

# Advancing Commonwealth Energy Storage: Awardee Summary

## Use Case: Behind the Meter - C&I Solar Plus Storage

<b>Advanced Microgrid Solutions, Inc</b>	
<b>Application Team</b>	National Grid Business Development AAH
<b>Location</b>	Brockton and Leicester
<b>Use Case</b>	BTM C&I Solar Plus Storage
<b>Award Amount</b>	\$645,000
<b>Cost-Share</b>	\$741,000
<b>Technology Type</b>	Lithium Ion Battery
<b>Capacity</b>	500kW/1000kWh
<b>Project Summary</b>	
Partnering with National Grid, AMS proposes two storage systems across two Walmart locations, one with existing solar PV and one without. Paired with software controls, the active demand management system would reduce peak load and provide seasonal, dispatchable peak demand management. This project could be widely replicable across big box stores, particularly if the host site, Walmart, becomes an active proponent of the business model.	

<b>Borrego Solar Systems, Inc. (Acushnet Company)</b>	
<b>Application Team</b>	Acushnet Company Genbright LLC
<b>Location</b>	New Bedford
<b>Use Case</b>	BTM - C&I Solar Plus Storage
<b>Award Amount</b>	\$700,000
<b>Cost-Share</b>	\$1,200,412
<b>Technology Type</b>	Lithium Ion Battery
<b>Capacity</b>	1500kW/3000kWh
<b>Project Summary</b>	
This project, to be located at a golf ball manufacturing plant in southeastern Massachusetts, would demonstrate multiple value streams. The application demonstrated intellectual leadership in the implementation of monetizable and non-monetizable benefits highlighted in <i>State of Charge</i> . Borrego also aims to demonstrate the capability of the energy storage system to perform a variety of storage functions at different points throughout the day in the most economically efficient manner.	

<b>University of Massachusetts - Boston</b>	
<b>Application Team</b>	Enel Green Power North America, Inc. Demand Energy Networks, Inc. EnterSolar
<b>Location</b>	Boston
<b>Use Case</b>	BTM C&I Solar Plus Storage
<b>Award Amount</b>	\$850,000
<b>Cost-Share</b>	\$930,613 (storage only) \$2,430,613 (total including PV)
<b>Technology Type</b>	Lithium Ion Battery

<b>Capacity</b>	500kW/1820kWh
<b>Project Summary</b>	
Umass Boston’s project would provide numerous non-monetizable benefits, including grid resiliency, GHG reductions, educational benefits, and more. The project also has an attractive workforce development angle, as UMass-Boston proposes to use the storage system as a living laboratory for the UMass community – generating a variety of educational opportunities, such as tours/demos, guest lectures, class projects, paid internships, technical consultancies, design/innovation competitions, service learning and creating shared value and sustainability performance.	

### Use Case: Residential Storage Dispatched by Utility

<b>SolarCity dba Tesla</b>	
<b>Application Team</b>	National Grid
<b>Location</b>	Nantucket
<b>Use Case</b>	BTM – Residential Storage Dispatched by Utility
<b>Award Amount</b>	\$1,250,000
<b>Cost-Share</b>	\$2,933,680
<b>Technology Type</b>	Lithium Ion Battery
<b>Capacity</b>	5kW/13.2kWh
<b>Project Summary</b>	
SolarCity proposes an aggregated system of its Powerwall home battery at 500 Nantucket residences. This would provide distribution infrastructure deferral for a projected 3 <sup>rd</sup> undersea cable on Nantucket Island and provide cost reductions. The project would also provide resiliency benefits to participating customers.	
<b>Sunrun, Inc.</b>	
<b>Application Team</b>	National Grid Green Homes
<b>Location</b>	Various Residential Sites Across MA
<b>Use Case</b>	BTM – Residential Storage Dispatched by Utility
<b>Award Amount</b>	\$560,576
<b>Cost-Share</b>	\$840,864
<b>Technology Type</b>	Lithium Ion Battery
<b>Capacity</b>	5kW/9.3 kWh
<b>Project Summary</b>	
Sunrun proposes an aggregated system of 200 Brightbox energy storage systems paired with solar PV to MA residences. These systems would provide backup power, demonstrate net metering time of use, respond to unique local and time-based characteristics, and more.	
<b>EnerNOC (ABRSD)</b>	
<b>Application Team</b>	Acton-Boxborough Regional School District
<b>Location</b>	Acton Boxborough
<b>Use Case</b>	Merchant – Solar Plus Storage
<b>Award Amount</b>	\$1,250,000
<b>Cost-Share</b>	\$1,280,000
<b>Technology Type</b>	Lithium Ion Battery
<b>Capacity</b>	2000kW/4000kWh
<b>Project Summary</b>	

EnerNOC proposes to install a storage system for Acton-Boxborough Regional School District. The project proposes numerous revenue streams, and is widely replicable across municipal customers and school districts. It provides many diverse benefits.

