

DOE-OE Energy Storage Technology Advancement Partnership
(ESTAP) Webinar

Building Community Resilience with Green Mountain Power

May 18, 2022



U.S. DEPARTMENT OF
ENERGY

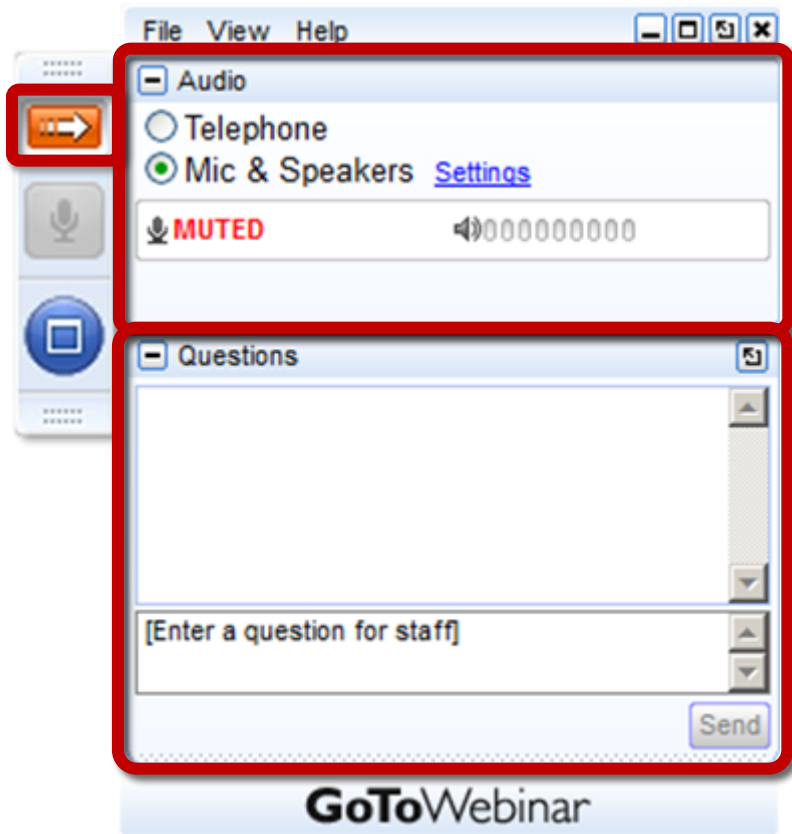


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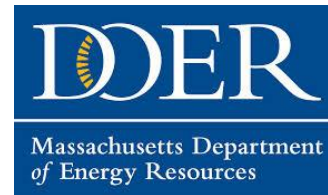
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Maryland
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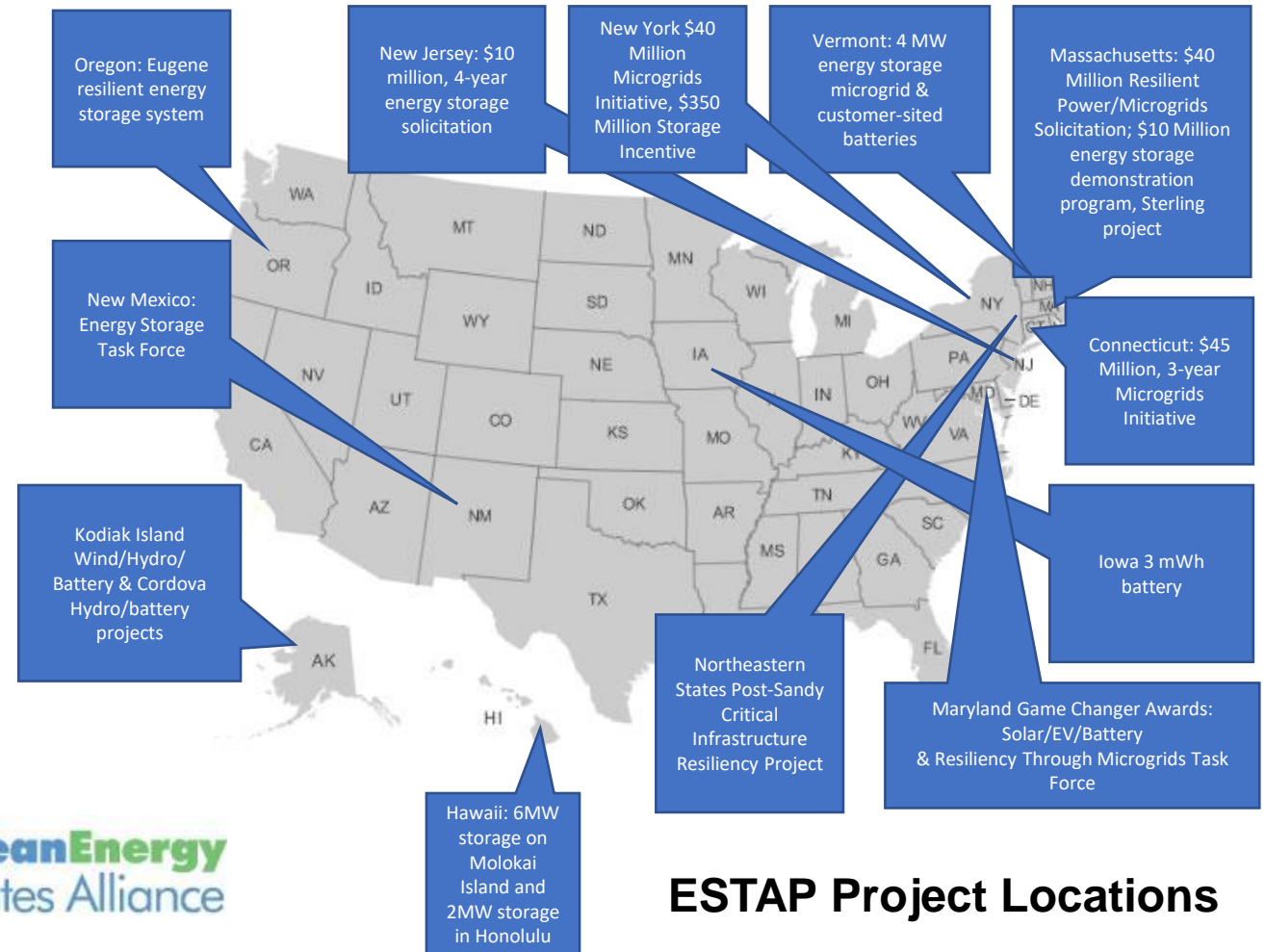


