

The Electricity Innovation Lab

e-Lab Webinar: Microgrid Lessons-Learned from Three Years of e-Lab Accelerator

October 20, 2016



Collaborate • Innovate • Accelerate

For more information: www.rmi.org/eLab

Or contact: elab@rmi.org

What is e-Lab?

e-Lab brings together decades of experience and expertise in electricity sector technology, policy, and business with leading-edge strategies to shepherd complex systems through change. Inspired by the best thinking on the today's dynamism and disruption, e-Lab addresses these guiding questions:

- ① How can we understand and effectively communicate the costs and benefits of distributed resources as part of the electricity system?
- ② How can we harmonize regulatory frameworks, pricing structures, and business models of utilities and distributed resource developers for greatest benefit to customers and society as a whole?
- ③ How can we accelerate the pace of economic distributed resource adoption?



What is e-Lab Accelerator?

“e-Lab Accelerator is an invitation-only, four-day working meeting to accelerate high-impact projects from teams working on innovative projects at the electricity system’s distribution edge.”



- **A structured working session** to make progress on their project or initiative
- **A rich learning experience** featuring experts on the latest thinking around new utility business models and distributed resources in the U.S. electricity sector
- **Tools and training** to conceptualize problems in collaborative and innovative ways
- **New alliances** to form a broader support network with other teams working on similar projects
- **A unique environment** conducive to creativity and breakthrough ideas

Overview of Today's Webinar

This webinar will explore the critical questions, challenges, and lessons learned from five leading edge microgrid projects from across the U.S., through the observations of Accelerator project facilitators.

- ① Overview of each project from RMI facilitator
- ② Moderated Q&A

Confidentiality Note: While our facilitators can make comments regarding the observations of teams and team discussions, there is certain information we may not be able to provide to protect the confidentiality of individual attribution. We will try our best to answer and explore the questions we receive, to the highest level of detail and specificity possible.



Introduction of Today's Speakers



Rachel Gold
Senior Associate, RMI



Roy Torbert
Principal, RMI



Jason Meyer
Manager, RMI



Leia Guccione
Principal, RMI



Koben Calhoun
Manager, RMI



Overview of Accelerator Microgrid Projects



www.rmi.org/elab *accelerator resources*

Rhode Island Microgrid Program Development

This team, representing the State of Rhode Island and key state stakeholders, aimed to develop the nation's leading statewide microgrid program. In response to threats to the coastal state from extreme weather events and other emergencies, the primary objective of the program is to provide energy surety and resilience for critical facilities and communities.

Through Accelerator, the team sought to:

- ① Clarify the needs, parameters, and potential roles for key stakeholders, especially the state and major utility
- ② Come to a shared understanding about possible state program design options
- ③ Learn from each other and from the participants and faculty of Accelerator



TEAM NAME:

Microgrid Program Planning

RHODE ISLAND

[LEARN MORE ABOUT THE TEAM](#)

Rhode Island Microgrid Program Development

Key questions the team came with:

- How can we surface key lessons learned from other states and apply them to Rhode Island?
- How can we value resilience, and how can resilience be 'stacked' with other possible value streams?
- How might we incent the utility to align with state goals for microgrid development?
- What policy designs fairly allocate cost and value to pertinent entities?
- How might we determine roles and responsibilities for specific entities?

Facilitation process for Accelerator:

- Develop Shared Understanding
 - Modeling the current system
 - Identifying key questions and existing insights
- Collaborative Process Design
 - Defining failure and success
 - Iteration of "strawman" program design
- Identifying Points of Leverage
- Technical Insight
 - Possible roles throughout microgrid lifecycle
 - Defining resilience
 - Understanding utility "requirements" and "unknowns" based on NY, MA microgrid experience

Rhode Island Microgrid Program Development

Key takeaways, breakthroughs:

- Diversity of opinions within entities can create collaboration opportunities
- Value of partnerships with emergency management agencies
- Value of 'diverging' away from the answer in order to arrive at a common understanding of stakeholder needs
- Importance of aligning existing funding streams, incentives, rates, and enabling mechanisms for microgrids

Where are they now?

