



HPQ – SILICON
R E S O U R C E S



Innovative Silicon Solutions

HPQ
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TSXV

OTCQX
THE BEST MARKET

HPQFF

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This presentation includes certain

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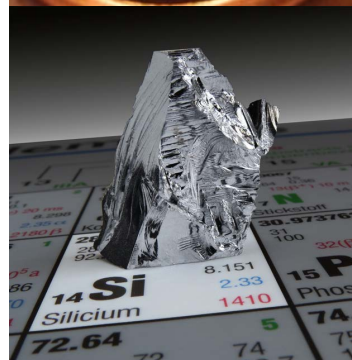
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The Corporation is focused on developing the *PUREVAP™ processes*. The *PUREVAP™ Quartz Reduction Reactor (QRR)*, (Patent Pending) a new carbothermic process to transform Quartz into Silicon, and the *PUREVAP™ Nano Silicon (Si) Reactor (NSiR)*, (Provisional 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 Gaspé Region, Province of Quebec.

WHY SILICON? DEMAND TO REACH 3.8 M MT WORTH US\$ 10 BILLION BY 2025¹

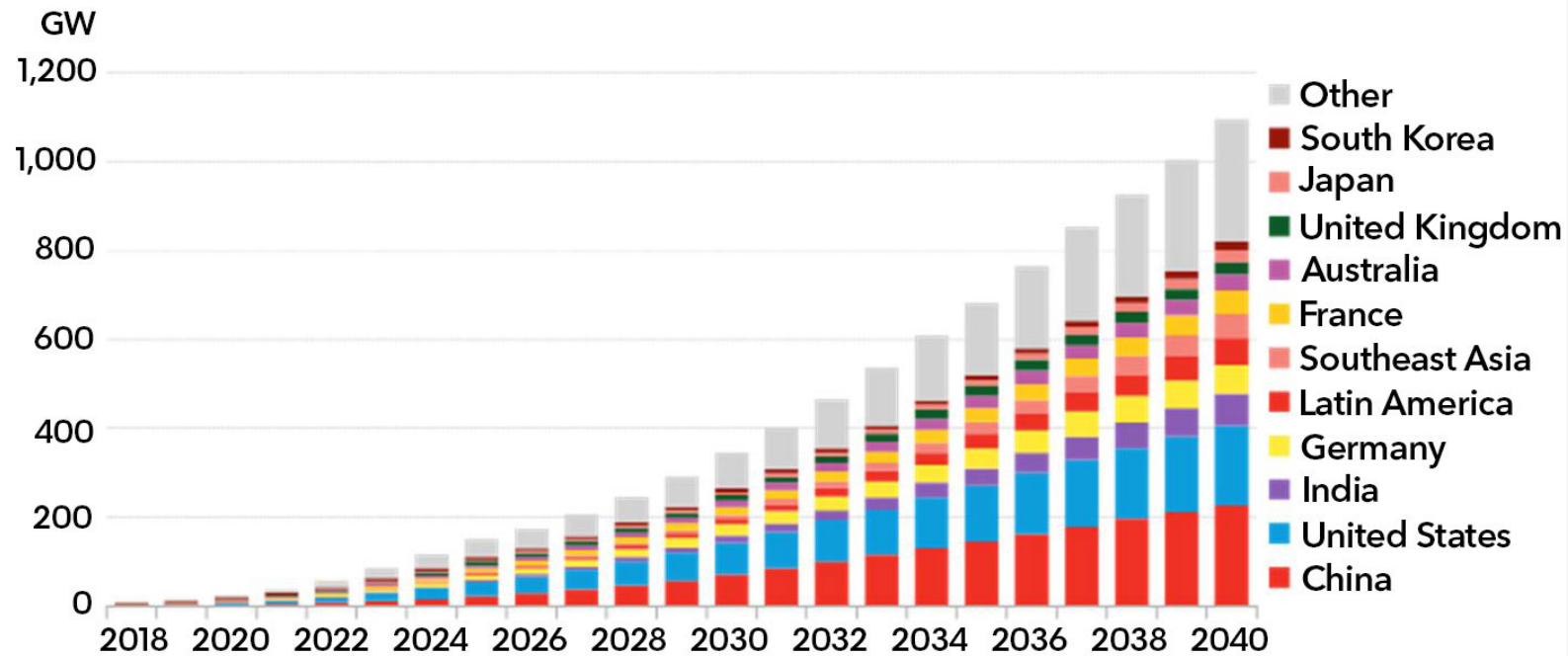


- **GROWTH WILL BE DRIVEN BY DEMAND FOR CHEMICAL GRADE SILICON (2N+ Si)**
- **2N+ Si IS THE FEEDSTOCK NEEDED:**
 - To make Silicones, a market expected to grow to US\$ 23 B by 2025 (CAGR 10.7%)²
 - To produce Polysilicon for solar energy, a market expected to surpass US\$ 200 By 2026 (CAGR 20%)³
 - For the battery sector, a new market coming online, that is expected to exceed 200K MT by 2030⁴

ENERGY STORAGE DEMAND ABOUT TO EXPLODE

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

Global cumulative energy storage installations



Source: BloombergNEF

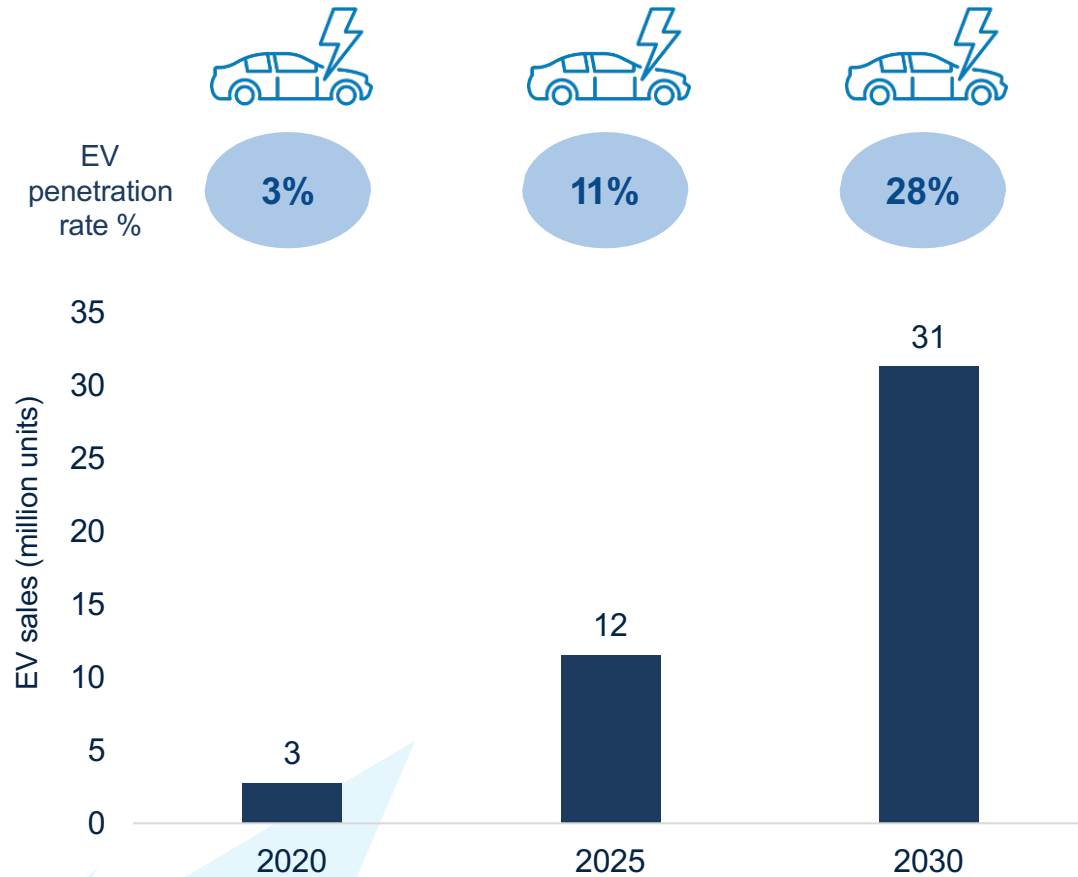
"Investment dedicated to energy storage will exceed \$40 billion by 2040 "

