

Combined Heat and Power Newsletter

This fall we are pleased to bring you the latest issue of our quarterly newsletter Combined Heat and Power. This free newsletter will highlight stories and events of interest to the CHP community, and will occasionally provide in-depth insight into the latest “hot topics.”

While our focus is primarily upon the Southeast region, we will also incorporate news from across North America. You can link directly to our sources by clicking “more details” at the bottom of each item. This newsletter will be prepared by the CHPCenterSE and published at the end of each quarter. We welcome your thought and contributions.

To subscribe to the electronic version of this newsletter, please [click here](#). For questions or to provide comments, please send an email to Maureen Quinlan at mequinla@ncsu.edu.

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Compiled by
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Hot Topic: Universities Use CHP to Reduce Emissions

Combined heat and power has been successfully implemented in a wide variety of facilities across the U.S.- glass and chemical manufacturing sites, hospitals, prisons, hotels, and waste water treatment facilities- anywhere there is a significant demand for clean, reliable electricity and heat. Many colleges and universities have also seized the opportunity to install their own CHP/cogeneration systems to support the power demands on campus as part of larger sustainability initiatives. In this type of application, the waste heat is often recovered to produce high quality steam for the university's research facilities. The University of Utah, Cornell University, and UNC Chapel Hill have all chosen to implement CHP systems to reduce greenhouse gas emissions, offset energy costs, and provide reliable power and heat to their campuses.

University of Utah

When it came time for the University of Utah to replace two 1960's boilers, they decided to invest in a more environmentally friendly CHP system. The 6 MWe system is the capstone project of a 10 year push to increase the efficiency of the school's facilities including lighting, heating and cooling, and water conservation measures. Unlike many CHP systems which are used to produce energy and heat is the byproduct, the University designed their CHP system to optimize heat production and produce electricity as a biproduct. This is because the University has a large demand for 450 degree F hot water. Ultimately, 100% of the school's hot water needs and 15% of its electricity needs will be met by the CHP system. This project was a part of a six phase energy saving contract with Chevron which has saved the University approximately \$2 million. The University of Utah's upgrade is featured in the Sept-Oct edition of *Distributed Energy*.

[More Details](#)

Cornell University

Cornell University is among 526 colleges to sign the American College and University Presidents Climate Commitment (ACUPCC) which commits the institutions to reducing their greenhouse gas emissions with the ultimate goal of climate neutrality. To help reach their emissions goal and control costs, Cornell will install a [30 MWe combined heat and power project](#) at its current central heating plant. Two natural gas turbines will be added to the campus's current cogeneration system, ultimately providing the campus with 80% of its electricity needs and recycling the waste heat to produce steam. This system is set to go online in 2009.

[More Details](#)

University of North Carolina

UNC Chapel Hill also signed the ACUPCC in 2006, and as a first step towards their goal of greenhouse gas emissions reductions they submitted their [2007 Greenhouse Gas Inventory Report](#) in September. The report devotes much time to energy generation, as this was the University's largest source of emissions. UNC operates its own combined heat and power facility that supplies all of the steam used on campus and up to a third of their electricity needs. The plant sometimes uses natural gas and fuel oil, but is primarily fueled by coal combusted in two circulating fluidized beds. This award-winning facility is one of the cleanest coal-burning power plants in the country thanks to the innovative CHP technology.

[More Details](#)

News from the Southeast

ACEEE Rates States on Energy Efficiency Policies

The American Council for an Energy-Efficient Economy (ACEEE) released its *2008 State Energy Efficiency Scorecard* in October which ranks each state on their energy efficiency policies and programs. ACEEE uses 8 policy areas to score the states, one of which is the state's encouragement of combined heat and power. Florida and North Carolina ranked highest among the Southeast states for fostering CHP through good interconnection standards, a renewable portfolio standard, and financial incentives, while Georgia and Louisiana were ranked at the bottom of the list for the CHP category. For the overall efficiency rankings, Florida and Louisiana were recognized among the most improved states in 2008, rising ten spots to 19th, and seven spots to 35th, respectively. The full report is available at www.aceee.org.

[More Details](#)

NCSU Will Become "Smart Grid" National Research Center

In September, NC State University was awarded \$18.5 million from the National Science Foundation to research how we can transform the outdated US power grid to one that is better suited for connecting to, storing, and transporting distributed renewable energy. The Future Renewable Electric Energy Delivery and Management Systems (FREEDM) Center will develop technology for an "Internet for Energy" through partnerships with utilities, technology manufacturers, alternative energy companies, and other universities. Such an improvement in infrastructure would allow customers to more easily connected their solar panels, wind turbines, or CHP systems to the grid and sell that energy to their utility.

