

RESILIENTPOWER

A project of **CleanEnergy**Group



“How-To” Resources for Building Energy Resilient Communities

Housekeeping



All participants are in “Listen-Only” mode. Select “Use Mic & Speakers” to avoid toll charges and use your computer’s VOIP capabilities. Or select “Use Telephone” and enter your PIN onto your phone key pad.

Submit your questions at any time by typing in the Question Box and hitting Send.

This webinar is being recorded.

You will find a recording of this webinar, as well as previous Resilient Power Project webinars, online at:

www.resilient-power.org

Today's Speakers



Seth Mullendore, Project Manager

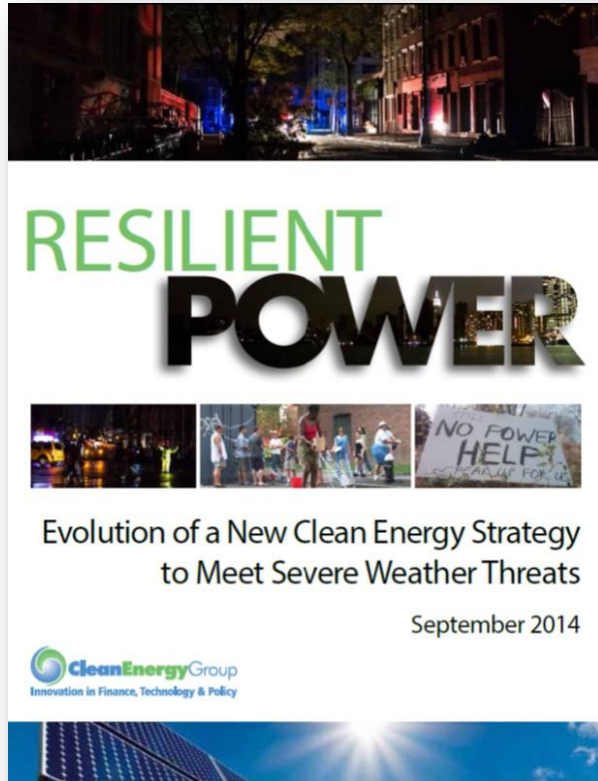


Todd Olinsky-Paul, Project Director



Rob Sanders, Senior Finance Director

Who We Are



www.cleanegroup.org

www.resilient-power.org



Meridian Institute
Connecting People to Solve Problems

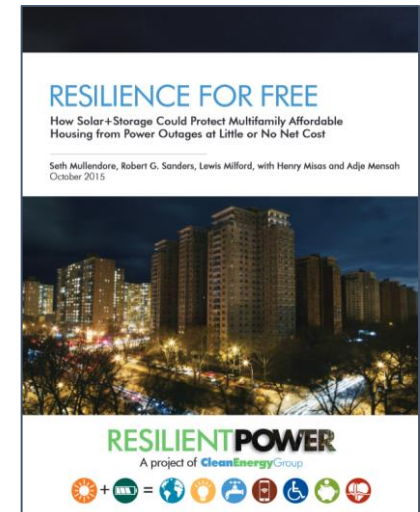
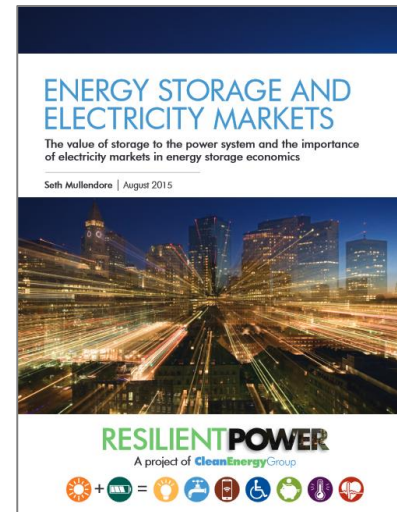
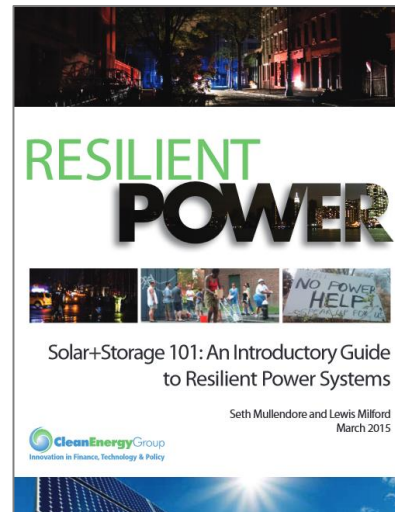
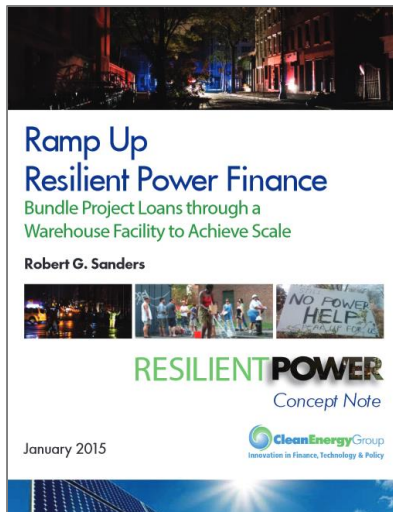


