



U.S. DEPARTMENT OF ENERGY

**International District Energy Association**

*Promoting CHP, District Energy, and Waste Heat Recovery*

## Final Report

**December 20, 2013**

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**Recipient:** International District Energy Association

**Project:** IDEA Clean Energy Application Center

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## **IDEA CLEAN ENERGY APPLICATION CENTER (CEAC) FINAL MANAGEMENT REPORT**

### **Executive Summary**

The DOE Clean Energy Application Centers were launched with a goal of focusing on important aspects of our nation's energy supply including Efficiency, Reliability and Resiliency. Clean Energy solutions based on Combined Heat & Power (CHP), District Energy and Waste Heat Recovery are at the core of ensuring a reliable and efficient energy infrastructure for campuses, communities, and industry and public enterprises across the country.

IDEA members which include colleges and universities, hospitals, airports, downtown utilities as well as manufacturers, suppliers and service providers have long-standing expertise in the planning, design, construction and operations of Clean Energy systems. They represent an established base of successful projects and systems at scale and serve important and critical energy loads. They also offer experience, lessons learned and best practices which are of immense value to the sustained growth of the Clean Energy sector.

IDEA has been able to leverage the funds from the project award to raise the visibility, improve the understanding and increase deployment CHP, District Energy and Waste Heat Recovery solutions across the regions of our nation, in collaboration with the regional CEAC's.

On August 30, 2012, President Obama signed an Executive Order to accelerate investments in industrial energy efficiency (EE), including CHP and set a national goal of 40 GW of new CHP installation over the next decade

IDEA is pleased to have been able to support this Executive Order in a variety of ways including raising awareness of the goal through educational workshops and Conferences and recognizing the installation of large scale CHP and district energy systems

A supporting key area of collaboration has involved IDEA providing technical assistance on District Energy/CHP project screenings and feasibility to the CEAC's for multi building, multi-use projects. The award was instrumental in the development of a first-order screening/feasibility tool for these types of community energy projects. The Excel based tool incorporates hourly climate based building loads data to arrive at the composite energy demand for the district and compares the Net Present Value (NPV) of the costs of CHP/DE alternatives. This tool has been used to provide assistance to several projects in the Northeast, Mid-Atlantic, Intermountain and Pacific Regions. The tool was disseminated to the CEACs and supplemented by a Training Webinar and a How to Guide

IDEA produced a [US Community Energy Development Guide](#) to support mayors, planners, community leaders, real estate developers and economic development officials who are interested in planning more sustainable urban energy infrastructure, creating community energy master plans and implementing CHP/ District Energy systems in cities, communities and towns.

IDEA has collected industry data and provided a comprehensive data set containing information on District Energy installations in the US. District energy systems are present in 49 states and the District of Columbia. Of the 597 systems 55% were DE alone while the remainder was some combination of CHP, district heating, and district cooling. District energy systems that do not currently involve electric generation are strong near-term candidates for the adoption of CHP due to the magnitude of their aggregated thermal load. This data has helped inform specific and targeted initiatives including technical assistance provided by the CEAC's for EPA's Boiler MACT Compliance by large District Heating System boilers.

These outcomes have been greatly enabled by the close coordination and collaboration with DOE CEAC leadership and with the eight regional US DOE Clean Energy Application Centers and the award's incremental funding has allowed IDEA to leverage our resources to be an effective champion for Clean Energy.

## **Background**

The U.S. Department of Energy (DOE) funded nine Clean Energy Application Centers (CEACs) around the country that promote and assist in transforming the market for Combined Heat and Power (CHP), Waste Heat to Power CHP, and district energy (DE) with CHP. The key services that the CEACs provide are market assessments, education and outreach, and technical assistance. The eight regional centers served a specific region of the country, and a separate center operated by the International District Energy Association (IDEA) supported the regional centers with technical assistance, education, training, publicity, and outreach related to district energy.

## **Project Objectives**

- Raise the visibility and increase awareness of the US CHP, District Energy and Waste Heat Recovery industry.
- Coordinate and collaborate with DOE CEAC leadership and with the eight US DOE Clean Energy Application Centers
- Serve as a technical and industry resource to create visibility, awareness and opportunities for the DOE CEAC's to play key role in growing the district energy industry.
- Create a web-based portal, linked to the CEAC SharePoint portal, to disseminate and organize industry data and information.
- Assist in analysis and assessment of industry renewal and growth opportunities.

