OneD BATTERY SCIENCES

NEXT GENERATION BATTERY TECHNOLOGY & NEW GLOBAL SUPPLY CHAIN OPPORTUNITIES

Vincent Pluvinage, PhD

Presented
at
Silicon Valley Business Forum
in Korea
on
May 11, 2021

Yimin Zhu, PhD

Co-Founder & Chief Technology Officer

A visionary in battery, fuel cell, and hybrid system development, Dr. Zhu has contributed to significant breakthroughs in nanomaterials.

Since 2007, Dr. Zhu has led the development, production, and commercialization of SINANODE battery technologies — first at Nanosys and, since the 2013 acquisition, at OneD.

Author of over 60 peer-reviewed papers and presenting his work at many industry conferences, Dr. Zhu holds over 70 energy storage worldwide patents and applications. He has dedicated himself to R&D and commercialization of energy storage, nanomaterials, and devices since 1998, first at Yamanashi University (NEDO Researcher Zero Emission EVs, Japan) and then in 2001 at Los Alamos National Laboratory (Scientist — Catalyst and Fuel Cells).

He earned his PhD in Electrochemistry at the Chinese Academy of Sciences.

BACKGROUND

R&D team, Manufacturing & Customer Technical Evaluations
Led by Co-founder & CTO Yimin Zhu, PhD

OneD BATTERY SCIENCES — EV Customer Focus
SINANODE Manufacturing

OneD material — SINANODE Pilot Production
Performance & Cost Optimization

nanosys — Nanowires for Energy Storage
Quantum Dots for Displays

HARVARD UNIVERSITY — Foundation Nanomaterial IP

2000 2001 2007 2014 2017 2021

SAMSUNG SDI

LG Energy Solution

posco

SK innovation

HYUNDAI

THE EV WORLD IS CHANGING…

FAST

WHY?

Global Mandates

HOW?

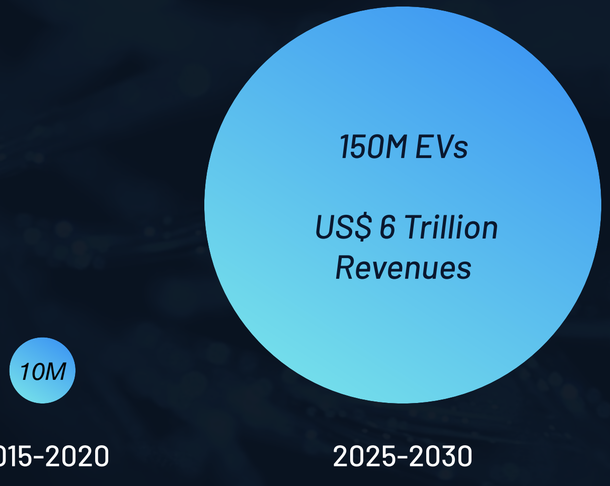
EV Supply Chains

VERTICAL INTEGRATION

LOCALIZATION

WHEN?

