



U.S. DEPARTMENT OF  
**ENERGY**

Energy Efficiency &  
Renewable Energy

# Partnering with DOE on the Water-Energy Nexus

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**Resilient Utility  
Coalition**  
**Visioning Workshop**

**Miami, FL**  
**August 18, 2016**

# Overview

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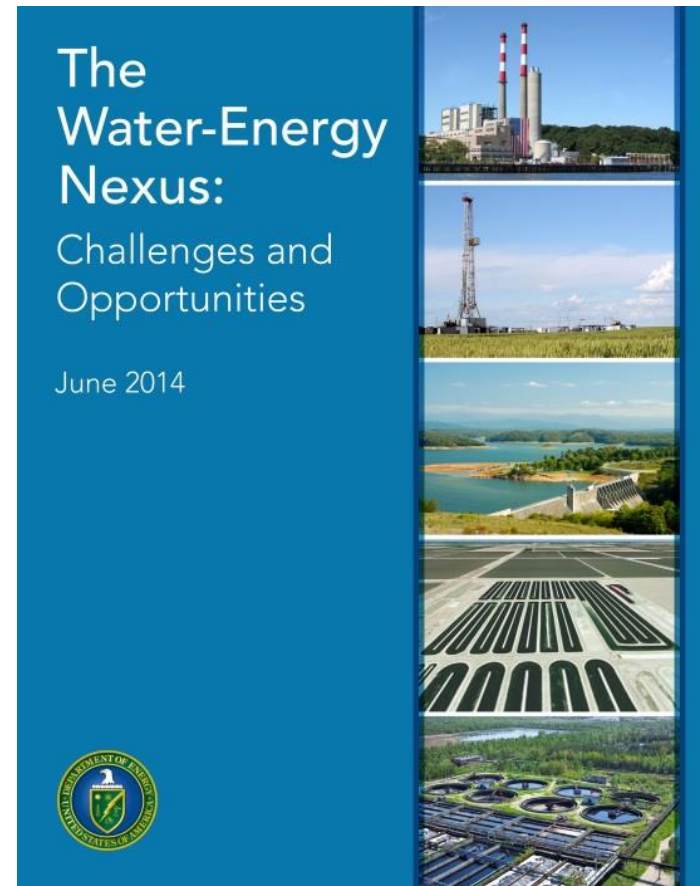
- **DOE and the Water-Energy Nexus**
- **DOE Programs**
  - **Better Plants**
  - **Superior Energy Performance**
- **Technical Assistance Offerings**
- **Better Buildings Accelerators**
  - **Wastewater Infrastructure**
  - **CHP for Resiliency**

# DOE and the Water-Energy Nexus

Search: DOE WETT

## The US Department of Energy

- Has expertise in technology, modeling, analysis, and data
- Undertakes work that has broad and deep implications
- Can approach the diffuse water area from the energy side



Download the full [Report](#)

# DOE's Six Strategic Pillars for the Water-Energy Nexus

1. Optimize the freshwater efficiency of energy production, electricity generation, and end use systems.
2. Optimize the energy efficiency of water management, treatment, distribution, and end use systems.
3. Enhance the reliability and resilience of energy and water systems.
4. Increase safe and productive use of nontraditional water sources.
5. Promote responsible energy operations with respect to water quality, ecosystem, and seismic impacts.
6. Exploit productive synergies among water and energy systems.

# Office of Energy Efficiency and Renewable Energy



## EERE Vision

A strong and prosperous America powered by clean, affordable, and secure energy

## EERE Mission

To create and sustain American leadership in the transition to a global clean energy economy

# EERE's Guiding Principles: Five Core Questions

## Impact

- Is this a high-impact problem?

## Additionality

- Will EERE funding make a large difference relative to existing funding from other sources, including the private sector?

## Openness

- Are we focusing on the broad problem we are trying to solve and open to new ideas, approaches, and performers?

## Enduring Economic Effect

- How will EERE funding result in enduring economic impact for the U.S.?

