Clean Energy Group
Resilient Power Project Webinar

New Jersey Energy Resilience Bank

Hosted by

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Lew Milford, Clean Energy Group President

October 28, 2014
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.cleanegroup.org/ceg-projects/resilient-power-project/webinars/

and at

vimeo.com/channels/resilientpower
About Clean Energy Group (CEG)

Clean Energy Group is a leading national, non-profit advocacy organization working in the US and internationally on innovative technology, finance and policy programs in the area of clean energy and climate change.
About the Resilient Power Project

CEG’s Resilient Power Project helps states and municipalities to implement clean resilient power solutions. Through the project, CEG helps states develop new partnerships, supports new public financing tools, connects public officials with private industry, engages federal resources, and works with state and local officials to support greater investment in resilient power deployment.

www.resilient-power.org
Upcoming Webinar: Financing Resilient Power

• How to access capital on terms that are economically feasible
• Describes broad range of financing approaches:
  • Bond financing
  • Clean energy financial institutions
  • Credit enhancement
  • Public & private ownership structures
• Explores appropriate financing strategies for specific market segments
Today’s Guest Speakers

• Mitch Carpen, Executive Director, New Jersey Energy Resilience Bank

• Thomas Walker, Deputy Director, New Jersey Energy Resilience Bank
Contents

1. Introduction to the ERB
2. Potential resilience solutions
3. Financing support for resilience
4. Eligibility
5. Questions and next steps
New Jersey Energy Resilience Bank (ERB) Overview

- The extensive damage and outages caused by Superstorm Sandy prompted the state to prioritize its efforts to minimize the potential impacts of future major power outages and increase energy resiliency.

- BPU and EDA have partnered to commit $200 million in funding for the ERB to assist critical facilities with securing resilient energy technologies that will make them – and, by extension, the communities they serve – less vulnerable to future severe weather events and other emergencies.
Mission

“Realizing energy resilience for New Jersey’s critical facilities through financing and technical assistance”
Contents

1. Introduction to the ERB
2. Potential resilience solutions
3. Financing support for resilience
4. Eligibility
5. Questions and next steps
The ERB will fund resilient energy systems for critical facilities

Resilient energy technology is ...

... distributed generation or other technologies ...

CHP plants can use a reciprocating natural gas engine

Gas Turbine CHP Plant

... that is islandable, capable of blackstart and can operate at critical load

Inverter system  Black Start Controls  Fuel cells

Resilient energy technology is not...

...emergency backup generators

Generator

SOURCE: DOE, NREL
# High Potential Resiliency System Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Suitability for potential resiliency options</th>
</tr>
</thead>
</table>
| **CHP**    | ▪ Combined heat and power (CHP) is the simultaneous production of electrical or mechanical energy and useful thermal energy from a single energy stream (e.g., reciprocating engines, microturbines)               | ▪ Offers potential energy savings (each year)  
▪ Thermal and electrical load well balanced to make economics favorable, with a technology proven in WWTPs |
| **Fuel Cell** | ▪ Consists of an anode, a cathode and an electrolyte that allows charges to move between the two sides of the fuel cell  
▪ Rapidly-evolving technology that produces electricity from natural gas with no moving parts | ▪ Greater capital cost than CHP (e.g., batteries)  
▪ Ideal for situations with a low thermal load |
| **Solar PV** | ▪ Generates power using a photovoltaic (PV) solar panel that can be fed into an electrical grid or local, off-grid electrical network  
▪ Allows the use of ordinary AC-powered equipment  
▪ Can only provide power during night/storm if coupled with storage (batteries) | ▪ Greater capital cost than CHP (e.g., batteries)  
▪ Near-zero ongoing operating costs |
| **Retrofit** | ▪ Addition of islanding and blackstart capabilities (e.g., ability to operate independently of the grid) to existing on-site generation system | ▪ No current resilient-sized system |
| **Microgrid** | ▪ Network combining two or more facilities that share on-site electricity production (and possibly heating), with islanding and blackstart capabilities | ▪ No nearby facilities to link to microgrid |
The ERB can cover a range of costs for both new and retrofit systems