DOE-OE Energy Storage Technology Advancement Partnership

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

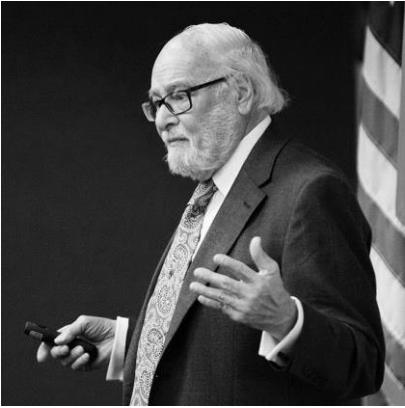
ESTAP Key Activities:

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



ESTAP Project Locations

Thank You!



Dr. Imre Gyuk

Director, Energy Storage Research,
U.S. Department of Energy



Dan Borneo

Engineering Project/Program Lead,
Sandia National Laboratories



Webinar Speakers



Dr. Imre Gyuk

Director, Energy
Storage Research, DOE
Office of Electricity



Sarah Ludwin Peery

Solar Energy Innovation
Fellow, Green Mountain
Power



Dan Borneo

Engineering Project /
Program Lead, Sandia
National Laboratories



Todd Olinsky-Paul

Senior Project Director,
Clean Energy States
Alliance (moderator)



Energy Storage for Resiliency in Vermont and Beyond

IMRE GYUK, DIRECTOR,
ENERGY STORAGE RESEARCH, DOE-OE

Vermont Public Service Dept. – DOE - Green Mountain Power

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



How to make the Microgrid Pay for itself:

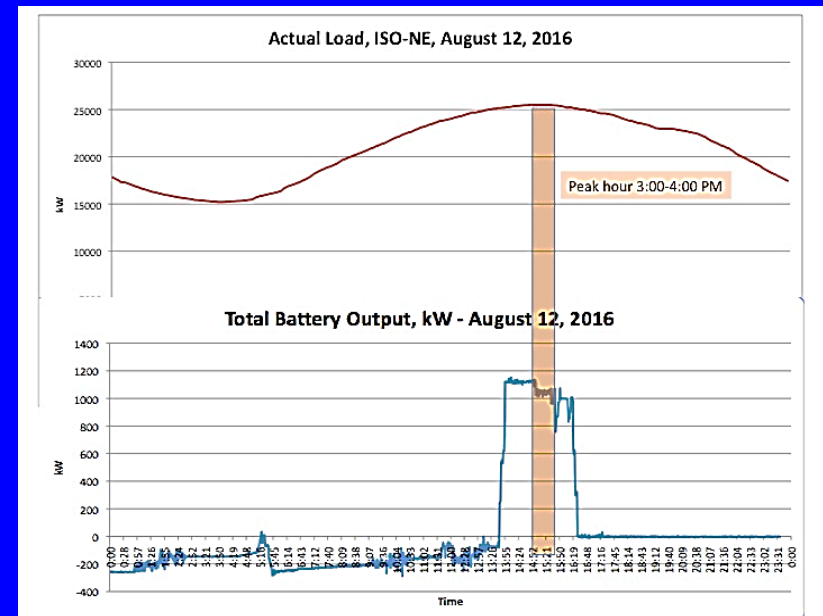
Regional Network Service (RNS):