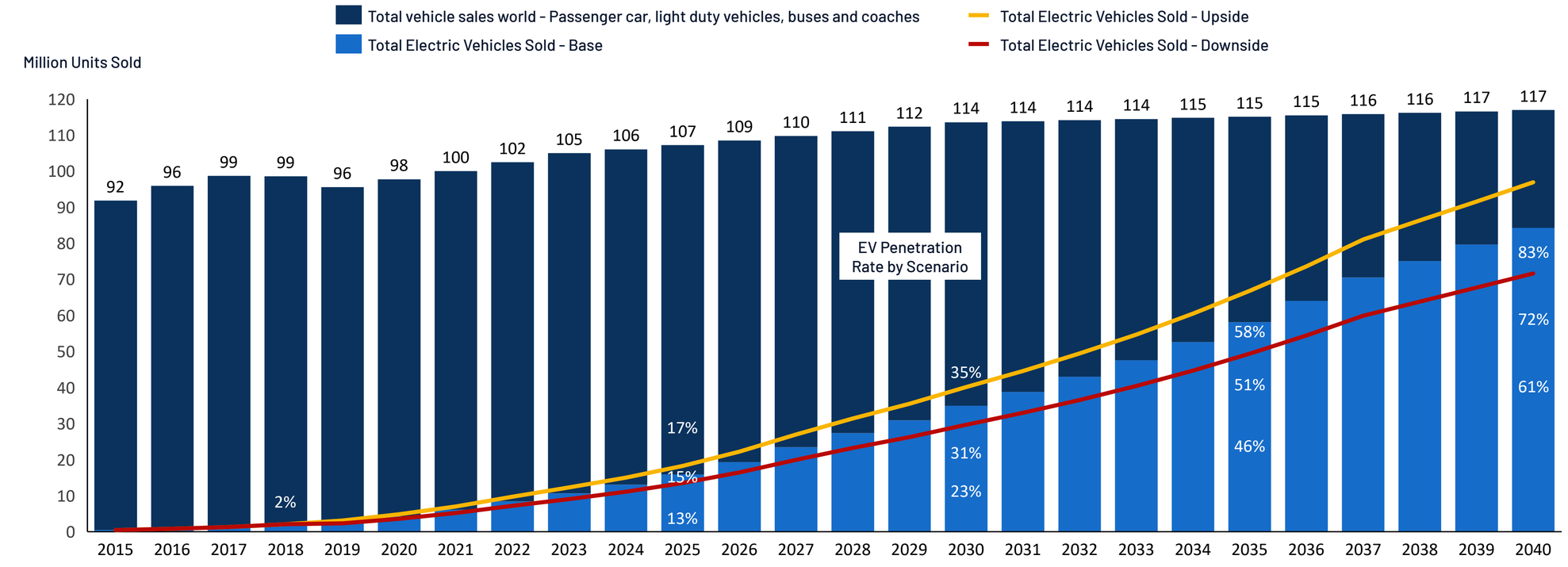
2021 Decisions



2015-2020

2025-2030

GROWTH IS ELECTRIC



Source: rho motion

2025 DETERMINES THE WINNERS OF THE EV RACE

2025 DETERMINES THE WINNERS OF THE EV RACE

They will be powered by nanosilicon-graphite anodes

SILICON IMPACTS OUR LIVES

Si is the second most abundant element on earth, after Oxygen

HUMAN COMMUNICATIONS

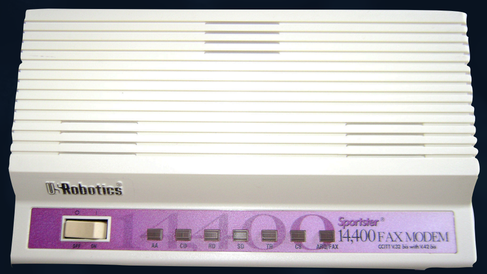
SONY TR55 (1955)

5 Silicon Transistors

SAMSUNG GALAXY S10

>450 billion

NETWORK COMMUNICATIONS



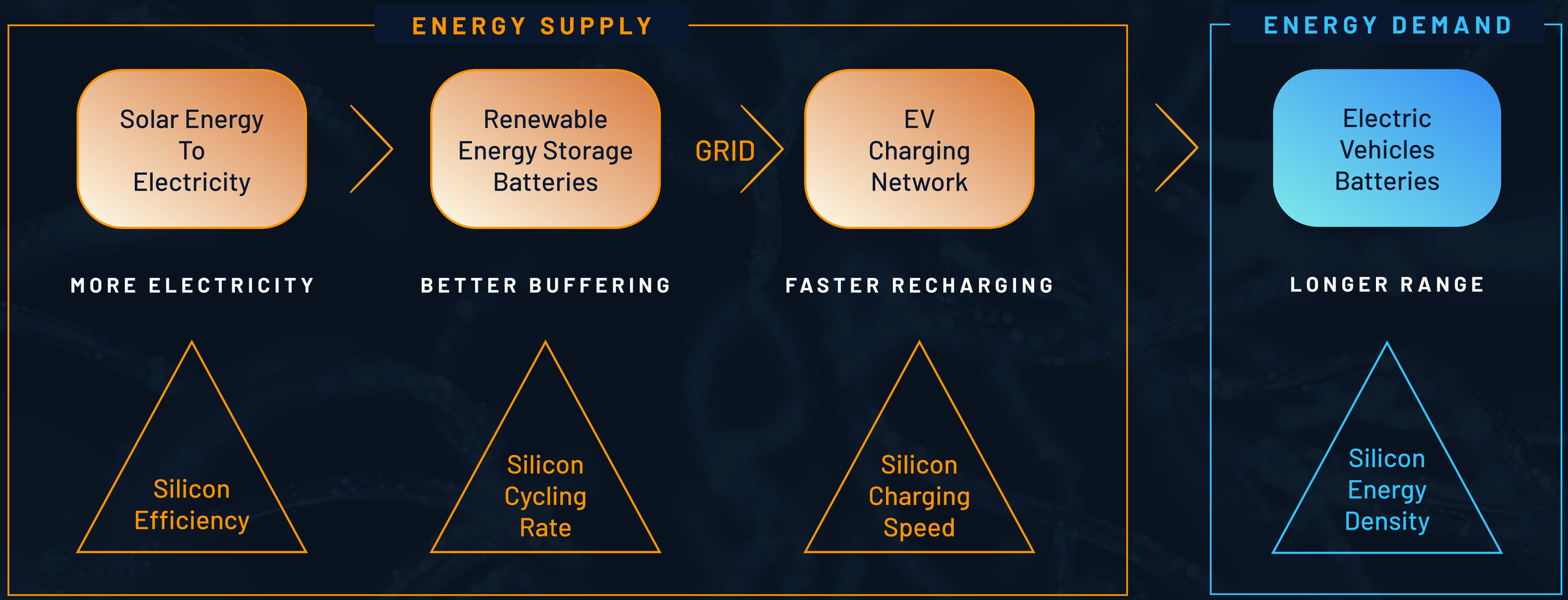
US ROBOTICS MODEM (1994)

