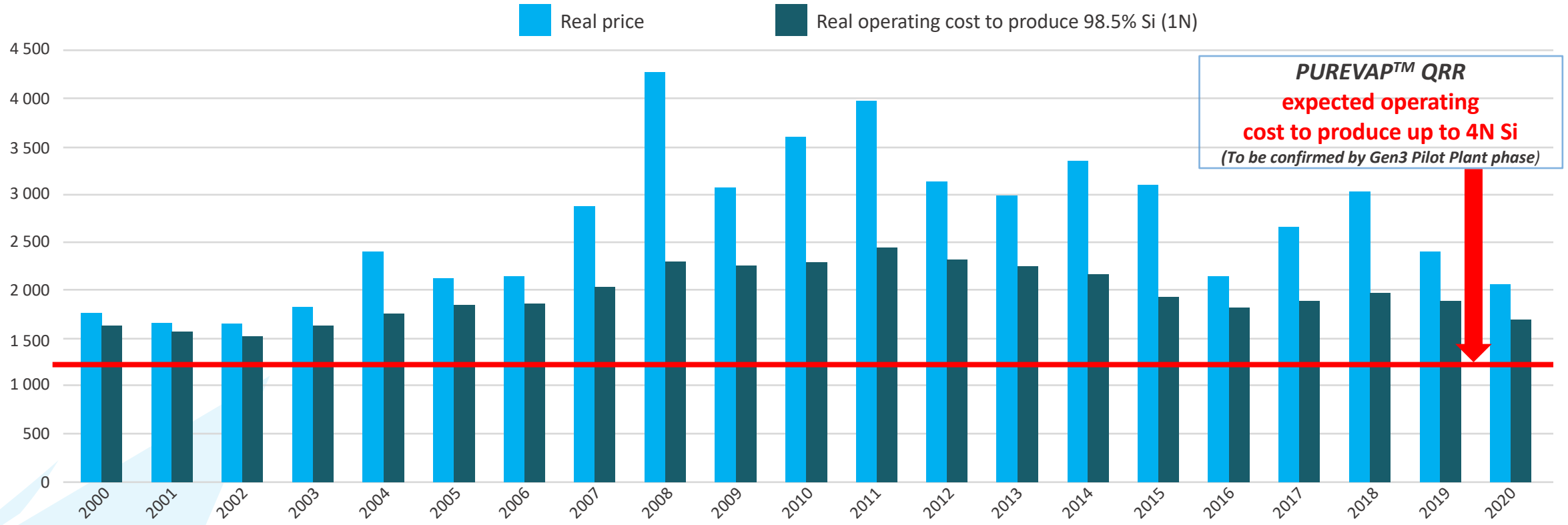
# *PUREVAP™ QRR* – LOW COST, LOW EMISSIONS

## *PUREVAP™ QRR* OPEX VERSUS CONVENTIONAL Si PRODUCERS

Silicon in the 2020s

### Inflation-adjusted prices are higher than they were in the early 2000s

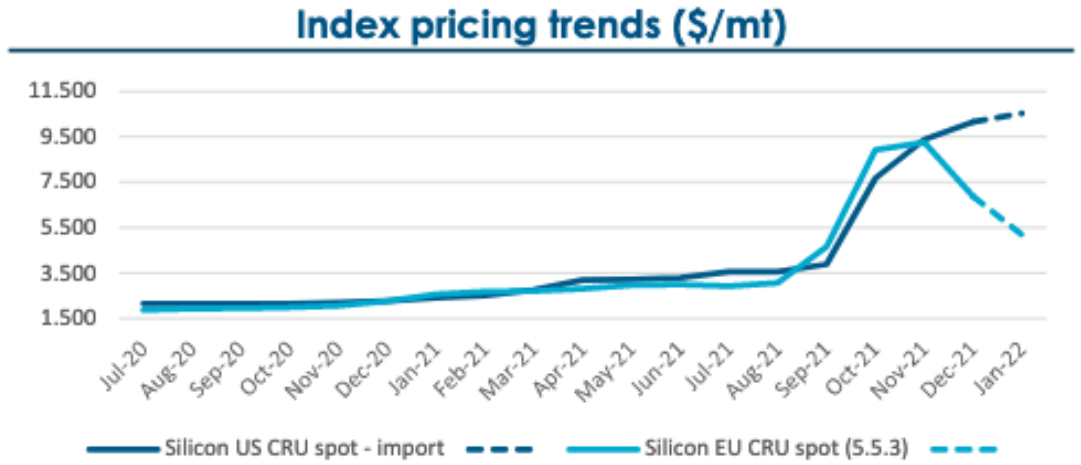
US spot price of 5.5.3 grade silicon vs. avg. operating cost at plants outside China and the CIS in real terms, $/t