**NuGen Capital**

<b>Application Team</b>	Unitil
<b>Location</b>	Fitchburg
<b>Use Case</b>	Merchant – Solar Plus Storage
<b>Award Amount</b>	\$1,225,013
<b>Cost-Share</b>	\$2,632,933
<b>Technology Type</b>	Lithium Ion Battery
<b>Capacity</b>	2000kW/8000kWh

**Project Summary**

NuGen proposes a front-of-the-meter storage system to be co-located with a solar array. System benefits include renewable energy integration, and resilience for critical loads. The project is expected to resolve solar saturation challenges in Lunenburg which currently prevents any new solar from connecting to the grid. Successful demonstration will provide a model for how future solar saturation challenges in the state can be resolved with energy storage. This project is the only project in Unitil territory.

**Use Case: Merchant - Municipal Light Plant (MLP) Asset**

**Borrego Solar Systems, Inc. (BELD)**

<b>Application Team</b>	Braintree Electric Light Department
<b>Location</b>	Braintree
<b>Use Case</b>	MLP Asset
<b>Award Amount</b>	\$700,000
<b>Cost-Share</b>	\$1,681,019
<b>Technology Type</b>	Lithium Ion
<b>Capacity</b>	2,000kW/4,200kWh

**Project Summary**

To be located at three BELD substations, the project proposes a set of three storage systems placed into a virtual power plant (VPP) model to reduce generation and transmission capacity charges and demonstrate several non-monetizable benefits, including integration of renewable generation. The project is unique in that it will also pilot a community storage-as-a-service model to help reduce participating customers' peak coincident charges.

**Reading Municipal Light Department (North Reading)**

<b>Application Team</b>	NextEra Energy, Inc
<b>Location</b>	Reading
<b>Use Case</b>	MLP Asset
<b>Award Amount</b>	\$1,000,000
<b>Cost-Share</b>	\$1,374,413
<b>Technology Type</b>	Lithium Ion Battery
<b>Capacity</b>	5,000kW/10,000kWh

**Project Summary (Next Page)**

RMLD North Reading will install a leased storage system for use as peak demand management within RMLD’s territory. Other system benefits include reducing electricity prices, deferring transmission and distribution investments, reducing GHG emissions, and more. This system would be co-located with a 2.5 MW natural gas fueled generator, potentially supporting a future microgrid for RMLD’s critical loads. This project would provide significant value to the northeast region of Massachusetts (NEMA), a highly constrained region in the ISO-NE network.

### Use Case: Resiliency/Microgrid

<b>Solect Energy, LLC (MITLL)</b>	
<b>Application Team</b>	MIT Lincoln Lab
<b>Location</b>	Lexington
<b>Use Case</b>	Resiliency/Microgrid
<b>Award Amount</b>	\$1,000,000
<b>Cost-Share</b>	\$1,102,267
<b>Technology Type</b>	Lithium Ion Battery
<b>Capacity</b>	1250Kw/2500kWh
<b>Project Summary</b>	
Solect proposes five modular storage units to provide energy resilience to MITLL’s research and development campus. The system will demonstrate a shared savings business model. The unique business model will allow the project team to leverage different benefits on the same site. MIT-LL is located adjacent to a military base and the system will provide valuable resiliency benefits.	

<b>University of Massachusetts – Marlborough Memorial Hospital</b>	
<b>Application Team</b>	National Grid Next Grid Markets McHale & Associates, Inc. ViZn Energy Systems, Inc. Icetec
<b>Location</b>	Marlborough
<b>Use Case</b>	Resiliency/Microgrid
<b>Award Amount</b>	\$685,595
<b>Cost-Share</b>	\$685,595
<b>Technology Type</b>	Zinc Iron Flow Battery
<b>Capacity</b>	300kW/800kWh
<b>Project Summary</b>	
UMass Marlborough proposes a unique use case co-locating a flow battery with both CHP and a ground-mounted solar array. This system would showcase a microgrid for critical facilities with additional benefits such as capacity charge reduction and demand response. The selection of a flow battery will allow UMass MMH to cycle the battery frequently, including to specifically demonstrate non-monetizable benefits.	