- State working on microgrid program design
- In the process of identifying demonstration projects, like like one low-medium income multifamily housing facility and one healthcare facility in Sandy-impacted counties
- Aligning program design with critical infrastructure targeting at state emergency management agency
- Shift in utility towards consideration of microgrids in utility rate design and non-wires alternatives proceedings

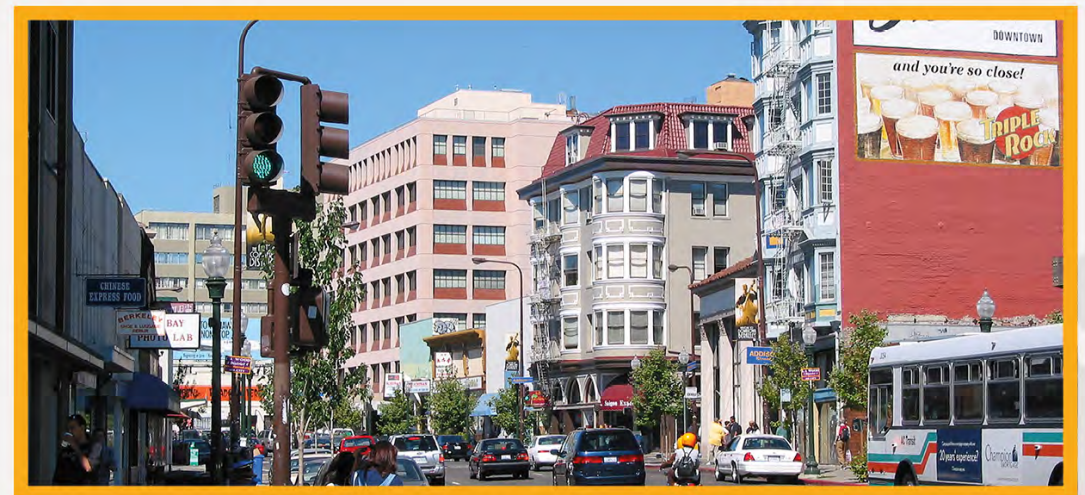


Berkeley Microgrid Resiliency Project

Stakeholders from the City of Berkeley, their utility (PG&E), technical advisor AECOM, and regulatory expert the Center for Sustainable Energy (CSE), convened to advance the Center Street Garage Microgrid Project. As part of the Resilient Berkeley Initiative, the microgrid will use renewable energy and storage to support critical services at nearby city facilities. As the project expands to nearby non-City customers, the model will serve as a pilot for other California microgrids.

Through Accelerator, the team sought to:

- ① Analyze the regulatory, technical, operational, and economic feasibility of microgrid design and connecting the microgrid to other nearby facilities to manage load in the event of a grid disruption
- ② Establish critical partnerships and solicit support



TEAM NAME:

Berkeley Microgrid Resiliency Project
BERKELEY, CA

[LEARN MORE ABOUT THE TEAM](#)

Berkeley Microgrid Resiliency Project

Key questions the team came with:

- What are the main purposes of the microgrid (the 'what' and the 'why')?
- How can partnerships with the utility to advance the City's objectives?
- What are the pathways to solve regulatory issues and unlock the full value of the microgrid?



Facilitation process for Accelerator:

- Build a Common Understanding
 - Modeling the current system
 - Take an open mindset to generate ideas
- Coalesce a Problem Statement
 - Examine the 'why' across different perspectives
- Defining Technical Criteria
 - Duration of outages and loads to be served
 - Determining storage requirement and cost estimates
- Rapid Cycle Prototyping
 - Reach consensus on design
- Barrier Identification
 - Institutional
 - Technical Feasibility
 - Cost

Berkeley Microgrid Resiliency Project

Key takeaways, breakthroughs:

- Parties are more aligned and have common ground to work within (City & PG&E)
- Collaboration with the utility may get around some regulatory barriers.
- CPUC involvement may not be needed
- New ownership models could allow for disaggregation of the energy and resiliency components of the microgrid

Where are they now?

- Secured California Energy Commission (CEC) grant
- Established Steering Committee and Technical Committee
- Continued discussions with PG&E
- Performing preliminary designs to inform the construction of the Center Street Garage



Air Force Energy Assurance

The Air Force's vision for installation energy projects is Mission Assurance through Energy Assurance. The Air Force requires resilient, cleaner, cost-effective energy for its core missions. Joint Base McGuire Dix Lakehurst (JB MDL) is pursuing an installation energy assurance planning initiative in response to this vision, as well as its experience as an integral component to Superstorm Sandy recovery efforts.

Through Accelerator, the team sought to:

- ① Clarify next steps for implementing a scalable, flexible, repeatable process for implementing energy assurance projects across the Air Force
- ② Clarify the resilient energy systems vision for JB MDL
- ③ Learn from each other and from the participants and faculty of Accelerator



TEAM NAME:

Air Force Energy Assurance

JOINT BASE MCGUIRE-DIX-LAKEHURST, NJ

LEARN MORE ABOUT THE TEAM

Air Force Energy Assurance

Key questions the team came with:

- How do we align site-specific resilience needs, opportunities, and characteristics with an enterprise approach to resilience?
- How do we value resilience?
- How do we engage our utility in our process and solution?
- What are our individual objectives driving interest in resilience?
- What are our individual understandings of resilience and resilient energy systems?

