



NEW ENERGY NEW YORK

“Establishing a domestic supply chain for lithium-based batteries requires a national commitment to both solving breakthrough scientific challenges for new materials and developing a manufacturing base that meets the demands of the growing electric vehicle (EV) and stationary grid storage markets.”

Jennifer. Granholm, Secretary of Energy, U.S. Dept. of Energy

A National Hub For Battery Innovation, Manufacturing, and Workforce Development pioneered by multi-sector coalition:

Lead: Binghamton University, SUNY

Non-Profits: New York Battery and Energy Storage Technology Consortium (NY-BEST), Research Foundation for the State University of New York (SUNY RF), IncubatorWorks, The Clean Fight New York

Government: New York State Research and Development Authority (NYSERDA), Empire State Development (ESD) Division of Science, Technology & Innovation (NYSTAR), Broome County

Academia: Rochester Institute of Technology, SUNY Broome Community College, SUNY Corning Community College

VISION. New Energy NY seeks to help the U.S. meet the demand for domestic battery products by establishing a battery development and manufacturing hub in Upstate New York around an emerging storage ecosystem and New York’s first Li-ion gigafactory set to open in the Greater Binghamton/Broome County area in 2022 by Imperium3 (iM3NY). iM3NY’s planned 10GWh manufacturing capacity will spur a new manufacturing economy, realizing the vision set by the Regional Economic Development Council of becoming “a leader in innovation and integration of battery technology and the energy storage sector.” The added jobs will create an economic resurgence in an underdeveloped area of Upstate New York that for decades has been encumbered with a declining manufacturing sector. New Energy NY’s multi-sector, comprehensive approach will provide competitive advantages to the hub against Asian manufacturers, helping U.S. gain global leadership in advanced battery manufacturing, and establish a battery and materials supply chain that meets national security requirements. New Energy NY will support domestic development and engineering initiatives, facilitate faster transition to innovative technologies, and accelerate the development of an advanced manufacturing workforce. The New Energy NY coalition will leverage existing resources in Upstate New York to launch new initiatives, fill resource gaps, and grow a competitive energy storage industry cluster with national impact, built on a foundation of equity and environmental justice.

ECONOMIC OPPORTUNITY. The Federal Consortium for Advanced Batteries has set a goal for the U.S. to establish a secure lithium battery supply chain by 2030. The U.S. currently manufactures 59 GWh annually at 8% of the world’s manufacturing capacity, while demand for batteries in domestic electric vehicles alone is estimated to reach 320 GWh in 2028, which will require >25,000 new direct battery manufacturing jobs and >100,000 new supply chain jobs. Over 15,000 of these are estimated to be needed in New York State (NYS). In addition, Bloomberg forecasts 8 GWh of annually deployed stationary Li-ion energy storage by 2028, a 5-fold increase over the current level, and the emergence of new markets and applications, such as in aviation and national defense. For the U.S. to meet the stated intent for a carbon-free grid and transportation system, it must satisfy a substantial need for additional manufacturing capacity, using improved and sustainable methods and equipment. Cells and batteries need to be designed and manufactured for easy and clean recycling of valuable components and minerals. The time and cost to get new battery technologies from lab to market needs to be reduced through development of an ecosystem for rapid prototyping, testing, commercial-scale pilot manufacturing, and scale-up manufacturing.

The transformative role of storage and the need for new or improved technologies at every step of the supply chain combine into unprecedented opportunities for the individuals, companies, regions, and states that will



provide the innovations, means of production, workforce, and supply chains to meet the global demands. Through numerous prior investments, NYS, with Upstate New York in particular, is positioned to become a national leader to meet this challenge. NYS is a global leader in technology and materials research for advanced batteries. Demand for storage in NYS is growing as elements of the Climate Leadership and Community Protection Act are realized, including mandates for 70% of electric production from renewable sources by 2030, a carbon-neutral grid by 2040, and adoption of electrified transportation across all sectors.

Within NYS, a hub has emerged in Broome County and the surrounding Southern Tier, catalyzed by unparalleled initiatives from NYSEERDA, ground-breaking R&D and consortium efforts at Binghamton University led by 2019 Nobel Laureate M. Stanley Whittingham, and the 2017 launch of the NYSEERDA Southern Tier Clean Energy Incubator (SCI) by Binghamton University, and coalition members NY-BEST and IncubatorWorks, which has served 45 U.S. and international companies. One notable SCI client, iM3NY is building a Li-ion battery gigafactory in qualified federal Opportunity Zones in Endicott, NY, projected to generate >1000 new direct jobs over the next 5 years. The launch of the gigafactory is also expected to result in regional contracts with various OEMs and companies in the battery supply chains, as well as in the expansion of various supply chain companies to the region. With the support of the EDA, New Energy NY will capitalize on these opportunities and leverage existing resources throughout NYS to build out an internationally competitive energy storage innovation cluster strengthened by the projects outlined below.

