



# U.S. Department of Energy Clean Energy Application Centers

*Promoting CHP, District Energy & Waste Heat Recovery*



U.S. DEPARTMENT OF ENERGY  
**Clean Energy Application Centers**

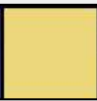
U.S. DEPARTMENT OF  
**ENERGY**

Energy Efficiency &  
Renewable Energy



# Evolution of “Clean Energy Application Centers”

- Originally Established as “Regional **CHP** Application Centers”
- Pilot Center Started in 2001 in the Midwest
- Eight Regional CHP Application Centers Established in 2003/2004 through DOE Competitive Process
- Energy Independence & Security Act (EISA) - 2007
  - *Re-designated the 8 Regional “**CHP** Application Centers” as “**Clean Energy** Application Centers”*
  - *Directs DOE to Continue the Operation and Effectiveness of the 8 Centers*



# Clean Energy Application Centers (RACs)

- **Mission:** Develop technology application knowledge and the educational infrastructure necessary to lead “clean energy” technologies as viable energy options and reduce any perceived risks associated with their implementation
- **Focus:** Provide an outreach and technology deployment program to end users, policy, utility, & industry stakeholders aimed at:
  - **Targeted Education**
  - **Unbiased Information**
  - **Technical Assistance**



# “Clean Energy” Technologies

## CHP



The sequential production of electric and thermal power from a single dedicated fuel source

## Waste Heat Recovery



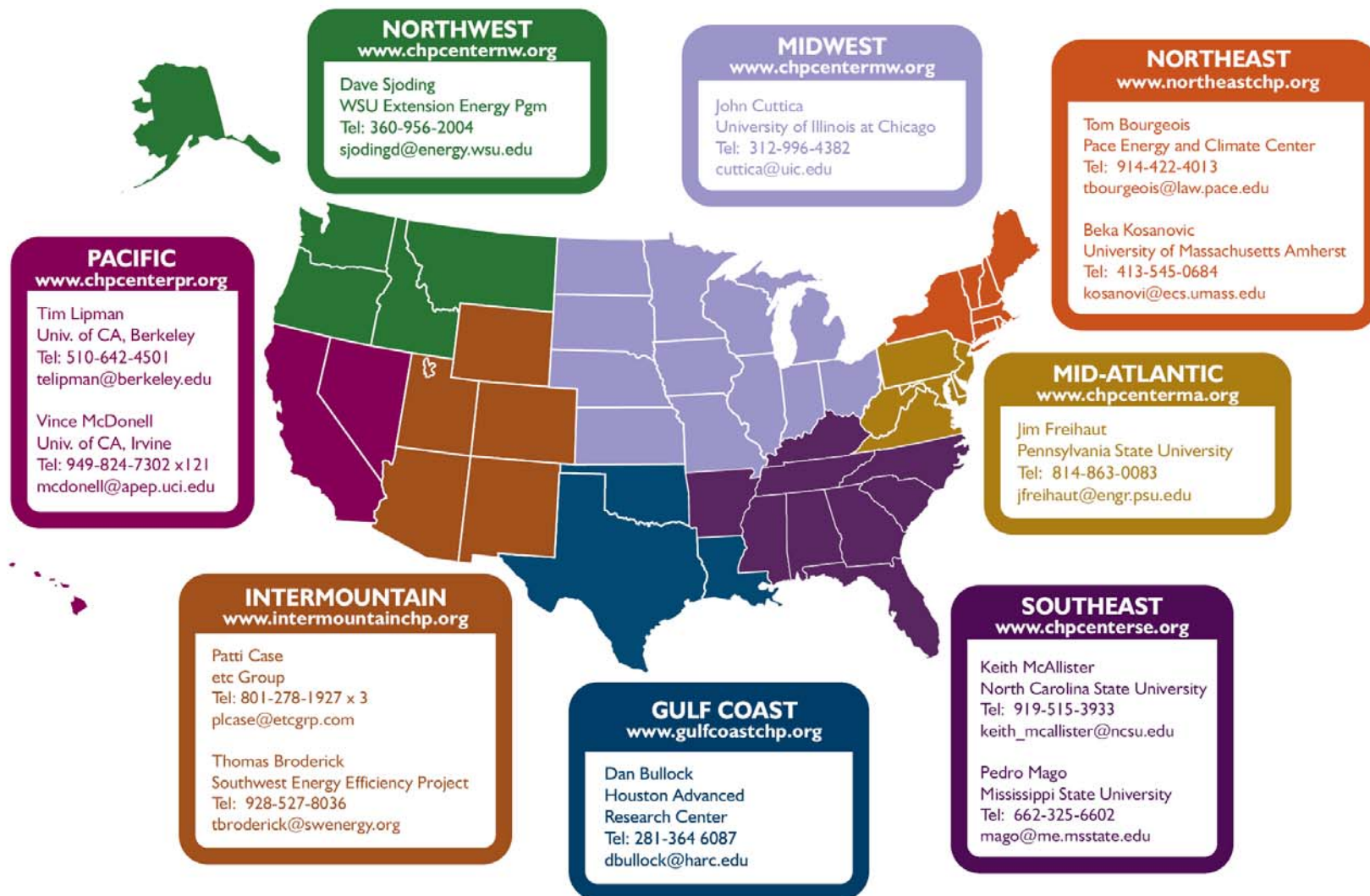
Captures heat otherwise wasted in an industrial process and utilizes it to produce electric power. These systems may or may not produce additional thermal energy