Data: CRU

# *PUREVAP™ QRR* PILOT PLANT STARTUP END OF Q1 2022

## AS US SILICON PRICES ARE TRENDING UP




**US SILICON SPOT PRICE AT THE END 2021 WAS US$ 10,000 MT**

Source Ferroglobe, Q4 2021 FS

## NEW EMERGING MARKETS FOR SILICON: ENERGY AND BATTERY SECTORS

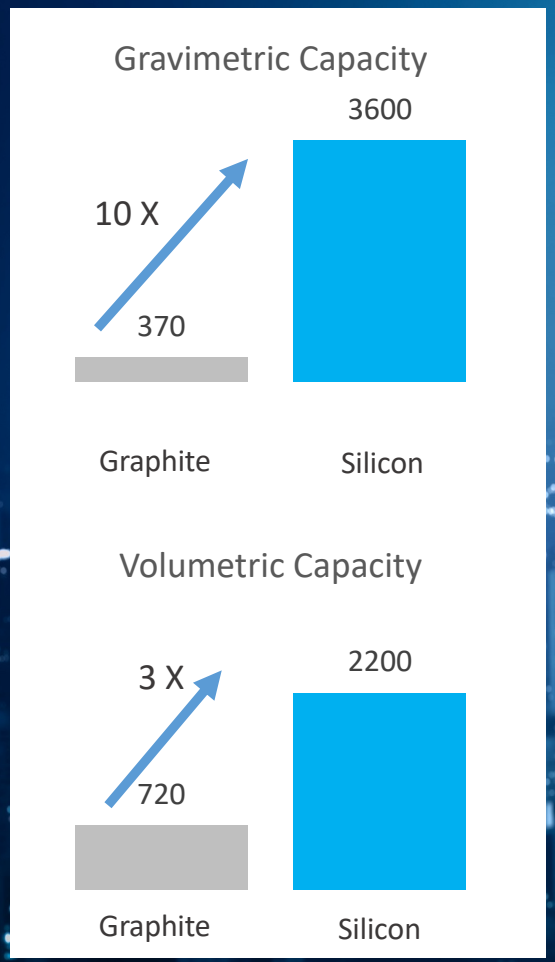
- Silicon for batteries demand is projected to exceed 200K MT worth ≈ US$ 2.6 B by 2030 (CAGR +50%), (Sources CRU and BusinessKorea.co.kr)

**HPQ UNIQUE ADVANTAGES IN THIS NEW MARKET**

- ***PUREVAP™ QRR*** capability to produce 3N to 4N Silicon in one step
- The ***PUREVAP™ NSiR,*** with a capability to transform the silicon produced by the ***PUREVAP™ QRR*** into the nano silicon material battery manufacturers are looking for. A perfect demonstration of HPQ Strategic Silicon Solution in action

# SILICON NANO POWDERS TO IMPROVE BATTERY CAPACITIES

## INNOVATIVE SOLUTION NEEDED FOR COMMERCIAL DEPLOYMENT OF SILICON IN BATTERIES




**HPQ IS WORKING TO BE READY TO PRODUCE, AT LARGE SCALE AND AT PRICE PARITY TO GRAPHITE, THE SILICON MATERIAL NEEDED BY BATTERY MANUFACTURERS**