SURDNA FOUNDATION

Fostering sustainable communities in the United States

Resilient Power Project

- Increase public/private investment in clean, resilient power systems
- Engage city officials to develop resilient power policies/programs
- Protect low-income and vulnerable communities
- Focus on affordable housing and critical public facilities
- Advocate for state and federal supportive policies and programs
- Technical assistance for pre-development costs to help agencies/project developers get deals done
- See www.resilient-power.org for reports, newsletters, webinar recordings



Resilient Power Project Website

- Publications Library
 - Nearly 100 publications, including ~ 30 reports & case studies related to resilient power.
 - Can search by project, year, technology, or keyword
- Webinars
 - Sign up for upcoming webinars
 - Watch 100+ webinar recordings, including 50+ on resilient power
- Project newsletters
 - The Resilient Power Project Newsletter (monthly)
 - Solar+Storage News (weekly)
- Resilient Power Project Map
 - Lists planned and operational resilient power installations across the US
 - Projects can be filtered by name, status, storage system size, services provided, and technology type.
- And more: Blog, FAQs, Featured Installations...

www.resilient-power.org

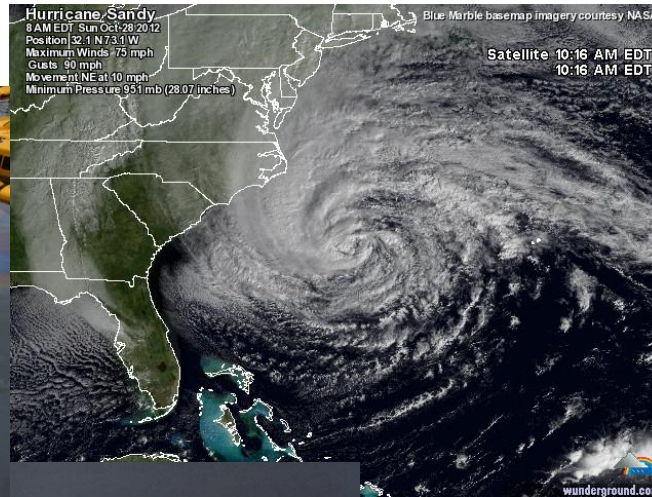
State Policy Overview

Todd Olinsky-Paul, Project Director,
Clean Energy Group/Clean Energy States Alliance

Hurricane Sandy

October 29, 2012

\$37 Billion in damages



Northeastern States Resilient Power Initiatives

Following Superstorm Sandy, the Northeastern states came to CESA/CEG seeking help in developing resilient power solutions.

Our role:

- Assist in policy and program development
- Provide convening and knowledge-sharing between states
- Provide information and research
- Help to draft RFPs and evaluate project proposals
- Monitor and evaluate program performance