## **Comparison of Actual Accomplishments with Goals and Objectives of the Project.**

IDEA worked with a Project Management Plan that aligned with the projective objectives and was approved by the DOE HQ Program staff.

Working in close collaboration with the regional CEAC's IDEA was able to meet project goals and objective. The activities were informed by a strategic vision jointly developed by IDEA and the CEAC's and DOE HQ.

## **Strategic Vision**

- Mayors, city planners, economic development officials and state energy officers seek out District Energy/CHP as a cost-effective, near-term community clean energy solution.
- Regulators are better informed and come to appreciate the importance of thermal energy and adopt policies that reward effective utilization of surplus heat and value CHP thermal as balancing capacity for grid penetration of renewables.
- Campuses continue to invest in CHP/DE as they grow and manage energy and meet the goals of Climate Action Plans.
- The Military develops Microgrids based on Campus CHP/DE Best Practices and innovations in energy.
- Downtown district energy systems, with thermal energy market scale, become prime locations for adoption of CHP.
- Mainstream media outlets begin to cover the many economic and environmental advantages of District Energy/CHP to create policy momentum for our industry.

## **Summary of Project Activities and Accomplishments**

During the award period, IDEA engaged in a variety of activities to support project objectives. The set of activities covered Education & Outreach, Project Support and Policy areas and the target sectors included Campuses, Downtown Utilities, Airports, Hotels, Process Industries, Pharmaceuticals, Manufacturing and the Military.

## **Education, Outreach and Resources**

### ***Conferences & Workshops***

IDEA Annual Conferences and Workshops were a key contributor to the delivery of education and content pertaining to the CHP and District Energy sectors.

The attendees per conferences averaged over 500 and provided CEAC staff and DOE HQ staff an opportunity to present and leverage the opportunities to meet with experienced practitioners of Clean Energy solutions. Presentations topics including CHP, District Energy, Biomass and Microgrids.

The following is a list of links to the proceedings of these events that cover the award period:

[3rd Global District Energy Climate Summit & Awards](#), September 23-25, 2013, New York, NY

[104th Annual Conference and Trade Show: "Building on Efficiency, Delivering Value"](#), February 2-5, 2013, Miami FL

[26th Annual Campus Energy Conference: "Clean Energy for Campus & Community"](#), February 18-22, 2013, San Diego, CA

[Combined Heat & Power 2012](#), October 15–17, 2012, Houston, TX

[103rd Annual Conference and Trade Show: "Cooler, Cleaner Cities"](#), June 29-July 2, 2012, Chicago, IL

[25th Annual Campus Energy Conference: "Innovations in Clean Energy"](#), February 6-9, 2012, Arlington, VA

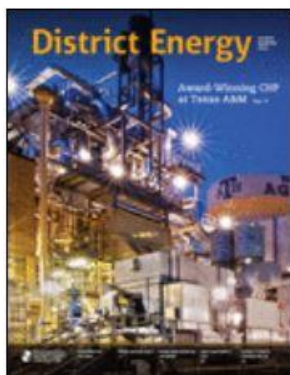
[102nd Annual Conference & Trade Show: "Essential Infrastructure for Energy-Efficient Communities"](#), June 26-29, 2011, Toronto, ON

[24th Annual Campus Energy Conference: "Cleaner Energy, Greener Campus"](#), February 22-25, 2011, Miami, Miami, FL

[101st Annual Conference & Trade Show: "Creating an Efficient Energy Future"](#), June 13-16, 2010, Indianapolis, IN

[23rd Annual Campus Energy Conference: "Repowering the Future"](#), February 9-12, 2010, Reno, NV

### ***District Energy Magazine Columns***



IDEA's District Energy Magazine serves as the central information resource for district energy industry professionals. Since first published by IDEA in 1915, it continues to be an authoritative source of district energy industry information because of the high quality of its articles and columns, most of which are contributed by volunteer authors.

With a circulation of over 10,000 print and digital copies, *District Energy* reports on developments and trends in district energy and/or CHP operations, technology, regulatory issues, legislative action, as well as marketing, legal and financial issues involved in developing district energy systems and their implications for the industry. The magazine also includes how-to recommendations from industry experts and new product developments.