PROJECTS

1. BATTERY-NY (\$30M). Support of innovations in battery technology and manufacturing is needed to leapfrog the present dominant Asian sector and provide a viable U.S. domestic industry. To address this, we propose to build BATTERY-NY, a technology development and manufacturing center in New York's Southern Tier for the development and pilot production of batteries that lowers the technical and financial risk barriers to market entry. BATTERY-NY, led by Binghamton's Distinguished Professor Stanley Whittingham, 2019 Nobel Laureate inventor of the Li-ion battery, will build on existing strengths within the State while advancing the following key goals: (1) develop and enable the scale-up and advanced manufacturing of batteries for various sectors including transportation, military, and energy, and (2) establish a robust manufacturing infrastructure that will advance the region by supporting multiple industries and their supply chains. It will fill the gap between the Ah cells that Binghamton and RIT can make today and a GWh factory by providing commercial-size cells in the kWh size range. A first-in-class facility in the U.S., BATTERY-NY will offer companies the latest technologies for the design and manufacture of batteries, as well as in-place pilot production, scale-up, and manufacturing capabilities that can be accessed without capital investment.

Risks and Mitigation Strategies: BATTERY-NY is based on the premise that its structure will sufficiently de-risk the full-scale technical and manufacturing development for battery companies to attract investment capital for construction of full-rate production capabilities. This risk is mitigated through our current and pending corporate partners, with financial wherewithal to invest in battery manufacturing.

2. Workforce Development (\$20M). The battery cluster will need an educated workforce at all levels, including technicians, engineers, and management. The iM3NY gigafactory is expected to create ~1000 jobs over 5 years, and other SCI and NY-BEST members currently have over 300 job openings. This number is expected to increase at least five-fold over the next 5 years, and recent studies show the potential for 30,000 jobs in NYS by 2030. This project will fill gaps in current workforce development opportunities and build the necessary talent pipeline for the growing cluster. During the *Phase I Planning Project*, we will work with industrial, commercial, and research communities to map the labor needs of the energy storage ecosystem. The coalition will then engage with the workforce development community to generate an inventory of existing programs across the region and identify gaps based on the needs assessment. We will work with workforce and talent development partners to subsequently define curricula at the various levels and job classifications



required to provide the training, education, certification, and skills needed. The team will also engage with industry and labor unions to create internship and apprentice programs. Special emphasis and focus on identifying, attracting, and engaging underrepresented communities will be a constant throughout the project.

Risks and Mitigation Strategies: The variety of organizations and programs needed to address all aspects of industry needs imposes significant coordination, planning, and monitoring challenges, intensified by a rapidly evolving environment caused by the pandemic. We will address these by establishing a workforce advisory board, with strong industry and union participation, to guide the project and provide oversight.

3. Supply Chain Development (\$5M). A reliable, regional, qualified supply chain is essential for a competitive U.S. energy storage manufacturing hub. Many materials and components are needed for battery manufacture and interfacing with the end use, such as solar, vehicle, wind, as well as for end-of-life recycling. The goal of this project is to grow NYS qualified suppliers and expand the domestic supply chain by helping U.S. companies expand to NYS, and recruiting international companies. First, we will create and maintain a supply chain database, hosted on the NY-BEST website; this will include guidance both on MWBE and veteran-owned organizations and across the resource and supply area, ranging from material supply to service firms needed to install projects. We will perform a gap analysis and develop and implement a strategy for growth or recruitment including outreach and marketing, matchmaking, as well as identification of potential sites for interested companies to expand. Additionally, we will develop efficient processes for supplier qualification utilizing BATTERY-NY facilities and other resources and centers of the coalition members.

Risks and Mitigation Strategies: While the goal of this project is to accelerate the establishment of a domestic supply chain, we realize that this process will extend beyond the timeline and scope of the project. Ensuring strong industry leadership, including participation from startups developing groundbreaking technologies, investors and development partners, and end users, we expect to identify opportunities for economic growth.