[More Details](#)

Freeing the Grid 2008 Grades States' Interconnection and Net Metering Policies

Favorable net metering and interconnection policies are crucial for encouraging renewable distributed generation at the state level. Published by the Network for New Energy Choices (NNEC), *Freeing the Grid* is a report card for state interconnection and net metering policies. In addition to grading each state on their current policies, the report breaks down what provisions should be included in a good policy, and highlights states that have gone above and beyond to encourage renewables, and those that are still lagging behind. Since the 2007 Edition, Arkansas and Kentucky have improved their net metering rules, North Carolina has improved their interconnection standards, and Florida has adopted a new net metering rule and interconnection standard. To learn more about interconnection and net metering, and to see how your state scored, [read the full report](#).

[More Details](#)

Sustainability Workshop Highlights Opportunity for CHP in Florida

On August 10, the *CHP and Sustainability Workshop: The Role of CHP in Florida's Energy Future* was held in Jacksonville, sponsored by the CHPCenterSE, ASME, and the University of Florida. CHP experts from around the country spoke on a variety of topics including the market for CHP in Florida, potential applications in Florida such as biofuels, and future trends. Michael Ohlsen from the Florida Energy Office provided a keynote session about how CHP fits in to state's overall energy policy. The workshop agenda and speaker presentations are available to the public at www.chpcenterse.org.

[More Details](#)

News from across North America

10% Tax Credit for CHP Included in Bailout Bill

On October 8, President Bush signed into law the Emergency Economic Stabilization Act of 2008 (H.R. 1424). The silver lining of the current financial crisis is the inclusion of the renewable energy production and incentive tax credits in this bill, which were due to expire at the end of 2008. In addition to extending the existing tax credits for solar and wind through 2016, the Energy Improvement and Extension Act also includes a new provision for combined heat and power systems. Systems that meet certain technical requirements and are up to 50 MW in size qualify for a 10% tax credit for the first 15 MW of the project. Though modest, the tax credit is meant to ease the cost burden for small to medium size projects, particularly in states that don't already have incentives. This tax credit is a major win for the CHP community.

[More Details](#)

Technical Advances Made in Micro-CHP Fuel Cells

Leading fuel cell developers Ceramic Fuel Cells Limited announced in July that technical advances have allowed them to significantly improved the power density and lifetime of their micro-CHP fuel cells over the last year. A 50% increase in cell power density has allowed CFC to increase the power output of their units will reducing per kW costs. The lifetime of the fuel cells has also increased by 35%, accomplished through their patented metal coating technology.

Notably, CFC's products use natural gas instead of hydrogen to generate electricity. Their testing has shown efficiencies of over 50% for a 1 kW fuel cell running on natural gas.

[More Details](#)

Inefficiency of Power Generation is “Elephant in the Room” in Climate Change Discussions

The United States Association for Energy Economics' (USAEE) August 2008 Newsletter includes an article written by Recycled Energy Development VP Richard Munson. *Recycling Energy Waste* details the evolution of the power industry in the US, including the drawbacks of relying on large inefficient centralized power plants. While the energy efficiency movement has focused on measures such as improving building lighting and vehicle fuel standards, power production efficiency has not budged from 33% in the last 40 years. Power generation now accounts for 42% of CO2 emissions in the U.S., up from only 12% in 1950. Munson recommends cutting CO2 emissions by capturing the waste heat from centralized power plants to increase their efficiency, establishing a carbon cap and trade system, and employing smaller distributed generation systems cited closer to energy demand. Such distributed generation will provide additional security, environmental, and economic benefits.

[More Details](#)

Washington D.C. Expands Its Net Metering Rules

Net metering is the billing arrangement between a utility and a customer who owns a distributed generation system, through which the customer receives compensation for the energy they have fed into the grid. In October, Washington D.C. amended its rules to allow larger systems to net meter. Residential and commercial customers can now net meter renewable energy systems, CHP, fuel cells, and microturbines up to 1 MW (up from 100 kW). At the end of the month, net excess generation is credited to the customer's next bill at full retail rate. In D.C., the Renewable Energy Certificates associated with the customer's generation are shared between the customer and the utility.

[More Details](#)

CHP Eligible in New Michigan RPS

In October, Michigan passed a Renewable Energy Standard (Public Act 295) which requires all electric utilities in the state to produce 10% of their electricity with renewable or cleaner fossil fuel resources by 2015. In addition to using solar, wind, and biomass resources, utilities can meet part of the requirement through energy efficiency measures and advanced cleaner energy systems such as industrial CHP.

[More Details](#)

Plug Power Awarded \$500,000 to Commercialize Residential CHP

In July, the New York State Energy Research and Development Authority (NYSERDA) awarded Plug Power Inc. \$500,000 to aid in the commercialization of their GenSys micro-CHP system. The high-temperature fuel cell system is designed to replace traditional heating technologies and partially offset electrical needs in residential and small commercial facilities. The NYSERDA funding will be used to incorporate a peak burner into the system design, which will improve start-up time and reduce the customers' installation costs.