IDEA has published Quarterly Columns in the District Energy Magazine by CEAC Directors on a rotating basis. These columns provided an opportunity for the regional CEAC's to create a focus on CHP projects and regional activities and incentives.

In addition, several topical columns from DOE HQ listed below helped to highlight the CEAC program and key initiatives.

- **Boiler MACT Update: Final major source rule and opportunities for CHP**, by Katrina Pielli, Senior Policy Advisor to the U.S. Department of Energy's Deputy Assistant Secretary for Energy Efficiency; and Susan Wickwire, Chief, Energy Supply and Industry Branch, Climate Protection Partnerships Division, U.S. Environmental Protection Agency
- **U.S. DOE Provides District Energy Regional Support** by Robert V. Gemmer, Ph. D., Technology Manager ,U.S. DOE Industrial Technology Program
- **40 GW of CHP by 2020: Seven years away!** by Claudia Tighe, CHP Deployment Program Manager, Energy Efficiency and Renewable Energy, Advanced Manufacturing Office, U.S. Department of Energy

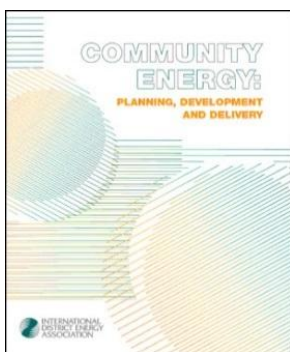
### Video Content

IDEA has assembled a collection of informative videos aimed at providing education and understanding of the many aspects of realizing CHP and District Energy Projects. They include presentations by champions, industry leaders, practitioners as well as case studies and best practice examples from the US and around the globe. A complete [index](#) is available at the IDEA Web site.

The [IDEA YouTube channel](#) is a curated video library hosted on YouTube and has many [popular](#) videos, including student videos showcasing Campus CHP and District Energy systems. These videos are collected through a competition which is part of the IDEA Annual Campus Energy Conference Event.

### **Resources**

- [Community Energy Development Guide](#) - Community Energy: Planning, Development & Delivery



IDEA produced a new publication, *Community Energy: Planning, Development and Delivery*, which aims to support mayors, planners, community leaders, real estate developers and economic development officials who are interested in planning more sustainable urban energy infrastructure, creating community energy master plans and implementing district energy systems in cities, communities and towns.

The new guidebook provides an overview of the local energy project development process, in a form that is accessible to lay readers, to assist them in making informed decisions on the analysis, planning, development and delivery of district energy systems



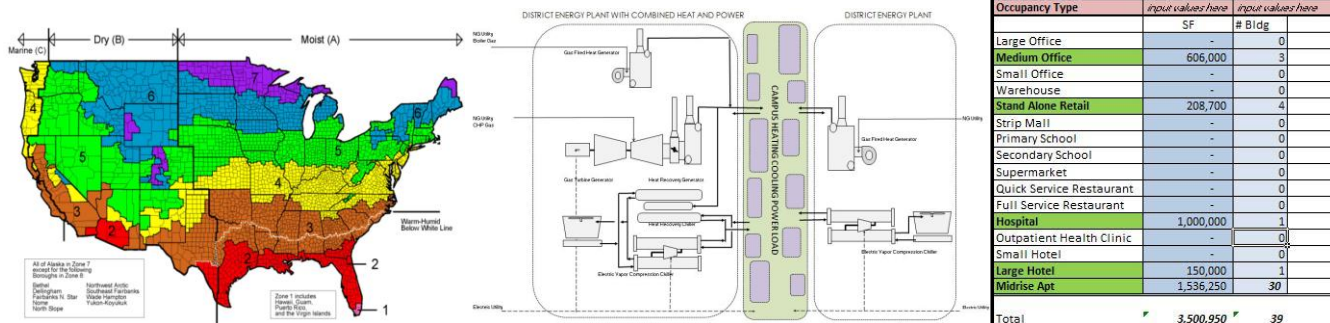
Three thousand three hundred copies of the Community Energy Development Guide have been distributed to planners, policy makers, city officials, Microgrid and Ecodistrict professionals and conference attendees. It has been well received and has provided a framework for the deployment of multi-building multi-function community energy systems planning to deploy CHP and District energy.