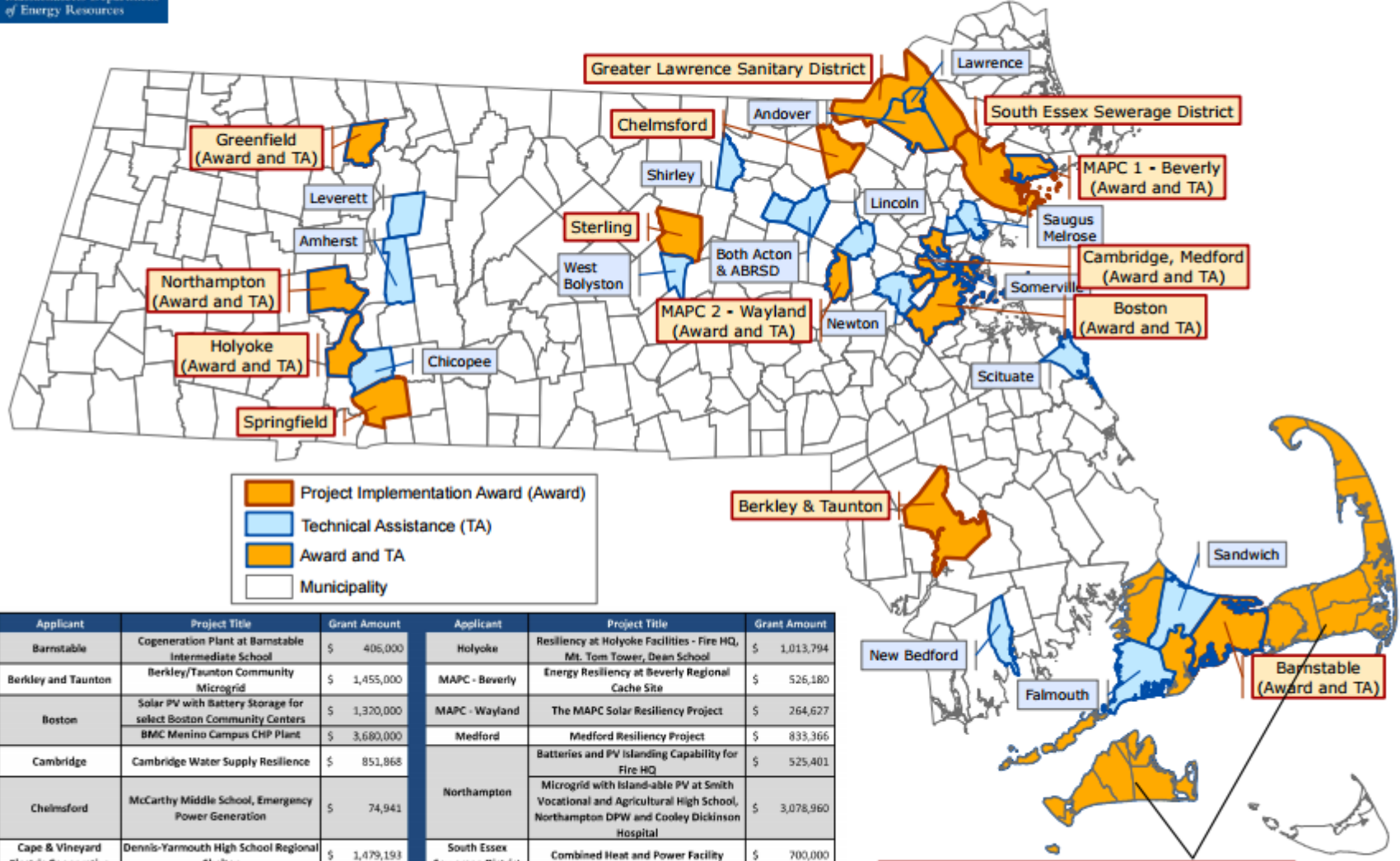
Results

- **Connecticut** Department of Energy and Environmental Protection (DEEP): \$50 Million, 3-year Microgrid Grant and Loan Pilot Program
- **New Jersey** Board of Public Utilities (BPU): \$9 Million Energy Storage Program and \$200 Million Energy Resilience Bank
- **Massachusetts** Division Of Energy Resources (DOER): \$40 Million Community Clean Energy Resiliency Initiative, \$10 million Energy Storage initiative; MassCEC: Microgrids program: state energy storage roadmap
- **New York** State Energy Research and Development Authority (NYSERDA): \$40 Million NY Prize microgrids competition

TOTAL: \$340 Million in new state funds in the Northeast alone



Community Clean Energy Resiliency Initiative Project Implementation and Technical Assistance