9600 Bits per Second

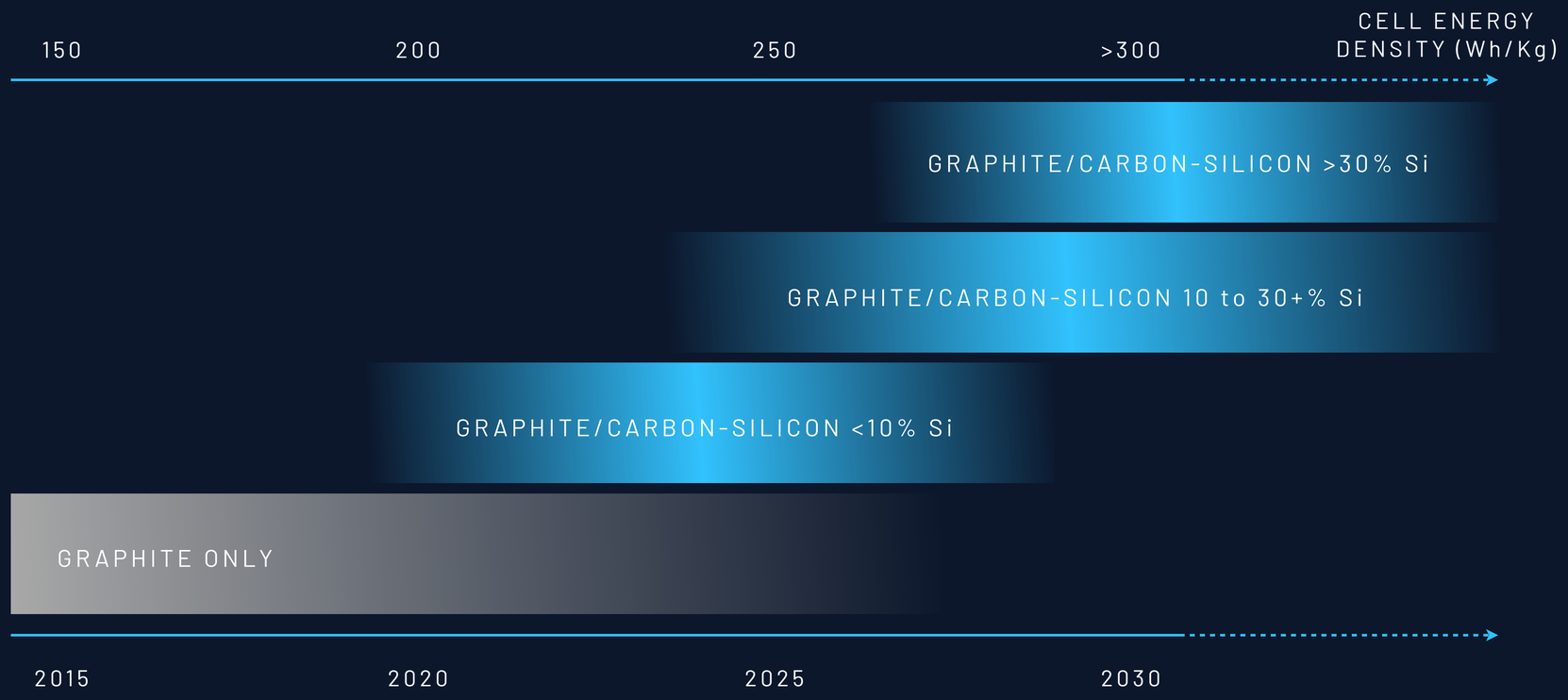
SILICA OPTIC FIBERS

100 GB per Second

SILICON IMPACTS ENERGY DEMAND & ENERGY SUPPLY



SILICON GRAPHITE ANODES DOMINATE NEAR AND LONG TERM PROJECTIONS



ROADMAP NATIONALE PLATTFORM ELECTROMOIBLITÅT, GERMANY

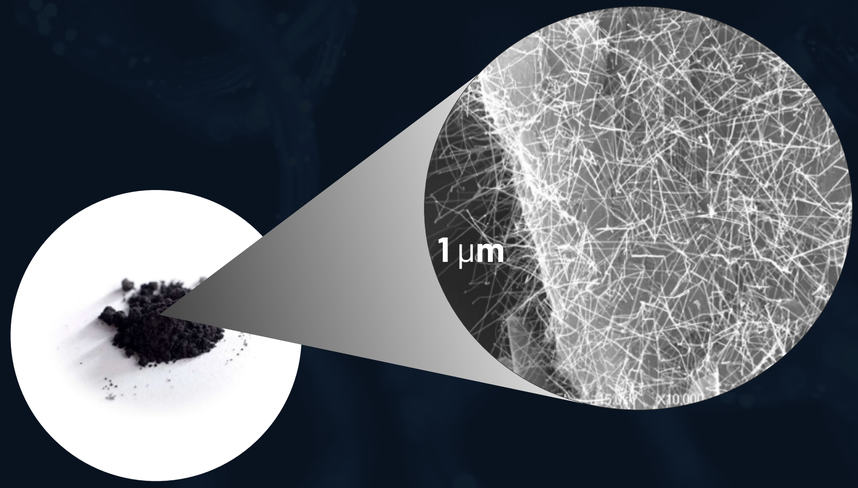
SILICON IMPACTS OUR LIVES

Si is the second most abundant element on earth, after Oxygen

HIGHER ENERGY MOBILITY

EV-GRADE GRAPHITE

Micron-size silicon oxide
< 7 wt. % has been mixed
to EV-grade graphite



100 TRILLION SINANODE NANOWIRES

Silicon Nanowires
> 21 wt. % can be fused
to EV-grade graphite

WHY NANOWIRES:

- Size
- Shape
- Speed
- Scale
- Sustainability

SINANODE®

SILICON NANOWIRE MOBILITY

TECHNOLOGY

Silicon nanowires fused to graphite particles is superior across all performance metrics.

