Building Community Resilience with Green Mountain Power

May 18, 2022
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The Energy Storage Technology Advancement Partnership (ESTAP) is a US DOE-OE funded federal/state partnership project conducted under contract with Sandia National Laboratories.

ESTAP Key Activities:

1. Facilitate public/private partnerships to support joint federal/state energy storage demonstration project deployment

2. Disseminate information to stakeholders
   • ESTAP listserv >5,000 members
   • Webinars, conferences, information updates, surveys.

3. Support state energy storage efforts with technical, policy and program assistance
Thank You!

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Energy Storage for Resiliency in Vermont and Beyond

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Joint Solicitation issued by VPS/OE
Rutland, VT

4MW / 3.4MWh of storage
Integrated with 2MW PV
Integrator: Dynapower

Groundbreaking: Aug. 12, 2014
Commissioning: Sep. 15, 2015

System can be islanded to provide emergency power for a resilient microgrid serving a highschool / emergency center.

Storage: Ancillary grid services, demand charge reduction
PV: Green power for the grid. Situated on Brown Field area
Regional Network Service (RNS): Payments for using transmission lines depend on monthly peak load.

Forward capacity market (FCM): Payments for regional capacity reserves to cover load excursions depend on the yearly peak day/hour identified by ISO-NE.

In addition, there are financial benefits from frequency regulation and arbitrage.

Capturing the yearly peak, $200,000 from PV and storage!
Vermont Follow-on Activities:

GMP Rutland Project referenced as model in VT Energy Strategic Plan! Legislative hearings on potential storage mandate. VT Department of Public Service commissioned Energy Storage Study.

- MacKnight Lane Project (DOE, Sandia, CESA)
  14 unit PV + Storage, affordable housing

- Panton VT. Project (GMP)
  • 1 MW storage linked with solar
  • Resiliency and utility cost savings

- Residential battery aggregation program (GMP)
  • Up to 3,000 batteries installed behind customer meters
  • Resiliency and utility cost savings
Sterling, MA: Microgrid/Storage Project
$1.5M Grant from MA. Additional DOE-OE Funding, Sandia Analytics

2MW/2hr storage with existing 3.4 MW PV to provide Resiliency for Police HQ and Dispatch Center. Li-ion batteries provided by NEC. Capital Cost: $2.7M

Dec. 2016, 2MW/2hr Storage, 3.4 MW PV  
Oct. 2016, Commissioning, NEC, Li-Ion
First Year of Operation:

Actual Savings:
- Arbitrage $11,731
- Monthly Peaks $143,447
- Annual Peak $240,660
- Total $395,839

April 2019: 1 million $ Avoided Cost!

Visitors: Germany, Switzerland, Denmark, Sweden, England, Ireland, Australia, Japan, Malaysia, Taiwan, Brazil, Chile, .... Thailand
North Troy, VT, Wind Curtailment
GMP, VEC, Sandia/DOE

N-S Transmission forms bottleneck for wind from the North to population in the South.
3MW / 12 MWh, Expected Completion: Sept. 2022
$5,500,000 Storage to be installed at SHEI Interchange:

100% of all benefits accrue to VT retail customers.
Emergence of Storage Ecologies

California: Mandate, CEC, PUC, Utilities, LBL

New York: BEST, NYSERDA, CCNY

Northwest (WA, OR, AK): PNNL, WA Clean Energy, PUCs, Senate

Southwest (NM, AZ): Sandia, Congressional/State Support,

Northeast (MA, VT): DOER, National Grid, GMP, Universities

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Ultimately we can imagine the Formation of local Resilience Centers meshing into nested Microgrids of increasing Sizes.
Storage of Various Durations will be Needed: Short, Medium, and Long

15 min – 4 hrs: smoothing renewables. **Li-ion**

4 – 12 hrs: day/night PV storage. **Flow Batteries**

12h – 3 days: bad weather backup. **Thermal/Gravity**

We will need some 1200-2300 GWh of Energy Storage!
Long Duration Energy Storage is essential for the Development of a Decarbonized, Reliable Grid but it will require New Technology, New Business Cases and New Regulatory Frameworks!
VERMONT RESILIENCY ZONES
Empowering customers, keeping communities connected

May 18, 2022

GreenMountainPower.com
GMP’s Proactive Climate Plan

- Targeted initiatives to make grid more resilient
  - undergrounding, installing insulated wire, replacing poles, adding batteries
- Prevent outages
- Recover more quickly when they happen
- In addition to regular grid work
- Features faster timeline and Resiliency Zones
What's a Resiliency Zone?

- Community hub that stays connected, even when the lights go out

- Can include: batteries, local power generation (solar), communications

- Custom plan in partnership with community
Panton and Strafford Hill microgrids

- Partnered with community several years ago
- Local solar first, providing clean power close to where it is consumed
- Then added batteries = this saves all GMP customers money
- Added microgrid capability
How are Resiliency Zone communities selected?

- Reliability
- CDC social vulnerability
- Communications infrastructure
- Community’s interest in partnering with GMP
Engaged 15 qualifying towns with community outreach

To start, 4 towns will be part of Resiliency Zone Pilots
- Rochester: Solar + storage microgrid in downtown
- Strafford: Add storage to Elizabeth Mine Solar
- Brattleboro: Community storage in Tri-Park mobile home community
- Grafton: Residential storage as non-wires alternative

More to come... We will work with 3 new communities a year! Building a **closer**, **connected**, and **empowered** energy system.
Think Big, Start Small and Scale Fast

Questions?

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This webinar was presented by the DOE-OE Energy Storage Technology Advancement Partnership (ESTAP)

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Upcoming Webinars

Quantifying the Health Benefits of Clean Energy Policies with EPA’s AVERT and COBRA Tools
Thursday, May 19, 1-2:30pm ET

Exploring Peaker Power Plant Inequities with Clean Energy Group’s New Mapping Tool
Thursday, June 23, 3-4pm ET

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