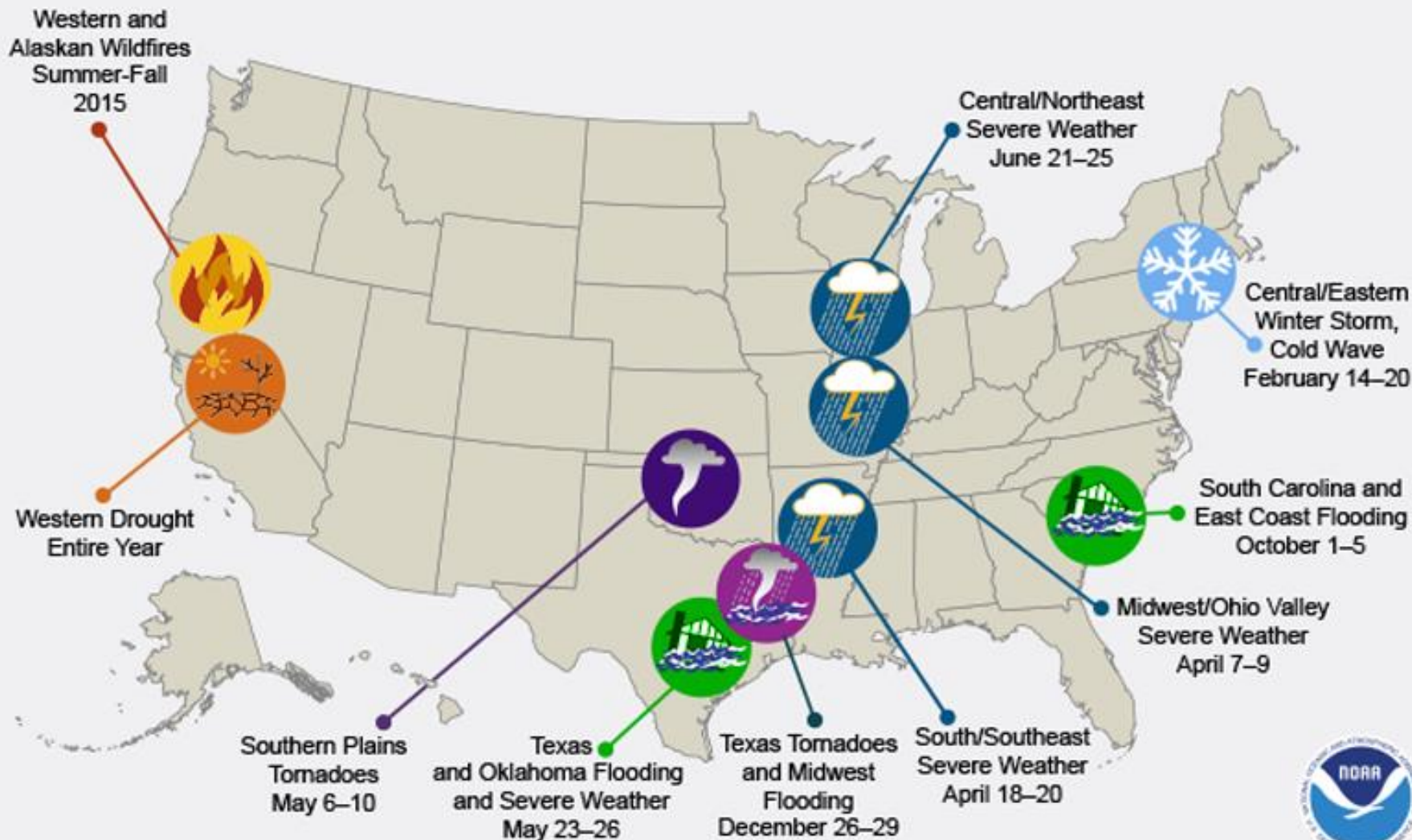


Project Implementation Award (Award)
 Technical Assistance (TA)
 Award and TA
 Municipality

Applicant	Project Title	Grant Amount	Applicant	Project Title	Grant Amount
Barnstable	Cogeneration Plant at Barnstable Intermediate School	\$ 406,000	Holyoke	Resiliency at Holyoke Facilities - Fire HQ, Mt. Tom Tower, Dean School	\$ 1,013,794
Berkley and Taunton	Berkley/Taunton Community Microgrid	\$ 1,455,000	MAPC - Beverly	Energy Resiliency at Beverly Regional Cache Site	\$ 526,180
Boston	Solar PV with Battery Storage for select Boston Community Centers	\$ 1,320,000	MAPC - Wayland	The MAPC Solar Resiliency Project	\$ 264,627
	BMC Menino Campus CHP Plant	\$ 3,680,000	Medford	Medford Resiliency Project	\$ 833,366
Cambridge	Cambridge Water Supply Resilience	\$ 851,868	Northampton	Batteries and PV Islanding Capability for Fire HQ	\$ 525,401
Chelmsford	McCarthy Middle School, Emergency Power Generation	\$ 74,941		Microgrid with Island-able PV at Smith Vocational and Agricultural High School, Northampton DPW and Cooley Dickinson Hospital	\$ 3,078,960
			Cape & Vineyard Electric Cooperative	Dennis-Yarmouth High School Regional Shelter	\$ 1,479,193
Greater Lawrence Sanitary District	Organics to Energy Upgrade Project	\$ 5,000,000	Springfield	Baystate Health Cogeneration Project	\$ 2,790,099
Greenfield	Greenfield Resiliency Plan for High School	\$ 367,310	Sterling	Implementing a Resiliency Plan through Clean Storage for a Municipal Microgrid	\$ 1,463,194
Total					\$ 25,829,933

