

The New York Battery and Energy Storage Technology (NY-BEST) Consortium: *Accelerating New York's Energy Storage and Technology Transfer Markets*

New York's Leadership in Energy Storage

As of 2012, the State of New York's energy storage industry employs approximately 3,000 workers and is responsible for over \$600 million in annual global sales.¹ New York represents an ideal market for further advancing energy storage. The state is home to the largest metropolitan area in the country served by an enormous and aging underground electricity infrastructure and the largest mass transit system in North America (with more than 6,300 subway cars, 2,300 railcars, and nearly 6,000 buses²), both presenting great opportunities for energy storage. The electric power delivery system in New York also includes significant upstate generating capacity serving downstate load which can create transmission constraints, making energy storage one solution to this challenge. This combination of energy consumption makes it one of the nation's leaders for energy storage, with 3.6%, or 1,400 megawatts (MW), of its capacity in pumped storage versus 2.2%, or 22,500 MW, nationally³ and a target for advanced forms of energy storage including batteries, ultracapacitors, flywheels and other sources. By 2020, the energy storage industry in New York could add approximately 15,000-20,000 jobs in this sector, billions of dollars in revenues, and significant improvements in the quality of life.

The growth experienced and anticipated within the state in the energy storage industry is in large part due to the work of the New York State Energy Research and Development Authority (NYSERDA), which recognized the potential for energy storage and established the New York Battery and Energy Storage Technology (NY-BEST) Consortium.



Urban Electric Power's 50kWh nickel-zinc flow battery system being demonstrated at a City University of New York building and supplying electricity to the building during peak electric demand.

Source: NYSERDA

¹ ECG Consulting Group, Inc., The Economic Impact of Developing an Energy Storage Industry In New York State, NY-BEST. October 2012. <http://ny-best.org/sites/default/files/type-page/4254/attachments/2012%2010%2005%20NY%20BEST%20Final%20Report%20%282%29.pdf>.

² Metropolitan Transportation Authority statistics

³ NY Energy Storage Roadmap, New York Battery and Energy Storage Technology Consortium. September 2012. http://ny-best.vm-host.net/sites/default/files/type-page/4254/attachments/NY-BEST%20Roadmap_final-1.pdf.

Creating the NY-BEST Consortium

In 2009, NYSERDA was tasked with working with industry, academic, and government partners to establish the NY-BEST Consortium using approximately \$25 million in Clean Air Interstate Rule (CAIR) proceeds as seed funding. A Program Plan outlining the consortium's priorities and budget was developed by NYSERDA, with stakeholder input, and approved by the NYSERDA Board of Directors. NY-BEST was fully launched in 2010 as an independent not-for-profit consortium with a 17 member Board of Directors elected by its membership, an executive director, and association management services staff.



A BAE hybrid electric bus developed with NYSERDA support. Fuel savings exceed 25% from the HybriDrive® system and corresponding reductions in emissions of particulate matter, NOx and GHG are achieved. More than 4,000 hybrid buses now contain BAE's HybriDrive® system (over 40% of the total hybrid bus market) comprising the largest fleets in New York City, London and elsewhere.

Source: NYSERDA

NY-BEST's primary goal is to position New York as a global leader in energy storage technology, including applications in transportation, grid storage, and power electronics.⁴ Included within the \$25.5 million in CAIR funding is support for research and development projects, testing and characterization capabilities, and \$4.35 million to partially support NY-BEST's operations and management over five plus years as the organization becomes self-sufficient through membership dues, testing revenues, and other private and federal sources.⁵

During this development process, NY-BEST worked with three primary objectives in mind: providing members with access to testing and characterization capabilities, supporting active networking and technology transfer, and providing research and development funding to develop and commercialize new energy storage technologies.

NY-BEST Overview and Activities

NY-BEST serves as an expert resource to energy storage-related companies and organizations seeking assistance to grow their businesses in New York and is an important connector in establishing a strong energy storage "ecosystem" encompassing all stages of energy storage product development and use. Between June 2011 and June 2013, NY-BEST membership grew 91 percent and now includes participation from over 125 members, ranging from manufacturers and academic institutions to

⁴ NY-BEST, New York State Energy and Research Development Authority. Date accessed, March 20, 2013.

<http://www.nyserdera.ny.gov/Energy-Innovation-and-Business-Development/Research-and-Development/Advanced-Clean-Power/NY-BEST.aspx>.

⁵ 2011–12 CAIR Annual Report on the New York Battery and Energy Storage Technology Consortium, New York State Energy and Research Development Authority. March 2012. http://www.ny-best.org/sites/default/files/resources/2011-12-CAIR-NY-BEST-Annual-Report%5B1%5D_0.pdf.

utilities and government entities. The majority of its members are New York based entities. Lastly, this effort serves as the focal point for energy storage industry-related activities, by:

- Serving as a center for communication, education, and interaction among key stakeholders in the energy storage industry;
- Leveraging New York's intellectual and manufacturing capabilities and market leadership;
- Supporting and accelerating the commercialization for new energy storage technologies; and
- Advocating for policies that promote the energy storage industry (using non-government sources such as member dues).



