



Community Solar + Storage

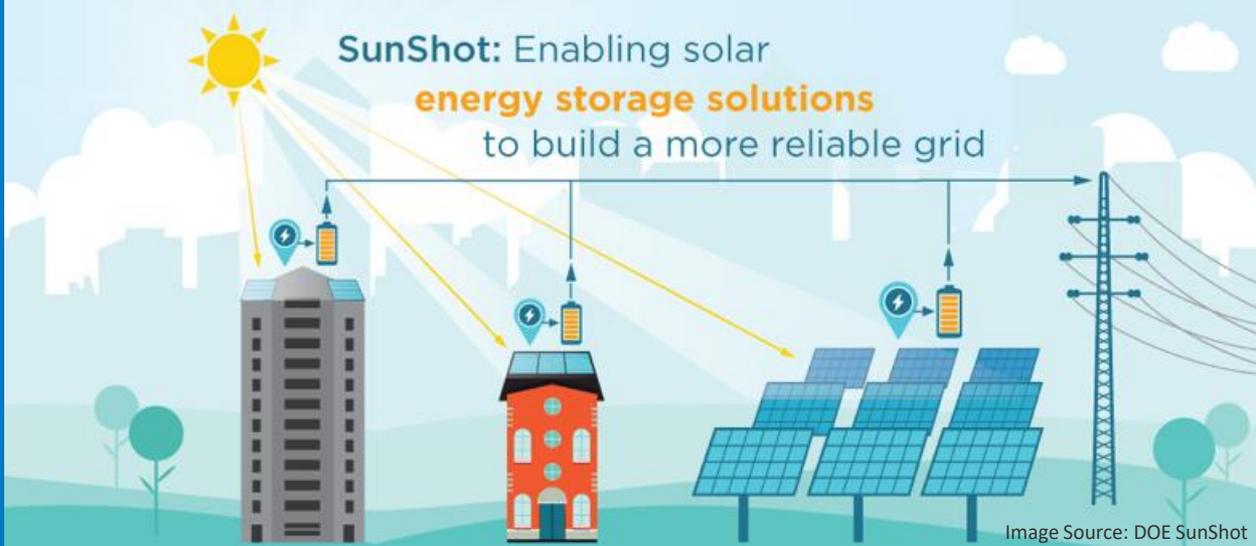
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Community Solar + Storage

Why is energy storage paired with solar important?



- Energy storage helps meet demand whenever needed
- Keeps renewable energy smooth and easily dispatchable during variable production
- Improves the availability and increases the market value of the electricity produced

Learn more about energy storage [here](#)

Learn more about solar + storage [here](#)

Potential Benefits to Community Solar Subscribers

- For project developers, storage paired with community solar could improve the value of the electricity generated by the solar system
 - This could allow for a lower-priced community solar subscription
- Subscribers could purchase subscriptions that include both solar and storage; storage could be used to manage subscriber demand charges



Image Source: Primus Power

Massachusetts's Community Solar+ Storage Incentives

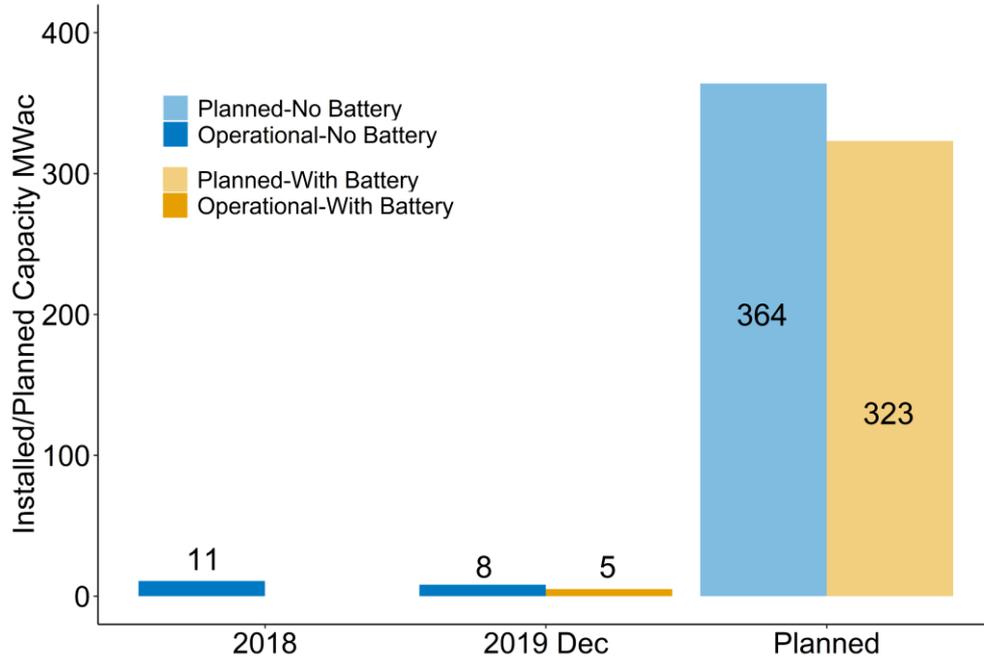
Community Solar Incentives in Massachusetts



