Meet Nyobolt, developing ultrafast-charging systems for battery-powered application

As part of our quick founder questions series – or QFQs – we spoke to Sai Shivareddy, CEO and co-founder of NyoBolt, about ultrafast-charging battery systems, getting the best out of each employee and finding the right anchor customers.

Temps de lecture : minute

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What was the catalyst for launching Nyobolt?

Nyobolt was formed by a team of scientists and engineers who wanted to solve real world problems related to high power and high efficiency industries. This passion came from over a decade of innovation and developing groundbreaking battery cell chemistry and energy storage technologies that can serve a diverse range of industries.

Our mission is to support the transition to clean energy seamlessly with ultrafast charging solutions, whilst increasing convenience and reducing the carbon footprint.

Tell me about the business - what is it, what it aims to achieve, who you work with and how you reach customers and so on?

Nyobolt develops ultrafast-charging systems for nearly any battery-powered application that requires high power and high uptime. From the

largest heavy-duty off-road vehicles to smaller industrial robots, mobile superchargers and power tools, we keep machines running faster and longer than any traditional lithium-ion battery on the market today. By delivering our innovative battery technologies to underserved sectors, our mission supports a rapid transition to clean energy and a net zero world.

We have about 100 employees in the UK, U.S, and Asia where initial battery production takes place. Our team includes world-class materials scientists, battery engineering experts, and applications experts who've joined us from some of the best automotive and charging OEMs in the world. We have a deep knowledge of the industries and applications that require our solutions, as well as what is scientifically feasible to allow batteries to safely perform at extremely high power rates over long life cycles.

In joint development with our customers, Nyobolt is helping businesses to meet their electrification goals while improving operational efficiency. Initial projects focus on retrofitting applications and machines with our modular battery pack systems and pairing them up with supercharging infrastructure to keep them running with quick and powerful recharges.

The constraints currently found in traditional lithium-ion chemistry and present-day charging infrastructure, typically mean vehicles and machines are down for critical amounts of time to recharge. This throws up issues when they need to be up and running for about twenty-two hours a day. The types of industries where Nyobolt's "pit-stop" charging has been the most effective is in materials warehouse robotics, mine haul trucks, professional tools, and heavy duty commercial vehicle sectors. We also love to demonstrate our charging power in high-performance vehicles like the Nyobolt EV.

How has the business evolved since its launch? When was this?

I founded Nyobolt in 2019 in Cambridge together with my co-founder and Chief Scientist, *Professor Dame Clare Grey*. Clare is the Geoffrey-Moorhouse-Gibson and Royal Society Professor of Chemistry at *Cambridge University* and I have a PhD in Engineering from *St John's College*, Cambridge where I collaborated with *Dyson* on groundbreaking concepts for high-power energy storage technologies. This was over 15 years ago and from then, I spent the next decade in the industry working on the high-volume manufacture of various components in the energy storage space, covering high-power batteries and fuel cells. In the last five years, we have had many evolution milestones on our road to delivering scalable, high-performance batteries to power ambitious applications for a competitive edge.

We launched the business following a breakthrough discovery by members of our team in using new anode materials in lithium-ion battery cells which allow for a faster transfer of electrons between the anode and cathode. This provides a much faster charge rate than what is seen in the wider market today and without the levels of degradation that normally accompany frequent "supercharging" of lithium-ion batteries in an electric vehicle (EV), computer or mobile phone.

Within our first two years, we developed the electronics and power conversion capabilities to support ultra-fast-charging battery systems in smaller applications like power tools and robotic cleaners. We also had our proprietary anode material production scaled to multi-ton level as well as establishing industrial battery cell development capabilities led by our cell engineering team in Boston, USA to bring our cells to market faster. That was in 2021, the year when we also raised £10M in Series A funding. This kicked off rapid development into new sectors including EVs and

industrial warehouse robotics.

By the end of 2022, we had successfully raised a further £50M in Series B funding and brought in strategic shareholders such as H.C. Starck, a key anode materials supplier in the industry, as well as IQ Capital. Both have been instrumental in supporting Nyobolt during our current growth stage. This year, the Series B funding and our acceleration into new high-power applications led us to develop and reveal our 6-minute, fast-charge Nyobolt EV concept, complete the installation of our anode material production facility in the UK, expand our cell development and prototyping operations in Boston, USA, and establish our cell manufacturing operations in Asia for full-scale production to start in 2024. Just last week, we also released our most recent innovation: a compact, mobile supercharger named Bolt-ee that will turn any parking spot into a supercharging location. So, it’s been a very busy and exciting year!