Development of lithium-ion battery at Binghamton University

Source: NYSERDA

As NY-BEST's mission is to build a vibrant energy storage sector in New York, this involves providing support along various stages of the product development and commercialization pipeline and bringing various organizations together to collaborate. Specifically, NY-BEST facilitates the commercial introduction of energy storage technologies in New York, builds the human capital and expertise needed to sustain a vibrant commercial energy storage industry, and leverages NYSERDA's seed resources to create a sustainable organization that provides value to its members.

For 2012, and in 2013, NY-BEST began leveraging the State's \$7 million commitment for testing and characterization capabilities (\$3.5 million CAIR and \$3.5 million in NYS Regional Economic Development Council initiative funding) with up to \$16 million from DNV GL (formerly DNV KEMA) to establish the BEST Testing and Commercialization Center at the Eastman Business Park in Rochester. DNV GL, which was competitively selected by NY-BEST to serve as the lab's operating partner, will also be relocating an existing energy storage testing operation from DNV GL's laboratory facility in Pennsylvania to the new center in Rochester. The BEST Testing and Commercialization Center, as it will be known, will provide unique testing and validation capabilities for companies in the battery and energy storage industry. The Center's capabilities are vital to bringing these emerging technologies to commercial market and are difficult for individual companies to procure at a reasonable cost. The Center will include more than 17,000 square feet of space and the opening is planned for December 2013.

Research and Development and Additional Activities

Using metrics to assess the success of NY-BEST, this initiative covers three main areas of focus: Consortium Operations; Testing, Characterization, and Prototyping Capabilities; and Research and Development. As the consortium continues to grow, additional metrics continue to be assessed. Funds are also budgeted for two independent, external evaluations of the NY-BEST initiative, which are

planned after NY-BEST's third year of independent operations (covering through March 31, 2014) and again after year six (covering through March 31, 2017).⁶

31 NY-BEST research and development projects have been awarded by NYSERDA and are in varying stages comprising approximately \$9 million from NYSERDA in CAIR funding and another \$11.5 million in co-funding. These include seed stage projects that are exploring whether the technologies hold promise for further investment and development, and one larger product development project led by GE. An existing research solicitation is still available to support this work with two remaining due dates (in April 2014 and November 2014). This solicitation seeks proposals to transition new energy storage technologies with proven technical feasibility to a working prototype.

As of June 2013, 93% of the \$25 million in CAIR funds had been expended, contracted, or committed to a specific activity.

NY-BEST also holds a number of conferences, seminars, and webinars throughout the year to bring the membership together, explore new technology or market developments, and facilitate partnerships. For instance, in March, 2013, more than 200 participants attended "Capture the Energy," the NY-BEST Annual Meeting and Conference, held in Troy, New York. This conference explored how leading companies are developing batteries, fuel cells, ultracapacitors, and other energy storage products that are offering solutions for strengthening our nation's infrastructure and economy. In addition, it brought together leaders from government, industry, and financial sectors to examine the policies that are influencing the energy storage sector.

During the past year, NY-BEST held three regional technology conferences throughout the state, an annual Investor's Conference, and seven webinars. NY-BEST also distributes an E-News to more than 1,000 subscribers with NY-BEST and member developments, energy storage announcements, and discoveries from New York and beyond. Research and procurement funding opportunities are also provided to members of NY-BEST. In addition, NY-BEST staff participates in standards setting discussions to inform appropriate testing and certification standards for energy storage products.

⁶ 2011–12 CAIR Annual Report on the New York Battery and Energy Storage Technology Consortium, New York State Energy and Research Development Authority. March 2012. http://www.ny-best.org/sites/default/files/resources/2011-12-CAIR-NY-BEST-Annual-Report%5B1%5D_0.pdf.

Additional Resources

<i>NY-BEST Consortium</i>	Provides additional information on NY-BEST, including membership, priorities, market and research studies and policies supporting energy production and storage, among others: http://www.ny-best.org/
<i>2011-2012 CAIR Annual Report on NY-BEST</i>	Includes a detailed summary of NY-BEST initiatives from FY'11-12: http://www.ny-best.org/sites/default/files/resources/2011-12-CAIR-NY-BEST-Annual-Report%5B1%5D_0.pdf
<i>The Economic Impact of Developing an Energy Storage Industry in New York</i>	Provides a comprehensive overview of regulatory and technology trends that are driving an increasing interest in energy storage technologies and energy storage markets throughout the world, with a focus in New York: http://ny-best.org/sites/default/files/type-page/4254/attachments/2012%2010%2005%20NY%20BEST%20Final%20Report%20%282%29.pdf