# *PUREVAP™ NSiR* – WHAT THE BATTERY INDUSTRY NEEDS

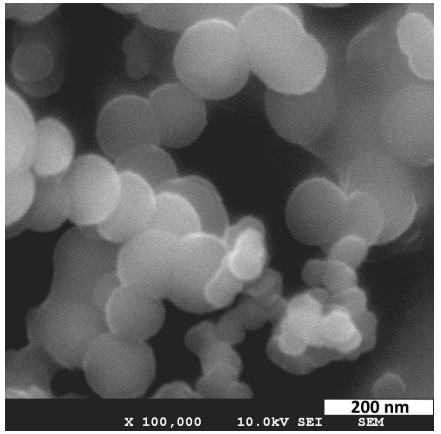
## HPQ NANO DEVELOPING A PROCESS TO PRODUCE THE NANO & MICRO Si MATERIAL NEEDED FOR BATTERIES

### MAKING SILICON MATERIALS FOR BATTERIES

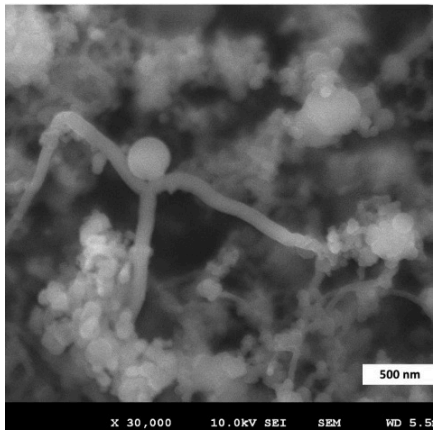
SILICON (Si) to NANOPOWDERS AND NANOWIRES - PUREVAP™ NSiR Process


A new scalable, versatile, low-cost plasma process with a capability to produce tailor made spherical Si materials from < 100 nanometer (nm) up to 5 micrometres (μm)

Material produced by PyroGenesis during proof of concept test




SILICON NANOPOWDERS




SILICON NANOWIRES

We have already signed 6 NDA's with battery manufacturers and received one order from a major car manufacturer

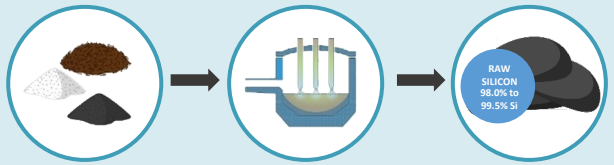
## STARTING COMMERCIAL VALIDATION OF A NEW LOW-COST PROCESS

- *PUREVAP™ NSiR is* a game-changing low-cost plasma-based process:
  - *NSiR* can transform HPQ *PUREVAP™ QRR* battery grade Si into the nano & micro size Si materials that batteries and EV manufacturers are looking for to improve anode efficiency
  - *NSiR* will offer advanced Si material for battery anodes at price parity with graphite