Facilitation process for Accelerator:

- Develop Shared Understanding
 - Systems Approach
 - Needs and Wants
- Collaborative Process Design
- Stakeholder Engagement
 - Analysis
 - Strategy
- Technical Insight
 - Microgrid Value Streams
 - Working with Utilities
 - Audience and Value Proposition



Air Force Energy Assurance

Key takeaways, breakthroughs:

- Value driven project optimization, instead of “value if” resilience
- The level of monitoring and system analysis needed to develop and implement a microgrid system can lead to significant other value streams
- Strategic and intentional stakeholder engagement is critical, especially for microgrid projects
- Can ask tough questions when given the space to take on risk

Where are they now?

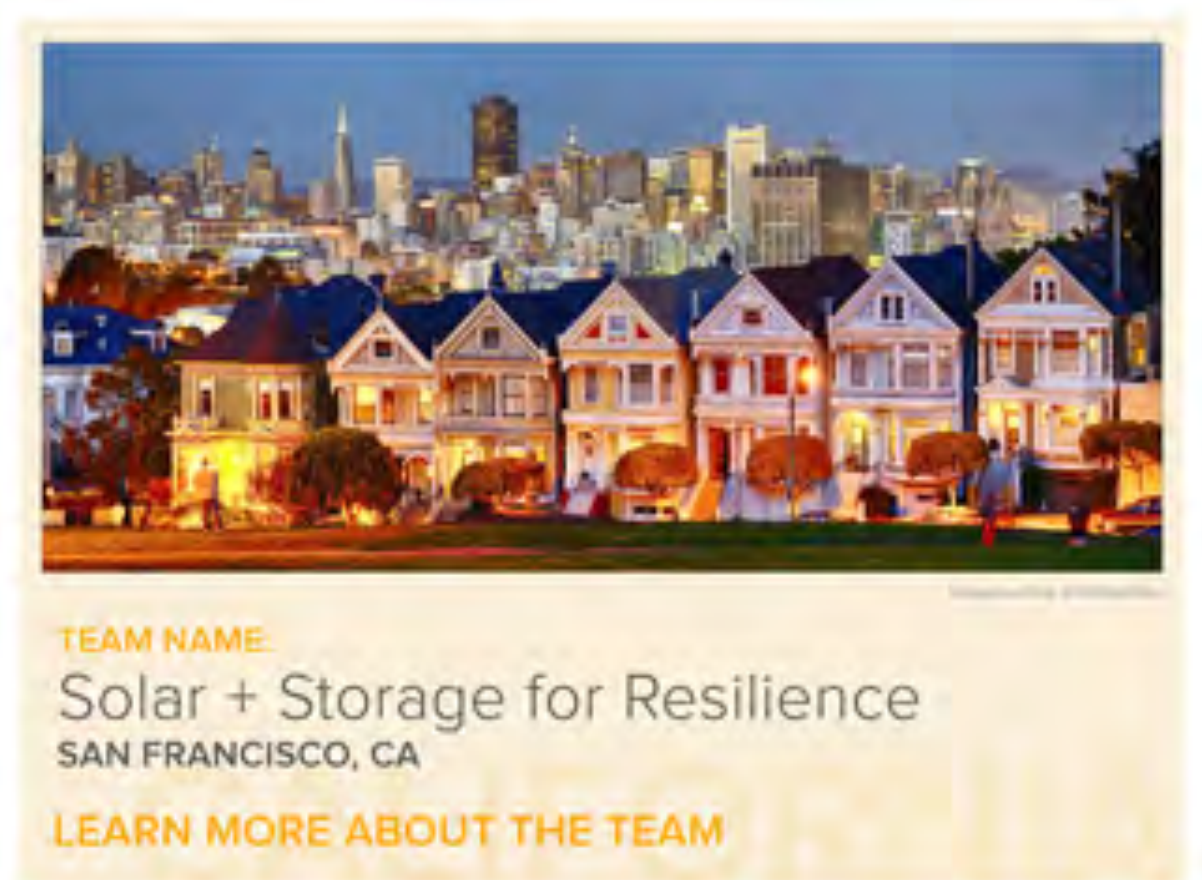
- At Accelerator, the Air Force team clarified their objective to develop a process that facilitates the creation of resilient, cost-effective, cleaner energy projects
 - The process will be based on the experience of JB MDL implementation
- JB MDL is finishing Phase I (baseline review) of their project and looking towards Phase II (design)
 - Stakeholder engagement and applying innovative value perspectives are key next steps

San Francisco Solar + Storage for Resilience

The vision for the San Francisco Solar+Storage for Resiliency project is to expand the solar market by serving as a national model for integrating solar and energy storage into an existing Emergency Response Plan. The team is working to create a road map of solar+storage deployment for resilience and will engage regional, state, and national networks to disseminate the plan and resources throughout the country.

