CHP for Resiliency Accelerator: Critical Infrastructure Planning and Resources Tools

ICF, Entropy Research LLC, Exergy Partners
FY 2016-2019

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Overview

Project Title: The Combined Heat and Power (CHP) for Resiliency Accelerator

Timeline:

Project Start Date: 05/09/2016

Budget Period End Date: 09/01/2019

Project End Date: 12/31/2018

Project Team and Roles:

Budget	DOE Share	Cost Share	Total	Cost Share %
Overall Budget	$500,000	$0	$500,000	0%
Approved Budget	$500,000	$0	$500,000	0%
Costs as of 3/31/19	$500,000	$0	$500,000	0%

Barriers and Challenges:

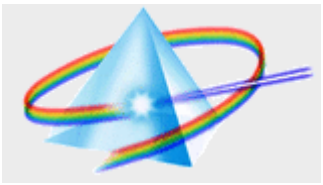
- Critical infrastructure facilities require enhanced energy resilience from storms and disaster events – improving the understanding of CHP helps planning efforts for increased resilience at state, local, and utility levels

Project Team and Roles:

- **ICF:** Program coordination, tool and report development, partner engagement and outreach
- **Entropy Research:** Technical guidance, oversight, and tool validation
- **Exergy Partners:** Technical guidance, oversight, and tool validation

AMO MYPP Connection:

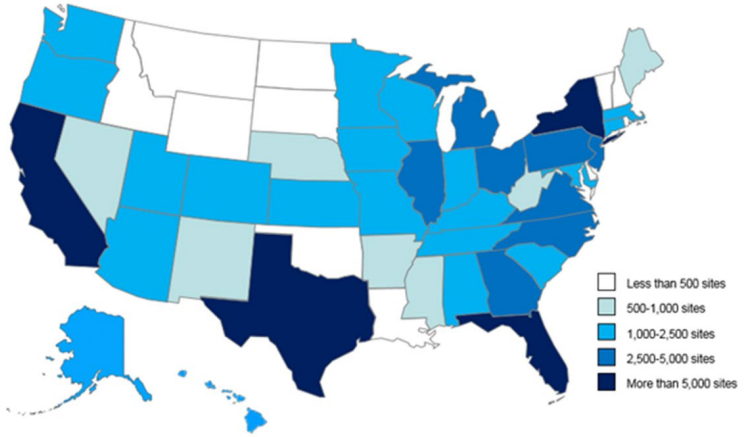
- MYPP Target 13.1 - Achieve a ten-fold cumulative increase in direct CHP technical support activities to potential commercial, institutional, and industrial end-users



Project Objectives

- **Problem Statement**:
  - Critical infrastructure facilities require enhanced energy resilience
  - Current deployment of CHP at critical infrastructure sites is limited due to lack of information and/or advanced technical & engineering challenges

CHP Potential at Critical Infrastructure Facilities



Source: U.S. DOE, Combined Heat and Power Technical Potential in the United States. 2016

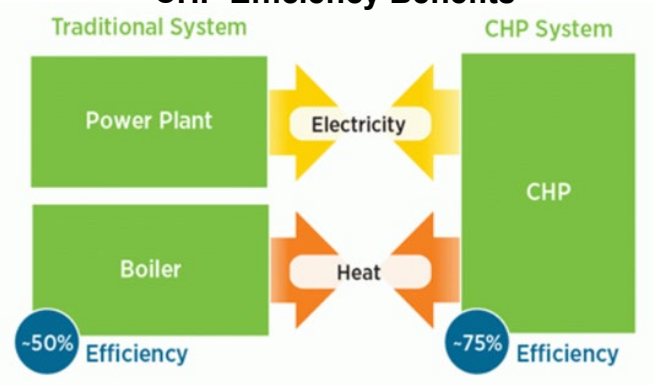
- **Project Objectives**:
  - Increase awareness of the benefits CHP can provide to critical facilities and the electric grid
  - Expand on new or existing planning efforts (states, municipalities, utilities) to include CHP as a solution in resilience plans
  - Document and share resilience plans that have successfully incorporated CHP
  - Create and publish a decision support tool and toolkit to assist potential decision makers in evaluating CHP and other DERs and part of their overall resilience planning efforts

- **Support for AMO Goals:**
  - CHP improves energy efficiency and resilience at critical facilities, allowing for increased economic competitiveness and enhanced safety for end-users
  - Increased collaboration among states, communities, utilities, CHP developers, and end-users to communicate resilience planning objectives and the incorporation of CHP
  - Provides online tools and decision support toolkits to aide in information dissemination and technical analysis