# HPQ NANO SILICON SOLUTIONS VS COMPETITION

## CONVENTIONAL CARBOTHERMIC PROCESS

### QUARTZ TO SILICON



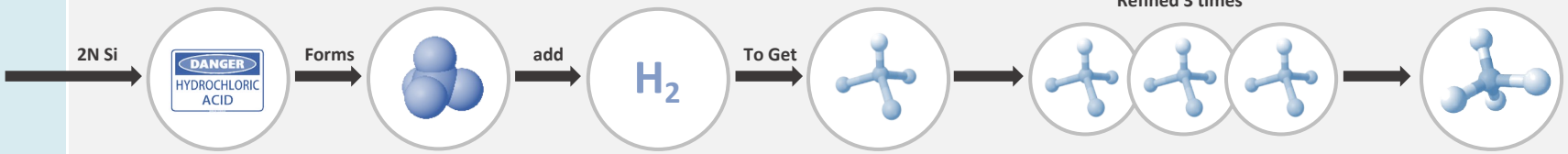

99.5% $SiO_2$ + Low Ash Coal + Wood Chips 6 MT Needed

Electric Arc Furnace

Energy Consumption: 12,000 kWh needed to produce 1 MT

## SILICON TO SILANE GAS PROCESS

### REC SILICON




Dissolved in

Silicon tetrachloride

Trichlorosilane

Silane Gas

## *HPQ PUREVAP™ PROCESSES: Simple and straightforward*

### PUREVAP™ QRR PROCESS

#### QUARTZ TO SILICON

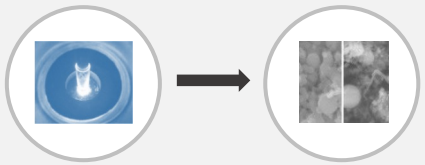

98.5% $SiO_2$ + Clean Coal 4,5 MT Needed

PUREVAP QRR Reactor

Energy Consumption: 13,000 kWh needed to produce 1 MT

### PUREVAP™ NSIR PROCESS

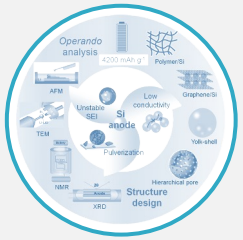
#### SI TO NANO SI

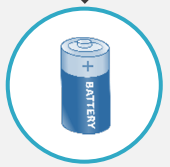



PUREVAP NANO Si Reactor

Si NANOPOWDERS & NANOWIRES

## Si Anode Materials




Cell / Battery manufacturing

**RF thermal plasma (Tekna )**

**CVD Process (Group14 Technologies, Amprius)**

**Nano Silicon materials**

# QUEBEC AN EMERGING KEY HUB FOR BATTERY SUPPLY CHAIN


HPQ is a Quebec - based company and stands to benefits from these initiatives

## Developing a uniquely clean and traceable supply chain

7

Clean energy

**Cathode active materials (LFP)**
- Battery material recycling experience
- Licence from HQ

**Lithium***
- Green electrolysis transformation and closed loop process Value-added bi-products
- Respects Québec's leading green mining regulations

**Recycled active materials (Ni, Co, Mn, Li)**
- Recycles 95% of EV battery components at battery grade purity
- Hydrometallurgical process

**Natural graphite***
- Carbon-neutral all-electric transformation – no petroleum products
- Innovative tailings management – waste collected and sold as bi-product

**Silicon**
- Tekna (nano-silicon powder, plasma process), HPQ Silicon, NanoSiEnergy. Ferroglobe Québec and Elkem have the expertise

Cathode active material

Anode active material

Cell

Clean Process

**Traceability is key**
- Québec's goal is to become the **1st location in North America to provide traceability for green batteries**
- Québec is home to OPTEL Group, a leading global provider of traceability systems, and many more!

OPTEL

* In development.
Source: Ministère de l'Énergie et des Ressources naturelles, "Québec Plan for the Development of Critical and Strategic Minerals 2020-2025 (QPDCSM)", 2021.

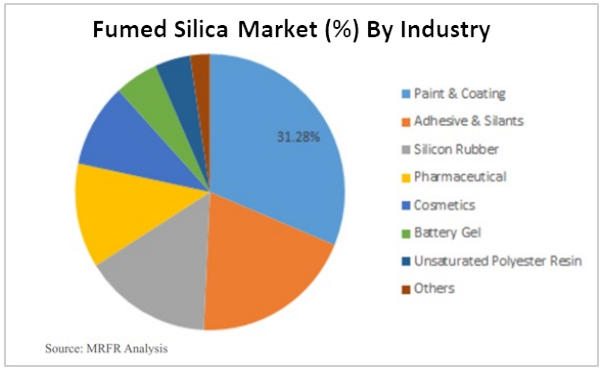
Investissement Québec International

Québec

# FUMED SILICA REACTOR: ANOTHER DISRUPTIVE TECHNOLOGY

- Fumed Silica (Pyrogenic Silica) is a versatile value-added white microscopic powder with high surface area & low bulk density
- Due to its unique properties commercial applications encompass various industries including personal care, pharmaceuticals, agriculture (food & feed), adhesives, sealants, construction, batteries and automotive to name a few