- Incentives for Community Solar were created under the Solar Massachusetts Renewable Target (SMART) Program with two community solar components:
 - Community shared
 - Low income community shared
- The SMART program includes an incentive available for battery storage with PV systems called the Energy Storage Adder
 - Ranges from \$0.0247 to \$0.0763 per kWh of electricity
 - The SMART Program website offers an [Energy Storage Adder Calculator](#)
- The incentive amount is based on two factors:
 - The size of battery in proportion to size of the system
 - How much electricity the battery can provide at a given time

Planned Community Solar + Storage Projects in Massachusetts

SMART Community Solar in Massachusetts (MWac)



Data Source: [Solar Massachusetts Renewable Target \(SMART\) Application Update](#)

- 687 MWac community shared solar projects are planned under the SMART Program
- 92 of those projects include battery storage systems

Updates to Massachusetts Storage Incentives

- The SMART program completed a 400 MW review in late 2019, and the DOER is currently implementing new regulations based on this review
- DOER's proposals encourage greater benefits from pairing solar with energy storage
- Modified requirements include*:
 - All Solar Tariff Generation Units greater than 500 kW must be paired with Energy Storage
 - Energy Storage Systems participating in retail level demand response must participate in a demand response program or must discharge at least 52 complete cycle equivalents per year

*DOER changes expected in effect February 2020; Revised Tariffs in effect late 2020 pending DPU approval

Happy Hollow Community Solar Installation

- Massachusetts' largest community solar-plus-storage farm
- Completed in 2019
- 7.1 MW community solar farm
- Includes a 3.3 MW storage system



Image Source: Clean Choice Energy & Borrego Solar

Community Solar + Storage Incentives Lessons



Massachusetts's SMART program has successfully implemented a community solar program that includes community solar + storage incentives



Incentives for community solar + storage can lead to an increase of pairing storage with community solar projects

Austin SHINES Project

Austin SHINES



Image Source: Austin Energy

Austin Sustainable and Holistic Integration of Energy Storage and Solar Photovoltaics (SHINES)

- **Goal:** optimize the value stream for solar and storage with a business model developed for grid, commercial, and residential applications
- The project includes two, grid-scale Energy Storage Systems (ESS):
 - **The 1.5 MW/3 MWh LG Chem lithium-ion battery located with the La Loma community solar array**
 - 1.5 MW/3.2 MWh Yunicos lithium-ion batter located with the Mueller Development which is composed of 2MW of rooftop solar