## District Energy



Central heating & cooling plants that incorporate electricity generation along with thermal distribution piping networks for multiple buildings (campus / downtown area)

# DOE Clean Energy Application Center Locations, Contacts, and Web Sites



For more information visit <http://www1.eere.energy.gov/industry/distributedenergy/racs.html>

## DOE Clean Energy Application Center Program Contacts

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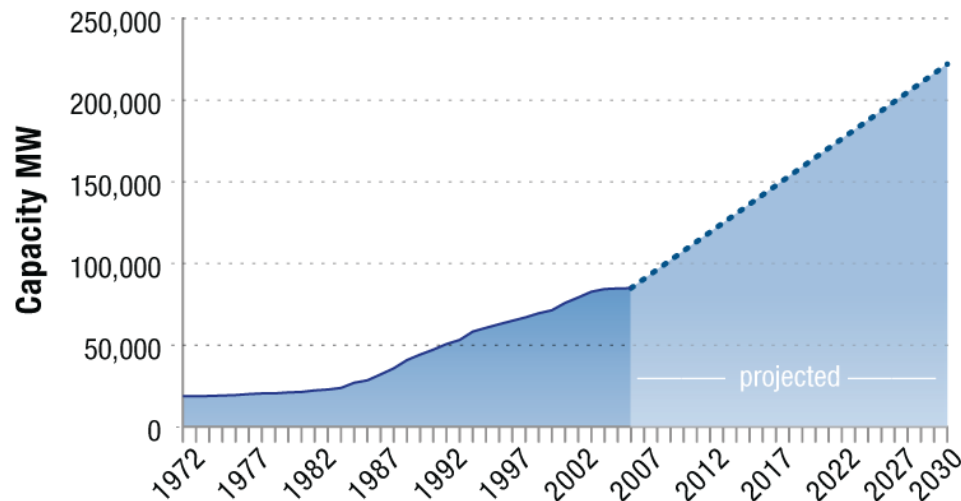
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# RACs Support DOE Industrial Technology Program (ITP)

- ITP overall goal of reducing energy intensity in the industrial sector by 25% over the next ten years
- Increase CHP Capacity from 9% of US Generating Capacity in 2010 to 20% by 2030

Historical CHP Capacity and Growth Needed to Achieve 20% of Generation



- \$234 billion private sector investment
- Nearly 1 million new jobs
- Reduces fuel use and CO<sub>2</sub> emissions



# RAC Services & Capabilities

## Unbiased Information

Develop & distribute informational materials

Perform market research to identify high profile candidate applications

## Targeted Education

Develop & conduct target market workshops, seminars, internet programs to educate end users, regulators, and other stakeholders

Assist in overcoming policy and other market barriers

## Technical Assistance

Provide technical assistance to potential user sites

Provide or coordinate on-site assessments for entities considering deployment of clean energy technologies



# Information (State & Regional Basis)

## Type of Information

- Basic Information
- Market Specific Applications
- Policies & Regulations
- Installations and Contacts
- Project Profiles
- Technical Reports/Studies
- Evaluation Tools
- News & Events
- Presentations