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:

2016 Dec. till 2017 Nov. Actual Savings:

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

Sean Hamilton



Carina Kaainoa

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

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](https://www.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

Stop the spread • Avoid close contact with others • Cover your mouth and nose with a cloth face cover when around others • Wash your hands often • Cover coughs and sneezes • Clean and disinfect often • Monitor your health daily

GMP pioneers with Panton microgrid



Solar panels cover more than 30 acres in Panton, as seen on March 16.

Solar project will be first of its kind in US

Dan D'Ambrosio
Burlington Free Press
USA TODAY NETWORK

PANTON - Most of the pieces for a pioneering "microgrid" that will act as a giant solar-powered backup battery during electrical outages are in place on the wide-open fields of Panton outside of Vergennes.

The solar-powered microgrid will be the first of its kind in the country, according to Josh Castonguay, chief innovation and engineering executive for Green Mountain Power. So are the 677 souls (plus 3,500 cows and 74,239 chipmunks, according to the town website) in this small Vermont village beside themselves with excitement?

"Actually, no, they're not," said Howard Hall, chairman of the Panton Selectboard. "It's nothing really exciting for most of the people here."

Green Mountain Power first approached the town in 2015 about building the solar field in a farmer's leased field on Panton Road. Hall said that in a town where the purchase of a wheelbarrow is the subject for debate, the \$40,000 yearly in tax revenue the solar installation produces was a welcome boost.

"We have one store in our town," he said. "We're not collecting taxes of course."



Josh Castonguay, Green Mountain Power's chief innovation and engineering executive, explains how the Panton microgrid will work, as seen on March 16. PHOTOS BY DAN D'AMBROSIO/FREE PRESS

"With microgrids powered by clean energy and paired with batteries to store and deploy that power when it's needed,

SoBu hot air balloon event causes traffic jam Saturday

April Barton
Burlington Free Press
USA TODAY NETWORK

A hot air balloon event Saturday night was so popular it caused a traffic jam in South Burlington. Hundreds of cars lined up for the Light the Night event. Maybe it was the warm temperatures or the drivable event which allowed visitors to stay COVID-safe remaining in their cars that caused people to come out in droves.

South Burlington police put out an advisory that night saying "traffic is significantly backed up on Kimball Ave, Community Dr, Gregory Dr and Kennedy Rd due to a hot air balloon parade of some sort."

While the police may have not known all the details of the event, South Burlington Recreation & Parks were there to assist as motorists drove through Technology Park. Event organizers and partners of the nonprofit Light the Night handed out QR codes for people to electronically donate to the Vermont Foodbank and collected food donations.

The event was free, but donations were encouraged. It began at 7:30 p.m. and lasted a couple of hours. Traffic was able to get back to normal at that point.

Traffic jams caused by an event, not something experienced for about a year while many stayed in isolation during the COVID-19 pandemic, could be the first signs of a return to normal.

Contact April Barton at abarton@freepressmedia.com or 802-660-8854. Follow her on Twitter @aprilbarton.



A hot air balloon glow entitled "Light the Night" brought out hundreds of cars in South Burlington on Saturday to support the Vermont Foodbank. FREE PRESS/APRIL BARTON

USA TODAY

Promising candidate

AstraZeneca and its research partner Oxford University released the first picture Monday of the large clinical trial they have run in the U.S. for their COVID-19 vaccine, finding that it is safe and prevents 70% of asymptomatic disease. <https://www.astrazeneca.com/news/2021/03/22/oxford-university-releases-first-picture-of-covid-19-vaccine-clinical-trial>

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

RESILIENCY ZONE PILOTS

- ▶ 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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ESTAP Website: <https://cesa.org/projects/energy-storage-technology-advancement-partnership/>

ESTAP Webinar Archive: <https://cesa.org/projects/energy-storage-technology-advancement-partnership/webinars/>



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

Read more and register at: www.cesa.org/webinars