<table>
<thead>
<tr>
<th>Eligible costs</th>
<th>Resilient retrofits</th>
<th>Non-eligible costs</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>New resilient systems</strong></td>
<td><strong>Resilient retrofits</strong></td>
<td><strong>Backup Generators</strong></td>
</tr>
<tr>
<td>▪ Core equipment</td>
<td>▪ Additional core equipment (e.g., battery storage for existing solar system, biogas storage equipment)</td>
<td>▪ Emergency backup generators</td>
</tr>
<tr>
<td>▪ Piping &amp; wiring</td>
<td>▪ Islanding equipment</td>
<td>▪ Onsite fossil fuel storage for emergency generators</td>
</tr>
<tr>
<td>▪ Islanding equipment</td>
<td>▪ Interconnection</td>
<td>▪ Transfer switches to support backup emergency generators</td>
</tr>
<tr>
<td>▪ Interconnection</td>
<td>▪ Installation</td>
<td></td>
</tr>
<tr>
<td>▪ Fuel pre-treatment (e.g., biogas treatment, or gas compression)</td>
<td>▪ Engineering and project management</td>
<td></td>
</tr>
<tr>
<td>▪ Installation</td>
<td>▪ Hardening of resilient energy system (e.g., elevation)</td>
<td></td>
</tr>
<tr>
<td>▪ Site work</td>
<td></td>
<td><strong>Other non-energy hardening</strong></td>
</tr>
<tr>
<td>▪ Engineering and project management</td>
<td></td>
<td>▪ Flood walls</td>
</tr>
<tr>
<td>▪ Hardening of resilient energy system (e.g., elevation)</td>
<td></td>
<td>▪ Elevation</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Other</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>▪ Used, refurbished equipment</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▪ Solar PV panels</td>
</tr>
</tbody>
</table>

Other
Contents

1 Introduction to the ERB
2 Potential resilience solutions
3 Financing support for resilience
4 Eligibility
5 Questions and next steps
This investment has not only economic benefits but also resiliency benefits.

**Economically Positive Investment**
- Energy Savings
- ERB Incentives
- Incremental Cost of Islanding
- Sizing for Resiliency

**Resiliency benefits**
- Public Safety
- Avoided Revenue Loss
- Shelter for Emergency
- Environmental Benefits

Economically healthy and resilient facility with functionality during a storm or disaster.
**Illustrative Pro Forma CHP Economics**

### Our assumptions

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engine / system size (kW)</td>
<td>250</td>
</tr>
<tr>
<td>Average electric load (kW)</td>
<td>350</td>
</tr>
<tr>
<td>Our best understanding of your critical load (kW)</td>
<td>250</td>
</tr>
<tr>
<td>Estimated capex for system ($/kw)</td>
<td>$9,000</td>
</tr>
<tr>
<td>Estimated islanding costs ($/kwh)</td>
<td>$615</td>
</tr>
<tr>
<td>Operating and maintenance ($); yearly cost for 15 years</td>
<td>$40K</td>
</tr>
</tbody>
</table>

### Summary of Project Costs

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Generation cost ($)</td>
<td>$2.3M</td>
</tr>
<tr>
<td>Islanding cost ($)</td>
<td>$0.2M</td>
</tr>
<tr>
<td>Total system cost</td>
<td>$2.5M</td>
</tr>
</tbody>
</table>

### Summary of Project Benefits

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical savings</td>
<td>$240K</td>
</tr>
<tr>
<td>Additional resiliency benefits (e.g., public safety, environmental, emergency shelter)</td>
<td></td>
</tr>
</tbody>
</table>
The ERB will be providing financing for unmet need

Calculation of duplication of benefits worksheet

<table>
<thead>
<tr>
<th>Sources</th>
<th>Uses</th>
<th>Unmet Need ($M)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insurance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FEMA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SBC Funding</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other State Funding</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other Federal Funding</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Total                           |      |                 |

- 100% provided by ERB
  - 40% incentive
  - 60% loan
The ERB could support you with comprehensive financing for your resilience project

<table>
<thead>
<tr>
<th>Overview of Proposed Total ERB Funding:</th>
</tr>
</thead>
<tbody>
<tr>
<td>100% unmet funding</td>
</tr>
<tr>
<td>Incentive:</td>
</tr>
<tr>
<td>40% of unmet funding need:</td>
</tr>
<tr>
<td>• Grant: 20% of unmet funding need provided as a grant</td>
</tr>
<tr>
<td>• Loan Forgiveness: 20% of unmet funding need may be available as a loan that may be forgiven based on performance-based standards</td>
</tr>
<tr>
<td>Loan: 60% of unmet funding need</td>
</tr>
<tr>
<td>Terms</td>
</tr>
<tr>
<td>• Interest rate:</td>
</tr>
<tr>
<td>- 2%, fixed interest rate for bond rating of BBB- or higher at the time of approval</td>
</tr>
<tr>
<td>- 3% fixed interest rate for applicants with bond rating lower than BBB- or which are not rated at time of approval</td>
</tr>
<tr>
<td>• Collateral: No collateral required</td>
</tr>
<tr>
<td>• Term: Up to 20-year term, based on useful life of majority of assets</td>
</tr>
<tr>
<td>• Principal Moratorium: Up to 2 years’ principal moratorium</td>
</tr>
</tbody>
</table>
Projects that do not qualify for ERB funding may be eligible for other programs offered by the state, or could seek private funding