## Eight Regional Websites

1. [www.northeastchp.org](http://www.northeastchp.org)
2. [www.chpcenterma.org](http://www.chpcenterma.org)
3. [www.chpcenterse.org](http://www.chpcenterse.org)
4. [www.chpcentermw.org](http://www.chpcentermw.org)
5. [www.gulfcoastchp.org](http://www.gulfcoastchp.org)
6. [www.chpcenternw.org](http://www.chpcenternw.org)
7. [www.chpcenterpr.org](http://www.chpcenterpr.org)
8. [www.intermountainchp.org](http://www.intermountainchp.org)



# Information Examples

- Over 100 Project Profiles Available
- CHP Guidebooks (more than 150,000 copies downloaded since 2004)
- CHP Site Walk-thru Document
- CHP Installation Data Base by State
- Numerous Technical Reports

**combined heat & power in manufacturing**

**combined heat & power in dairy farms**

**combined heat & power (CHP) Resource Guide**  
Second Edition

**Combined Heat & Power (CHP) Resource Guide for Hospital Applications**  
Published in 2007

Prepared by:  
Midwest CHP Application Center  
University of Illinois at Chicago  
Energy Resources Center  
and  
Avalon Consulting, Inc.

OAK RIDGE NATIONAL LABORATORY  
ANNUAL REPORT OF THE U.S. DEPARTMENT OF ENERGY FOR THE YEAR 2007

Prepared by:  
Midwest CHP Application Center  
with the assistance of  
Avalon Consulting, Inc.  
Energy and Environmental Analysis  
PEA, Inc.

OAK RIDGE National Laboratory  
CHP CENTER  
renewable energy



# Education Examples

- Educated Over 25,000 Individuals on CHP
  - 120+ targeted workshops, seminars, webinars
  - 60+ conferences
- Audiences:
  - State Policy Makers
  - Targeted Market Sectors
  - Architects and Engineers
- Presentation Materials Available on Websites



*Springfield, Illinois*



*Wooster, Ohio*



# Sample Accomplishments - Policy



- **New Jersey** law now allows CHP plants that provide thermal energy to contiguous properties to also provide electric power to those properties (*even across right-a-ways*)
  - **Big win for the CHP / District Energy Industry!!!**
  - **Mid-Atlantic RAC** in partnership with industry worked hard in educating legislators and regulators on the concept, the benefits, and the proper language



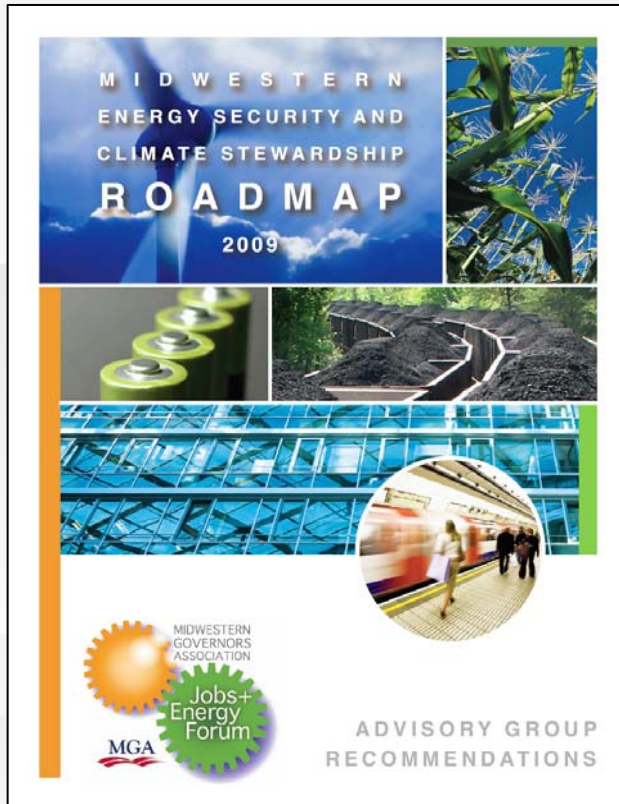
# Sample Accomplishments - Policy

- **Texas** law requires a CHP feasibility analysis to be conducted on all new construction and major renovations to existing **Government Buildings** defined as “**critical buildings**” – expected to continue service during prolonged electric outages (*up to 14 days*)
  - **Gulf Coast RAC** provided technical education and analysis leading to the introduction of the bill
  - Now working on the rules for implementation