| | REAL | | Projection | |
|---|---|---|---|---|
| | 2016 | | 2022 | |
| Fumed Silica Market | Quantity MTY | Value (USD) | Quantity MTY | Value (USD) |
| Global | 300,000 | 1,500 Million | 425,000 | 2,263 Million |
| North American | 59,100 | 416 Million | 76,000 | 575 Million |
| Canadian | 19,300 | 136 Million | 24,400 | 185 Million |

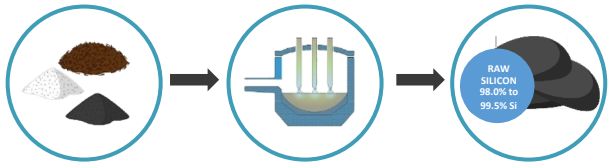



- In 2021, HPQ signed an agreement with PyroGenesis covering the development of a new Fumed Silica Reactor development program and the future commercialisation of fumed silica materials produced by the process
- Included in the agreement, the $2 million stated cost of construction and operation of a 50 mt per year commercial pilot plant will be covered by the following parties:
  - The Federal Government of Canada (SDTC) will pay ≈ 33% of the cost,
  - The Quebec Government (TED) will pay ≈ 30% of the cost,
  - HPQ Silica Polvere Inc (an HPQ subsidiary) will pay ≈ 29% of the cost, and
  - PyroGenesis Canada Inc will cover the remaining ≈ 8% and act as operator

# TRADITONAL FUMED SILICA PROCESS VS NEW PROCESS

## QUARTZ ($SiO_2$) TO SILICON (Si)

### CONVENTIONAL PROCESS TO MAKE SILICON




99.5% $SiO_2$ + Low Ash Coal + Wood Chips 6 MT Needed

Electric Arc Furnace

Energy Consumption: 12,000 kWh needed to produce 1 MT

## SILICON (Si) TO FUMED SILICA ($SiO_2$)

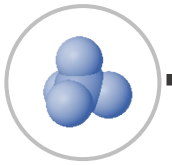
### CONVENTIONAL PROCESS TO MAKE FUMED SILCIA

2N Si


Dissolved in

Forms

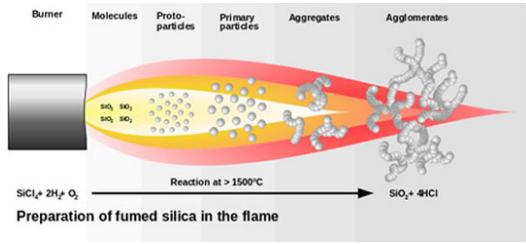
SiCl4



Silicon tetrachloride

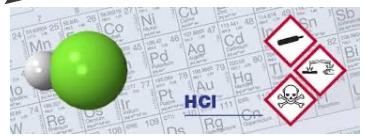
add

$H_2$
$O_2$




Energy Consumption: 98,000 kWh needed to produce 1 MT of Fumed Silica

Fumed Silica




Hydrogen Chloride Gas

**HPQ: Simple and straightforward Solutions**

## QUARTZ ($SiO_2$) TO FUMED SILICA

### FUMED SILICA REACTOR

Quartz $SiO_2$

Fumed Silica Reactor

Fumed Silica

Energy Consumption: 15,000 kWh needed to produce 1 MT

- The new plasma-based process allows a direct Quartz to Fumed silica transformation
  - Removing the need for hazardous chemicals in the Process, and
  - Eliminating Hydrogen Chloride Gas (HCl) releases
- New process requires 15,000 kWh/MT, versus 110,000 kWh/MT for traditional process
  - A staggering 86% reduction in the energy footprint
- The process feedstock is Quartz not Silicon, this will make its Capex a small fraction of what is required to build a traditional Fumed Silica plant