## Proper Role of Government

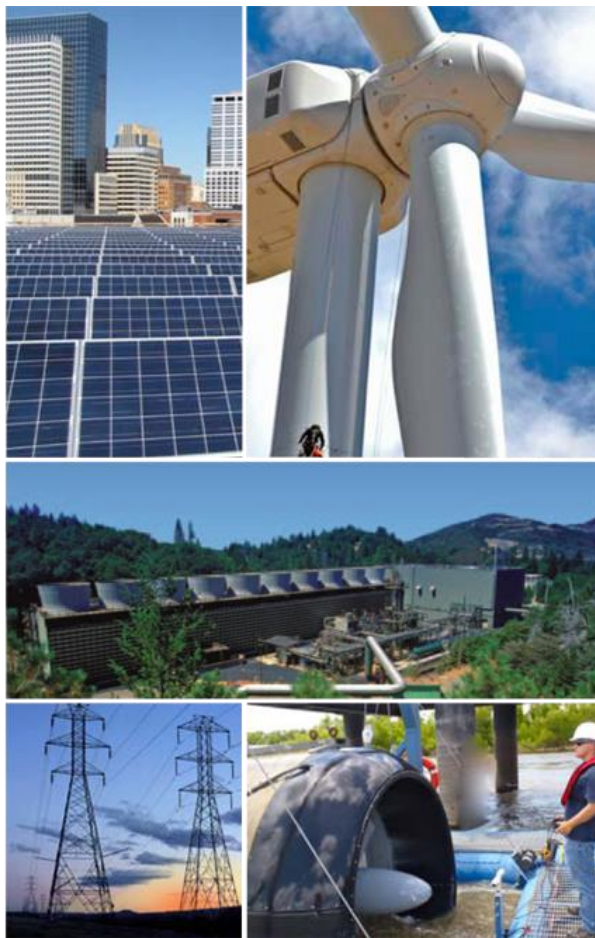
- Why is this investment a necessary, proper, and unique role of government?



# Sustainable TRANSPORTATION



# Renewable ELECTRICITY GENERATION



# Energy Saving HOMES, BUILDINGS, & MANUFACTURING



# Energy Saving

## HOMES, BUILDINGS, & MANUFACTURING

EERE leads a robust network of researchers and other partners to continually develop innovative, cost-effective, energy-saving solutions, which helps make our country run better through increased efficiency – better plants, manufacturing processes, products, new homes, ways to improve older homes, and buildings in which to work, shop, and lead our everyday lives.

### Program Offices:



Building Technologies  
Office



Advanced Manufacturing  
Office



Weatherization &  
Intergovernmental  
Programs Office



Federal Energy  
Management Program

### Select Energy Efficiency Accomplishments:

- Standards enacted since 2009 are projected to avoid a cumulative total of 2.2 billion metric tons of carbon emissions by 2030
- More than 250 DOE partners through the Better Buildings Challenge on track to achieve average energy savings of 2.5% annually and saving 36 TBtus and \$300 million since the Better Buildings Challenge began
- LED cost reduction – 90% since 2008



**Sustainable**  
TRANSPORTATION



**Renewable**  
ELECTRICITY GENERATION



**Energy Saving**  
HOMES, BUILDINGS,  
& MANUFACTURING



## EERE Crosscutting Initiatives



Within our technology office budgets, EERE organizes and coordinates investments across our technology sectors around common themes to achieve maximum impact for the U.S. taxpayer.

# Better Plants – Water Utilities

- Industrial arm of the Better Buildings Initiative
- 19 utilities have joined, 6 in the Challenge
- Organizations set long-term efficiency goals
- Receive technical assistance and national recognition
- Quarterly webinars to share solutions

— [energy.gov/betterplants](http://energy.gov/betterplants)



# Better Plants – Partner Benefits

- Technical Assistance
- Peer Networking Opportunities
- National Recognition



DOE official poses with Volvo NRV employees

**DOE will assign an expert Technical Account Manager, who will help you navigate the program and tap into our energy-saving resources**

# Better Plants – In-Plant Training

- Teach participants steps and tools for implementing projects
- Are available for the entire supply chain
- Webinars available online



Process heating INPLT at an ArcelorMittal plant in Nov. 2013. Photo courtesy ArcelorMittal and ORNL.