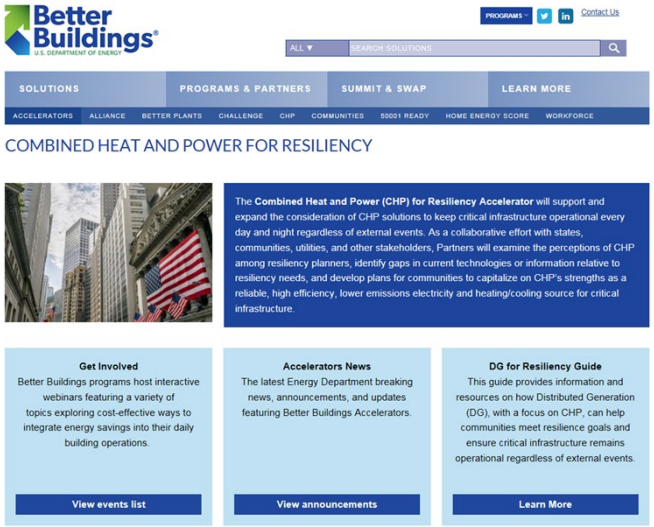
Technical Innovation

- **Current Practice:**
  - Resilience planning efforts often do not take into account the value that CHP can provide to end-users and the grid
  - Limited collaboration among decision makers, and no guide on how to incorporate CHP into planning efforts
- **Approach:**
  - Work with 24 partners to foster collaboration among states, communities, and utilities in order to identify barriers and solutions to incorporating CHP in resilience planning
  - Develop detailed, yet easy-to-use tools and toolkits to assist decision makers in evaluating CHP/DERs as an approach to improving resilience
- **Innovations:**
  - Identify resilience ranking criteria and screening framework for identifying candidate sites conducive to CHP
  - Provided framework and strategy for reviewing existing resilience strategies and policies, and developing new approaches and programs
- **Impact:**
  - Developed a wide variety of materials (tools, toolkits, issue briefs) to assist partners in resiliency decision making

CHP Efficiency Benefits



Resiliency Accelerator Website – Resources List



CHP for Resiliency Accelerator Partners

Cities/Counties

- City of Boston
- Hoboken, NJ
- Miami-Dade Water and Sewer Department
- New York City Mayor's Office of Recovery and Resiliency
- Pittsburgh, PA
- Montgomery County, MD

State Agencies

- Maryland Energy Administration
- Massachusetts Department of Energy Resources
- Missouri Department of Economic Development, Division of Energy
- New York State Energy Research and Development Authority (NYSERDA)
- Utah Governor's Office of Energy Development
- Pennsylvania Public Utility Commission

Utilities

- Bath Electric Gas and Water Systems
- National Grid
- Nicor Gas
- PSEG Long Island/Long Island Power Authority
- Spire
- Tennessee Valley Authority
- United Illuminating

Other

- Amity School District
- Edison Electric Institute
- Thermal Energy Corporation (TECO)
- Healthcare Without Harm
- International District Energy Association (IDEA)

Technical Approach

Gap Analysis

- Identified key informational gaps on how distributed generation (CHP, microgrids, solar+storage) can be included in resilience planning
- Documented good examples of resilience planning strategies

Partner Collaboration

- Worked with partners to implement resilience plans that include CHP
- Included partner input into tools and resources being developed for future use

Resource Development

- Developed four key resources, based on input from partners, that provide information on how to evaluate CHP for resilience
- Documented partner activities on resilience planning and incorporate of CHP/distributed generation, with a focus on lessons learned.