Through Accelerator, the team sought to:

- ① Define a process for identifying technical solutions for solar + storage resilient systems to be implemented at critical facilities in San Francisco
- ② Learn from parallel approaches and expertise from other teams and the faculty at eLab Accelerator



San Francisco Solar + Storage for Resilience

Key questions the team came with:

- How to design a process to assess technical feasibility of solar + storage across multiple critical facilities?
- What are the critical technical, economic, and regulatory barriers? And how can we address them?
- What is the business case for the solar + storage systems? How can we value the delivery of resilient power, both during and outside emergency events?
- How can we disseminate the process, lessons learned, and key takeaways to other communities?

Facilitation process for Accelerator:

- Modeled the current reality in San Francisco and their energy system
- Defined a use case for scenario planning and a technical design process
- Iterated on the use case to test technical design parameters
- Evaluated technical, economic, and regulatory barriers across multiple technical design
- Defined critical questions and areas of research for detailed analysis and follow-on work

San Francisco Solar + Storage for Resilience

Key takeaways, breakthroughs:

- Asset and infrastructure ownership is critical in defining potential business models and the technical design.
- Value allocation, including accounting for varying allocation of costs and benefits, is critical when addressing microgrids and a topic such as resilience.
- Successfully implementing resilient critical facilities will require addressing ownership challenges and potential integration of systems across multiple sites.

Where are they now?

- Identified critical facilities through a public multi-stakeholder process.
- Completed development of the first set of key resources:
 - Interactive Map
 - Guidance on Critical Load Assessment
 - Solar+Storage Sizing tool
- Developing 12 case studies that model technical system design and outline the business case for deployment.



Hoboken Microgrid Development

The Hoboken Microgrid team came to develop and recommend pilot project design, financing, and ownership models for the City of Hoboken and the State of New Jersey to deploy microgrid solutions for critical facilities in Hoboken and beyond.

Through Accelerator, the team sought to explore the following:

- ① Likely barriers for microgrid deployment in Hoboken, and the State of New Jersey more broadly
- ② Possible roles for the utility and other stakeholders in project development
- ③ Financing and ownership options for a future microgrid
- ④ Legal and regulatory challenges the project team would need to address in development of the microgrid



Hoboken Microgrid Development

Key questions the team identified:

- What is, and could be the role of the utility [in the microgrid]?
- Can we connect multiple city owned buildings across city owned streets under current regulatory law [in New Jersey]?
- What is the value combination that actually gets the microgrid built?

Facilitation process for Accelerator:

- Build a shared perspective of the current opportunity
- Unpack assumptions around the current reality
- Identify leverage points in the system
- Develop new solutions
- Test, refine, and add detail to solutions
- Develop a plan for action



Hoboken Microgrid Development

Key takeaways, breakthroughs:

- Redundant infrastructure can and should be part of the microgrid design
- Regulations allow for the provision of emergency power between customers during a major grid outage
- Possible roles for the utility and 3rd party project developers
- Leveraging the distributed generation assets to participate in regional power markets (PJM) can improve project economics
- Start with publicly owned critical facilities that require infrastructure upgrades in the near future

Where are they now?

- The City and PSE&G are working to revise their MOU to continue their partnership
- The NJ BPU produced a white paper outlining how they see the opportunities for microgrids in New Jersey informed by the work of the team
- The City is in the process of laying new underground conduit which will support the microgrid distribution system
- The NJ BPU has announced the next phase of funding for microgrid projects
- The City is working with PSE&G to move into detailed design and engineering



Panel Discussion: Value of Resilience



Panel Discussion: Project Stakeholders



Panel Discussion: Facilitation Process



Panel Discussion: Additional Questions

Thank You!

Accelerator 2017 is now open for applications at www.rmi.org/elab_accelerator

Please contact Courtney Fairbrother for any questions at cfairbrother@rmi.org



2017 Project Themes

- **New Business Models:** Projects explore new utility business models, market structures, and regulatory efforts focused on optimizing the value of distributed energy resources (DERs) for all stakeholders
- **DER Value Creation:** Projects tackle new rate designs, compensation mechanisms, deployment strategies, and customer engagement programs focused on creating value streams for DERs
- **Microgrids & More:** Projects demonstrate or pilot innovative local DER solutions such as microgrids, downtown clean energy zones, net-zero districts, climate action planning, and others