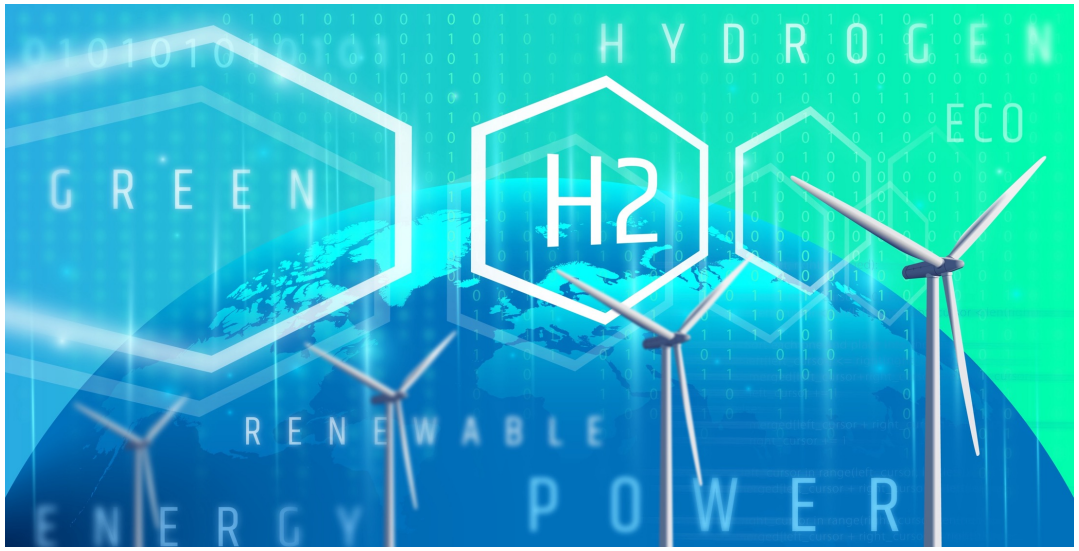
# OTHER HPQ OPPORTUNITIES

## COMPLEMENTARY HYDROGEN VENTURES

HPQ is exploring hydrogen-based ventures, that could be complementary to its Silicon / Silica projects

Two processes under evaluation:

1. Swiss based company $EBH_2$ Systems SAS to evaluate green hydrogen technology
   - ➢ Working together to develop an industrial scale $EBH_2$ system to power HPQ *PUREVAP™ QRR & NSIR* processes and thereby produce the greenest silicon materials
2. Developing our processes of making hydrogen via hydrolysis of nanosilicon materials made by our *PUREVAP™ NSiR*




# HPQ INNOVATIONS: INDICATIVE TIMELINE

## STARTED IN 2015, HPQ HAS IMPLEMENTED AN INNOVATION DRIVEN TECHNOLOGY DEVELOPMENT STRATEGY

| PROJECTS | 2022 | 2023 | 2024 | 2025 |
|---|---|---|---|---|
| ***PUREVAP™ QRR*** | *Gen3 commissioning* | *Gen3 QRR Pilot plant validation of technology, commercial scaling up decision*<br>*Using Gen3 High Purity Silicon to make micron size powders for Batteries and Silicon nitride markets* | *Gen4 PUREVAP™ QRR commercial plant (s) Engineering– Construction – Commissioning*<br>*Evaluate the option of continuing using Gen3 High Purity Silicon to make micron size powders for Batteries and Silicon nitride markets* | *Start of commercial production* |
| ***PUREVAP™ NSiR*** | *Gen1 NSiR tech development* | *Gen2 NSiR proof of commercial scalability Engineering – Construction – Commissioning*<br>*Gen1 NSiR to make nano size silicon materials for batteries anode manufactures* | *Gen2 NSiR Ops. Pilot Plant decision*<br>*Engineering – Construction – Commissioning of Gen3 NSiR Pilot Plant*<br>*Using Gen2 NSiR then Gen3 NSiR to transform QRR silicon into nano & micro size silicon materials for batteries anode manufactures* | *Gen3 NSiR validation of technology, commercial scaling up decision* |
| **FUMED SILICA** | *Engineering – Construction – Commissioning of Fumed Silica Pilot Plant* | *Pilot plant validation of technology & commercial scaling up decision*<br>*Using Fumed Silica Pilot plant to produce materials for potential end buyers* | *Fumed Silica commercial plant (s) Engineering – Construction – commissioning* | |
| **OTHERS** | *EBH2 Technology validation*<br>*Developing high value applications usage for HPQ Silicon and Nano Silicon (Porous Silicon, Silicon for Hydrogen, and others)* | | | |

