

# SCALEUP—Seeding Critical Advances for Leading Energy technologies with Untapped Potential

## PROJECT DESCRIPTIONS

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### **24M Technologies, Inc. – Cambridge, MA**

*Next-Generation Lithium Metal Anode Cells for Electric Aviation - \$9,000,000*

Over the last decade, the cost of lithium-ion (Li-ion) energy storage systems has fallen while energy density has improved steadily. The current generation of Li-ion batteries is approaching performance and cost plateaus, however, just as new electrified transportation applications are emerging. The 24M team will develop and scale up batteries incorporating a Lithium Electrode Sub-Assembly and SemiSolid cathode that deliver lower cost energy storage (<70 \$/kWh), superior power (>1.5 kW/kg), and improved energy density (450 Wh/kg) for electric aviation. The 24M Technologies team will develop and scale up a commercial, modular large-pilot line (1 MWh/y) for customer validation with a clear path to GWh/y production capacity of new Li metal-based batteries.

### **Cambridge Electronics, Inc. – Cambridge, MA**

*8" 3DGaN FinFET Technology for Energy Efficient Data Centers and 5G Network - \$4,320,000*

Cambridge Electronics Inc. (CEI) has developed a disruptive 3D gallium nitride (GaN) technology with far greater capabilities than today's planar GaN transistors. CEI aims to create an ecosystem around the 3DGaN technology by transferring it to a US-based 8" silicon wafer manufacturing plant and partnering with epitaxial wafer vendors, foundries, and semiconductor chip and module manufacturers for collaborative product development. The success of the proposed project will have a broad impact in improving energy efficiency, reducing greenhouse gas emissions, and creating high-tech jobs in the U.S. energy efficiency and green energy industries.

### **Sila Nanotechnologies – Alameda, CA**

*Scale-up Technology for Accelerated Adoption of High-Capacity Silicon Anodes in Mass Market Electric Vehicles - \$10,000,000*

With prior ARPA-E support, Sila developed a unique drop-in replacement silicon (Si) dominant composite anode powder that boosts automotive lithium-ion battery (LIB) energy density by 20%+ and enables fast charging. Sila has built a pilot production line, operating 24/7 for the last 2 years, and is commissioning its first factory (50 MWh) to introduce its Si anodes in wearables and portable electronic devices as well as for qualification electric vehicles. As part of SCALEUP, Sila aims to develop a portfolio of technologies focused around advanced reactor designs with more efficient material processing, on-line diagnostics, improved precursor utilization, and improved material handling. This proposed project will significantly (1) reduce Si anode costs; (2) improve efficiency and reduce waste in production; (3) reduce engineering and cost risks; and (4) reduce EV battery costs and accelerate the move to clean transportation and renewable energy.

### Switched Source LLC – Vestal, NY

*Scaling Up Cost-Effective Grid Modernization – \$8,560,000*

Switched Source is introducing the next generation of distribution automation technology for large commercial and industrial customers and electric utilities, which cost-effectively improves the electric distribution grid's reliability, resiliency, and distributed generation hosting capacity. Switched Source's product portfolio consists of two patented smart grid devices that actively manage real and reactive power flows on medium voltage systems. The critical next step to gain acceptance as a viable investment and validated utility technology is through structured demonstration projects on partner utility electric distribution systems, with third-party performance evaluations. SCALEUP will enable Switched Source to resolve remaining technology and commercial adoption risks by establishing the processes, infrastructure, and technology validation to bring a game-changing ARPA-E technology to the utility market.

### LongPath Technologies Inc. – Boulder, CO

*Basin-SCAN: Basin Scale Continuous oil and gas emissions Abatement Network – \$5,000,000*

LongPath Technologies proposes the largest continuous emissions monitoring network for the oil and gas industry. The network will be able to locate and size natural gas emissions in real time across 700 square miles of the Permian basin in the Southwest U.S. Project objectives include scaling up a network to cover 850+ oil and gas facilities, reducing system costs, expanding value-added services on the sensor platform, and quantitatively proving net gains of continuous monitoring. Potential impacts include reducing oil and gas production emissions by 60-80% basin wide.

### AutoGrid Systems, Inc. – Redwood City, CA

*Highly Scalable Virtual Power Plant (VPP) PLATFORM for Mass Storage and EV Deployments - \$2,250,000*

AutoGrid's Flex™ is an energy flexibility management and virtual power plant software platform that enables utilities and energy-as-a-service providers to aggregate and optimize distributed energy resources. Flex™ allows its customers to maximize monetization of value streams, such as time-of-use arbitrage (purchasing and storing energy when the cost of electricity is low and selling or using stored energy when the cost is high) demand charge (charges determined during peak demand) management, and grid services. This project proposes to significantly increase Flex™ capabilities by co-optimizing, in real time, the number of storage assets to 100,000 and expanding its features and functionality for the electric vehicle fleet management use case.

### Ionic Materials – Woburn, MA

*High-Throughput Manufacturing of Breakthrough Polymer Electrolyte to Enable Low-Cost Solid-State Batteries - \$8,000,000*

Ionic Materials (IM) will validate three critical elements of its polymer electrolyte (PE) thereby retiring key technical, manufacturing, and market risks on the path toward commercialization: high-volume, commercial-quality manufacturability of polymer electrolyte materials and components; safety of high capacity Li-ion cells; and commercial-specification-aligned cell performance. The team will drive toward a 15% reduction in production cost of IM's PE powder and third-party qualification of ultrahigh capacity automotive Li-ion cells (250 ampere hour). This project will demonstrate that the IM PE can be a low-cost component in safe, solid-state Li-ion batteries.