## Use Case: Behind the Meter - C&I Solar Plus Storage

General Electric Company	
<b>Application Team</b>	RDK Engineers Suffolk AECOM
<b>Location</b>	Boston
<b>Use Case</b>	BTM C&I Solar Plus Storage
<b>Award Amount</b>	\$220,667
<b>Cost-Share</b>	\$220,667
<b>Technology Type</b>	Latent Heat Storage
<b>Capacity</b>	181kW/1840kWh
<b>Project Summary</b>	
GE proposes an ice storage system at the new headquarters being developed in Fort Point. The system would be co-located with a solar PV array. Since the system will be located in a new building, the HVAC can be sized with the ice storage system, allowing for greater system impact than a similar system installed as a retrofit.	

Boston Medical Center	
<b>Application Team</b>	Alternative Power Source, Inc.
<b>Location</b>	Boston
<b>Use Case</b>	BTM C&I Solar Plus Storage
<b>Award Amount</b>	\$402,500
<b>Cost-Share</b>	\$402,500
<b>Technology Type</b>	Lithium Ion Battery
<b>Capacity</b>	520kW/1044kWh
<b>Project Summary</b>	
The storage system, to be owned by BMC, will provide a number of benefits, including resiliency for critical facilities, conditioning BMC's CHP unit during emergency islanding, relieving strain and congestion on the grid, and serving as an example of aggregating assets to gain additional revenue from frequency response.	

Tesla, Inc.	
<b>Application Team</b>	Wynn Boston Harbor
<b>Location</b>	Everett
<b>Use Case</b>	BTM C&I Solar Plus Storage
<b>Award Amount</b>	\$1,074,225
<b>Cost-Share</b>	\$1,074,225
<b>Technology Type</b>	Lithium Ion Battery
<b>Capacity</b>	1044kW/4200kWh
<b>Project Summary</b>	
Tesla proposes to deploy a storage system at the under-construction Wynn Boston Harbor resort. This project would be sited at a new development and can be integrated into construction plans upfront, rather than retrofitted at the facility. The project may serve as a model for other property developers planning large-footprint developments in the state.	

## Use Case: Investor Owned Utility (IOU) Grid Mod Asset

National Grid	
<b>Application Team</b>	Vionx Engineering Corporation Worcester Polytechnic Institute Energy Initiatives Group LLC
<b>Location</b>	Shirley
<b>Use Case</b>	IOU Grid Mod Asset
<b>Award Amount</b>	\$875,000
<b>Cost-Share</b>	\$877,000
<b>Technology Type</b>	Vanadium Redox Flow Battery
<b>Capacity</b>	500kW/3000kWh
<b>Project Summary</b> National Grid proposes a vanadium redox flow battery collocated with its 1MW solar PV array. The project was designed to demonstrate non-monetizable benefits and utility operation of storage. The project will help fulfill National Grid's goal to test a utility-scale project and quantify non-monetizable benefits.	

## Use Case: Municipal Light Plant (MLP) Asset

Massachusetts Municipal Wholesale Electric Company (Ashburnham MLP)	
<b>Application Team</b>	Ashburnham Municipal Light Plant NEC Energy Solutions
<b>Location</b>	Ashburnham
<b>Use Case</b>	MLP Asset
<b>Award Amount</b>	\$600,000
<b>Cost-Share</b>	\$1,937,000
<b>Technology Type</b>	Lithium Ion Battery
<b>Capacity</b>	2000kW/4000kWh
<b>Project Summary</b> MMWEC-Ashburnham will deploy NEC's lithium ion-based Grid Scale Storage system. This system will enable additional residential and commercial solar, both of which are currently oversaturated and unable to interconnect, and 200kw or more of wind. MMWEC will take lessons learned from this demonstration and apply them to other similar storage projects at MLPs.	

