Innovative Silicon Solutions



www.HPQSilicon.com

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.



ENERGY STORAGE DEMAND ABOUT TO EXPLODE

ENERGY STORAGE CAPACITY MUST INCREASE TO OFFSET THE VARIABILITY OF RENEWABLE ENERGY





"Investment dedicated to energy storage will exceed \$40 billion by 2040" Yayoi Sekine, energy storage analyst for BNEF



WE ARE ONLY AT THE START OF A LONG-TERM EV MEGATREND



4

BUT THERE IS A "BATTERY BOTTLENECK"



BATTERY PERFORMANCE HAS EVOLVED MUCH MORE SLOWLY THAN ELECTRONICS AND COMPUTERS Improvements have been made in battery technology, but they have not kept pace

16x WHY IS BATTERY TECHNOLOGY EVOLVING SO SLOWLY? 14x Processor (MIPS ompared to year 0) Batteries have evolved differently than electronics: 12x 10x Electronics improve by shrinking physical circuits enabling ۲ Hard Disk (capacity) manufacturing technology to evolve rapidly. 8x Batteries improve by advances in CHEMISTRY & MATERIALS SCIENCE. ۰ 6x Memory (capacity) Improvem Many of the chemical processes used in modern batteries have ٠ 4x reached their limits Battery (energy stored) 2x **IMPROVEMENTS IN MATERIALS SCIENCE ARE REQUIRED** ۲ 1x 2 3 5 0

Time (years)



BREAKTHROUGHS IN MATERIALS SCIENCE



LITHIUM-ION BATTERIES CAPACITIES ARE LIMITED BY GRAPHITE

- In conventional batteries, the negative electrode or anode is made of carbon in the form of graphite.
- **Graphite** is batteries limiting factor.
- Silicon allows for faster charging and higher storage capacity than graphite.

THIS IS WHY SILICON (Si) IS NEEDED TO BREAK LI-ION BATTERIES' LIMITATIONS

"Silicon anodes are generally viewed as the next development in lithium-ion battery technology ... Silicon's ability to absorb more charge translates to longer battery life and smaller batteries."

(Yury Gogotsi, Director, A.J. Drexel Nanomaterials Institute, Drexel University)



HPQ SILICON PROVIDING BATTERY SOLUTIONS

- Since 2015 HPQ has implemented a Silicon Innovation Strategy
- Currently advancing development of numerous silicon products
- Creating silicon products to resolve Material Science issues
- Breakthrough imminent with Nano Silicon for battery anodes
- Cost effective silicon solution for EV and battery manufacture
- > HPQ is one the rare advanced Silicon solution that is public



HPQ VALUE PROPOSITION: COMMERCIALIZE AND MONETIZE





GROWTH IN THE EV MARKET TO DRIVE STRONG DEMAND FOR ALL BATTERY MATERIALS



TODAY: GRAPHITE IS FUNDAMENTAL TO RECHARGEABLE BATTERY ANODES



Graphite dominates half the lithium-ion battery – BUT THE WORLD NEEDS BETTER BATTERIES

Source: Pallinghurst-Traxys battery analysis. %s represent the proportions of cathode and anode in each battery respectively. NCA batteries contain 2% aluminium (not shown), NOU websites and presentation

www.HPQSilicon.com

HPG – SILICON R E S O U R C E S

BY 2030 ANODES MAY CONTAIN UP TO 30% SILICON – A MASSIVE DEMAND



Battery Grade Silicon demand will surpass 200K MT by 2030 – SO THE QUESTION BECOMES: WHO CAN MAKE THAT MATERIAL IN QUANTITY?

Source: Modified NOU presentation and Roskill

 $\begin{array}{cccc} HPQ & - & SIL ICON \\ R & E & S & O & U & R & C & E & S \end{array}$

AUTO MANUFACTURERS PIVOTING TOWARD SILICON





Tesla's latest battery day presentation confirmed that the future of battery anodes will include Silicon. Tesla "...**plans on removing graphite from the anode**." (NBCFM September 23, 2020 Research Flash)



Porsche is researching high-performance batteries with silicon instead of graphite anodes in order to achieve an even higher energy density and better fast-charging capability.



"The battery cell is the combustion chamber of tomorrow," says Oliver Blume, Chairman of the Executive Board of Porsche AG. "Our electrified high-performance sports and racing cars place the highest demands on battery technology. To meet these demands, Porsche needs special high-performance cells. Silicon has big potential."