Tell us about the working culture at Nyobolt

We believe in a collaborative approach to innovation and a systems-level approach to tackling the challenges that are holding back the electrification of new products and services. Building on more than 10 years of research, our international team of experts is breaking new ground in a variety of different hotspots such as materials, cells, modules, packs, software control and power electronics.

Our working culture is supportive, open and respectful of all employees and aims to get the best out of each employee.

How are you funded?

The business has been funded by strategic partners and venture capital

firms. From seed to Series B, we have raised over £63.45M in the last three years. These firms include *Cambridge University Enterprise seed funds*, anode materials supplier *H.C. Starck*, and the deep tech investor specialist *IQ Capita*l, *Amadeus Capital* as well as various angel investors from Cambridge and San Francisco.

What has been your biggest challenge so far and how have you overcome this?

I think from what we've seen in the battery and EV industry in the last two years,the biggest challenge has been taking even the most brilliant design and innovative technology from the lab to full-scale production. Even the most successful ideas on paper require a seamless integration of customer demand, product certification, production capacity and supply chains operating in sync to bring your product from concept to delivery. And even when you have all the pieces of the value chain aligned, in our current geopolitical and climate crisis environment there is always the potential for hurdles. Whether that's supply chain shortages or devastating effects of war, there are lots of external factors can severely disrupt your go-to-market strategy.

Nyobolt has a very focused and disciplined strategy to bring our first fast-charge products to customers. Internally, we have chosen to innovate on the battery system chemistry, design and engineering. But alongside this, we are outsourcing cell and pack manufacturing to partners who have certified factories and full-scale operations already running to reduce our capex costs and get products into the hands of customers faster. We know that getting our technologies out onto the market and generating revenue is key to attracting more customers and investment as and when we need it.

Of course, with the positive influences on local battery manufacturing that we're seeing from government policies in the U.S. and Europe especially,

we are considering bringing manufacturing in-house one day, but for now, we are focused on launching scaled production with partners next year and powering up fleets across the world.

How does Nyobolt answer an unmet need?

There’s a big trend in the battery innovation space today to move to increasingly higher energy density in cells to maximise range as an output. The primary reason for this is to meet the ever-increasing EV demand. But when it comes to industries that require high-power and rapid charging to generate high uptime in fleet operations, traditional lithium-ion battery technologies on the market still have limitations related to heat dissipation and chemical reactions. Rapid charging generates more heat, which can be detrimental to the long-term health and efficiency of the battery.

Nyobolt’s anode properties and cell engineering have solved a number of these constraints. Our engineering allows for high-power density in our cells that can be matched with supercharging capabilities up to 350 kW or more while still safely powering up machines and vehicles in just minutes.Not only that, but they can also last well over thousands of fast charge cycles.

Customers who are moving to retrofit their fleets with Nyobolt battery solutions favour high power-dense batteries in condensed, more efficient packs. We are working with our customers to optimise the number of machines they have in operation while raising the overall efficiency of the fleet. We do so by designing their high-power charging infrastructure, routes, and charging cycles. In these industries where time is money, we are trying to help solve these unmet needs.

What’s in store for the future?

The next few years will be critical for Nyobolt’s future success, so we have a lot of work to do. It’s a very exciting time for us as we get closer and closer to making ultrafast charging ubiquitous in the industry.

Our plans for the next year include delivering the first Nyobolt battery systems to customers who have urgent needs to increase the efficiency of their fleets; whether it be materials handling robots, power tools, or heavy-duty off-road vehicles. We will also continue to help EV manufacturers to realise their ambitions.

The customers, partners and investors who have joined Nyobolt since our launch, and who will come on board during our current production launch phase, will be critically important to our growth and success. We are looking forward to helping them reach their net-zero goals while improving business efficiency and reducing costs over the long term.

What one piece of advice would you give other founders or future founders?

As a deep tech founder focused on hardware, product market fit is difficult and takes a long time even if you have a breakthrough technology. Finding the right anchor customers is everything in this space and that means saying no to most of the opportunities that suck up valuable engineering resources early on. Being surrounded by experienced industry advisers makes a big difference in maximising the chances of success.

And finally, a more personal question! What's your daily routine and rules you're living by at the moment?

I'm normally responsible for taking my son to school so the morning starts off with activities around that. We live in Cambridge, which is a cycle-friendly city, so I try to make the most of that and get my exercise in by cycling everywhere. I avoid any meetings before 10 am to focus on the most important tasks for the week ahead. We've got operations in Asia, and on the east coast of the US in Boston, so there is an element of round-the-clock meetings and calls. Most days end quite late in the evening. I relax by spending time in nature, yoga and reading.

Sai Shivareddy is the CEO and co-founder of *NyoBolt*

Article by Sai Shivareddy