- [IDEA Online Resource Guide](#)



IDEA completed an Online Resource Guide of technical and business expertise by region and technology categories to facilitate CEAC access to District Energy, CHP and Waste to Energy categories. It is an excellent source for locating best-of-breed providers of services, products and technology to the district energy, combined-heat-and-power (CHP) and waste-to-energy (WtE) industries. Listings feature IDEA member organizations in good standing who provide products and services to these industries. In addition to locating resources by industry, it is now possible to search for resources by geographic regions that correspond with the U.S. Department of Energy Regional Clean Energy Application Centers areas.

- **District Energy, CHP First Order Screening Tool**



The IDEA District Energy Screening Tool uses an energy and economic model to provide a quick and first order sense of the financial potential that a District Energy and District Energy with Combined Heat and Power project might offer to a proposed urban development project. It is a tool for CEAC's and others in assessing CHP and District Energy Potential in a consistent and useful manner. This first order CHP /District Energy screening tool was developed by the International District Energy Association and GLHN Architects and Engineers with support from the Department of Energy.

The tool is for use in a multi building multi-function project and provided the planning or development team a screening analysis with a "go, no-go" decision to advance the analysis with a deeper engineering study.

## Technical Assistance

At the request of regional CEAC's IDEA provided technical assistance and project support for several potential multi-building, multi-function phased development projects. In addition to site-meetings and phone calls, IDEA conducted a first-order screening for DE/CHP using the Screening tool. Several scenarios comparing NPV of costs using 25 year cash flows and regional reference loads by building types

- Intermountain CEAC - Potential feasibility study for multi-acre planned development in Denver, CO

- Mid Atlantic CEAC – Allegheny River Project , Pittsburgh , PA
- Mid Atlantic CEAC - Mellon Arena, Pittsburgh, PA
- Mid Atlantic CEAC – Philadelphia Navy Yard, Philadelphia, PA
- Pacific CEAC - Oakland Military Base
- Northeast – CEAC – Energize Ithaca, Ithaca, NY
- Southeast CEAC - CHP Project Assessment for the Presidio of Monterey on August 23, with Jay Tulley, Energy Manager, and Directorate of Public Works USAG Presidio of Monterey, California. The project was to assess a CHP system for buildings centered on barracks and dining facilities on 3 campuses with 150 buildings.
- MID-Atlantic CEAC, and the Regional Industrial Development Corporation of Southwestern Pennsylvania - ALMONO Project planned at the 178-acre former J&L steel mill site, brownfield redevelopment in Hazelwood, PA.

### **Policy Support**

- IDEA conducted a series of educational meetings with Senate staffers including the offices of Senators Rob Portman(R-OH), Senator Jeanne Shaheen (D-NH) and Senator Lisa Murkowski (R-AK) regarding S.1205, the "Local Energy Supply and Resiliency Act" (LESRA) as drafted by Senator Al Franken (D-MN). Senator Murkowski(R-AK) has agreed to co-sponsor LESRA.
- IDEA and EESI conducted a Hill Briefing on District Energy/CHP as a Resiliency Strategy in May, 2013 with over 130 attendees from Senate and Congressional offices, NGO's and related agencies.
- IDEA conducted follow on conversations with Senate staff regarding LESRA and Senators Al Franken(D-MN) and Lisa Murkowski have agreed to submit LESRA as an amendment to S. 761: "Energy Savings and Industrial Competitiveness Act of 2013", co-sponsored by Senator Jeanne Shaheen (D-NH) and Senator Rob Portman (R-OH).
- IDEA supported the Architect of the Capitol in planning and communications on the integration of CHP in the Capitol Power Plant. A formal announcement and video is planned for imminent release.
- IDEA has been participating in Joint discussions with CT DEEP to assist with expanding microgrid investment and innovation in CT and the states impacted by Hurricane Sandy and other major storms. The goal is to draft an RFP for Round 2 funding.
- IDEA has been working closely with the MA DOER and City of Boston on planning for a policy update on district energy/CHP/Microgrid to support accelerated market penetration.
- IDEA has provided presentations, materials and moderator services to many CEAC events, Workshops, Webinars and Regional Dialogues.