Yayoi Sekine, energy storage analyst for BNEF

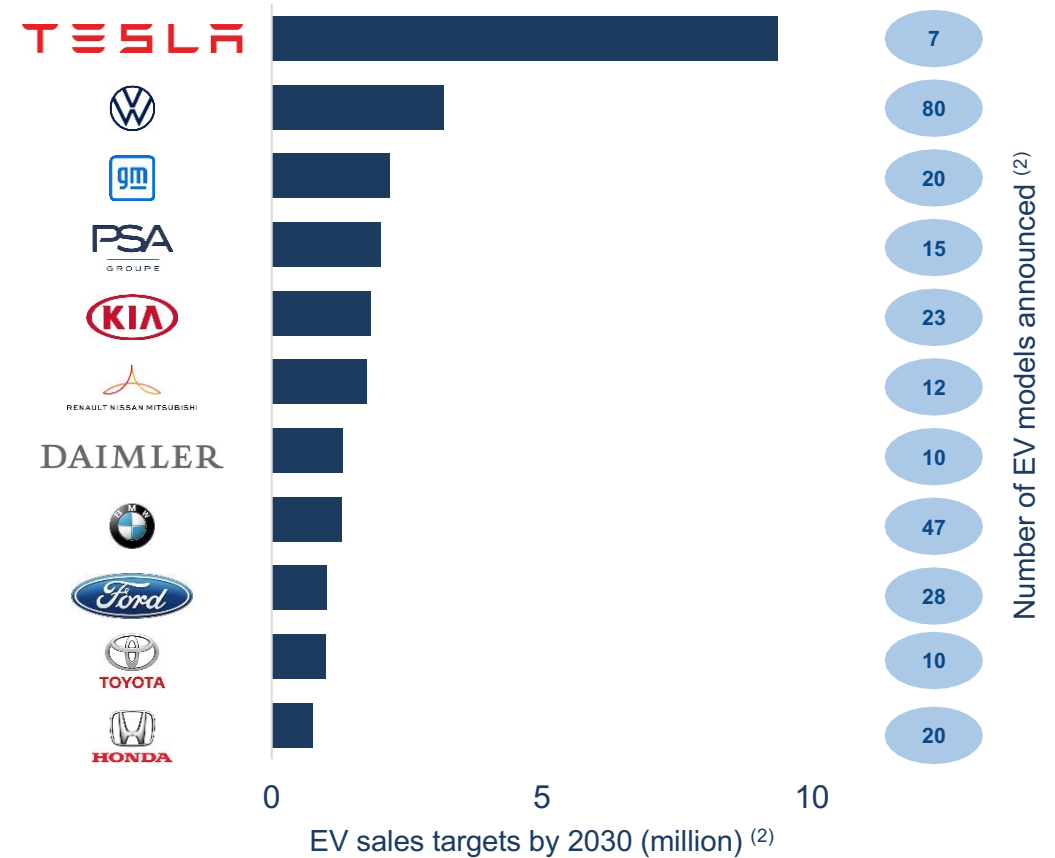


+ THE LONG-TERM EV MEGATREND IS ONLY STARTING

EV adoption and vehicle sales ⁽¹⁾



Leading EV manufacturer plans – over \$300 billion committed



The World is going “all-in” on electric vehicles

(1) Source: Benchmark Mineral Intelligence, Rho Motion
(2) Broker research, Bloomberg New Energy Finance, NOU websites and presentation

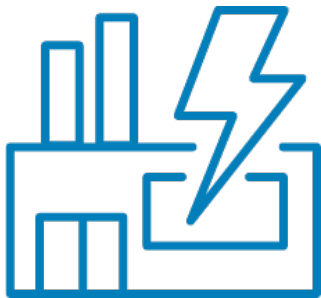
THIS WILL DRIVE STRONG DEMAND FOR ALL BATTERY MATERIALS

Recent increased # of Megafactories

January 2020: 121

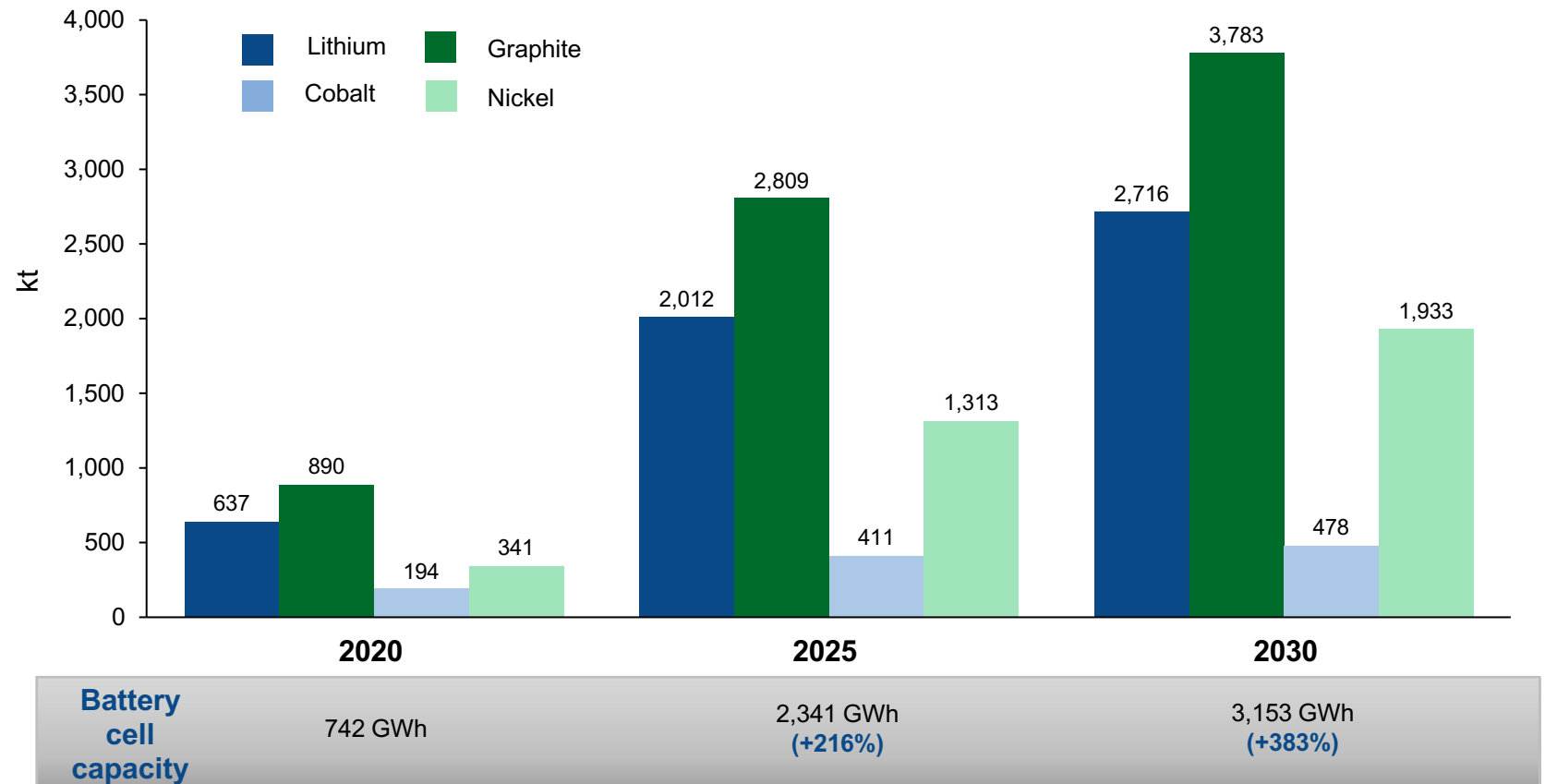


March 2021: 199



Growth = 64%

Raw material demand vs global lithium-ion cell / Megafactory capacity



As the number of Megafactories increases, battery material demand is forecasted to grow significantly by 2030

BUT THERE IS A “BATTERY BOTTLENECK”

BATTERY PERFORMANCE HAS EVOLVED MUCH MORE SLOWLY THAN ELECTRONICS AND COMPUTERS

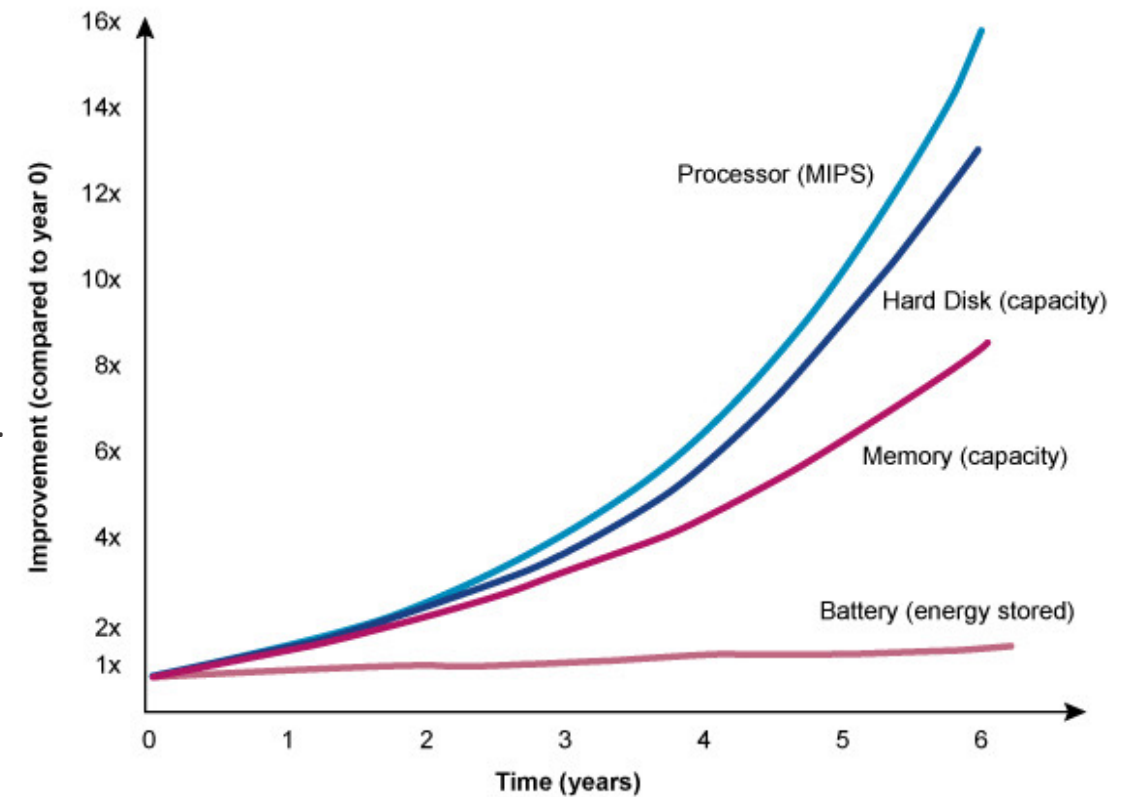
Improvements have been made in battery technology, but they have not kept pace

WHY IS BATTERY TECHNOLOGY EVOLVING SO SLOWLY?