NextEra Energy Resources Acquisitions, LLC	
<b>Application Team</b>	N/A
<b>Location</b>	Norwood
<b>Use Case</b>	MLP Asset

<b>Award Amount</b>	\$500,000
<b>Cost-Share</b>	\$1,535,300
<b>Technology Type</b>	Lithium Ion Battery
<b>Capacity</b>	1000kW/4000kWh
<b>Project Summary</b>	
NextEra proposes a storage system at a new construction biotech facility to provide monthly peak load reduction, demand response, monthly peak transmission reduction, and coincidental peak reduction. The proposed system will be sited at a biotech facility, which is broadly replicable in Massachusetts, and the project will also provide some savings for the Norwood Municipal Light Department.	

### Use Case: Resiliency/Microgrid

<b>University of Massachusetts Amherst</b>	
<b>Application Team</b>	University of Massachusetts Clean Energy Extension
<b>Location</b>	Amherst
<b>Use Case</b>	Resiliency/Microgrid
<b>Award Amount</b>	\$1,143,200
<b>Cost-Share</b>	\$1,281,263
<b>Technology Type</b>	Lithium Ion Battery
<b>Capacity</b>	1000kW/400 kWh
<b>Project Summary</b>	
This project proposes to install a storage system to demonstrate integration of renewable distributed generation. The project also has a workforce development component, as the team will use it as an educational tool for UMass students. This system would be used to balance system constraints with its 15 MW cogeneration plant and ~5MW solar PV array. The selection of a long-duration battery will lend itself to more resiliency benefits.	

### Use Case: Load Serving Entity (LSE)/Competitive Electricity Supplier Portfolio Optimization

<b>Constellation NewEnergy, Inc.</b>	
<b>Application Team</b>	Stem, Inc.
<b>Location</b>	Various Unspecified Sites
<b>Use Case</b>	LSE/Competitive Electricity Supplier Portfolio Optimization
<b>Award Amount</b>	\$1,250,000
<b>Cost-Share</b>	\$1,903,283
<b>Technology Type</b>	Lithium Ion Battery
<b>Capacity</b>	1500kW/2700kWh
<b>Project Summary</b>	
Constellation proposes several lithium ion batteries for use as transmission and distribution demand charge reduction. The project would procure 15-20 customers with a battery per site. The project will provide capacity and transmission savings as well as behind-the-meter benefits to participating customers.	

## Use Case: Merchant - Co-Located with Traditional Generation Plant

<b>Massachusetts Municipal Wholesale Electric Company (Wakefield MGLD)</b>	
<b>Application Team</b>	Wakefield Municipal Gas and Light Department NEC Energy Solutions
<b>Location</b>	Wakefield
<b>Use Case</b>	Merchant, Co-located with Traditional Generation Plant
<b>Award Amount</b>	\$800,000
<b>Cost-Share</b>	\$2,418,000
<b>Technology Type</b>	Lithium Ion Battery
<b>Capacity</b>	3,000kW/5,000kWh
<b>Project Summary</b>	
MMWEC-Wakefield proposes a storage system at a substation within Wakefield MGLD's territory which will work in tandem to an under-construction 2.5MW gas-fired generator. The storage system will provide peak load reduction and energy arbitrage, with the gas-fired generating functioning only in summer and shoulder months. The project will demonstrate the benefits of co-locating energy storage with traditional gas-fired generation to provide a more level yearly load curve.	

<b>Taunton Municipal Light Plant</b>	
<b>Application Team</b>	Taunton Municipal Light Plant Fractal Energy
<b>Location</b>	Taunton
<b>Use Case</b>	Merchant, Co-located with Traditional Generation Plant
<b>Award Amount</b>	\$1,250,000
<b>Cost-Share</b>	\$2,225,000
<b>Technology Type</b>	Lithium Ion Battery
<b>Capacity</b>	1500kW/6,000kWh
<b>Project Summary</b>	
The project team proposes a lithium ion storage system collocated with a gas generation plant and planned solar PV array. The system proposes to provide many non-monetizable benefits. The project will demonstrate the benefits of co-locating energy storage with a gas-fired high capacity factor peaker plant. The load management protocols developed for the project can be duplicated for other projects within Massachusetts.	

## Use Case: Merchant - Solar Plus Storage

<b>Ameresco-Partners</b>	
<b>Application Team</b>	Green Charge Networks Partners Healthcare
<b>Location</b>	Somerville
<b>Use Case</b>	Merchant, Solar Plus Storage
<b>Award Amount</b>	\$348,318
<b>Cost-Share</b>	\$697,636
<b>Technology Type</b>	Lithium Ion Battery
<b>Capacity</b>	250kW/500kWh

**Project Summary**

Ameresco proposes a PPA model “between-the-meter” storage project co-located with existing solar PV at Partners’ headquarters in northeast Massachusetts for peak demand reduction and virtual net metering. If the between-the-meter model combining virtual net metering for the solar with on-site storage is viable, it could potentially be replicated for community solar projects (i.e., residents could purchase storage for on-site resiliency and pay into an offsite community solar project).