# Superior Energy Performance (SEP)



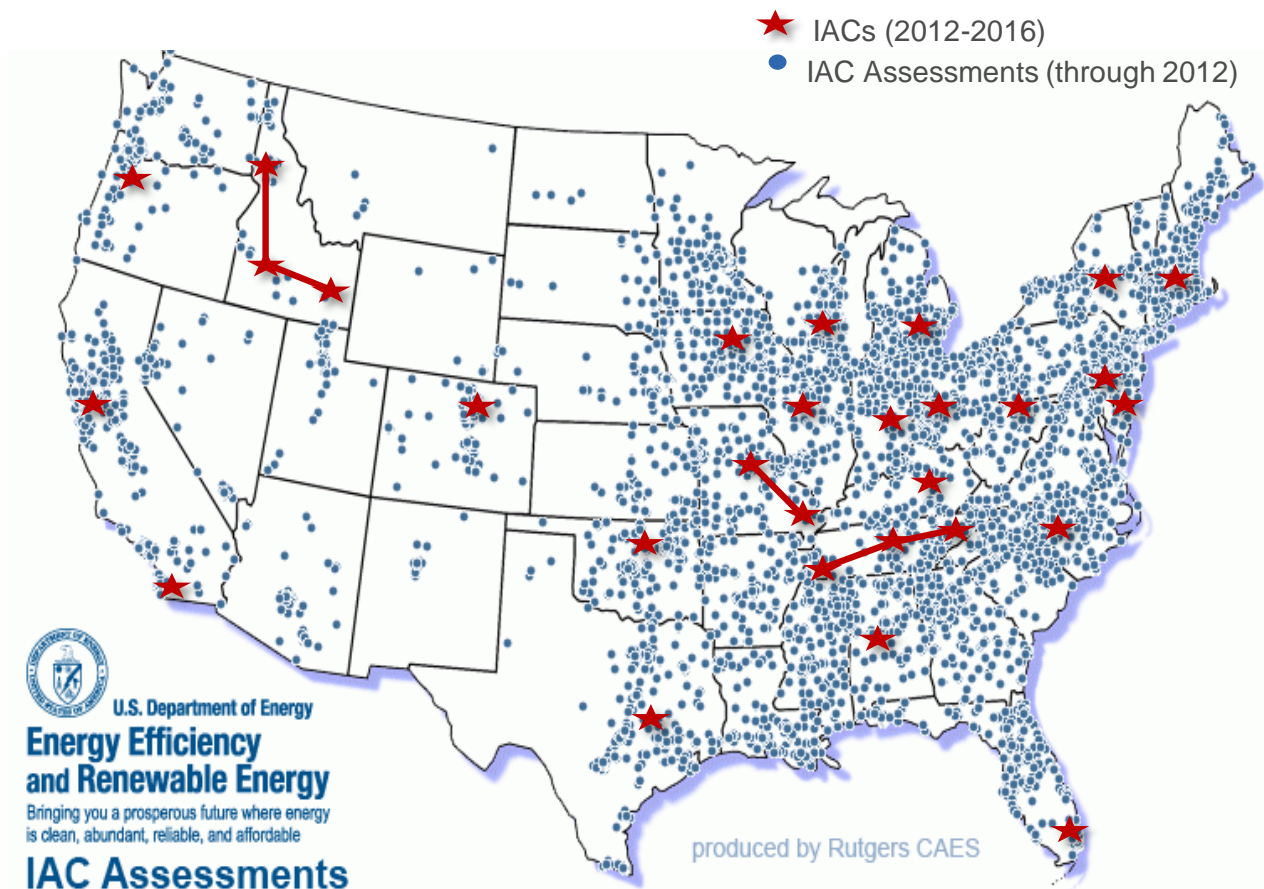
- Certification program
- ISO 50001 energy management standard
- Verifies energy savings achieved
- New water utility members:





# Industrial Assessment Centers (IACs)

- 24 centers based in universities around the country
- FREE assessments for small and mid-sized manufacturers, including water & wastewater plants



# CHP Deployment Program

Program activities include:

- Market analysis and tracking

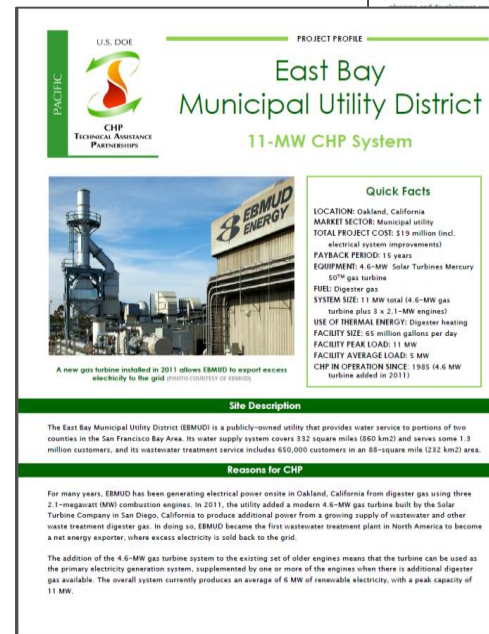
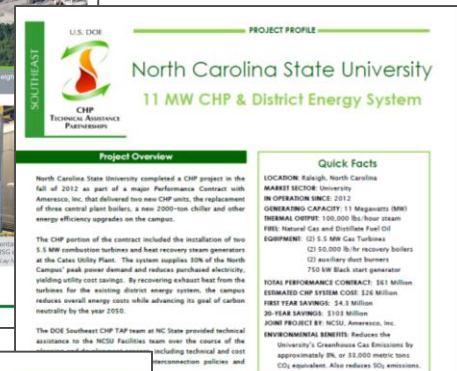
➤ CHP Market Study – Technical Potential

➤ DOE/ICF CHP Installation Searchable Database

- Fact sheets, reports, project profiles:

➤ Waste Heat to Power Market Assessment

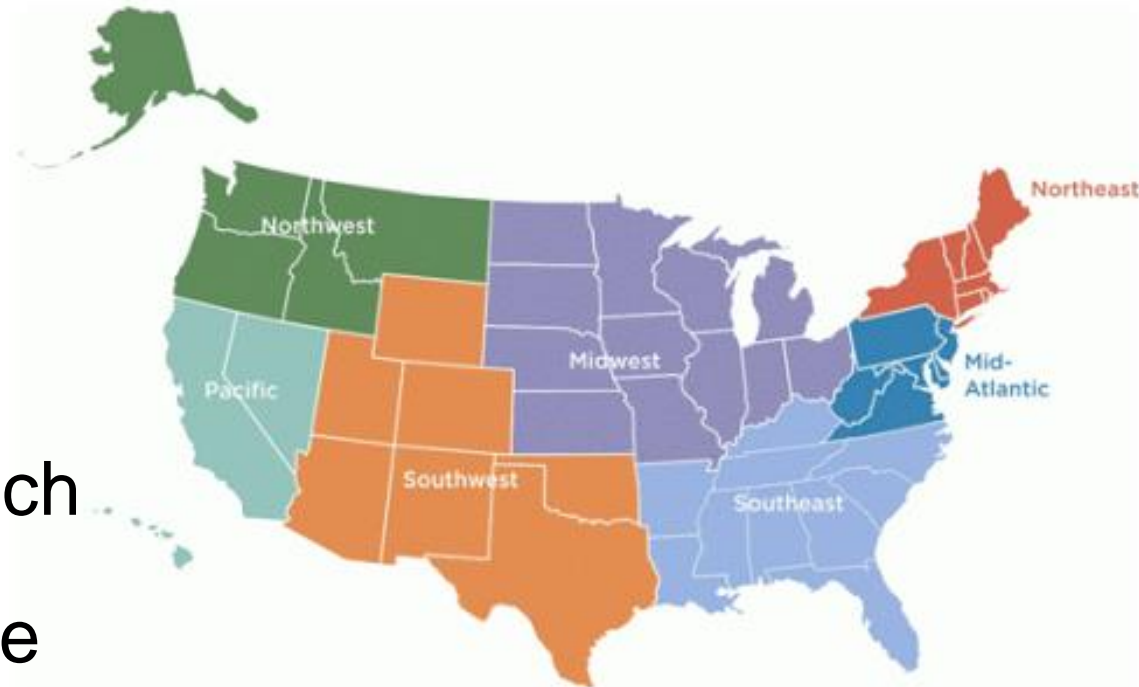
➤ CHP Project Profile Database



# CHP Technical Assistance Partnerships (TAPs)

CHP TAPs provide:

- Market Opportunity Analysis
- Education & Outreach
- Technical Assistance



**Free CHP screenings and  
engineering assistance**

[www.energy.gov/CHP](http://www.energy.gov/CHP)

**Water Resource  
Recovery Facilities  
are a Target Market**

# Combined Heat & Power for Resiliency Accelerator



## Fact Sheet

### Combined Heat and Power for Resiliency Accelerator

The Better Buildings Initiative is a national leadership initiative calling on state and local officials, corporate chief executive officers, university presidents, utilities, and other leaders to make commitments to improve the energy efficiency of their buildings and plants, save money, and increase competitiveness. The U.S. Department of Energy (DOE) is expanding this initiative to engage leaders in a set of Better Buildings Accelerators designed to demonstrate specific innovative approaches, which, upon successful demonstration, will accelerate investment in energy efficiency.

Natural and man-made disasters, like Superstorm Sandy or Hurricane Katrina, focus attention on securing critical infrastructure (CI) for national or regional security, economic continuity, and/or public health and safety. Virtually every community in the U.S. has facilities that fall within the definition of critical infrastructure, needing uninterrupted electricity and heating or cooling services. States and municipalities spend considerable time planning for and reinforcing their critical facilities and seeking resources to install the best economic solution; however, a key technology solution – combined heat and power – is often overlooked.

Combined heat and power (CHP) has proven effective in ensuring uninterrupted electric service through multiple major disasters in hospitals, schools, and places of refuge. CHP systems simultaneously generate electricity and produce thermal energy, maintaining needed power, hot water and space conditioning services on-site at high efficiency. And, unlike diesel back-up generators, CHP typically does not require over-land fuel deliveries. The U.S. Department of Energy is launching the Combined Heat and Power for Resiliency Accelerator to support and expand the consideration of CHP solutions by states, communities and utilities for their critical infrastructure needs. As a collaborative effort with states, communities, utilities, and other stakeholders, the Accelerator will examine the perceptions of CHP among resiliency planners, identify gaps in current technologies or information relative to resiliency needs, and develop plans for communities to capitalize on CHP's strengths as a reliable, high efficiency, lower emissions electricity and heating source for critical infrastructure.

More specifically, the Combined Heat and Power for Resiliency Accelerator partners will work to:

- ▶ Establish a dialogue on the current and/or planned usage of CHP in resiliency planning for critical infrastructure (CI), the value propositions for using CHP in CI, and any barriers for CHP in CI at the state, community, and utility levels.
- ▶ Expand existing or new resiliency plans to include CHP as a solution, including:
  - Identify any technical, policy or economic barriers impeding CHP installations in CI
  - Promote the merits of CHP and, in particular, CHP's value proposition in resiliency planning
  - Identify and assess the appropriateness of CHP for critical facilities in their jurisdiction
  - Establish solutions to overcome barriers and increase CHP usage in their community
- ▶ Share resiliency action plans that include CHP as a solution option with other communities.
- ▶ Document replicable models for using CHP as a resilience strategy based on the experience of Accelerator partners.
- ▶ Create a decision support tool for assessing and prioritizing the appropriateness of CHP for critical infrastructure facilities within a jurisdiction.
- ▶ Publish a toolkit to support communities in utilizing CHP as a resiliency solution in critical infrastructure.