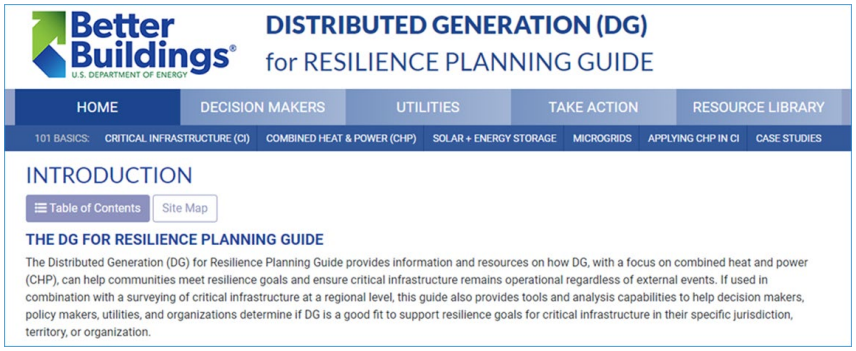
Results and Accomplishments

- Collaborated with 24 partners through 10 webinars and 2 in-person meetings over the two-year accelerator
- Developed Key Materials for Public Use:
  - **The DG for Resilience Planning Guide** – Web-based toolkit that provides information and resources on how distributed generation (focus on CHP) can help state, communities, and utilities meet resilience goals with CHP, and offers step-by-step strategies for policy and program planning
  - **The CHP for Resilience Screening Tool** – Web and excel-based tool to assist users in identifying key resilience priorities at end-user facilities, and provide an individual site screening assessment for CHP, incorporating the resilience priorities and site metrics
  - **Distributed Energy Resources (DER) Disaster Matrix Issue Brief** – Matrix and report detailing how different DERs are impacted by different types of natural disasters, and highlighted key resilient design considerations for all technology options and disaster scenarios
  - **Partner Profiles** – Coordinated with partners to complete 20 individual profiles detailing key accomplishments in resilience planning and incorporating CHP/DERs in planning efforts and at end-user sites

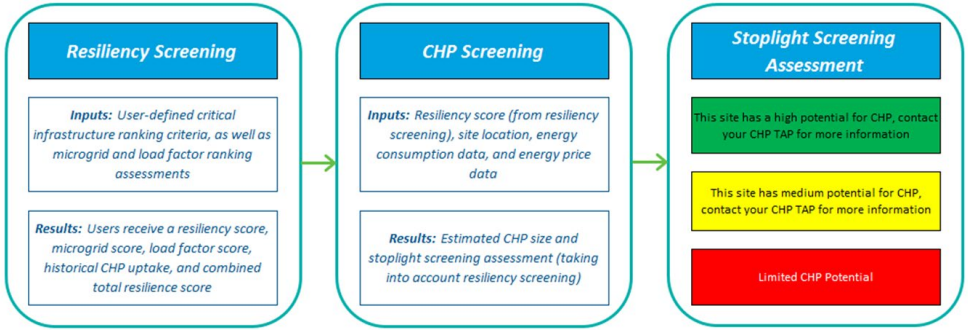
- *Accelerator Accomplishments Fact Sheet*
- *All Accelerator Resources*

Results and Accomplishments

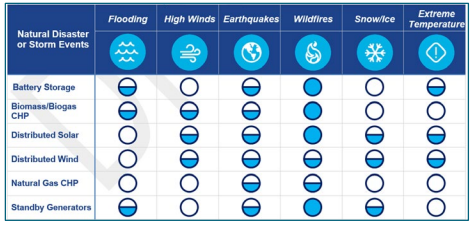
- **The DG for Resilience Planning Guide:**
  Created innovative frameworks and decision-making guides to assist users in identifying key resilience strategies and a portfolio of sites.
  - Provided framework for users to quickly assess a critical infrastructure portfolio for potential DG deployment, and/or;
  - Provided a framework for reviewing existing resiliency strategies and policies, and developing new programs

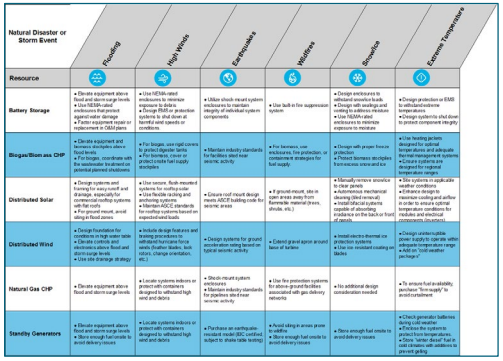


- **The CHP for Resilience Screening Tool:**
  Constructed a unique approach for ranking resilience factors at end-user sites, and incorporated rankings into CHP for resiliency screening



- **DER & Disaster Matrix Issue Brief:**
  Comprehensive review to examine the performance of DERs during and after disaster events
  - Provided stakeholders with a way to evaluate different technology options/combinations best able to meet resilience priorities, and;
  - Provide a framework for reviewing existing resiliency strategies and policies, and developing new programs





Transition

- All tools and resources are publicly available, with ongoing engagement and support from ICF and other partners
- Promotion and distribution of resources by DOE CHP TAPs for resilience planning and CHP in critical infrastructure assistance
- Interest from a wide variety of end-users: communities, critical manufacturing, military bases, etc.
- Outreach has included webinars, conferences, user manual, and training video for CHP Screening Tool