BUSINESS MODEL

Ready to implement at scale for 2025 model year while fitting into existing value chain at lower $/kWh anode cost.

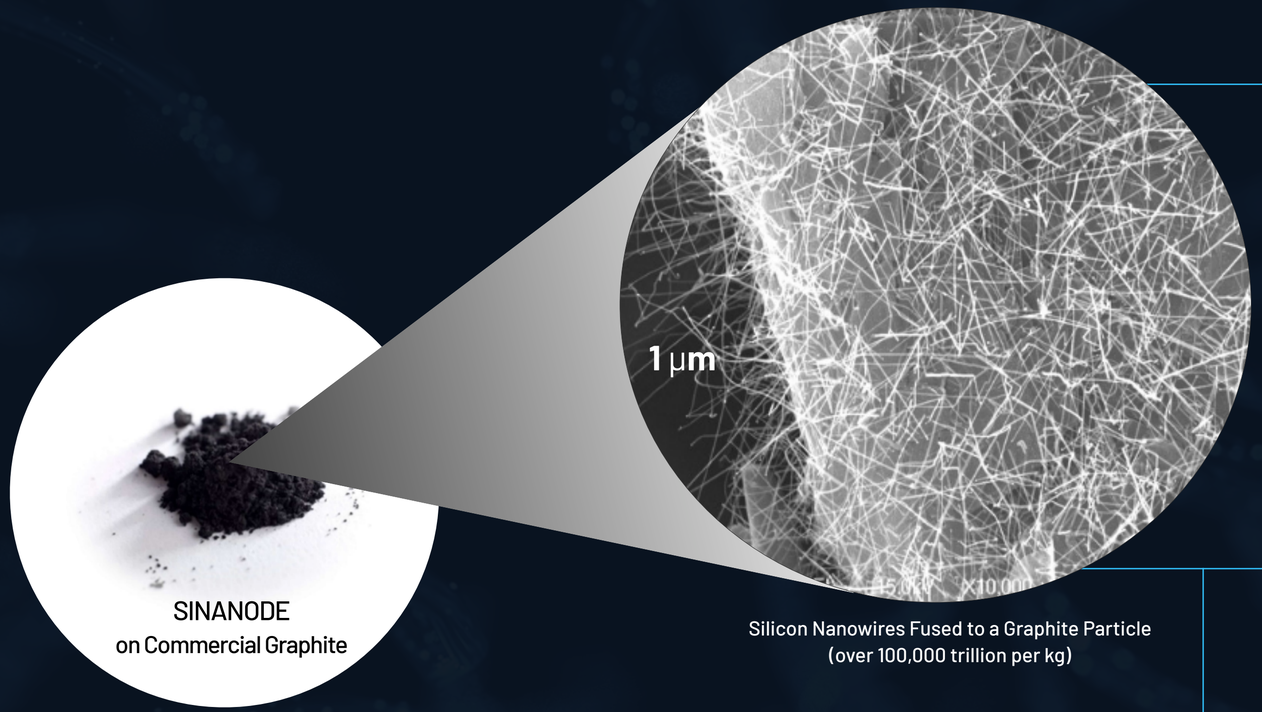
BRAND PROPOSITION

Multiple consumer messaging opportunities to differentiate the EV battery.

PATENT PORTFOLIO

Over 200 granted patents and applications protect our customers, partners, and their investments in large scale anode production and next generation EV battery designs.