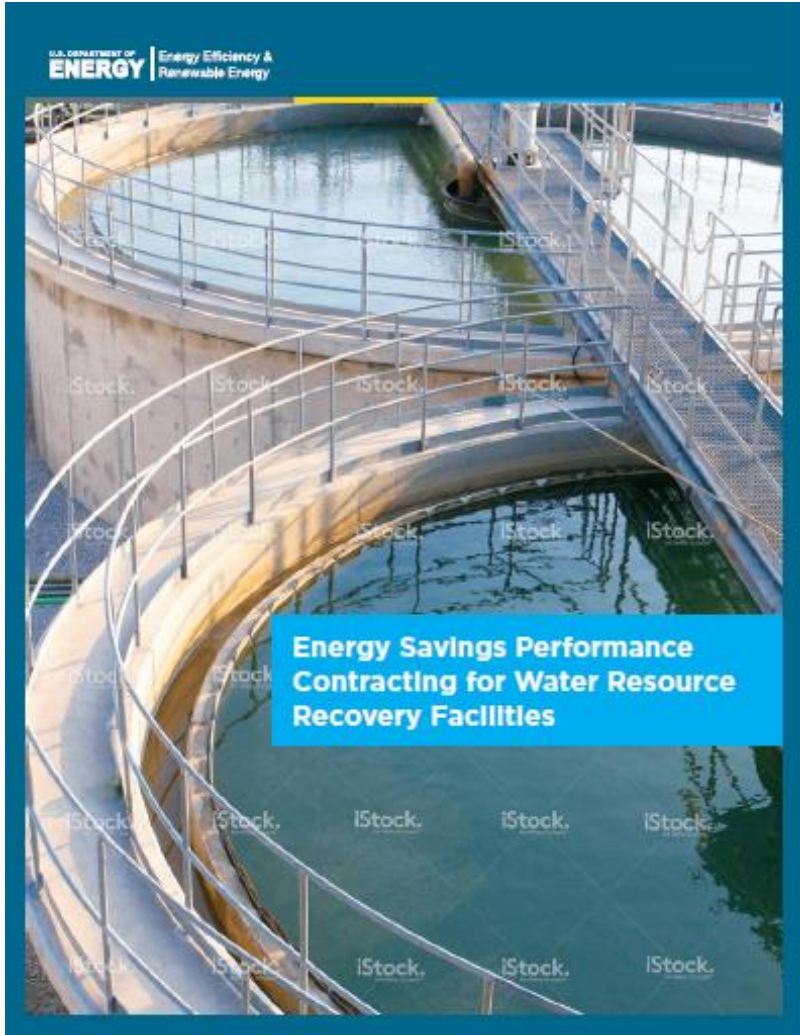
#### CHP & Resiliency in Critical Facilities

Critical infrastructure resiliency is the ability to maintain operations in hospitals, water and wastewater treatment facilities, 911-call/data centers, places of refuge, etc. during natural or man-made disasters. CHP is an efficient and clean approach to generating on-site electric power and useful thermal energy from a single fuel source. Therefore, independent of the resiliency value, CHP can efficiently generate clean, local energy, while

- Three-year commitment
- Purpose to support and expand the consideration of CHP solutions for critical public infrastructure needs
- Partners will create a CHP decision support tool, document models, and publish a community support toolkit
- Additional partners welcome!



# Wastewater Infrastructure Accelerator



- Three-year commitment
- Purpose to accelerate a pathway to a sustainable wastewater infrastructure
- Partners will establish an energy data management approach, assess technical & other measures, consider financing options, and draft model infrastructure improvement plans
- Additional partners welcome!



# Better Buildings Solution Center



- Features 400 solutions tested and proven by partners
- Find solutions by topic, building type, solution type, building size, sector, technology, location, and more.
- Access showcase projects, including for water resource recovery facilities

<http://betterbuildingsolutioncenter.energy.gov/better-plants/all-tools-and-trainings>

# Thank You

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