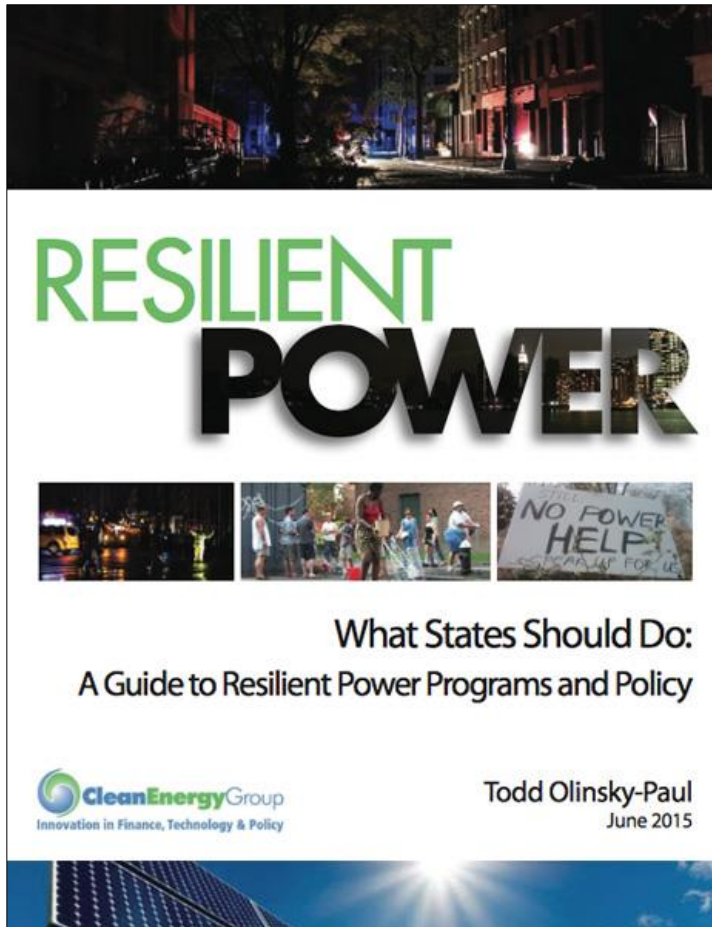
Cape & Vineyard Electric Cooperative received Award and Technical Assistance (includes all Barnstable and Dukes County towns)

U.S. 2015 Billion-Dollar Weather and Climate Disasters



This map denotes the approximate location for each of the ten billion-dollar weather and climate disasters that impacted the United States during 2015.

State Resilient Power Guidebook



- Descriptions of existing state resilient power programs
 - Best practices
 - lessons learned
- Policy tools states can use to promote resilient power solutions
- The roles of non-state entities
 - Utilities
 - Developers and third-party service providers

Download at: bit.ly/ResilientStates

ESTAP* Overview

ESTAP is a project of CESA

Purpose: Create new DOE-state energy storage partnerships and advance energy storage, with technical assistance from Sandia National Laboratories and funding from DOE-OE

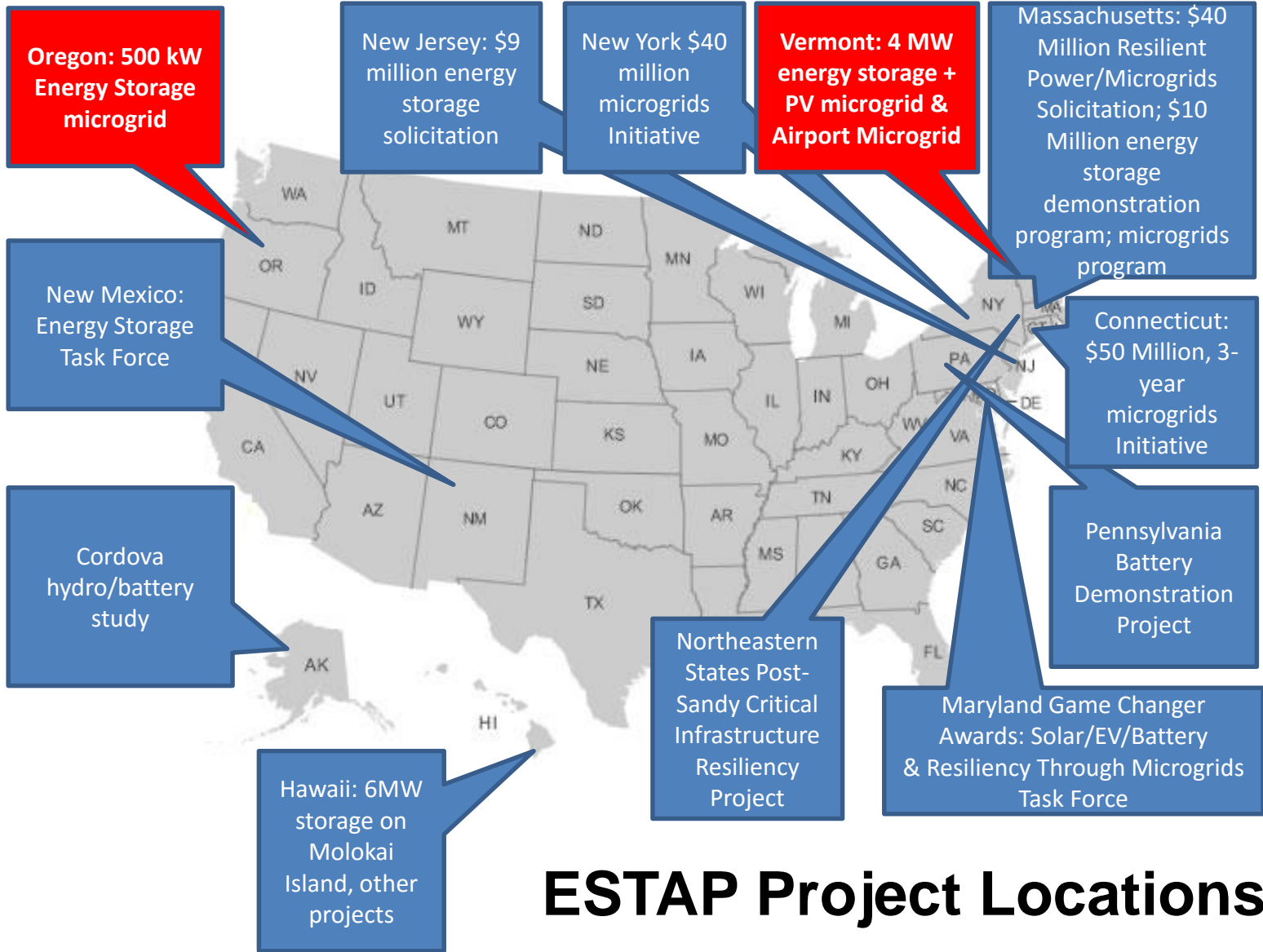
Key Activities:

1. Disseminate information to stakeholders
2. Facilitate federal/state partnerships to support energy storage **program development** and **project deployment**

Outcome: Energy storage project deployments across the U.S. with co-funding from states, project partners, and DOE

* (Energy Storage Technology Advancement Partnership)





ESTAP Project Locations





Vermont

- Joint federal/state, public/private demonstration project
- 4 MW energy storage + 2.5 MW PV microgrid
- Sited on closed landfill (brownfield redevelopment)
- Provides resilient power for school serving as public shelter

Oregon

- Joint federal/state, public/private demonstration project
- 500 kW energy storage + PV microgrid
- Provides resilient power to three critical facilities: water supply, telecommunications, and utility operations center



www.cleanenergystates.org/projects/energy-storage-technology-advancement-partnership/

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Energy Storage Technology Advancement Partnership

Overview

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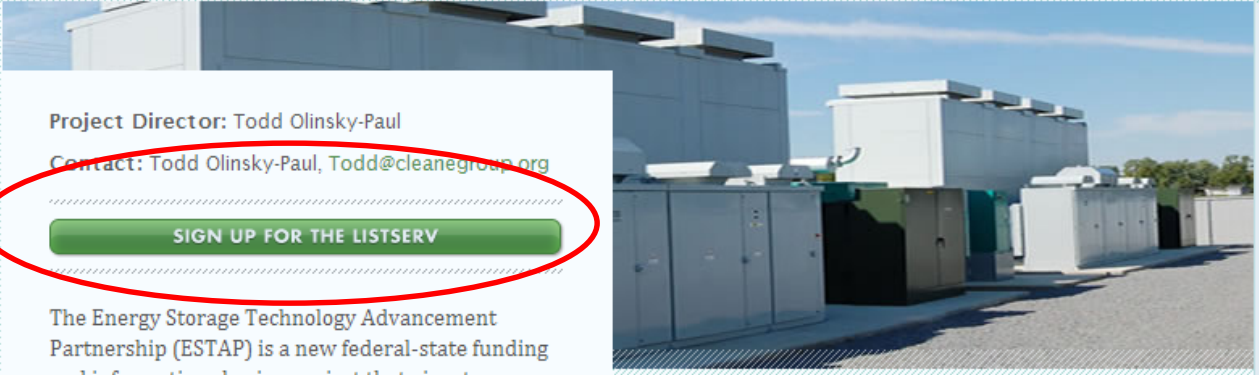
[Resources and Webinar](#)

[Archives](#)

Project Director: Todd Olinsky-Paul
Contact: Todd Olinsky-Paul, Todd@cleanegroup.org

The Energy Storage Technology Advancement Partnership (ESTAP) is a new federal-state funding and information sharing project that aims to accelerate the deployment of electrical energy storage technologies in the U.S. The value proposition for participating states is to work closely with the U.S. Department of Energy's Office of Electricity Delivery and Energy Reliability (DOE-OW) on near-term joint funding and technology deployment, to join a network of leading states supporting energy storage technology, and to achieve faster progress in electrical energy storage commercialization and economic development.