Batteries have evolved differently than electronics:

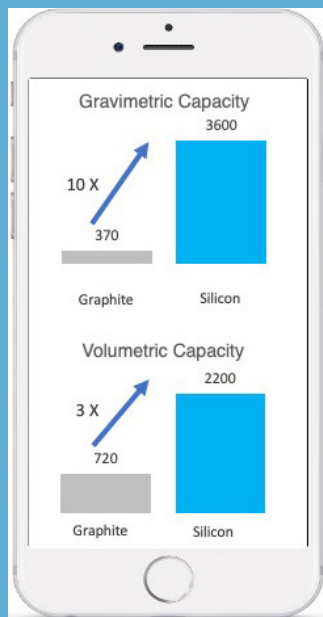
- **Electronics improve by shrinking physical circuits** enabling manufacturing technology to evolve rapidly.
- **Batteries improve by advances in CHEMISTRY & MATERIALS SCIENCE.**
- Many of the chemical processes used in modern batteries have reached their limits

IMPROVEMENTS IN MATERIALS SCIENCE ARE REQUIRED



BREAKTHROUGHS NEEDED IN BATTERY MATERIAL SCIENCE

AUTO MANUFACTURERS ARE PIVOTING TO SILICON



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)



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

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)

DEPLOYING SILICON IN BATTERIES REQUIRES INNOVATIVE SOLUTIONS!

SINCE 2015 HPQ HAS IMPLEMENTED A SILICON INNOVATION STRATEGY

PROVIDING SILICON MATERIALS FOR BATTERIES & MORE

- 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 the only vertically integrated advanced Silicon solution provider that is public



PROJECTS

DEVELOPING A MULTITUDE OF GAME CHANGING TECHNOLOGIES

PUREVAP™ QRR

*From Quartz to High Purity
Silicon in one step*



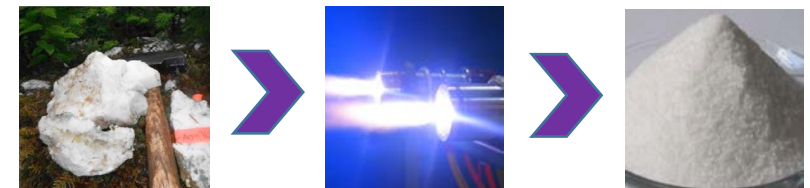
PUREVAP™ NSiR

*From Silicon to Nano Materials
in one step*



**FUMED SILICA
REACTOR**

*From Quartz to fumed silica
in one step*

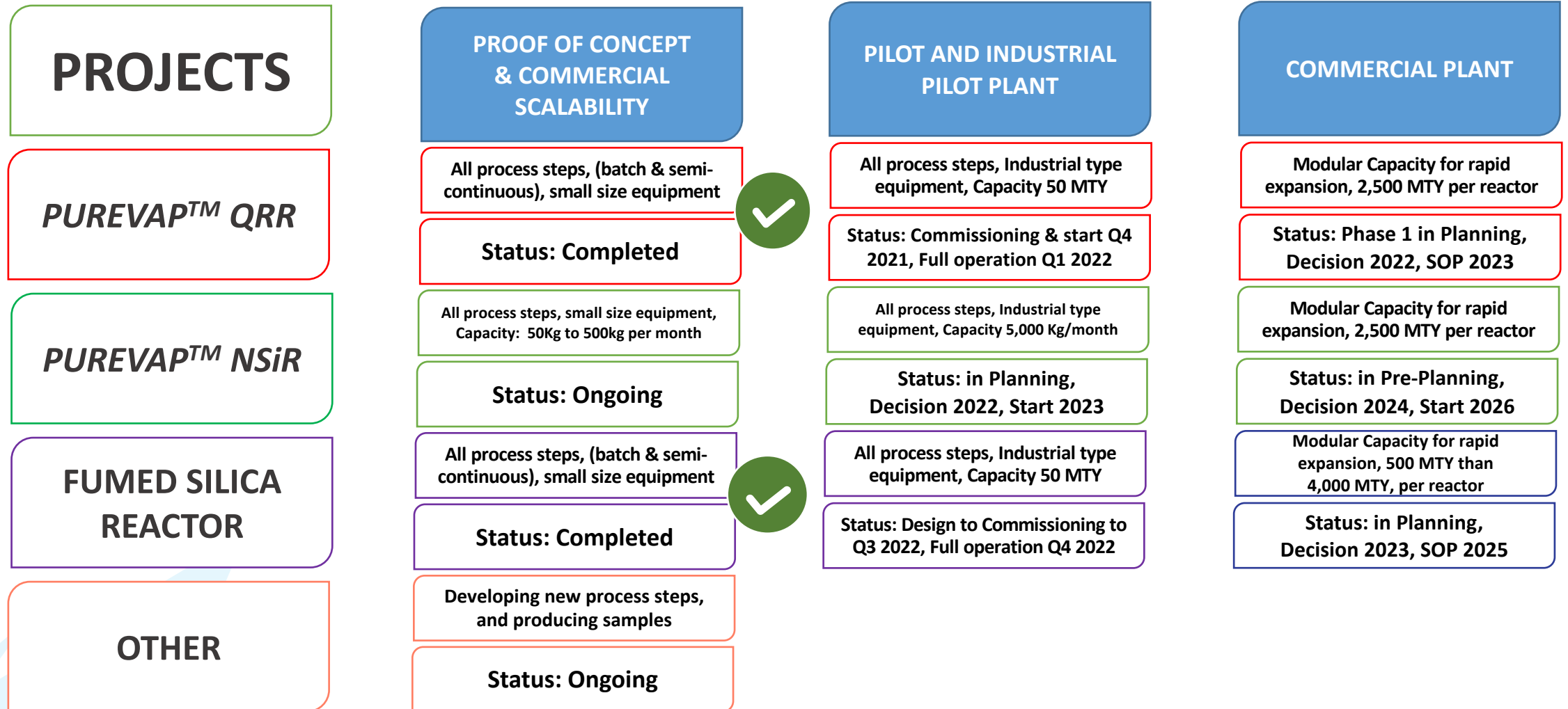


OTHERS

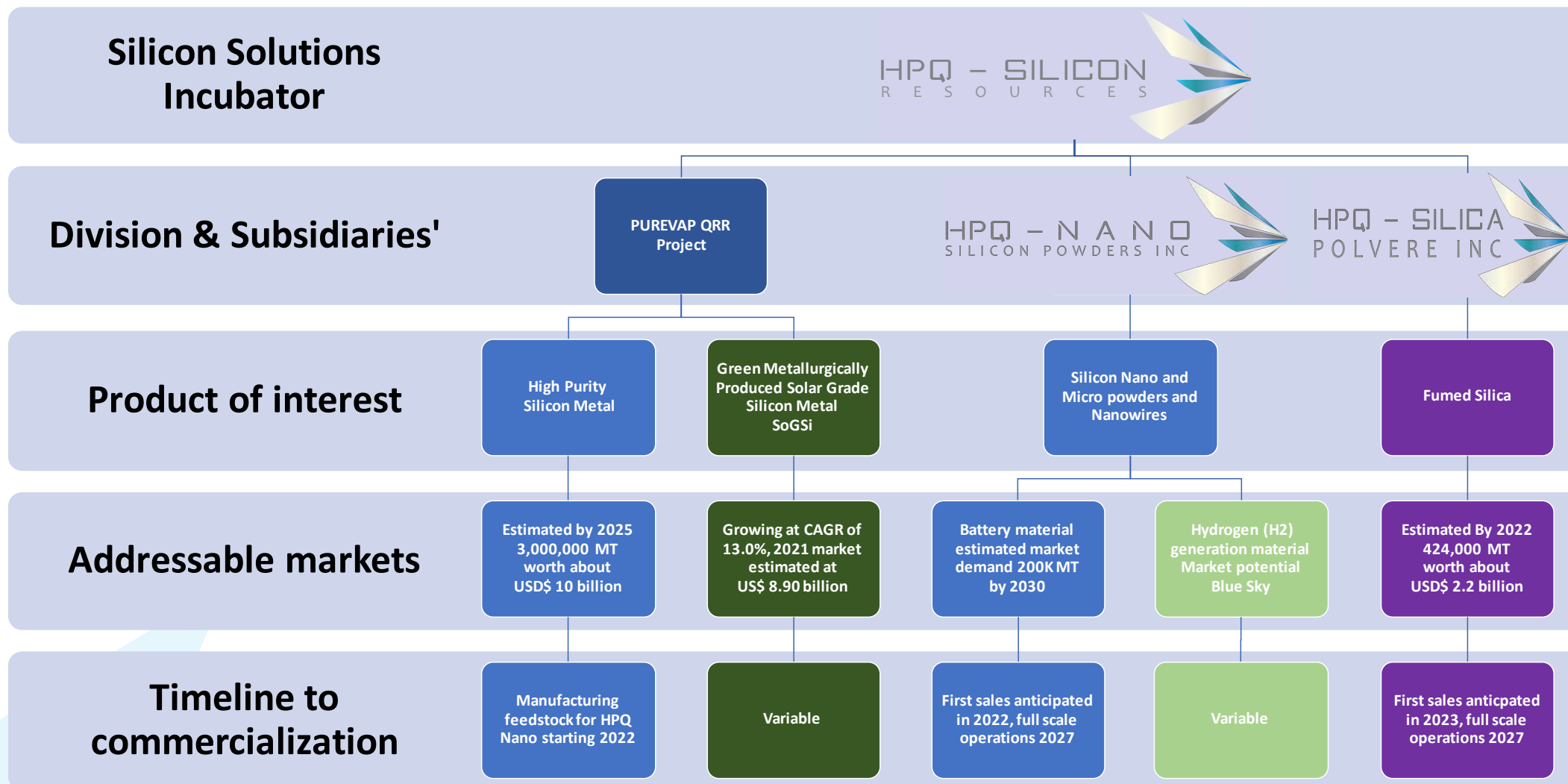
*Using Nano Silicon for others
high value applications*