The company made this announcement at the first Volkswagen Power Day, held on March 15 2021



General Motors Co, President Mark Reuss said at an investor conference held Wednesday April 7 2021, that GM is experimenting with **silicon-rich** and lithium metal anodes, solid state and high voltage electrolytes, and dry processing of electrodes for its next generation of Ultium batteries, due around 2025. (Reuters April 08, 2021)



SILICON ATTRACTIVENESS



YES, SILICON IS AWESOME, BUT INEXPENSIVE? NOT REALLY

Silicon may be the most abundant element in earth's crust after oxygen, but like all other energy metals (lithium, graphite, cobalt, nickel and others):

- It does not exist in its pure state!
- Expensive carbothermic process needed to extract it from Quartz



RAW SILICON MUST BE ENGINEERED BEFORE IT CAN BE USED FOR BATTERY APPLICATIONS

www.HPQSilicon.com

HPQ - SILICON R e s o U R C e s

THE CHALLENGES

DEPLOYMENT OF SILICON (Si) IN BATTERIES FACES CHALLENGES



THE BIG ONE

WHY

• The volumetric fluctuations (>300 %) of Silicon (Si) during charge/discharge cycles leads to irreversible energy storage capacity loss.

⊖ ∮ ⊕

- Repeated exposure of the fresh silicon surface to battery electrolyte leads to a continual reformation of the Solid electrolyte interphase (SEI);
- Basically, the SEI grows thicker with each charge/discharge cycle.







CHALLENGE: ECONOMICALLY VIABLE SOLUTION

CURRENT APPROACHES TO SILICON USE HIGHLY ENGINEERED AND EXPENSIVE MATERIALS









SILICON STRUCTURED IN SIO GLASS > 2,000 US\$ / Kg SILICON STRUCTURED IN GRAPHITE > 3,000 US\$ / Kg

SILICON NANOWIRES > 30,000 US\$ / Kg SILICON NANOPOWDERS > 20,000 US\$ / Kg

Presently:

- Silicon is used in a blended form with graphite
- Typically only represents around 5% by wt
- Limiting performance improvements achieved to date

Silicon Nanopowders or Nanowires could replace graphite now

- But a new manufacturing process must be develop to allow Si Nano material to reach cost parity with graphite...
- Graphite for anode cost from US\$10 to US\$20 per Kg

HPQ - DEVELOPING LOW-COST SOLUTIONS



STARTING COMMERCIAL VALIDATION OF LOW-COST PROCESSES TO MAKE AND TRANSFORM SILICON

HPQ is developing:





A new scalable, versatile, low-cost plasma process with a capability to produce tailor made spherical Si materials from < 0.10 μ m up to 5 μ m





SILICONSILICONNANOPOWDERSNANOWIRESMaterial produced by PyroGenesis during proof of concept test

HPQ is also looking into:

- Using *PUREVAP[™] QRR* Silicon (Si) as feedstock to produce added value products.
- Exploring the technical and commercial potential of using silicon nano powders made by the *PUREVAP™ NSiR* to produce hydrogen by hydrolysis.



SOLVING THE SILICON PUZZLE FOR BATTERIES

HPQ NANO WITH **PYROGENESIS** HPQ NANO PUREVAP™ NANO SI REACTOR (NSIR)

- With more than 20 years of experience developing and using plasma atomization to make metal powders for 3D printing PyroGenesis technical team is developing the PUREVAPTM Nano Si Reactor (NSiR).
- The PUREVAPTM NSiR is a new low-cost plasma based process that can transform the battery grade Silicon made by HPQ PUREVAPTM Quartz Reduction Reactor (QRR) into the nano Silicon materials that battery and Electrical vehicle manufacturers are looking for.
- \succ Our goal: achieving cost parity with graphite making Silicon material from < 0.10 μ m up to 5 μ m.



HPQ LOW-COST SOLUTIONS VS COMPETITION





PUREVAP[™] NSiR NEAR TERM PATHWAY



PROJECT MILESTONES AND INDICATIVE TIMELINE





PUREVAP[™] NSiR SCALABLE & LOW-COST

Indicative Scaling-up Pathway



20

PUREVAP[™] QRR – HPQ FUNDAMENTAL ADVANTAGE

THE PUREVAP[™] QRR: GAME CHANGING VERSATILITY VERSUS CONVENTIONAL PROCESS



PUREVAP[™] QUARTZ REDUCTION REACTOR (QRR) SCALABILITY AND CAPEX ADVANTAGES:

- New conventional plants are scalable by minimum increments of 30,000 MTY
 - Conventional plant set-up limits 2N+ Si production at 40% of plant output
- PUREVAPTM QRR process is scalable by increments of 2,500 MTY
- *PUREVAP[™] QRR* match the CAPEX per Kg costs of Tier 1 producers for less investment (85% 90% less)
 - ▶ *PUREVAPTM* QRR CAPEX per Kg of annual capacity reaches US\$ 6.22 for a (2) 2,500 MTY Plant
 - Rima Subsidiary, Mississippi Silicon, paid US\$ 6.11 per per Kg of annual capacity in 2015 to build a 36,000 MT annual capacity Raw Silicon plant. This represented a > US\$ 200M investment