<table>
<thead>
<tr>
<th><strong>NJ Energy Resilience Bank</strong></th>
<th><strong>NJ Economic Development Authority</strong></th>
<th><strong>NJ Clean Energy Program</strong></th>
<th><strong>NJ Environmental Infrastructure Trust</strong></th>
<th><strong>NJ Healthcare Facilities Financing Authority</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Mission</td>
<td>Increase resiliency of critical facilities to extreme events</td>
<td>Finance small and mid-sized businesses, administer tax incentives, redevelopment initiative</td>
<td>Promote energy efficiency and use of clean energy</td>
<td>Provide financing for environmental infrastructure projects to protect water sources and safety</td>
</tr>
<tr>
<td>Target sectors</td>
<td>Critical facilities e.g. hospital, WWTP, education</td>
<td>NJ-based businesses and communities</td>
<td>NJ residents, businesses and local governments</td>
<td>Drinking water, wastewater, equipment purchase, storm water, landfill etc.</td>
</tr>
<tr>
<td>Products offered</td>
<td>Partial grants, loan forgiveness and discounted loan</td>
<td>Low interest lending, training, mentoring</td>
<td>Partial rebates for installation of energy efficient equipment¹</td>
<td>Loans with some principal forgiveness</td>
</tr>
<tr>
<td>Eligibility requirements</td>
<td>Public facilities, Damage from specific storms, Other</td>
<td>Size of business, Number of employees, Business location, Other</td>
<td>Varies – based on location, building type, fuel source</td>
<td>Various – projects must fall in list of eligible sectors</td>
</tr>
<tr>
<td>Funds disbursed to date</td>
<td>$200M available</td>
<td>~$23B in assistance; ~$52B in public/private investment</td>
<td>TBD</td>
<td>&gt;$4.3B to local and county government and some private facilities</td>
</tr>
</tbody>
</table>

¹ CHP program includes up to a 30% rebate subject to a cap on dollars per kW basis
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Eligibility Criteria

Eligibility Overview

- Eligible ERB Applicants
  - Public facilities – municipal and county authorities
  - Non-profits
  - For-profit businesses that meet the SBA definition of “small business”

All other entities, and all privately owned utilities, are currently ineligible

BPU/NJEDA are working with HUD toward regulatory flexibility for the ERB that would expand the list of eligible entities
To be eligible for funding under the Energy Resilience Bank, according to the Robert T. Stafford Disaster Relief and Emergency Assistance Act (P.L. 93-288), as amended by the Disaster Relief Act of 1974 (P.L. 93-288), projects must:

- Demonstrate a tie Superstorm Sandy or
- Have incurred physical damage from one of the six additional nationally-declared disasters dating from December 2010
HUD Requirements

- Direct impact by Sandy or other qualifying disaster
  - Physical damage to facility caused by the eligible disaster
- Indirect impact by Sandy - must demonstrate that the project is supporting revitalization of the community in which it is located and one of the following
  - Area flooding and/or loss of power that prevented facility from treating waste water, causing a release of sewage/storm water into the surrounding waterway
  - Area flooding and/or loss of power from a qualifying disaster prevented the facility from operating and being able to treat drinking water
- With limited exceptions, per federal regulation, CDBG-DR funding may not be used within a Coastal Barrier Resource Area (CBRA)
- Project equipment must be installed at a facility and be operational within two years of the closing of the ERB grant and loan
The ERB evaluates all projects on the following criteria:

- Tech. Efficiency / Economic Cost Effectiveness
- LMI National Objective
- Most Impacted Communities
- Readiness to Proceed
- Criticality
- Microgrid
- Facility Energy Efficiency

Additional detail on these criteria available
Application Overview

- Outreach / engagement
- Intake application
- Full application
- Technical review
- Financial / Federal requirement review
- Board consideration
- Closing
- Construction and monitoring

External approvals (e.g., NEPA, air and water, public bids and other DEP review)

Some steps in the application process will take place concurrently.
Contents

1 Introduction to the ERB
2 Potential resilience solutions
3 Financing support for resilience
4 Eligibility
5 Questions and next steps
How the ERB team can help you

- Provide technical support on feasibility and possible options
- Assist with financial analysis
- Connect you to other sources of funding
- Support you in enhancing the community and improving energy resilience
- Help you communicate with your stakeholders to explain the benefits of energy resilience
- Provide you with a single point of contact at ERB

Any questions or concerns?
# ERB Contacts

<table>
<thead>
<tr>
<th>Name</th>
<th>Address</th>
<th>Email</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mitch Carpen</td>
<td>36 West State Street, Trenton NJ</td>
<td><a href="mailto:mcarpen@njeda.com">mcarpen@njeda.com</a></td>
</tr>
<tr>
<td>Thomas Walker</td>
<td>44 South Clinton Avenue, Trenton NJ</td>
<td><a href="mailto:Thomas.Walker@bpu.state.nj.us">Thomas.Walker@bpu.state.nj.us</a></td>
</tr>
</tbody>
</table>

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