PATHWAYS TO INDUSTRIALIZATION



VALUE PROPOSITION: COMMERCIALIZE AND MONETIZE

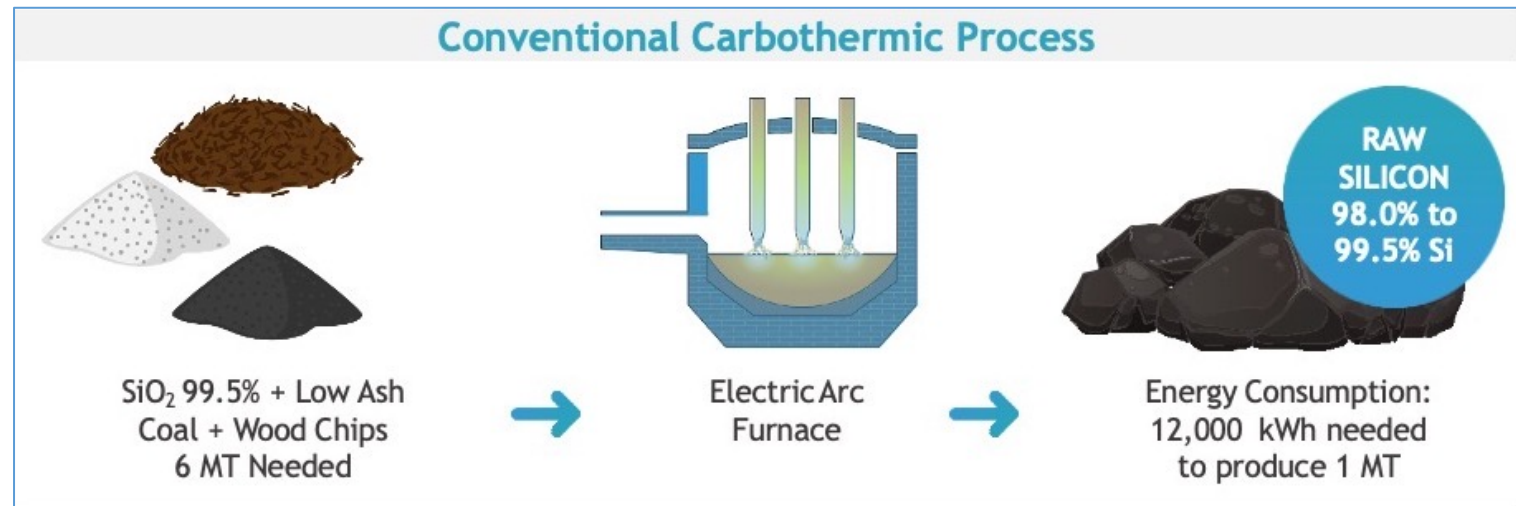


SILICON 101

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

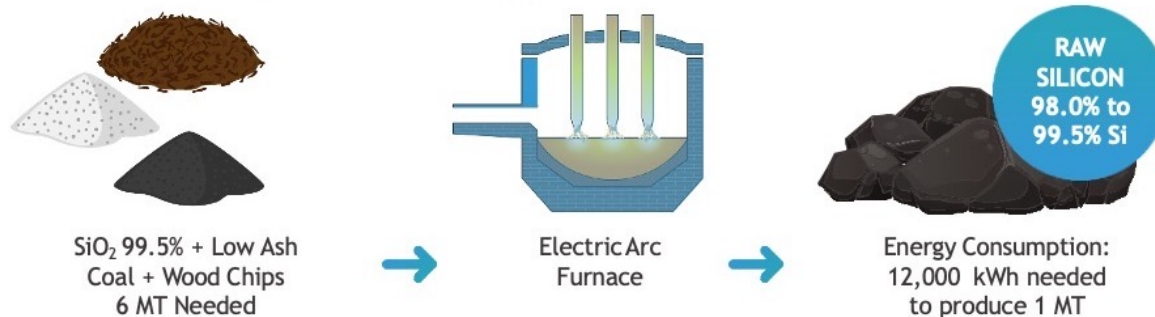


+ RAW SILICON MUST BE ENGINEERED BEFORE IT CAN BE USED FOR BATTERY APPLICATIONS

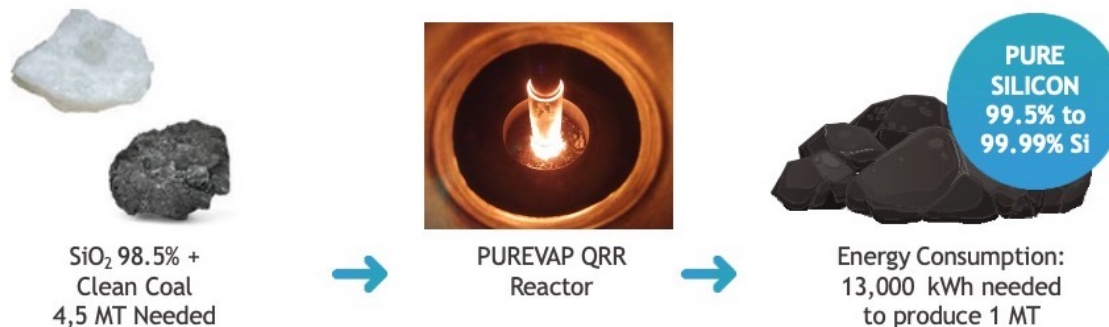
PUREVAP™ QRR – HPQ DISRUPTIVE TECHNOLOGY

THE PUREVAP™ QRR: GAME CHANGING VERSATILITY VERSUS CONVENTIONAL PROCESS

Quartz (SiO_2) to Raw Silicon (Si) - Conventional Carbothermic Process



Quartz (SiO_2) to High Purity Silicon (Si) - PUREVAP™ QRR Process



SCALABILITY AND CAPEX ADVANTAGES:

- New conventional plants are scalable by minimum increments of 30,000 MTY
 - Conventional plants 2N+ Si production limited at 40% of plant output
 - Requires additional purification steps
- *PUREVAP™ QRR* process is scalable by increments of 2,500 MTY, allowing flexible customer solutions
- *PUREVAP™ QRR* CAPEX per Kg of annual capacity matches that of a Tier 1 producer for (85% - 90%) less investment
 - *PUREVAP™ QRR* CAPEX per Kg of annual capacity is estimated at 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. (a > US\$ 200M investment)