**WH Bennett, Inc.**

<b>Application Team</b>	Solar Invictus 4, LLC Tesla Inc. Bayes Norton Farm, Inc. Allied Consulting Engineering Services, Inc. Schofield. Barbini & Hoehn, Inc. John Lolley, P.E.
<b>Location</b>	Martha’s Vineyard
<b>Use Case</b>	Merchant – Solar Plus Storage
<b>Award Amount</b>	\$382,194
<b>Cost-Share</b>	\$382,196
<b>Technology Type</b>	Lithium Ion Battery
<b>Capacity</b>	600 ac kW/1,020 ac kWh

**Project Summary**

This project proposes a solar array plus a storage system at a large farm located on Martha’s Vineyard. The system would be used for solar smoothing to reduce voltage flicker on the feeder and reduce GHG emissions from diesel generators on the island. Additionally, Eversource has confirmed that the installation of storage would reduce current solar saturation and is the only way they will allow the solar system to interconnect. The net metered power would be sold to local non-profits at a discount.

**Use Case: Municipal Light Plant (MLP) Asset****West Boylston Municipal Lighting Plant**

<b>Application Team</b>	Massachusetts Municipal Wholesale Electric Company Amber Kinetics
<b>Location</b>	West Boylston
<b>Use Case</b>	MLP Asset
<b>Award Amount</b>	\$242,563
<b>Cost-Share</b>	\$242,563
<b>Technology Type</b>	Flywheel Technology
<b>Capacity</b>	128kW/512kWh

**Project Summary**

WBMLP proposes to install 16 flywheels co-located with existing solar. The system will provide peak load reduction and energy arbitrage, among others. There is a prison in the West Boylston MLP territory and the utility has expressed resiliency and reliability concerns when there is an outage as they need to maintain minimal power services for the prison.

**Use Case: NEW USE CASE - Transit**

### Martha's Vineyard Transit Authority

<b>Application Team</b>	Massachusetts Department of Transportation Wampanoag Tribe of Gay-Head Aquinnah Vermont Energy Investment Corporation South Mountain Company ART Engineering
<b>Location</b>	Martha's Vineyard
<b>Use Case</b>	Transit
<b>Award Amount</b>	\$545,000
<b>Cost-Share</b>	\$545,000
<b>Technology Type</b>	Lithium Ion Battery
<b>Capacity</b>	500kW/1400kWh
<b>Project Summary</b>	
<p>This lithium ion battery to be located at the VTA Operations and Maintenance Facility would enable electrification of VTA's bus fleet, providing an energy storage demonstration as well as clean transit benefits. System benefits would include transit operations, operational flexibility, service resiliency during times of need, and renewable storage, among others. The goal of the project is to enable the electrified transit fleet, which will help reduce the Vineyard's reliance on fossil fuels. By pairing the storage systems with solar PV, VTA will be able to charge the busses in accordance with their fleet schedule and minimize or eliminate demand charges they would incur from charging the busses during peak hours.</p>	

### Zeco Systems (dba Greenlots)

<b>Application Team</b>	Hannaford Brothers Company ReVision Energy
<b>Location</b>	Dracut, Clinton, Leominster, Taunton
<b>Use Case</b>	Transit
<b>Award Amount</b>	\$438,600
<b>Cost-Share</b>	\$627,300
<b>Technology Type</b>	Lithium Ion Battery
<b>Capacity</b>	200kW/365kWh
<b>Project Summary</b>	
<p>Greenlots proposes to install 2 DC fast chargers for electric vehicles at each of four Hannaford supermarkets. The proposed project will demonstrate that DC fast chargers, rather than being an unmanaged load that could increase operating costs and overload circuits, can be utilized as an asset to the grid. Paired with storage discharge and load management software, and pricing signals to EV drivers, this project would provide peak capacity reduction, renewable integration, demand charge reduction, and site upgrade deferrals. The proposed project also supports the Commonwealth's target to have 300,000 zero-emission vehicles on the road by 2025.</p>	