Background



NEW RESOURCES

May 16, 2013
 CESA Webinar Recording: Smart Grid, Grid Integration, Storage and Renewable Energy
 By CESA

UPCOMING EVENTS

June 18, 2013
 ESTAP Webinar: An Overview of the Electricity Storage Handbook,
 More Events



Resilient Power Finance

Rob Sanders, Senior Finance Director,
Clean Energy Group

- The economic case for solar+storage
- Technical Assistance Fund
- Financing tools

Value of Solar

- **Offset electricity consumption (kWh)**
- **Solar Renewable Energy Certificates (SREC)**
- **Incentives**
 - Federal Investment Tax Credit (ITC)
 - State and local incentives

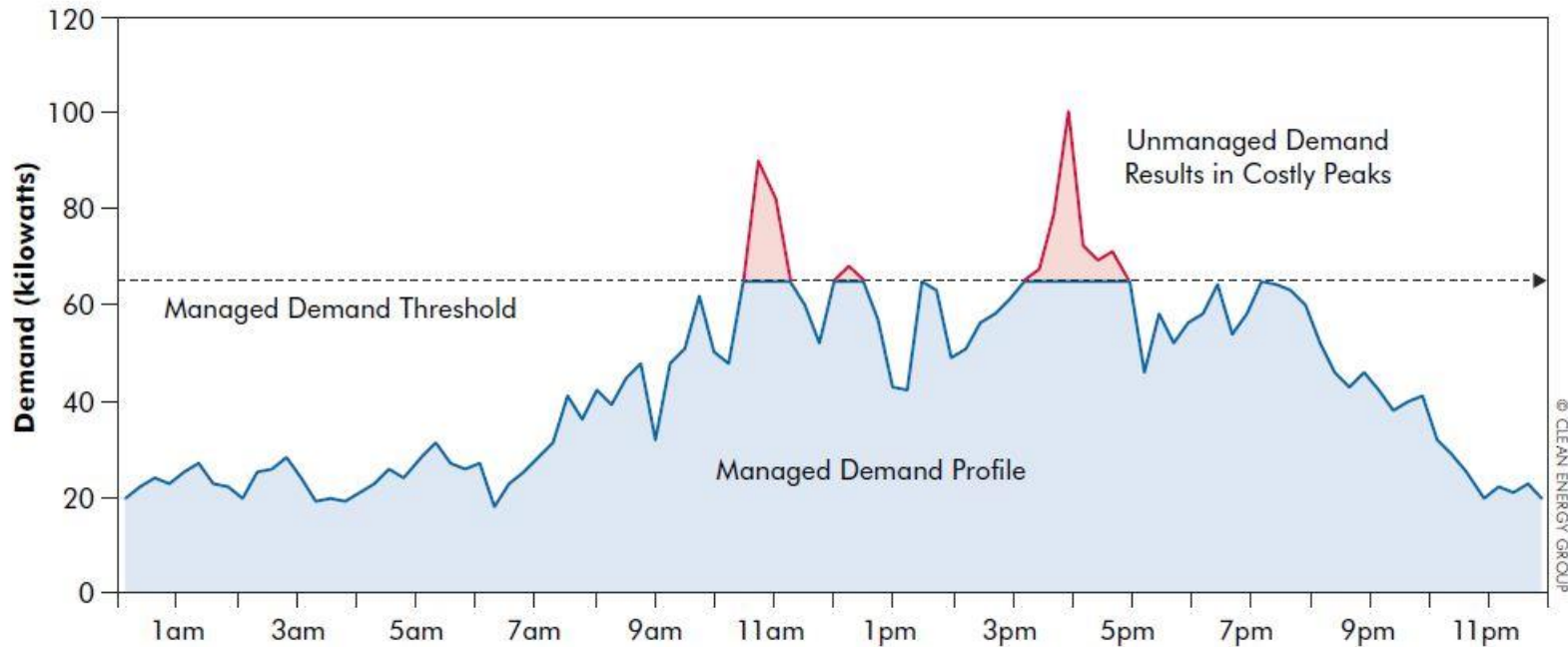
Value of Battery Storage

Energy storage technologies have the capacity to benefit each segment of the power system.