SINANODE®

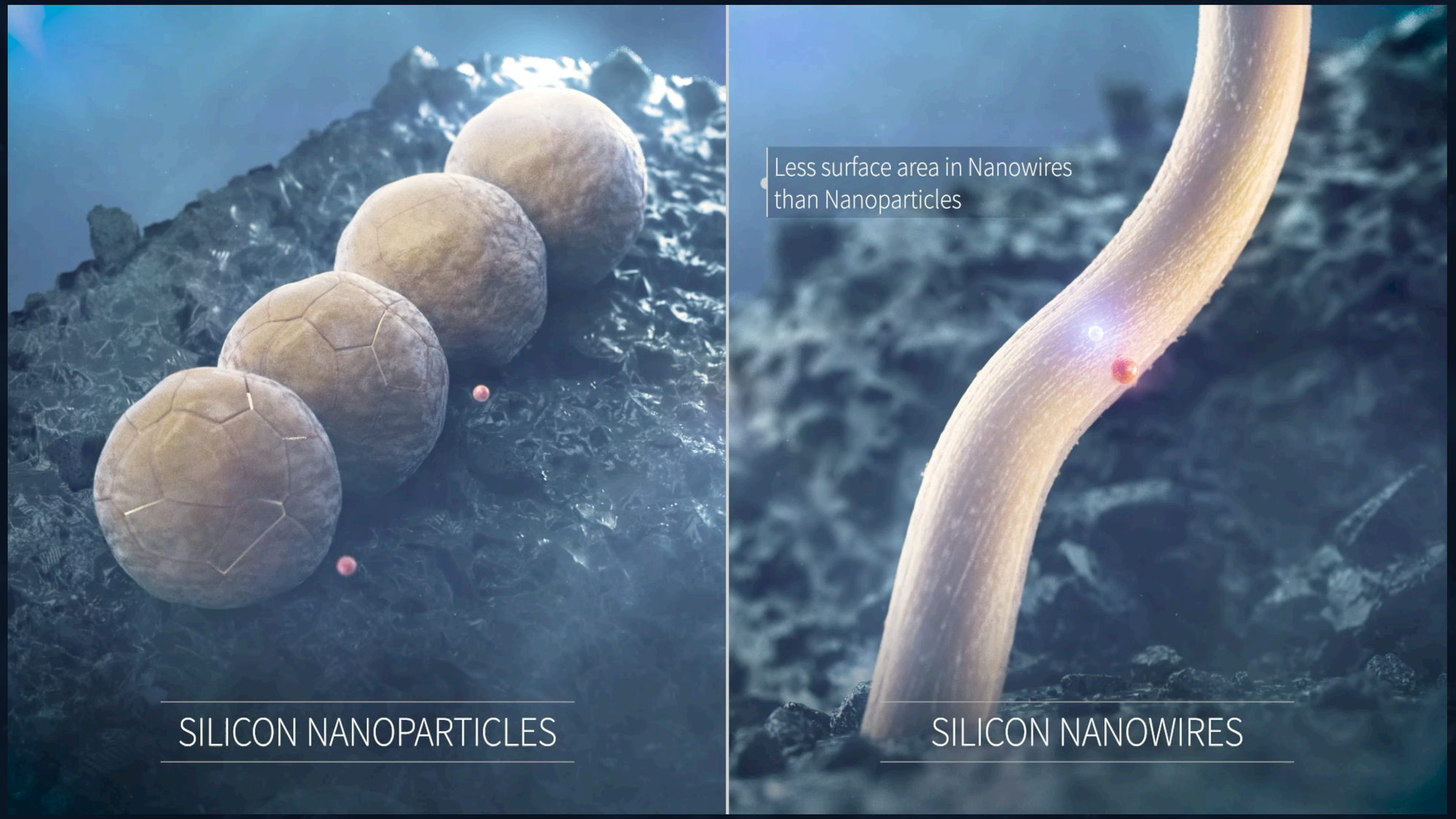


Silicon Nanowires Fused to a Graphite Particle
(over 100,000 trillion per kg)

THE SINANODE STEP

Our manufacturing process integrates a step into existing anode production by growing silicon nanowires onto graphite particles – permanently fusing them in place.

1 ELECTRON + 1 LITHIUM ION PER 6 CARBON ATOMS + **15 ELECTRONS + 15 LITHIUM IONS PER 4 SILICON ATOMS**



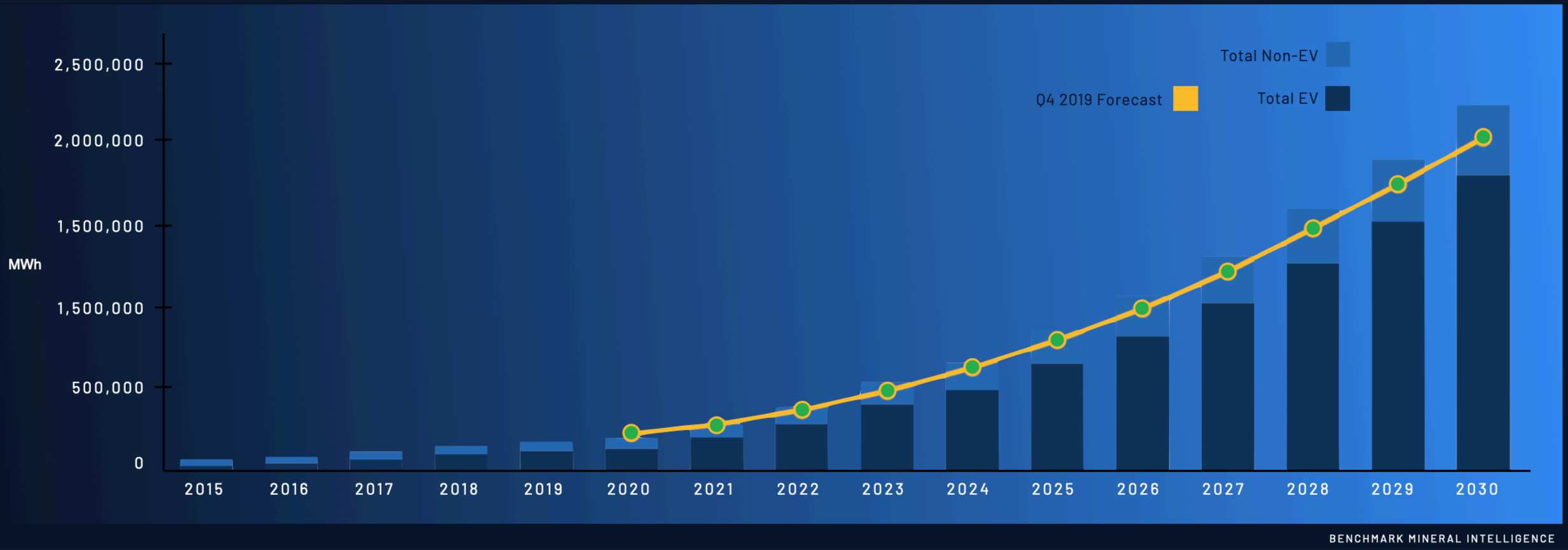
For 3D video, please go to: www.onedsinanode.com