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

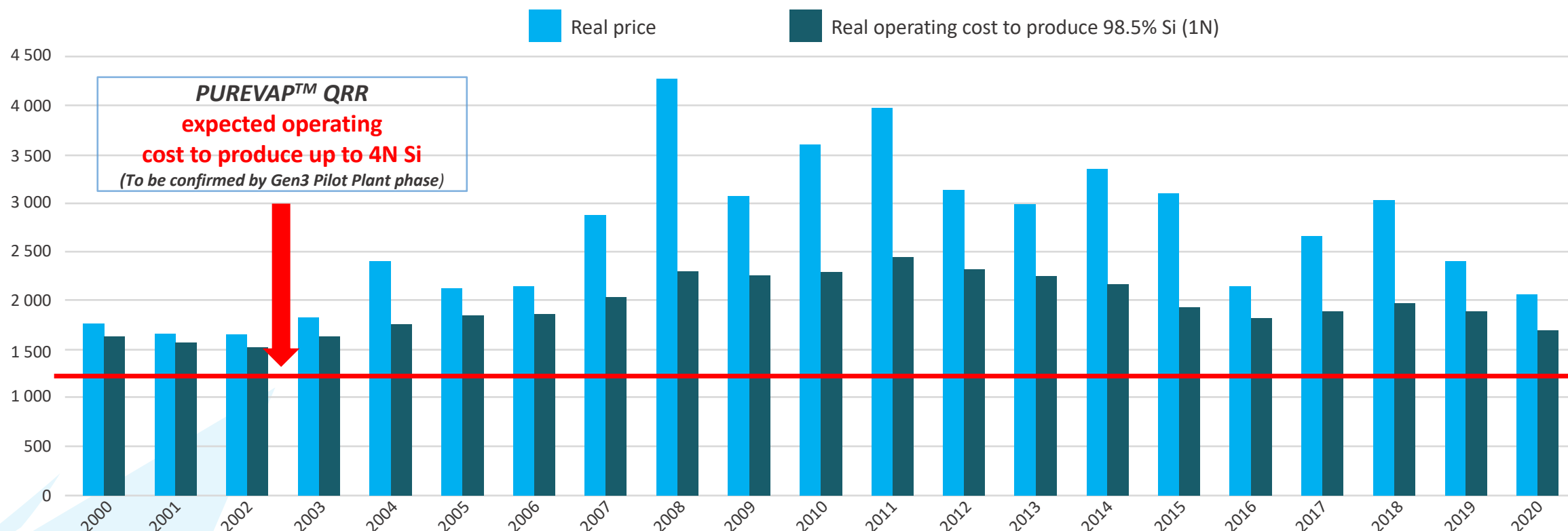
PUREVAP™ QRR – LOW COST, LOW EMISSIONS

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



PUREVAP™ QRR GEN3 READY FOR Q4 START

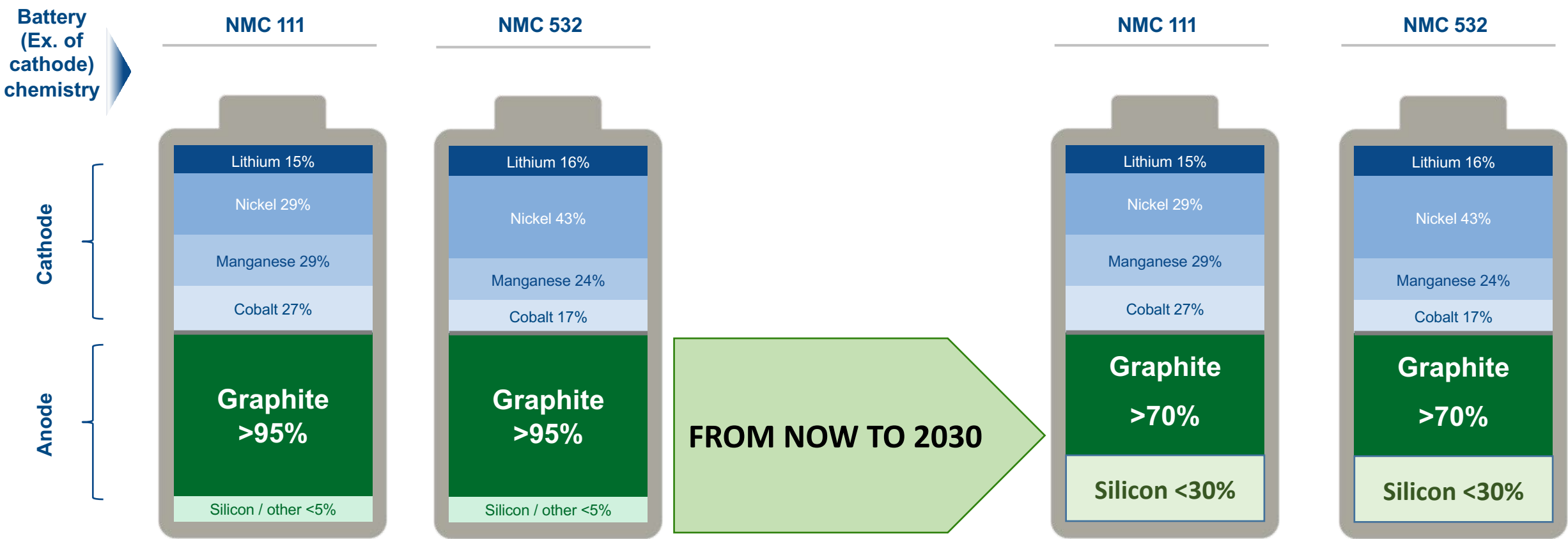


June 2021 pictures of Mr. P. Peter Pascali, President and CEO of PyroGenesis & Bernard Tourillon, President and CEO of HPQ Silicon next to the Gen3 PUREVAP™ QRR Pilot Plant (middle image blurred for confidentiality)

"We have always believed that our PUREVAP™ QRR process would completely revolutionize the transformation of quartz (SiO_2) into silicon, and yet we continue to be amazed by the truly unique capabilities of the system, especially as it pertains to producing a low-cost battery-grade silicon feedstock that can be used to make the nano silicon materials needed for Lithium-ion batteries."

Bernard Tourillon President and CEO HPQ Silicon Resources Inc

TODAY: GRAPHITE IS FUNDAMENTAL TO RECHARGEABLE BATTERY ANODES

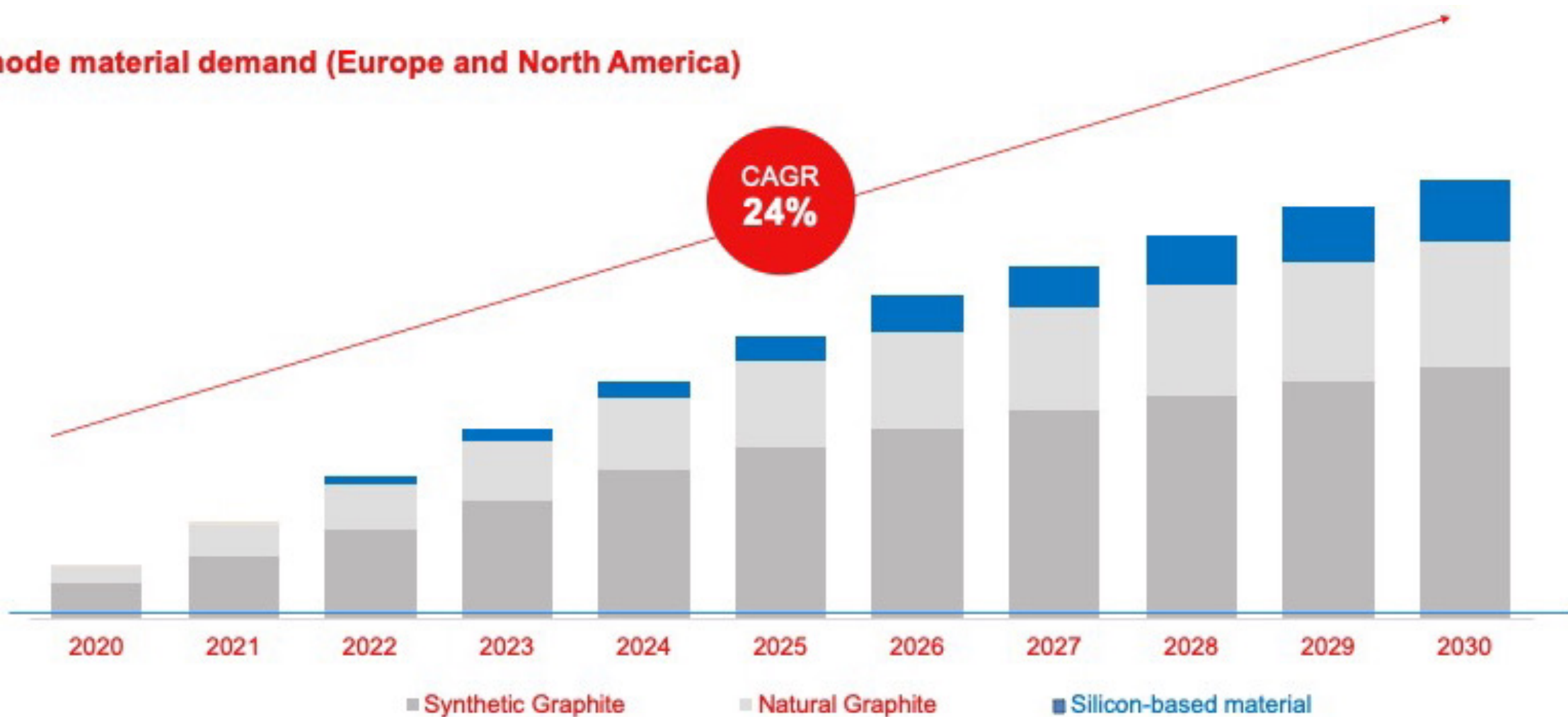


BY 2030, BATTERY ANODES MAY CONTAIN UP TO 30% SILICON¹
THIS WILL CREATE MASSIVE DEMAND FOR BATTERY GRADE SILICON

Source: Pallinghurst-Traxys battery analysis. %s represent the proportions of cathode and anode in each battery respectively, NOU websites and presentation. 1) ROSKILL

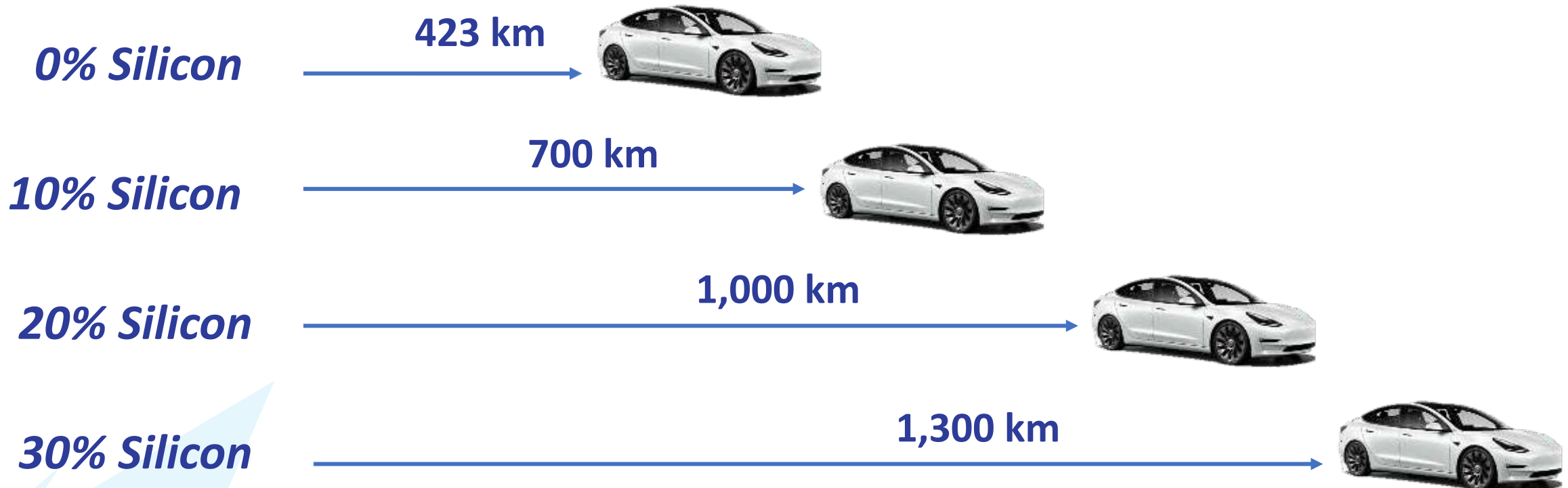
SILICON SHARE OF ANODE MATERIAL DEMAND IS STARTING

Anode material demand (Europe and North America)



THAT IS BECAUSE THE WORLD WILL NEED SILICON TO MAKE BETTER AND FASTER CHARGING BATTERIES

POTENTIAL IMPACT OF SILICON IN ANODE OF TESLA MODEL 3 ON SINGLE CHARGE



Source:
Altech Chemicals

WITH A POTENTIAL DEMAND > 200K MT BY 2030, WHO WILL BE IN POSITION TO PRODUCE, AT A PRICE THAT BATTERY MANUFACTURERS WILL BE WILLING TO PAY, THE SILICON MATERIAL NEEDED?