Source: Clean Energy Group

Customer Value: Peak Shaving



Peak reduced from 100 kW to 65kW = 35 kW reduction

@ \$10/kW = \$4,200 annual savings

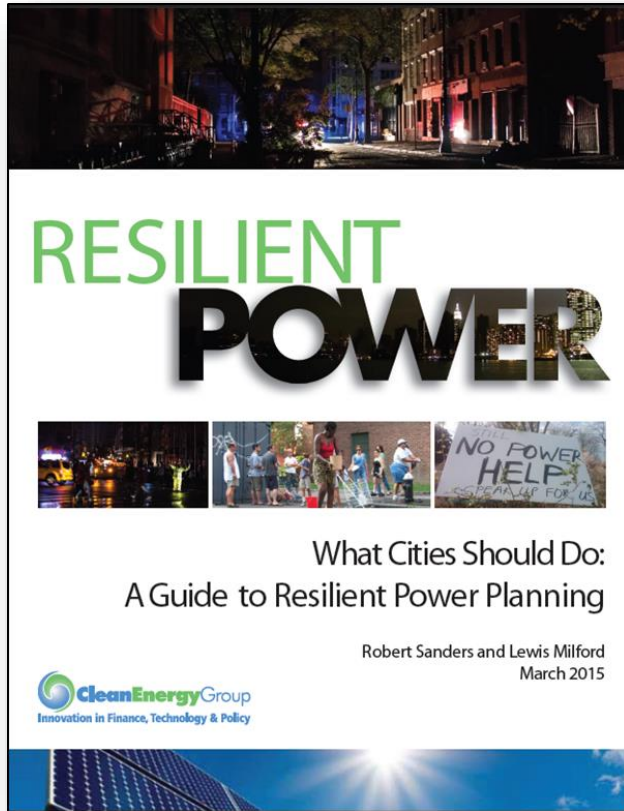
@ \$20/kW = \$8,400 annual savings

Utility/Grid Value

- Demand response
- Power system reliability

Ancillary Services	
Frequency regulation	Balancing of electricity supply and demand to keep frequency within operational bounds. Includes services for responding to both increases and decreases in system frequency.
Spinning reserve	Generation capacity that is connected to the power system but not generating electricity until needed, with the ability to respond immediately, within 10 minutes.
Non-spinning reserve	Generation capacity that is not connected to the system but can be brought online after a brief delay.
Voltage control	Similar to frequency regulation but using reactive power to maintain proper transmission system voltage.
Black start	Ability to restore power to part of the grid after failure occurs.

Resilient Power Inequality



The challenge for our country now is to bend the technology trend for solar+storage systems to serve public needs, such as affordable housing and other essential services in low-income communities.

bit.ly/CEG-Resilient-Cities

Resilient Power Projects – Housing



- Technical assistance fund: project grants to design and deploy resilient power systems
- Demonstrate viability of clean energy + storage in affordable housing and assisted living
- Working with housing and solar+storage developers in NYC, Chicago, DC, Newark, Boulder
- Via Verde (Bronx) – could be 1st solar+storage project for resilient power applied to affordable housing

Resilient Power Projects – Community Facilities



- Demonstrate viability of clean energy + storage in critical community facilities
 - Community shelters, police and fire stations, hospitals, wastewater treatment
- Working with municipalities to develop resilient power plan for critical facilities
- Municipal solar+storage project planning underway in Baltimore, Salt Lake City, Los Angeles, Duluth, DC

Technical Assistance Fund

- An essential market development tool - funded by foundations
- Grants pay for 3rd party TA to determine project feasibility
 - To date: 16 projects: community facilities and elderly, family & supportive affordable housing projects in NYC, Chicago, DC, Austin, Baltimore & Newark NJ
- Require sharing of deal & financing docs, reporting of project performance for 2 years



© bob henney

Innovative Financing Models

- Once decision is made to pursue resilient power project – how do you finance it?
- Municipalities, housing/ community developers have broad range of options.

BOND FINANCING

General obligation bonds
Morris Model
501(c)(3) bonds
Housing bonds
School construction bonds
Disaster recovery/climate resiliency bonds
Commercial/municipal PACE bonds



CLEAN ENERGY FINANCIAL INSTITUTIONS

State Energy Resilience Banks
Warehouse credit facility
West Coast Infrastructure Exchange model



PUBLIC AND PRIVATE OWNERSHIP STRUCTURES

3rd party ownership with PPA
Municipal improvement districts
Utility ownership



CREDIT ENHANCEMENTS

Public benefit funds
U.S. DOE Loan Guaranty



Source: Clean Energy Group

Hybrid Approach is Needed

- Financing is just one key public resource that is needed to scale resilient power for critical facilities
 - Technical assistance
 - Targeted support for pre-development costs
 - Consistent, supportive policy
- Investment won't get traction in this emerging market without an adequate policy & regulatory framework, sustained TA, data collection & analysis, and information sharing.



Questions?

- **Seth Mullendore**, Project Manager, Clean Energy Group
- **Todd Olinsky-Paul**, Project Director, Clean Energy Group/
Clean Energy States Alliance
- **Rob Sanders**, Senior Finance Director, Clean Energy Group

Please type your questions into the question box on your webinar console and hit “send.” We will answer as many questions as time allows.

Slides and a recording of this webinar will be posted on our website within 24 hours.

Thank you for attending our webinar

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Find us online:

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**RESILIENT
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Upcoming Webinars

- New Jersey Energy Storage Rebate Program, February 17
- Hydrogen and Fuel Cells for Resiliency: Financing Energy Resiliency, February 18
- Energy Storage in PJM: Wholesale Market Rules and Requirements, February 23
- Software for Energy Storage Optimization: Free Tools from Sandia National Laboratories, February 25
- San Francisco Community Resiliency Planning, March 7
- Fuel Cells for Telecommunication, March 17

www.cleanelectric.org/webinars

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Sign up for the RPP e-Distribution List to get notices of future webinars and the monthly *Resilient Power Project Newsletter*: <http://bit.ly/RPPNews-Sign-UP>

More information about the Resilient Power Project, its reports, webinar recordings, and other resources can be found at www.resilient-power.org.