# UPCOMING CATALYSTS

- ***PUREVAP™ QRR* Project**
  - ❑ Start of Pilot Plant
  - ❑ Production of 3 and 4 N Silicon
  - ❑ Production of micron size silicon powders samples for batteries and Silicon Nitride (Si3 N4) markets
- ***PUREVAP™ NSiR Project***
  - ❑ Engineering, construction and commissioning *Gen2 NSiR* proof of commercial scalability pilot
  - ❑ Production of nano size silicon materials samples for potential end buyers
- **EBH2 Project**
  - ❑ Second validation tests

## HPQ CAPITAL STRUCTURE

| Major Investors | Basic | Fully Diluted |
|---|---|---|
| Management & Board | 6.3% | 10.4% |
| PyroGenesis Canada Inc. | 8.7% | 10.4% |
| IQ (Investissement Québec) | 8.4% | 7.0% |
| Strategic Investors | 10.9% | 10.0% |

| | | 52 weeks | | |
|---|---|---|---|---|
| | Price | Low | High | |
| (As of March 21 2022) | $ 0.460 | $ 0.280 | $ 1.25 | Millions |
| Basic Shares Outstanding | | | | 339.2 |
| Options (Avr. Price $0.61 / Duration 2,71 years) | | | | 20.0 |
| Warrants (Avr. Price $0.20) | | | | 17.5 |
| Fully Diluted Shares Outstanding | | | | 376.8 |
| Market Capitalization (Basic) | | | | 156.0 |
| Market Capitalization (Fully Diluted) | | | | 173.3 |
| Cash and Cash equivalent available for projects advancements | | | | 8.5 |

# MANAGEMENT, BOARD & OTHERS

## Management

**Bernard J Tourillon, BAA, MBA**
Chairman, President, CEO and Director

**Noelle Drapeau, LLL, MBA, PMP**
Corporate Secretary and Director

**Francois Rivard**
CFO

## Independent Directors

**Richard Mimeau, B.Sc.**
Director

**Peter Smith, PhD, P. Eng.**
Director

**Robert Robitaille, M.B.A., L. Ph.**
Director

**Daryl Hodges H. BSc, M.Sc.**
Director

**Patrick Levasseur**
Director, Special consultant to the CEO

## Consultants/ Technical Advisors

**Marcel Drapeau, BA, BSC. Comm, LLL**

**PyroGenesis Canada Inc**

## Transfer Agent

**Computershare**

## Auditors

**KPMG S.E.C.N.R.L.**

**3000 Omer-Lavallée St, Suite 306**
**Montreal, Quebec,**
**CANADA, H1Y 3R8**

**(t) +1-514-846 3271**
**(f) +1-514-372-0066**

www.hpqsilicon.com

# CONTACT

**Bernard J. Tourillon, B.A.A, MBA**
**Chairman, President and CEO**
bernard.tourillon@hpqsilicon.com
**+1-514-907-1011**

**Patrick Levasseur**
**Director**
**Special Consultant to the CEO**
patrick.levasseur@hpqsilicon.com
**+1-514-262-9289**