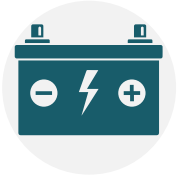
THE CHALLENGES

DEPLOYMENT OF SILICON (Si) IN BATTERIES FACES CHALLENGES



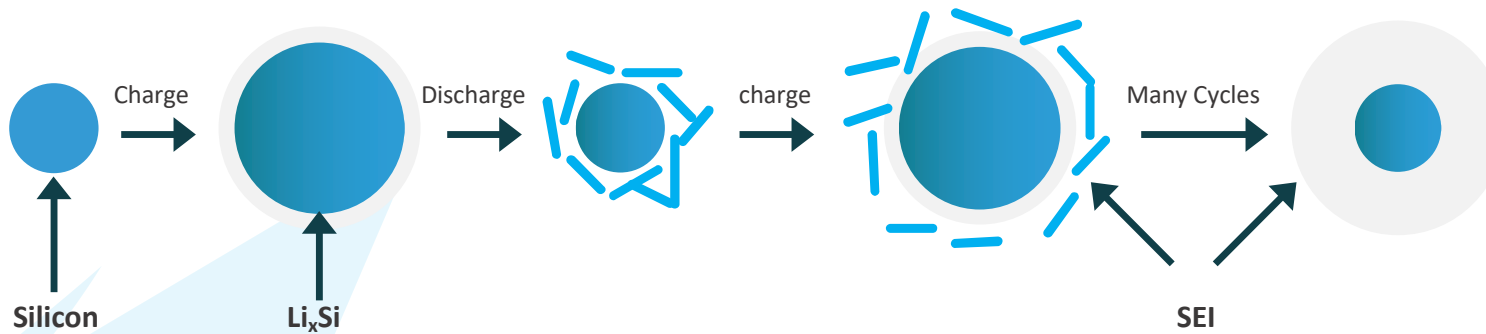
THE BIG ONE

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



WHY

- 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.

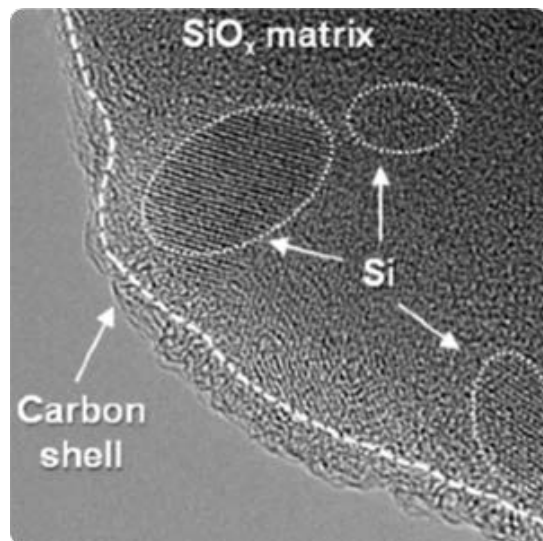


RESULTING IN POOR BATTERY LIFE CYCLE

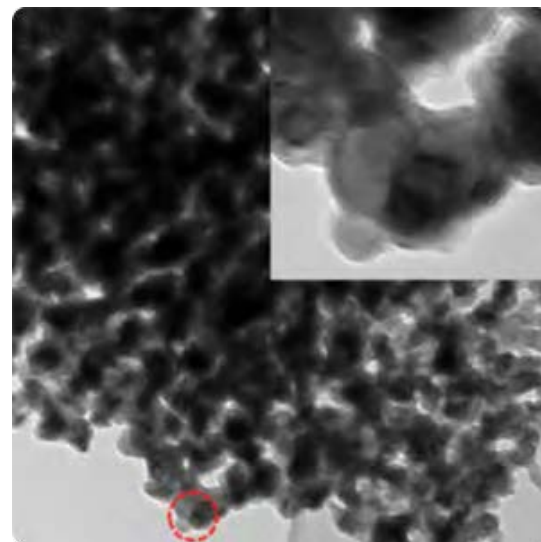


ECONOMICALLY VIABLE SOLUTION DO NOT EXIST NOW

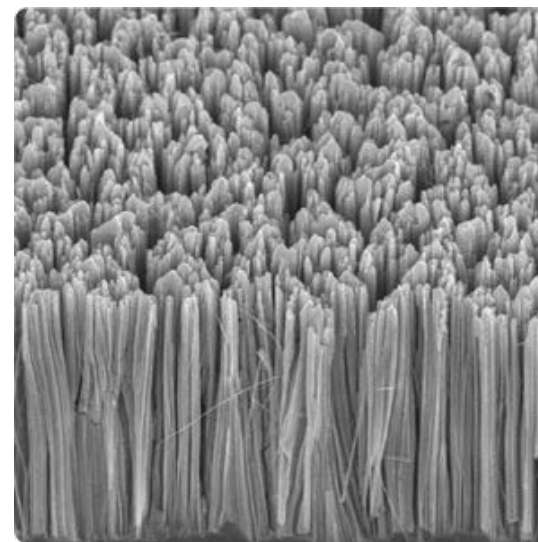
CURRENT APPROACHES TO SILICON USE HIGHLY ENGINEERED AND EXPENSIVE MATERIALS



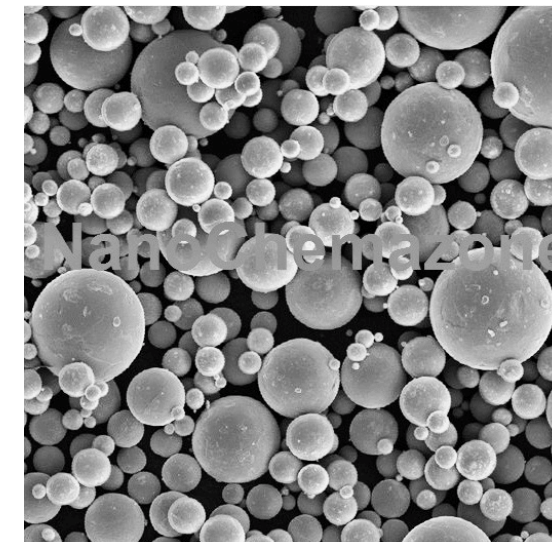
SILICON STRUCTURED
IN SIO GLASS
> 2,000 US\$ / Kg



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



SILICON
NANOWIRES
> 30,000 US\$ / Kg



SILICON
NANOPOWDERS
> 20,000 US\$ / Kg

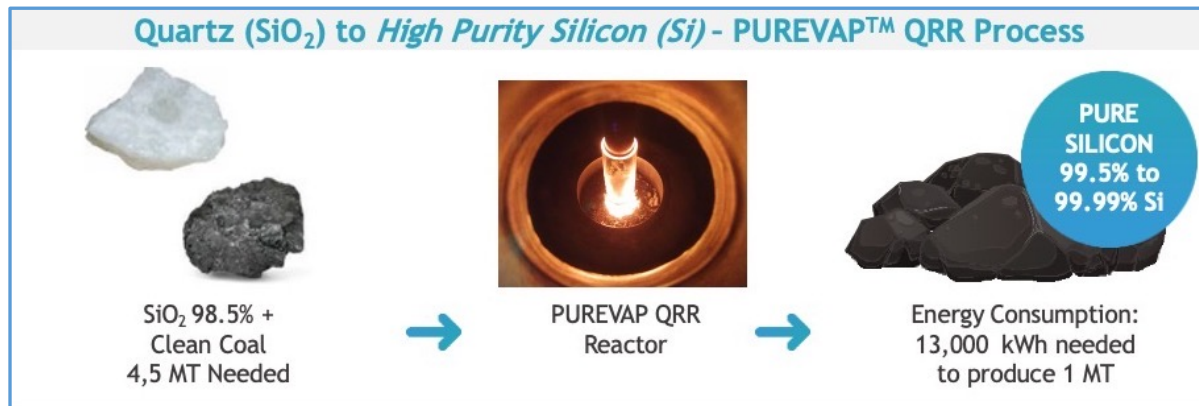
SILICON NANOPOWDERS OR NANOWIRES COULD REPLACE GRAPHITE NOW

- New manufacturing process must be developed to allow Si Nano material to reach cost parity with graphite...
- Graphite for anode cost between US\$10 to US\$20 per Kg

