

## ENERGY STORAGE PROVIDES MULTIPLE BENEFITS TO MUNICIPAL UTILITIES

Municipal utilities provide superior electric service at highly competitive rates to the communities they serve. As independent public power suppliers, they bring many benefits to municipal utility customers, including price stability, long-term reliability, and resource diversity.

Continually adapting to changes in the electric industry, they are embracing greener and cleaner energy policies, emerging technologies and smart grid initiatives to combat greater uncertainty and rising costs. Energy storage is one such technology that can provide multiple benefits.

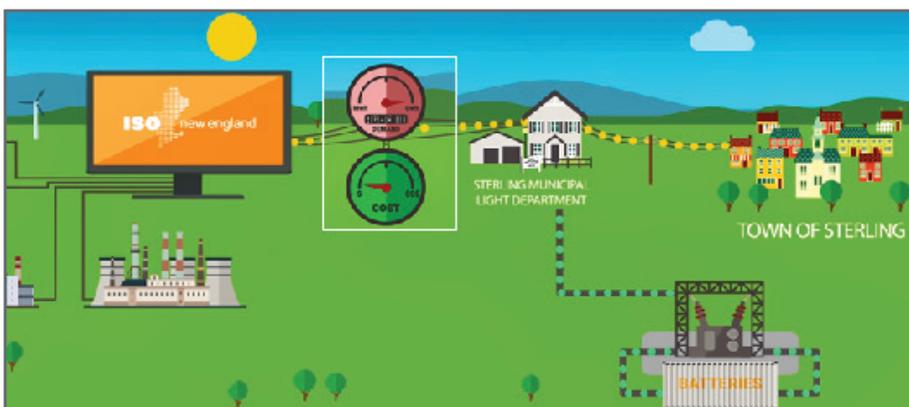


## THE ROLE OF ENERGY STORAGE

- » Energy Storage systems, like the GSS<sup>®</sup> Grid Storage Solution, can provide multiple economic and resiliency benefits to municipal utilities and its rate payers.
- » Peak Shaving - By discharging the batteries of an energy storage system during hours of regional peak electricity demand, a municipal utility can significantly reduce its costs for not only electricity capacity and transmission services, but also wholesale electricity, providing significant savings for its ratepayers.
- » Resiliency - An energy storage system can isolate from the main grid in the event of a power outage, and provide backup power for community resources to provide critical emergency services during natural disasters and extended power outages.
- » Grid Stability – Energy storage can provide local voltage support to electricity networks, improving efficiency and power quality, and could provide services back to the larger transmission network by performing frequency regulation or response.

## VALUE PROPOSITION

- » Electricity Capacity and Transmission Savings. A municipal utility can significantly reduce its electricity transmission or distribution service charges by using energy storage to decrease its demand for grid power during peak hours.
- » Energy Arbitrage Savings. Energy arbitrage – charging the energy storage system when demand and electricity prices are low and discharging the system when demand and the price of electricity is high can provide significant savings for ratepayers.
- » System Ancillary Services Revenue. When not being used for capacity, transmission, or arbitrage, energy storage can provide frequency regulation or response (where available) to create additional revenue streams for its owner.
- » Renewables integration benefits. In cases where a large percentage of a municipal utility's generation comes from renewable sources, energy storage can provide grid stability and reliability through voltage support to compensate variable power sources like wind and solar.
- » Resilience benefits. A significant value based on enabling otherwise lost services due to grid disruptions for a commercial customer and improving public safety and health by providing backup power to critical services like a town's police and dispatch services.



By installing a battery system, a municipal utility like Sterling can start to control how and when it buys electric services from the ISO. This is important, because reducing purchases during times of regional peak demand will save money for the utility and its ratepayers.

Clean Energy Group created a 2-minute animation on the economics of Sterling battery storage project. Watch it at: <http://bit.ly/SterlingVideo>

CASE STUDY:

**STERLING, MASSACHUSETTS**

- » Sterling Municipal Light Department (SMLD) is a municipal utility serving the small town of Sterling, Massachusetts. In 2013, SMLD led the United States in solar-watts-per-customer with the installation of 3.2MW of solar PV. Solar currently accounts for approximately 30 percent of SMLD’s peak load and was used to offset the increasing costs of electricity for the town.
- » However, the solar was not always available, for example under snow, cloud cover due to storms, or grid outages. As the costs of Regional Network Service (RNS) and Forward Capacity Market (ICAP) charges in ISO New England more than doubled from 2010 to 2017, the town’s electricity continued to grow more expensive due to solar’s variable availability during peak demand hours.
- » Sterling deployed a 2-megawatt/3.9 megawatt-hour GSS® Grid Storage Solution to ensure demand reduction during peak hours, store low cost solar electricity not consumed during the day, and purchase electricity from the grid during low demand times at night. By using cheaper stored electricity from the GSS® to reduce electricity needs when grid power is most expensive, SMLD reduces the cost of electricity, transmission and capacity payments to the grid operator, lowering electricity bills for everyone in the town.
- » Additionally, since the energy storage system is able to isolate from the main grid in the event of a power outage, it can power the town’s Police and Dispatch center for about two weeks in the event of a grid outage or disaster.
- » From contract signing to operation the project took only 4 months to complete. Construction began in October 2016, and it was operational in December 2016.
- » The project was the first utility-scale energy storage facility in New England and was at the time of installation the largest battery of its kind in the region.



2MW/3.9MWh GSS® installation at SMLD

Actual Savings in 2017	
Regional Network Service Charge (RNS) savings	\$163,000
Forward Capacity Market (ICAP) savings	\$241,000
Savings from Arbitrage	\$ 13,000
<b>Total</b>	<b>\$417,000</b>

Other Potential Revenue Streams	Per Year
Frequency Regulation (~4,000 hours)	\$120,000
Arbitrage Opportunity	\$ 26,000
Maximum RNS Savings	\$197,000