4. Climate Justice Initiative (\$5M). The Broome County hub of the storage cluster exemplifies both risks and opportunities around environmental justice. The iM3NY gigafactory is gearing up on the Huron Campus located within 2 Opportunity Zones in Endicott, NY (36007013400, 36007013500). With a history of industrial contamination in the mid-20th century that persists today, these zones have a substantially higher population of Black residents than the rest of the County (up to 30% vs. 4%). Thus, we will use the opportunity around iM3NY to minimize existing and potential environmental risks, while ensuring that the economic benefits are shared by these disadvantaged communities. The coalition will work with its partners to develop programs to address this, such as funds for the support of main street businesses, demolitions, pollution prevention, and DEI initiatives in Endicott and Broome County. During *Phase I*, we will also assess risks/opportunities associated with energy manufacturing operations in other disadvantaged areas beyond Broome County.

Risks and Mitigation Strategies: Economic revitalization comes with a risk of gentrification and displacement of current low-income and minority residents. The coalition will work with its partners to develop strategies to protect against displacement, preserve existing affordability, and produce new affordable housing.

5. Storage Acceleration (\$15M). The project will establish NYS as the premier destination for realizing energy storage technologies and startups from prototyping to scale-up to manufacturing. For early-stage technology development, the project will merge the Binghamton University XCEED technology accelerator with the SUNY Startup Summer School (S4) to provide comprehensive customer discovery and startup training with prototyping and testing components, leading to formation of fundable storage-related startups. More mature startups will be channeled through a later-stage accelerator delivered by The Clean Fight NY to advances them towards manufacturing readiness, helping secure pilot sites, manufacturing and strategic partners, and investors. We will also seek to extend the 76West Clean Energy Competition, which has attracted companies from around the world to the Southern Tier, while providing funding for early-stage startups to pilot technologies, establish manufacturing, and acquire customers and partners in NYS. The final



component of the project will address the fact that battery technologies are of national security interest and may be subject to export control regulations that mitigate against foreign influence. We will provide guidance, a certification process, and funding for qualified incubators to develop new or modify existing facilities (partitioning, monitoring, surveillance), and support operations to allow export-controlled R&D.

Risks and Mitigation Strategies: Given the capital intensity of developing storage technologies and scaling startups, one risk associated with the project is the current absence of private investment firms among the project partners. During *Phase I*, the coalition will leverage its extensive networks in the clean energy industry to secure appropriate investor partners. The risk is also reduced by other sources of matching funds.

SUCCESS METRICS. **Cross-project:** Regional GDP growth; Growth of manufacturing entities; Job creation; Wage growth; Demographic breakdown of populations benefiting from investments. **1. Battery-NY:** Technologies piloted; Companies Served; New products manufactured; Center revenues. **2. Workforce:** Reduced unemployment and poverty; Students staying post-graduation; # individuals completing training; # workers placed in quality jobs; # participants from target populations. **3. Supply Chain:** # of companies engaged in supply chain. **4. Justice:** Disadvantaged population member participation and employment. **5. Acceleration** # startups launched; International startups locating to NYS; Capital raised by startups; Technologies piloted; New products launched; Strategic partnerships.

COALITION (See *2i. Regional Assets* for full member capabilities and map of region). The industry cluster will be developed using a hub and spoke model. The hub will be located in Broome County centered around the iM3NY gigafactory and the BATTERY-NY Center. The spoke in Albany (Capital region), with NY-BEST, NYSEDA, ESD/NYSTAR, and SUNY RF, will promote connectivity and synergies of the hub and program projects with organizations, resources, and opportunities throughout the state. The Rochester area spoke will provide earlier-stage prototyping support, prior to the scale-up and manufacturing support provided by BATTERY-NY. Spokes in the surrounding Southern Tier counties, with community college, incubator, and government coalition members, will help propagate cluster benefits to regional rural communities.