SINANODE®

- ✓ Energy Density Triples, Increasing Range
- ✓ Charge Speed Increases
- ✓ Lifespan Increases

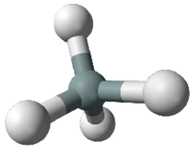
- ✓ Cost per kWh Decreases
- ✓ Anode Weight Decreases
- ✓ Carbon Footprint Decreases

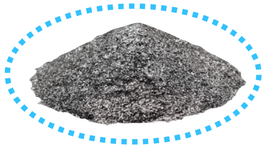
BATTERY DEMAND GROWTH



BENCHMARK MINERAL INTELLIGENCE

THE SINANODE STEP





EV-GRADE GRAPHITE

- Multiple Suppliers
- Natural or Synthetic

COMMERCIAL SILANE GAS (SiH_4)

- Used in Electronics & Solar
- High Purity, Low Cost

CVD PROCESSING SYSTEM

- Commercial Equipment: Solar CVD Stacks
- Patented Process

SILICON-ENHANCED EV GRAPHITE

- Silicon Nanowires Evenly Distributed & Fused
- Ready for Use in Any EV Cell Factory

EV ELECTRODE COATING

- Standard Wet Coating Processes
- New Dry Coating Processes

GLOBAL EV GRAPHITE PRODUCTION CAPACITY
2020: 450,000 tons
2025: Forecasted > 800,000 tons