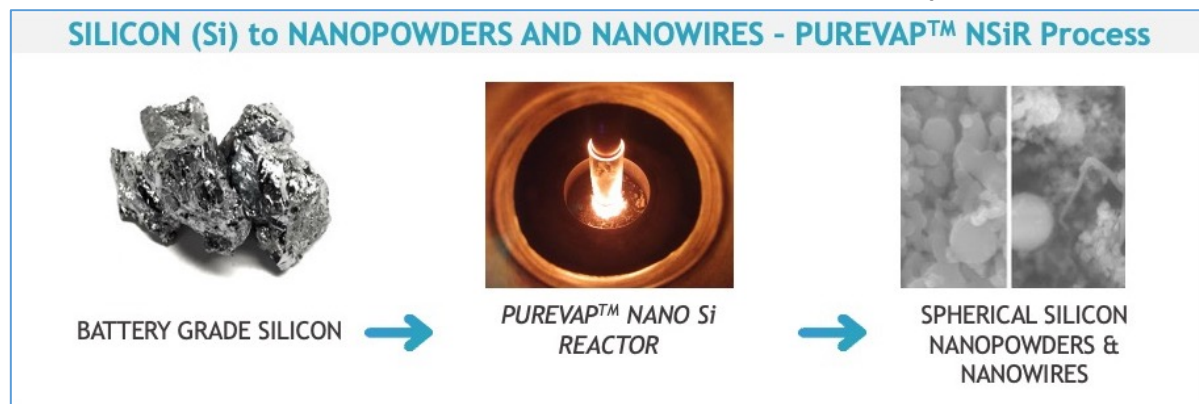
HPQ - DEVELOPING LOW-COST SOLUTIONS

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

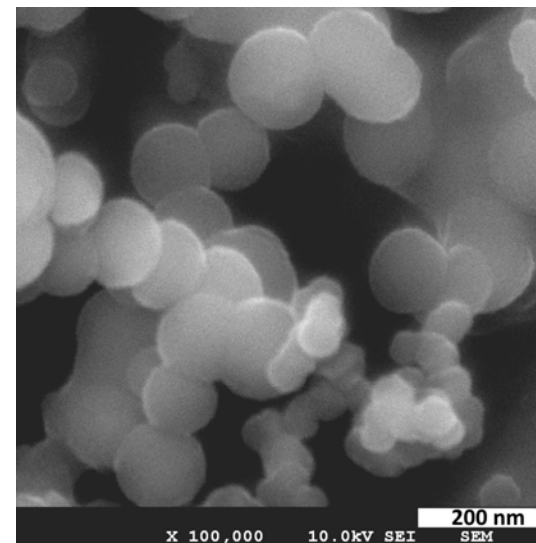
HPQ is developing:



A new scalable, versatile, low CAPEX & OPEX carbothermic process



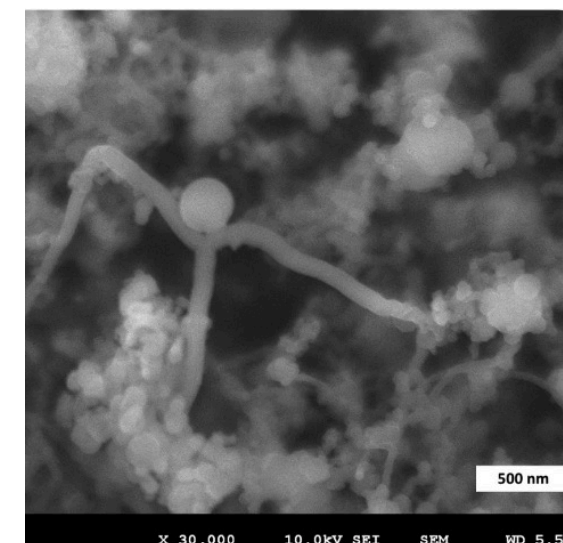
A new scalable, versatile, low-cost plasma process with a capability to produce tailor made spherical Si materials from < 0.10 μm up to 5 μm



SILICON

NANOPOWDERS

Material produced by PyroGenesis during proof of concept test



SILICON

NANOWIRES

HPQ TO BE IN A POSITION TO PRODUCE THE MATERIAL:

- Because the *PUREVAP™ NSiR* is a game-changing low-cost plasma-based process that can transform battery grade Si made by HPQ *PUREVAP™ QRR* into the customized nano Si materials that Batteries and Electrical Vehicle manufacturers are looking for

SOLVING THE SILICON PUZZLE FOR BATTERIES

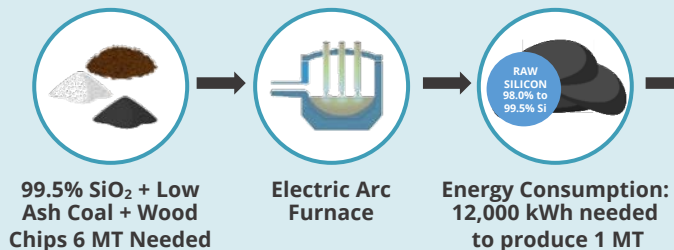
HPQ NANO WITH PYROGENESIS HPQ NANO PUREVAP™ NANO Si REACTOR (NSiR)

- 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 *PUREVAP™ Nano Si Reactor (NSiR)*.
- **Our goal: achieving cost parity with graphite making Silicon material from $< 0.10 \mu\text{m}$ up to $5 \mu\text{m}$.**
- **Phase 1 NSiR testing generated the following positive results to date:**
 1. Production of nano silicon powders of less than 150 nm, the threshold above which silicon fracturing occurs.
 - a) Further efforts will focus on improved measures and control the size distribution of our material, a critical criterion for battery manufacturers.
 2. Production rate achieved exceeded the original goal.
 - b) Continuous process improvements to further increase the production capacity, and thereby reducing future commercial production cost.
- Final equipment modifications are presently being completed, then testing will resume focus on producing qualified samples for testing by a third-party, the “*Institut National de Recherche Scientifique*” (INRS), and subsequently to awaiting battery manufacturers and automobile manufacturers

