TECHNOLOGY

PLUGGING AWAY AT POWERING THE FUTURE

Silicon Valley charges ahead to reinvent the battery

Sila, which replaces graphite with silicon, and packs more ionized atoms into a smaller space, in Alameda, Calif. on Sept. 1, 2021. Sila executives hope their new battery chemistry can help create a new era of energy storage.

By Cromwell Schubarth – TechFlash Editor, Silicon Valley Business Journal
Aug 25, 2022 **Updated** Aug 26, 2022, 6:18pm PDT

The global push to replace gas-powered vehicles with electric ones and to slow global warming has put a charge in the battery industry.

Expecting huge demand in coming years, venture capitalists are pouring unprecedented amounts of money into startups working on new kinds of batteries for both cars and

storage systems for homes and businesses. And with growing scrutiny over both the environmental costs and sustainability of extracting the materials used in batteries, a fleet of new startups is working on finding more eco-friendly solutions.

Battery companies are finding a ready market for innovation in the industry, said Ian Hayton, who leads materials and chemicals research for Cleantech Group, an industry consulting firm.

“To get to the goal of displacing internal combustion engine vehicles with electric vehicles, we need better batteries that provide better technical performance at a lower cost,” Hayton said.

Venture and private equity investors are already trying to push the battery market forward. Around the globe so far this year, startups working on new kinds of batteries have raised $13.6 billion in venture or private equity funding, which is well on track to break last year’s record of $18.6 billion, according to PitchBook Data.

A similar story is playing out in both the United States and in the Bay Area. Already in 2022, investors have put $6.1 billion into U.S. battery startups — 33% more than they invested in such companies in all of last year, according to PitchBook. Locally, such companies have already raised $800 million. That’s on pace to beat last year’s record tally of $1.2 billion and already above the previous record of $500 million.

Those tallies don’t include the money venture and private equity investors are putting into companies working to develop more ecologically sound or humane ways of extracting the materials used in batteries. Metals such as cobalt, lithium and nickel are often mined in ways that are harmful to the environment or use child labor.

“There is a lot of investment going into solving that problem and making the whole supply chain for battery materials more efficient. There is also the whole question of finding ways to re-use old battery materials,” Hayton said.

Enlarge

Jorg Heinemann, Chief Executive Officer at EnerVenue, holds a Nickel-hydrogen battery which is the basic building block of EnerVenue energy storage units.

Why here?

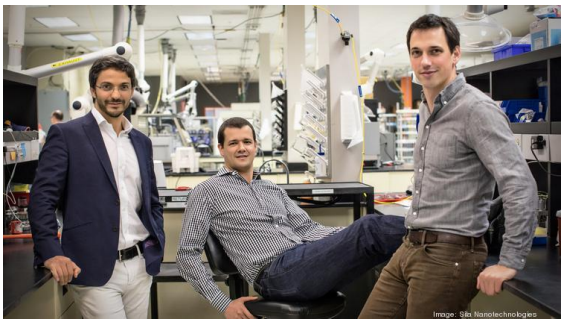
It's clear from the funding tallies that the Bay Area has become a hub of battery innovation. That's no accident, industry experts say.

You don't have to look any further than Fremont to understand a big part of the reason why. The success of electric vehicle giant Tesla Inc., which has a massive factory there, was largely dependent on battery development.

"The thing that Tesla did was bring a lot of battery talent into Silicon Valley," said Celina Mikolajczak, a former top manager at the car company who is now the chief battery technology officer at Lyten Inc., a San Jose battery startup. "The thought of everything you needed to do was enough to make you want to get under your desk and hide. But after you have a front row seat to that, you realize it can be done and you know what it takes to make it happen."

But Silicon Valley and the Bay Area have other advantages that have helped boost the region's role in battery development, experts say. Stanford University, the University of California, Berkeley, and the area's other universities produce numerous graduates who are trained in electrical engineering, materials science and related areas. And the region's thriving tech sector has attracted many more such engineers.

"We pull people from many different industries," said Gleb Yushin, co-founder and chief technology officer of Sila Nanotechnologies Inc., an Alameda-based battery materials provider. "Some come from the semiconductor industry, some from the solar industry and lots of them come from the oil and gas industry."



Alameda-based Sila Nanotechnologies was co-founded by, from left, Gleb Yushin, Gene Berdichevsky and Alex Jacobs.

SILA NANOTECHNOLOGIES

Market potential

All the Bay Area battery fervor is being spurred by the promise of sharing in what's expected to be a huge prize.

The market for EV batteries alone will explode from $46 billion last year to nearly $560 billion in 2030 — even as batteries become cheaper, according to a forecast from Precedence Research, an industry consulting firm. Similarly, the market for stationary batteries used by the electricity industry to store energy generated by volatile solar and wind systems will grow from $25 billion to $224 billion over the same time period, according to Precedence's predictions.

Meanwhile, sales of battery materials will double by 2030 to more than $80 billion, according to Allied Market Research.

The market is also being catalyzed by the U.S. government's effort to shorten supply chains and boost domestic production, particularly of batteries.

Most batteries used in EVs today are made in Asia. But under one of the new provisions in the new Inflation Reduction Act, such vehicles would only be eligible for a $7,500 tax credit if their batteries are made in North America with materials and parts sourced in large part from countries with which the United States has a free trade agreement.

A technician tests ceramic separators for electric vehicle batteries in a lab at QuantumScape in San Jose, on June 15, 2022. Makers of batteries that could charge in a few minutes are setting up assembly lines, bringing the technology a big step closer to auto showrooms.

Still, it's not a sure thing that the expected battery boom will benefit Bay Area businesses in the long run. If local companies like Lyten Inc. and San Jose's QuantumScape Corp. are going to take their place among the Asian giants that now dominate the industry, they'll need to prove they can mass produce their cutting-edge batteries while consistently meeting the exacting specifications of automakers or utility companies. That's going to be a long and painstaking process, Hayton of Cleantech Group said.

QuantumScape in particular might be able to complete that process by end of the decade — "but that's not a sure thing," he said.

Sila's Yushin says the challenge can be daunting. "When you develop new processes or materials there is a lot of uncertainty," he said. "When you take this into production you run into an even higher level of uncertainty."