ANNUAL PROCESSING CAPACITY
2 GWh Silicon-Graphite Anode Material per CVD Stack*

GLOBAL EV BATTERY PRODUCTION CAPACITY
2020: 390 GWh
2025: Forecasted > 890 GWh

*Wh = Ah x 3.6V

THE SINANODE STEP

REPLACES THREE STEPS

~~PURIFYING THE MGS~~

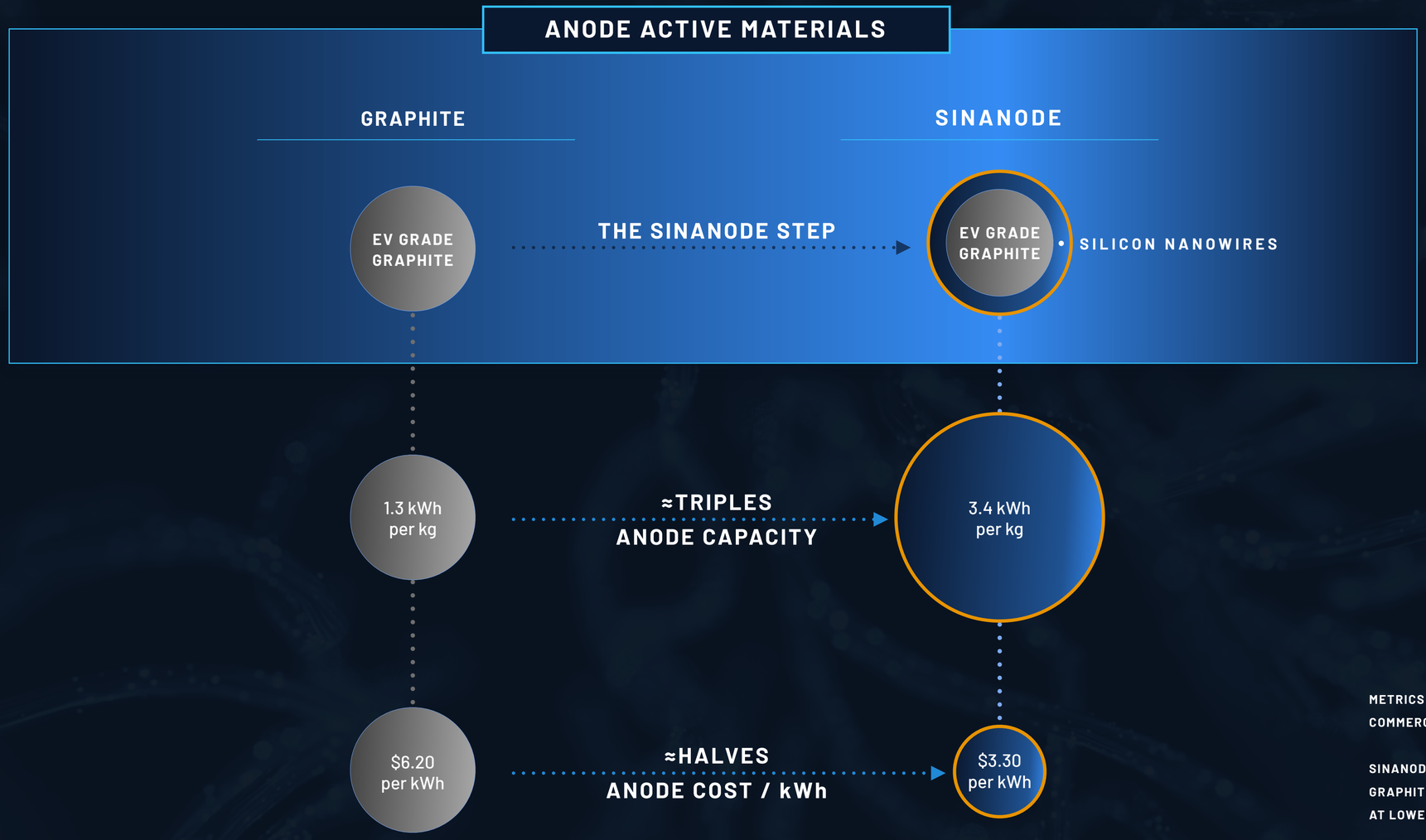
~~GRINDING IT TO NANO-SILICON~~

~~MIXING SILICON & GRAPHITE W/ POLYMER~~

BENEFITS:

- ✓ Uniform nano-silicon distribution within graphite anode layer
- ✓ Electrically connected nano-silicon to graphite
- ✓ Fully compatible with both wet & dry electrode coating processes

SINANODE MANUFACTURING PROCESS INCREASES ENERGY DENSITY & REDUCES COST

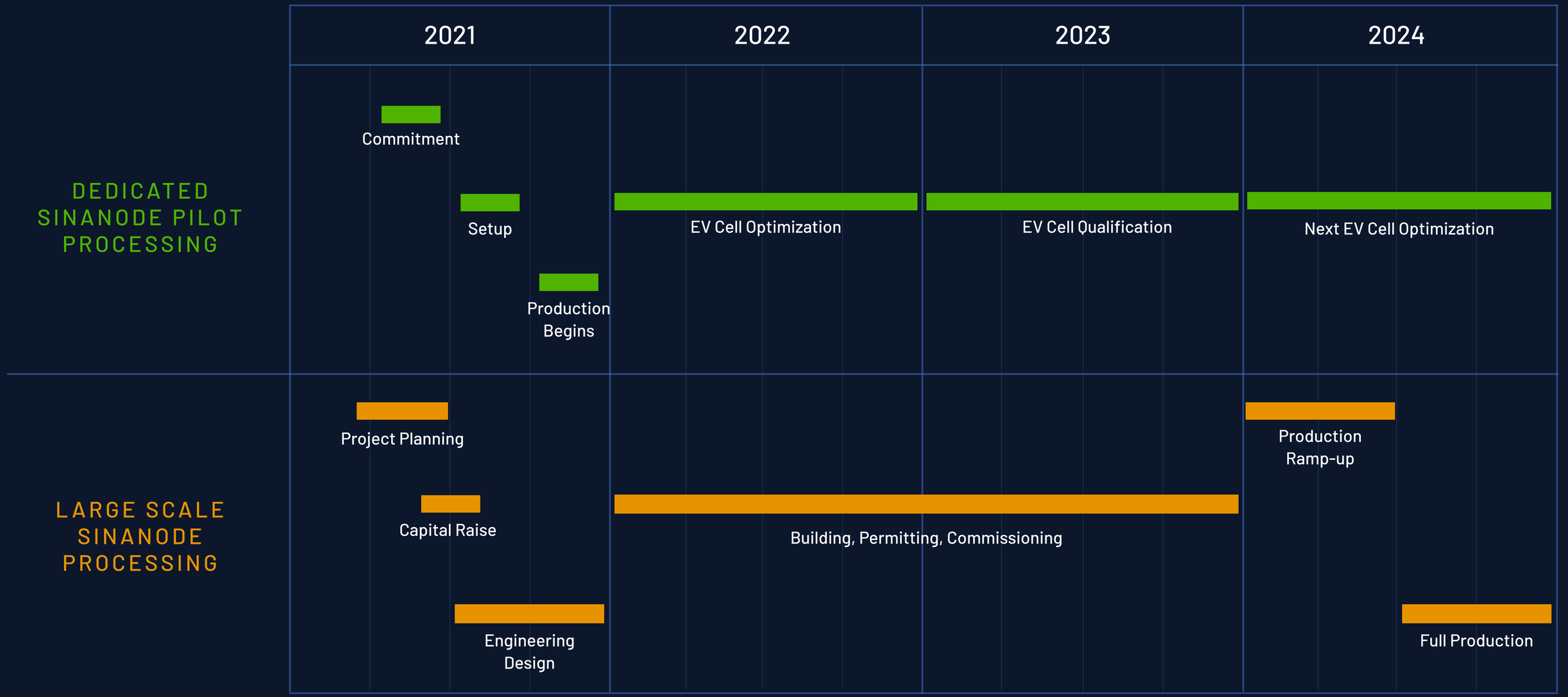


METRICS PROVIDED INCLUDE VARIABLE COSTS USING COMMERCIAL EQUIPMENT & ALL REQUIRED INPUTS.

SINANODE MATERIALS WITH HIGHER SILICON/ GRAPHITE RATIOS ENABLE EVEN HIGHER CAPACITIES AT LOWER COSTS.

Wh = 3.6 V x Ah.

ADOPTION PLAN TIMELINE



SINANODE®

BRAND PROPOSITION

“Nanowired” silicon differentiates the SINANODE battery from all others, giving OEMs a superior, patented technology platform to leverage to consumers.