HPQ - SILICO R E S O U R C E

PUREVAP[™] QRR – LOW COST, LOW EMISSIONS



PUREVAPTM 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



HPQ – OTHER SILICON BUSINESS OPPORTUNITIES

Megatrends

Growth

Energy

Efficiency

Alternative

Sustainability

Energy &

Population

Urbanization

Global Megatrends

Implications

economy

markets:

vehicles

sources of

Growing middle

class China and

India, Brazil and other emerging

India: consumption

infrastructure build

Reduce weight of

Growing demand for solar and other

renewable energy

vehicles and Electric

End Customer Product

Silicon: aluminum for cars, housing growth

Silicon: Silicone sealants for construction

Silicon as alloying agent for aluminum to

Silicone sealants for wind turbine and solar

Prospects for silicon allovs in batteries

Higher consumption of silicon for

polysilicon used to make solar cells

Prospects for silicon Base Energy Storage

replace steel in vehicles

Silicones: healthcare, cosmetics,

packaging





DEMAND TO REACH 3.8 M MT WORTH ABOUT US\$ 10 BILLION BY 2025 (CRU)

• NEW PLANTS NEEDED TO MEET DEMAND GROWTH

4

- GROWTH WILL BE DRIVEN BY DEMAND FOR CHEMICAL GRADE SILICON (2N+ Si)
 - Used as feedstock to make Silicones

Usages

Metallurgical

Grade S

(98.0% - 98.9% Si)

Chemical

Grade Si (99.0% - 99.5% Si)

6

Aluminum

Silicones

- Silicone's market expected CAGR 10.7% (from US\$ 14.0 B in 2020 to US\$ 23 B by 2025¹)
- > Used as feedstock to produce Polysilicon (for both Siemens and FBR processes)
- > Used as feedstock to make engineered Silicon for battery applications



WHY INVEST IN HPQ SILICON?





UBS estimates that over the next ten years, the energy storage market in the United States alone could grow to as much as \$426 billion, and there are many ways to buy into the surge! (CNBC Dec 30, 2019)

HPQ – SILICON: AN INVESTMENT OPPORTUNITY TO PARTICIPATE IN THE SURGE!

- Ready to become the lowest cost producer of the nanomaterials needed for the starting renewable energy revolution:
 - Spherical Silicon Nano & Micron powders for Li-ion Batteries
 - Material potential already generated NDA's with battery manufacturers and advance material companies
 - Received a firm order for Si Nanopowders from major car manufacturer
 - Silicon Nanowires for Li-ion Batteries
 - Spherical Silicon Nanopowders for Hydrogen (H₂) production
 - Pure Silicon (99.5% Si up to 99.99% Si) for specialty applications
- Supported by world class technology partners



HPQ CAPITAL STRUCTURE



Share Price (April 21, 2021)	\$0.790	Cash and Cash equivalent in hand			\$ 5,251,176	
		Dedicated Cash for PUREVAP [™] QRR Pilot Plant				\$ 1,950,000
52 Week Low	\$0.060	In the money warrants and options \$ 11,017				\$ 11,017,182
52 Week High	\$1.680	TOTAL CASH POSITION \$				\$ 18,218,358
		Warrants Breakdown				
Shares Outstanding:	283,034,559	Expiration	Warrant	Exercise	Potential	In the money
		Date	Outstanding	Price	Cash to HPQ	Cash value
IQ Convertible debenture	16,363,636	Aug-21	31,250,000	0.155	\$ 4,843,750	\$ 4,843,750
Warrants:	55,891,012	Jan-22	4,152,000	0.155	\$ 643,560	\$ 643,560
		Jul-22	1,779,412	0.150	\$ 266,912	\$ 266,912
Options:	6,100,000	Aug-22	200,000	0.150	\$ 30,000	\$ 30,000
		Dec-22	1,575,000	0.100	\$ 157,500	\$ 157,500
Fully Diluted:	361,389,207	Apr-23	8,540,000	0.100	\$ 854,000	\$ 854,000
		Jun-23	4,394,600	0.100	\$ 439,460	\$ 439,460
Market Capitalization:	\$223,597,302	Sep-23	4,000,000	0.610	\$ 2,440,000	\$ 2,440,000
Market Capitalization (FD):	\$285,497,474	TOTAL	55,891,012	0.173	\$ 9,675,182	\$ 9,675,182

HPQ Share Performance 12 months





MANAGEMENT, BOARD & KEY INVESTORS





Management

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

Patrick Levasseur Vice-President, COO and Director

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

Francois Rivard CFO



Major Investors

Management & Board	≃ 6 7%	≃ 7.7% (FD)
	_ 0.776	_ /////
PyroGenesis	≅ 8.0%	≅ 11.0% (FD)
Investissement Québec		\cong 8.7% (FD)
Strategic Investors	≅ 4.3%	≅ 3.4% (FD)
Key Investors	≅ 6.6%	≅ 8.1% (FD)



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



CONSULTANTS, TRANSFER AGENT AND AUDITORS







Consultants/ Technical Advisors Marcel Drapeau, BA, BSC. Comm, LLL

PyroGenesis Canada Inc

Apollon Solar Sa



Transfer Agent

Computershare



CONTACT





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



Patrick Levasseur Vice-President, COO and Director patrick.levasseur@hpqsilicon.com +1 514 262-9289



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



+1 514 372 0066



+1 514 846 3271



www.HPQSilicon.com