# Sample Accomplishments - Policy



- **Midwest Governors Association** published their “Midwestern Energy Security & Climate Stewardship Roadmap 2009” which was approved by the Midwest Governors

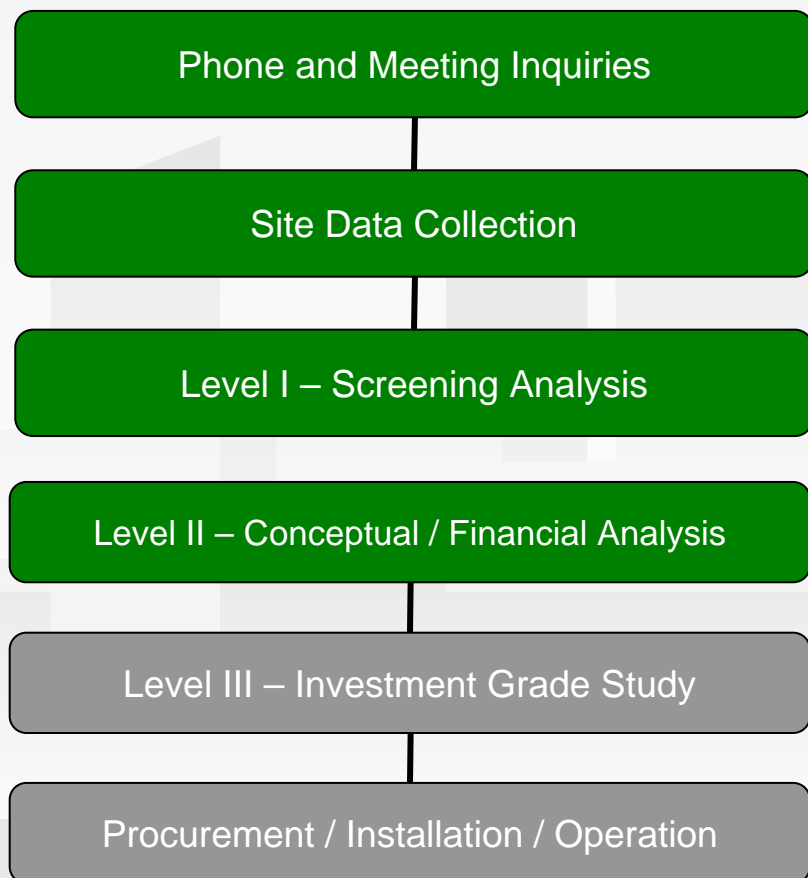
## Midwest RAC provided:

- All the input on CHP (education and analytic calculations) for the report
- Participated in the MGA task force
- The report calls for doubling the CHP capacity in the Midwest by 2030 (21.2 GW) with annual CO<sub>2</sub> emissions avoidance of 64 MMT annually
- The report outlines policy needs to reach those targets (Midwest RAC input)



# Technical Assistance

## Feasibility Steps



## RAC Capabilities

- Analysis Performance thru Level II
- Consulting Expertise thru all Steps
- Bringing customers and CHP engineering community together

## RAC Project Support

- Over 225 assessments & 700 tech support activities
- Represents over 1.5 GW installed or in development



# Sample Accomplishment – Technical Assistance

## ■ BP Oil (World Wide Energy)

Trading Center – **Houston, Texas**

- New Construction
- 4.3 MW (low NOx) Turbine
- 1,300 Ton absorption Chiller
- 75% efficiency --- N+1 reliability



## **Gulf Coast RAC participation:**

- Introduced & promoted the CHP concept to the design team and end user (*extensive education and information exchanges*)
- Organized tours of Del Medical Center for BP management to witness CHP installation & operation
- Provided BP Oil technical assistance in overseeing the feasibility study done by ARUP (*engineering firm*)



# Sample Accomplishment – Technical Assistance

- **Grays Harbor Paper Mill – Hoquiam, Washington**
  - 18.5 MW boiler/steam turbine system
  - Biomass fueled (wood waste)
  - Thermal energy utilized in the plant process

## Northwest RAC participation:

Assisted in developing a lease purchase agreement

- Local utility owns equipment (leases to paper mill)
- Paper Company Revenues:
  - Onsite power displaces utility power
  - Excess power sold to the utility
  - Green tags sold to the utility
- State financing included in package





# Questions / Discussions

## Contact Information

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[www.chpcentermw.org](http://www.chpcentermw.org)