SINANODE®

PATENT PORTFOLIO OVERVIEW

A cornerstone of OneD's electrochemical leadership, our patent portfolio includes over 200 patents and patent applications covering nanowire inventions ranging from material structures to manufacturing processes and equipment.

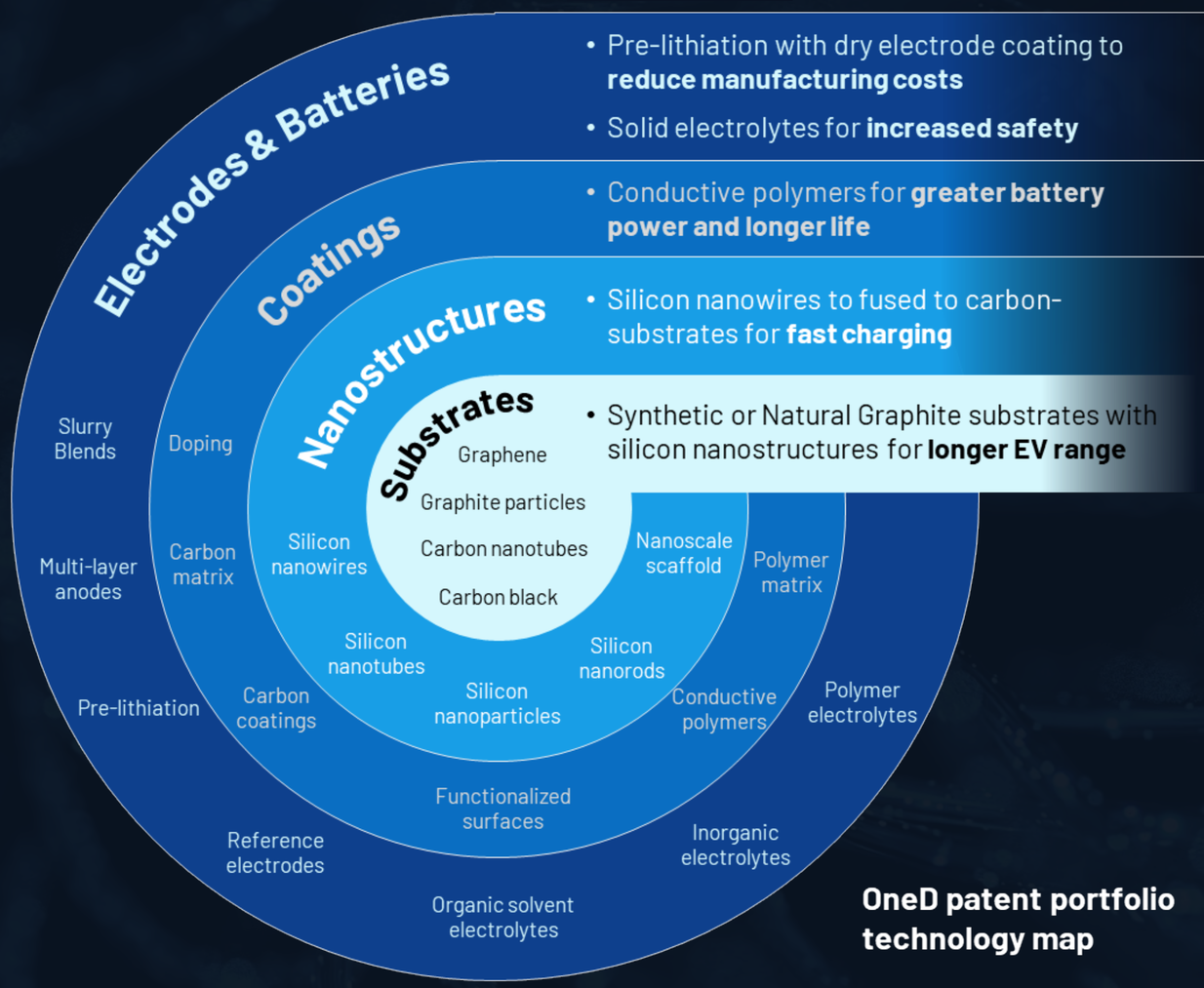
OneD's leading IP portfolio protects our customers, our partners, and their investments in large scale anode production and next generation EV battery designs.

Key Inventors:

Yimin Zhu
Chunsheng Du

Chumning Niu

Charles Lieber (Harvard U.)
Paul Alivisatos (now Berkeley U.)
Peidong Yang (now Berkeley U.)
Yi Cui (now Stanford U.)



OneD patent portfolio technology map

SINANODE®

SUCCESSFULLY LEVERAGING THE HIGHEST SILICON IN GRAPHITE ANODES WILL DEFINE EV LEADERSHIP

- ✓ Delivers performance that cannot be matched with today's silicon additives
- ✓ Scalable to meet 2024 production volumes
- ✓ Lowers cost as performance increases
- ✓ Compatible with the large material suppliers and EV cell makers
- ✓ Provides unique consumer-relevant differentiation
- ✓ Flexible to move up and down product segmentation tiers

SINANODE®

SILICON NANOWIRE MOBILITY

Designed for Speed, Scalability, Sustainability

THANK YOU

www.onedsinanode.com