Lightning In A Bottle: Part 2
NESEA BuildingEnergy Boston 2016

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Massachusetts
HIC 168572 EL-1136MR
SolarCity, the #1 full-service Residential and Commercial solar provider in America*

The national leader in solar, SolarCity has:

- 9 Years of experience
- 27 States with installations
- 90+ Facilities
- 340+ Batteries deployed
- 1,800+ MW installed
- 2,000+ Commercial projects
- ~15,000 Employees
- 230,000+ Installed Customers
- $9 Billion+ Of solar projects financed

* According to the Q4 2015 GTM Research U.S. PV Leaderboard.
Storage Technology Leadership

- SolarCity has worked for 4+ years on batteries
- Developed suite of battery products + internal software
- Fully integrated grid scale and distributed storage
- Over 340 batteries deployed by SolarCity
SolarCity residential solar+storage

- Battery charges 100% from solar panels, even during grid outages
- Provides backup power to select electrical circuits
- Complies with IEEE 1547 and UL 1741 standards for disconnection from utility grid

During the day, solar energy charges your battery while it powers your home.

As the day transitions to night, your battery backup system is ready to keep things running smoothly if the grid does down.
The future of solar + storage

- “For utilities and grid operators, the technology is designed to enable remote-aggregated control of solar battery systems.”
  - Peter Rive, SolarCity Co-Founder and CTO
- “SolarCity’s customer contract explicitly contemplates future market opportunities and creates a revenue-sharing opportunity for customer.”
DemandLogic - Solar+Storage for Demand Charge Reduction

**12 PM**
Your system is at full production, charging your battery and reducing your need for utility power.

**5 PM**
As solar production decreases, the battery is intelligently discharged to reduce peak demand charges.

**10 PM**
You draw power from the utility company at night at lower off-peak demand rates.
Example Customer (K-12)
K-12 - Original Load Profile
K-12 - Load Profile after DemandLogic

SCE Ratepayer - Example School - Load Profile After PV + DemandLogic
## K-12 - Economic Overview

<table>
<thead>
<tr>
<th></th>
<th>Estimated savings:</th>
</tr>
</thead>
<tbody>
<tr>
<td>SolarCity Demand Rate</td>
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<tr>
<td>Avoided Demand Cost</td>
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<tr>
<td>PV System Size (kW)</td>
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<td>Solar PPA Rate ($/kWh)</td>
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<td>Storage System Size (kWh)</td>
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<td>Avoided Energy Cost</td>
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<td>Storage System Size (kWh)</td>
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### K-12 Economic Overview Table

<table>
<thead>
<tr>
<th>Month</th>
<th>MAX Demand Reduction (kW)</th>
<th>Demand Payments to SolarCity</th>
<th>Utility Demand Cost Reduction</th>
<th>Solar Production (kWh)</th>
<th>Energy Payments to SolarCity</th>
<th>Utility Energy Cost Reduction</th>
<th>Total Project Savings</th>
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<td>January</td>
<td>98</td>
<td>$ 784</td>
<td>$ 1,005</td>
<td>26,238</td>
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<td><strong>68,572</strong></td>
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**Estimated savings:**
- Savings from DemandLogic: $ 2,646
- Savings from Solar: $ 9,458
Example Customer
(Industrial)
Industrial -- Original Load Profile
Industrial -- Load Profile with DemandLogic
## Industrial -- Economic Overview

<table>
<thead>
<tr>
<th></th>
<th>Demand</th>
<th>Energy</th>
<th>Total Project Savings</th>
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<tr>
<td><strong>Avoided Energy Cost ($/kWh)</strong></td>
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<tr>
<td><strong>Solar PPA Rate ($/kWh)</strong></td>
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<td><strong>SolarCity Demand Rate ($/kW)</strong></td>
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<tr>
<td><strong>PV System Size (kW)</strong></td>
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<td><strong>Storage System Size (kW)</strong></td>
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<tr>
<td><strong>Storage System Size (kWh)</strong></td>
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<tr>
<th>Month</th>
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<tbody>
<tr>
<td>January</td>
<td>1,208</td>
<td>$10,872</td>
<td>$14,556</td>
<td>922,820</td>
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<td>653,927</td>
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* Savings from DemandLogic: $44,213

Savings from Solar: $116,427
Policy Can Drive Storage Deployment in Buildings

Building Benefits

Grid Benefits

Customer Value
Massachusetts Could Avoid $600 Million Annually

- In long-term avoided costs for energy, capacity, transmission, and distribution

MA Top 100 Hours 2014

Example Residential Storage Programs

Green Mountain Power Tesla Powerwall Pilot Program

- Customers pay:
  - $6,501 up front payment
  - $6,501 up front payment + Receive $31.76 Monthly Credit
  - $37.50/month

SDG&E Proposed “Bring Your Own Battery” Pilot

- Customers pay little or nothing
- Customers purchase qualified battery
- Receive up front incentive to nearly/completely defer customer cost
  - When combined with other incentives

*SolarCity is not involved with these programs.*
Example Commercial and Industrial Programs

New Jersey Renewable Energy Storage Incentive

- $300/kWh rebate
- Energy storage behind C&I customer meter and paired with renewable energy

California Self-Generation Incentive Program

- $1.31/W rebate (equivalent to $655/kWh for 2-hour system)
- Customer-sited energy storage with 2-hour minimum runtime
- Projects count toward utility procurement targets
- 144 MW of storage projects reserved or in progress
State Policies that Support Energy Storage

DOER $10 Million Storage Program
- Include customer-sited energy storage

Energy Storage Procurement Target (S 1762, Downing)
- Include storage target in Energy Omnibus Bill
- Include customer-sited energy storage

Support solar!

Make interconnection easy

Clarify participation in existing programs, like net metering
Our Vision

Work in partnership with a committed utility to help usher in the 21st century of electric power by delivering cleaner, cheaper and more reliable energy through distributed generation.
GMP Residential Storage Program

GMP will provide Tesla Powerwall 7kWh model under with three pricing options:

Option 1: Customer Pays $6,501
- Direct Sale w/ no GMP access to battery
- No savings to ratepayers

Option 2: Customer Pays $6,501 and Receives $31.76 Monthly Credit
- Direct Sale w/ GMP shared access
- Credit based on benefit of hitting Forward Capacity Market peaks 75% of the time and Regional Network Service Peaks 50% of the time

Option 3: Customer Pays $37.50/month
- Rate Rider- $86 monthly payment + $50.70 monthly credit
- Credit based on hitting 100% of FCM peaks and 75% of RNS peaks, and energy arbitrage

System benefits based on capacity market, transmission charges, and energy arbitrage

*SolarCity is not involved with this program.
Proposed SDG&E “Bring Your Own Battery” Pilot

- Customer purchases qualified battery
- Receives upfront incentive
  - Combined with other incentives, would nearly or completely defer customer cost
  - Tiered based on level of utility control allowed
- Customers accept dynamic rate that aligns charging and discharging with grid needs
- SDG&E directly controls storage during limited high-load hours
- Ratepayers and shareholders equally share savings
- Test the ability of customer-owned BTM storage to defer circuit upgrades

*SolarCity is not involved with this program.