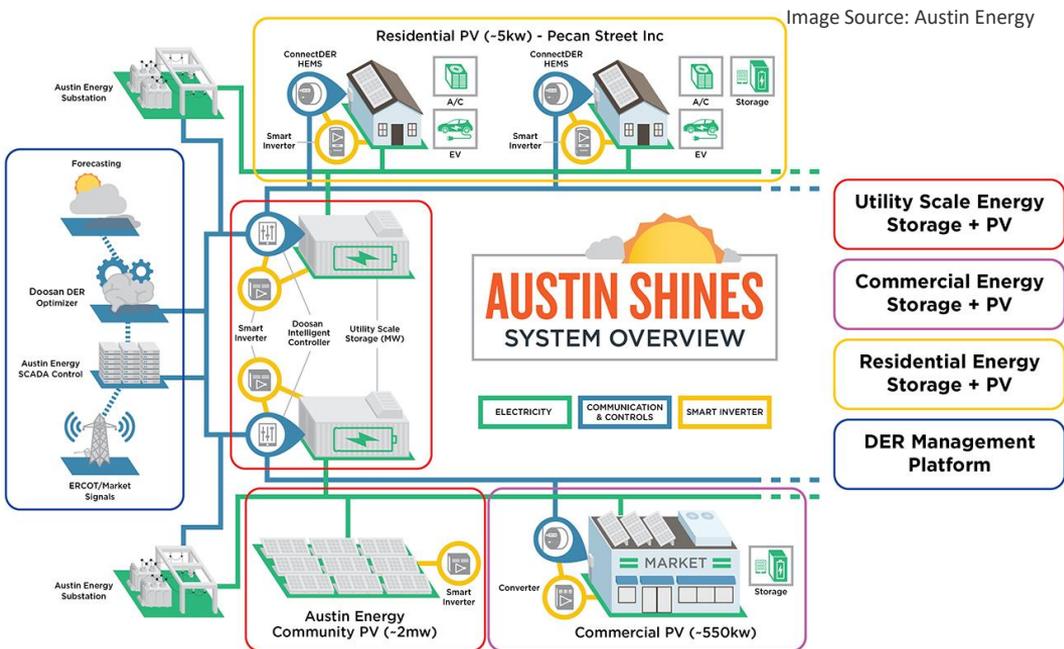
La Loma Community Solar Array

- Built with 9,054 solar panels, totaling 2.6 MW of capacity
- Paired with an on site 1.6 MW battery pack
- 50% capacity carve out for LMI customers at a reduced rate under the Customer Assistance Program (CAP)
- For non-CAP customers, the rate is 1.3 cents/kWh higher than the current Power Supply Adjustment (PSA) price
- Rates for CAP and non-CAP customers is locked in for 15 years
- The non-CAP program is sold out and has a waiting list, indicating strong demand for community solar + storage projects in the area



Image Source: The Austin Common

Austin SHINES System



The paired La Loma Community Solar Array + Storage is integrated as part of the larger Austin SHINES system:

- Two utility scale energy storage systems
- Customer-sited energy storage systems at residential and commercial properties
- Smart inverters
- Real-time data feeds
- Distributed energy resource optimizer
- Vehicle-to-grid (V2G) component

Austin SHINES Community Solar + Storage Lessons



Storage projects can be successfully implemented alongside community solar projects, like the La Loma Community Solar Array



Battery storage paired with community solar can be developed as part of a grid-scale initiative that can also include commercial and residential applications

United Power's "Community Battery" Strategy in Colorado

Strategy for Community Battery



Image Source: United Power

- United Power implemented Colorado's first commercial-scale battery storage project
- The Firestone Storage System is the first of several storage projects, and employs a 4 MW/16 MWh storage system
- The project went live in November 2018
- Batteries in the system store energy produced by all sources on United Power's grid- including solar

Community Battery Project

- United Power utilizes a Community Solar-like subscription model
- Customers purchase a share of the battery and receive a credit
- Instead of a credit for power generated like with community solar, the credit customers receive offsets peak demand charges



Image Source: United Power

Community Battery Model Lessons



A community-solar structure can be applied to battery storage projects and provide similar customer benefits



Customers can subscribe using a similar model



Customers can receive credits to offset their peak demand charges

Kaua'i Island Electric
Cooperative Solar + Storage
Lawa'i Peaker Plant

Solar + Storage

Lawa'i Solar Plant



Image Source: AES Corporation

- Located on the island of Kaua'i
- 28 MW solar photovoltaic (PV) and a 100 MWh five-hour duration energy storage system
- Allows for solar generation to supply the grid while charging the battery system, altering the allocation dynamically as demand changes
- Dispatches solar and battery power simultaneously to answer spikes in demand or black start the grid altogether after a system-wide outage

Learn more about Lawa'i Solar Plant [here](#)

Kaua'i Grid Recovery using Solar + Storage

- In July 2019, Kaua'i experienced cable failure at the largest power plant on the island, and issues at local oil-fired and hydro power plants
- Caused a 2+ hour blackout for residents
- Because the Lawai plant and local Tesla battery facility were able to fully charge in preceding days, the grid was brought back on-line
- Solar + Storage helped meet the demand while the largest power plant was repaired
- Further blackouts were prevented



Image Source: Kauai Island Utility Cooperative

Solar + Storage Grid Benefits



Battery storage paired with community solar projects can support the grid during high demand and low supply situations, similar to the Kaua'i battery project



The Kaua'i battery project provided power to the grid generated by solar while local power plants dealt with issues and helped prevent further blackouts

Community Solar+ Storage Lessons Learned



An incentive program can be successfully implemented for community solar + storage like the Massachusetts's SMART program



Incentives can lead to an increase of pairing storage with community solar projects



Storage projects can be successfully implemented alongside community solar projects in states without strong community solar legislation, like the La Loma Community Solar Array in Texas



Battery storage paired with community solar can be developed as part of a grid-scale initiative that includes commercial and residential applications



A community-solar subscription structure can be applied to battery storage projects and provide similar customer benefits



Customers can receive credits to offset their peak demand charges



Battery storage paired with community solar projects can support the grid during high demand and low supply situations, and prevent blackouts