Lead. Binghamton University (All projects), one of the top public universities in the U.S., and home of the 2019 Nobel Laureate inventor of the Li-ion battery Stanley Whittingham, leading the Northeast Center for Chemical Energy Storage, will serve as the consortium lead, providing the Regional Economic Competitiveness Officer and overall coordination of projects and coalition members, while serving as the site of the BATTERY-NY center. **Non-Profits. NY-BEST (All projects)**, a consortium in energy storage with a membership of >185 manufacturers, academic institutions, utilities, technology and materials developers, startups, government entities, engineering firms, systems integrators, and end users throughout NYS, will lead the supply chain project, while supporting all other projects. **Research Foundation for The State University of New York (Projects 2, 5)**, overseeing sponsored research and technology commercialization throughout the SUNY system, will directly contribute to the workforce development and acceleration projects, while facilitating systemwide collaborations and providing existing funding opportunities to storage technologies and startups. **The Clean Fight New York (Project 5)**, a nonprofit accelerator in NYS designed specifically to help growth-stage startups scale at speed, will support the acceleration project with a manufacturing readiness program. **IncubatorWorks (Projects 2, 4, 5)**, serving 4 underserved rural counties in the Southern Tier, will support the workforce development, equity, and acceleration projects, ensuring participation among disadvantaged communities within the impact region. **Academia. Rochester Institute of Technology (All projects)** is the 3rd largest private STEM university in U.S., home of one of the largest co-operative education programs in the world and of the RIT/NY-BEST Battery Prototyping Facility. While contributing their expertise to the development of all projects, RIT will play a critical role in building out the workforce development initiative and supporting the supply chain program. **SUNY Broome Community College** and **Corning Community College (Projects 2,4)**, comprehensive 2-year community colleges in the



New Energy New York: 1. Project Narrative

Southern Tier, will be instrumental in deploying the workforce development and equity efforts. **Government, New York State Research and Development Authority (NYSERDA; All projects)**, a NYS public-benefit corporation, offers programs, technical expertise, and funding, and collaborates with businesses, industry, federal government, academia, the environmental community, public interest groups, and energy market participants to advance clean energy goals in the state. **Empire State Development Division of Science, Technology & Innovation (ESD NYSTAR; All projects)**, state government organization for NYS economic development, promotes the state economy, encouraging business investment and job creation, and supporting local economies. NYSEDA’s and ESD’s support, provided through their expertise, resources, networks, and match funding, will be instrumental to all proposed projects. **Broome County (All projects)**, home of the iM3NY gigafactory and the future BATTERY-NY Center, will work to support local infrastructure, workforce development, and other economic initiatives around the gigafactory and the energy storage hub, ensuring engagement, support, and training of low-income, rural, and disadvantaged communities.

MATCHING (See also *2ii.Sustainability*). New Energy NY’s coalition members have unparalleled experience in securing match from private, regional, state, and federal sources, in addition to an extensive list of partners and supporters. The Academic and Non-Profit partners continuously secure grants from federal, state, and private sources for R&D, entrepreneurship, and workforce and economic development, with many centered around storage. The Universities have numerous agreements with industry (joint development, center membership, and student placement), and the non-profits have many strategic partners that provide funding and resources. New Energy NY will add unique resources and capabilities, helping the coalition members gain international reputation that can be leveraged to secure additional funding and other resources through grants, memberships, partnerships, and sponsorships. The Government partners include two premier state agencies that fund economic development and entrepreneurship in NYS. NYSEDA and ESD routinely provide funding to academia and non-profits that develop high-impact programs, centers, and initiatives, and have made a commitment to the success of New Energy NY by becoming coalition members. The projects proposed are all vetted by the agencies as aligning with NYS priorities. Both agencies can provide support directly to companies that utilize New Energy NY resources, allowing the companies to contribute financially to the sustainability and continuation of the projects. Partners and Supporters (see appendices) have indicated potential match to the projects in a variety of ways, including through infrastructure investments, direct support to projects, as well as payments for use of services and resources.

TIMELINE. Phase I: Form workgroups, industry leadership council, outreach (Oct 2021 – Jan 2022); Onboard Project Coordinator (Dec 2021); Framework, assessments, project scoping via surveys, feedback, customer discovery, and consultants (Dec 2021 – Feb 2022); New Energy NY Planning Conference with coalition members, partners, and stakeholders (Jan 2022); Project development (Jan 2022); Grant writing (Feb-Mar 2022). Some of Phase I activities will carry over if Phase II is awarded to continue assessment.

Phase II Projected Timeline and Activities

	2022				2023				2024				2025			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
BATTERY-NY	Space, spec, renovation plans				Renovate, permits, staff				Install, training				Operations			
Workforce	Needs & gap assessment, program design				WFD programs deployment											
Supply Chain	Data, gap analysis, database				Recruitment; Qualification Process				Support, site selection; Run qual center							
Justice	Analysis, town halls, panels, planning				Projects deployment											
Acceleration	Coordinate, design; 76W funding				Recruit and run programs; Run annual 76W competition											
	Finalize specs, RFP, marketing				Applications open				Evaluate, award				Grant period			