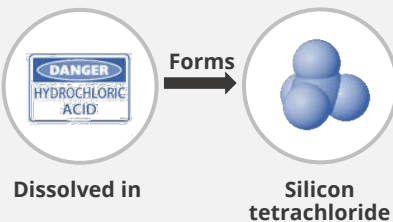
HPQ LOW-COST SOLUTIONS VS COMPETITION

CONVENTIONAL CARBOTHERMIC PROCESS

QUARTZ TO SILICON



2N Si



add

H₂

To Get

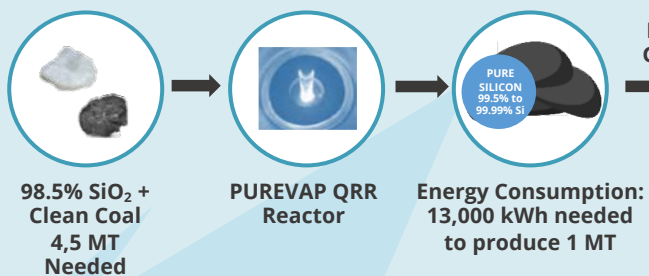


Refined 3 time



PUREVAP™ QRR PROCESS

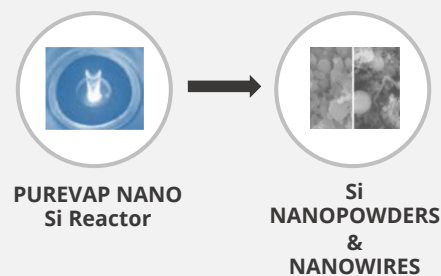
QUARTZ TO SILICON



Battery Grade Si

PUREVAP™ NSIR PROCESS

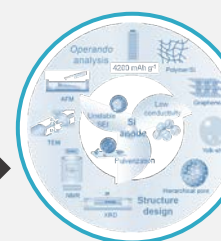
SI TO NANO SI



SILICON TO SILANE GAS PROCESS

REC SILICON

Si Anode Materials

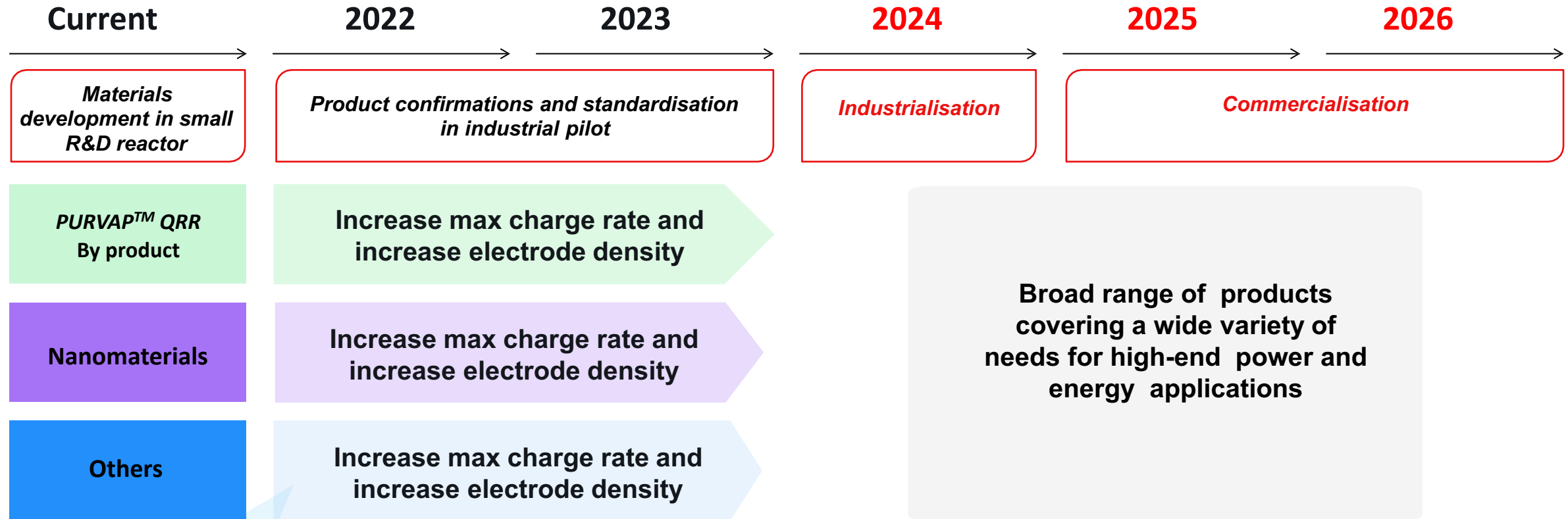


Cell / Battery manufacturing

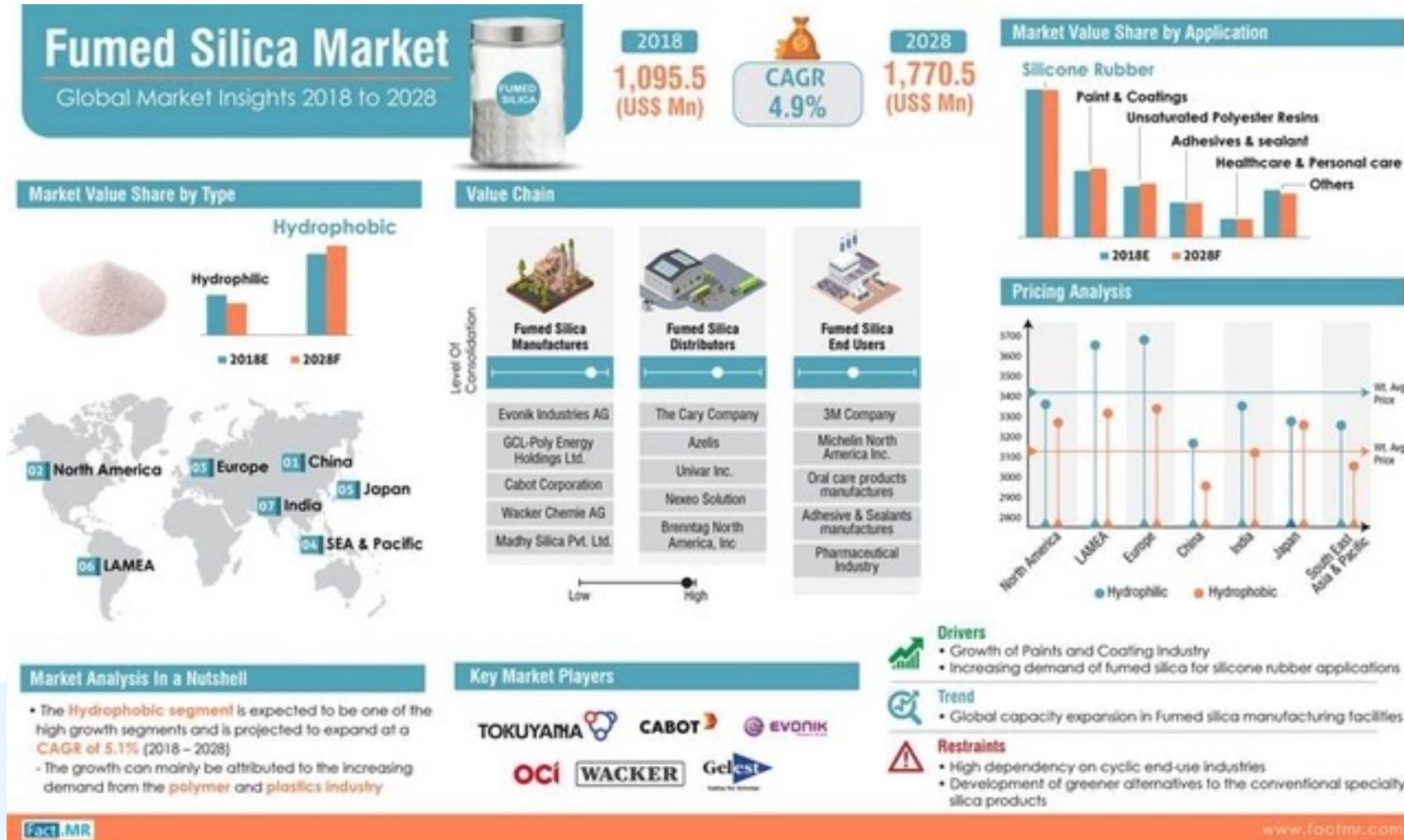
Next Generation Silicon Anode Manufacturing (Group14 Technologies)



NSIR CLEAR ROADMAP FOR ENERGY STORAGE APPLICATIONS



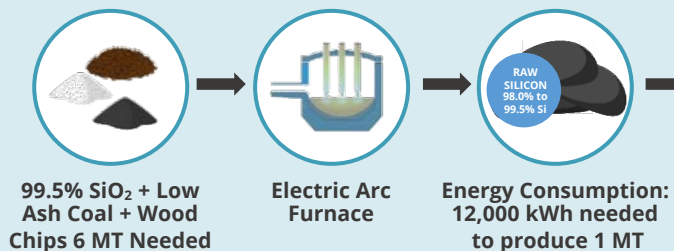
HPQ – PYROGENESIS FUMED SILICA PROJECT



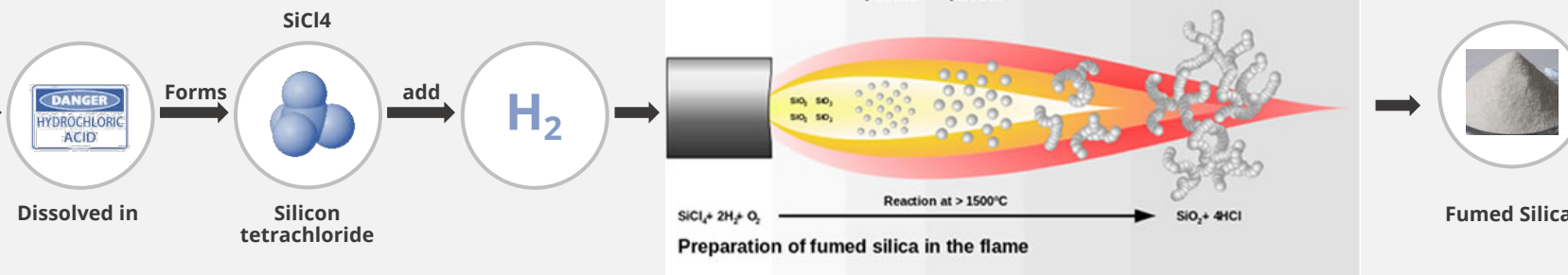
TRADITIONAL PROCESS VS NEW PROCESS

CONVENTIONAL CARBOTHERMIC PROCESS

QUARTZ TO SILICON



SILICON TO FUMED SILICA



FUMED SILICA REACTOR

QUARTZ TO FUMED SILICA



- On May 4, 2021, HPQ and PyroGenesis announced that they were actively evaluating the commercial opportunity of developing a plasma process that could convert Silica (Quartz, SiO₂) into Fumed Silica (Pyrogenic Silica) in one step.
- On May 27, 2021, PyroGenesis announced being awarded a \$700,000 grant from Sustainable Development Technology Canada (“SDTC”) for a novel production process to transform quartz into fumed silica using a plasma reactor, and that this project was being done in partnership with HPQ Silicon Resources.
- Both Parties are striving to finalize the legal framework of the partnership by the end of Q2 or at the start of Q3.

HPQ CAPITAL STRUCTURE

Share Price (June 15, 2021)	\$0.810	Cash and Cash equivalent in hand				\$ 5,269,200
		Dedicated Cash for PUREVAP™ QRR Pilot Plant				\$ 1,950,000
52 Week Low	\$0.150	In the money warrants and options				\$ 10,883,682
52 Week High	\$1.680	TOTAL CASH POSITION				\$ 18,102,882
		Warrants Breakdown				
Shares Outstanding:	283,484,559	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:	55,691,012	Jan-22	4,152,000	0.155	\$ 643,560	\$ 643,560
		Jul-22	1,779,412	0.150	\$ 266,912	\$ 266,912
Options:	5,850,000	Aug-22	200,000	0.150	\$ 30,000	\$ 30,000
		Dec-22	1,375,000	0.100	\$ 137,500	\$ 137,500
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:	\$229,622,493	Sep-23	4,000,000	0.610	\$ 2,440,000	\$ 2,440,000
Market Capitalization (FD):	\$292,725,258	TOTAL	55,691,012	0.173	\$ 9,655,182	\$ 9,655,182

HPQ TRADING (last 12 months) and other stats



HPQ TRADING STATISTICS					Float
		Shares Traded	Value	Average	Turnover
12 months rolling		574,913,159	\$ 419,110,736	\$ 0.729	2.028
> \$0.50	JUL 15 to MAY 31	490,079,737	\$ 393,622,792	\$ 0.803	1.729
> \$0.75	DEC 15 to MAY 31	289,094,861	\$ 294,722,290	\$ 1.019	1.020
Shares Outstanding		283,484,559			

HPQ SHAREHOLDERS ANALYSIS				
HPQ Holdings	# of shareholders	Shares held	Average	%
1 million + shares	20	60,158,036	3,007,902	21.2%
100,000 to 999,999 shares	259	59,361,325	229,194	20.9%
10,000 to 99,999 shares	1,713	47,024,410	27,451	16.6%
500 to 9,999 shares	6,906	17,308,042	2,506	6.1%
1 to 499 shares	6,555	831,588	127	0.3%
TOTAL NOBO LIST	15,453	184,683,401	11,951	65.1%
TOTAL OBO LIST	6,941	98,801,158	14,234	34.9%
OUTSTANDING	22,394	283,484,559	12,659	

HPQ TRADING VS TSX-V Index (last 12 months)



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 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
 - Pure Silicon (99.5% Si up to 99.99% Si) for specialty applications
 - Spherical Silicon Nanopowders for Hydrogen (H₂) production
- Supported by world class technology partners



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)
PyroGenesis	≅ 8.0%	≅ 11.0% (FD)
Investissement Québec		≅ 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



Auditors

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

CONTACT



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HPQ TRADING VS NOU (last 12 months)