[More Details](#)

Utilities as Barriers to CHP

Forbes.com published a special report on energy efficiency in July, highlighting the basics of CHP plants and their energy saving potential. The article explores the range of roles that a major Utility can play in a CHP project- from hostile opponent to active partner. Case studies of a regional hospital and the Massachusetts Institute of Technology highlight the impact of Utility imposed delays and fees on a CHP project's success.

[More Details](#)

California Hospital to Install Fuel Cell CHP System

UTC Power announced in July that it will supply St. Helena Hospital in Napa Valley with a 400 kW PureCell® Model 400 system slated to come online summer '09. These highly efficient fuel cells will provide the facility with clean electricity and the waste heat will be captured to heat the buildings and supply hot water. Partially funded by a grant from the California Self Generation Incentive Program, St. Helena's fuel cell CHP system allows them to increase the reliability of their power, reduce their impact on the environment, and realize energy savings.

[More Details](#)

CHP System Meets Strict California Emissions Standard

In July, UTC Power announced that four models of its PureComfort® combined cooling, heating and power system meet the California Air Resources Board (CARB) standards. The CARB standards were established in 2007 and are the most stringent in the U.S. In order to be certified for sale in California, manufacturers of electrical generation technologies must ensure their emissions per 1 MWh of generation do not exceed 0.07 lbs for nitrogen oxides, 0.10 lbs for carbon monoxide and 0.02 lbs for volatile organic compounds. UTC's low emission CHP systems achieve efficiencies of up to 90%.

[More Details](#)

Overcoming Regulatory Barriers to Clean Distributed Energy

A September 2008 study published by Recycled Energy Development (RED), *Deploying Clean Energy: Overcoming Regulatory Barriers*, identifies and offers solutions for policies which currently discourages the spread of distributed generation resources, particularly those that recycle waste heat. These inhibiting policies fall under the categories of outright barriers (block non-utility generation), value deniers (prevents local, clean generation from being fully valued), and playing field tilters (create advantages for central electric generation). RED estimates that capturing waste heat could offset 30% of US fossil fuel generation, and offers three main policy solutions to promote this technology: a national cap and trade system for reducing pollutants, a modified national energy efficiency standard for power plants, and seven actions that the Federal Energy Regulatory Commission can take to level the playing field for clean energy.

[More Details](#)

Why Do We Still Throw Away Heat?

The average US power plant is 33% efficient (the majority of energy is lost as heat escapes the system), just as it was in 1957. In *Renewable Energy World*, Thomas Blakeslee gets to the heart of our energy wasting bad habits, formed decades ago when fuel was cheap and there were therefore no incentives to capture the power of heat and increase efficiency. The article looks at current regulatory and financial barriers that prevent U.S. Utilities from seeking high efficiencies, and points to the success of technologies like CHP, geothermal, and solar thermal power in other developed nations.

[More Details](#)

BP Alternative Energy Buys 525 MW CHP Plant

In early July, BP announced it has acquired a natural-gas fired cogeneration plant in Indiana from NiSource, Inc. to the tune of \$210 million. The Whiting Clean Energy facility had been reliably supplying steam for a BP refinery, also in Whiting. The CHP plant will continue to improve the efficiency of the refinery through steam production, and will allow BP to sell lower-carbon electricity to the local market.

[More Details](#)

Despite Inhibitors, Demand for CHP Will Grow

In the July/August edition of *Cogeneration and On-Site Power Magazine*, energy expert James Hunt predicts an increase in demand for industrial scale CHP systems as energy prices and concerns for the environment grow in the coming years. Hunt describes the variety of technologies, sizes, and fuels that can comprise a CHP system and provides examples of how industry has employed CHP around the world in paper mills, chemical manufacturing facilities, and greenhouses. Despite its popularity in Europe, Hunt argues that capital costs must come down, and regulatory barriers to interconnecting systems to the power grid must be removed for CHP to become more competitive with traditional power plants in the U.S.

[More Details](#)

Study Says Virginia Must Invest in Efficiency, CHP

In response to Virginia's rapidly increasing demand for electricity, the American Council for an Energy-Efficient Economy (ACEEE) has released *Energizing Virginia: Efficiency First* to offer policy solutions that will encourage rather than dampen the commonwealth's economic growth. The study found that energy efficiency measures and demand response are the least expensive and quickest ways to offset Virginia's demand growth. ACEEE lays out 11 efficiency policy recommendations, including implementing combined heat and power supporting policies. ACEEE estimates energy efficiency policies and programs could save 10,000 GWh, equivalent to 8% of the state's electricity by 2015, while reducing customers' electric bills and creating thousands of new jobs.

[More Details](#)

Research Studies

A number of research studies were published this quarter related to combined heat and power (or "cogeneration" systems).

Analysis of combustion turbine inlet air cooling systems applied to an operating cogeneration power plant

"In this work, combustion turbine inlet air cooling (CTIAC) systems are analyzed from an economic outlook, their effects on the global performance parameters and the economic results of the power plant." (R. Chacartegui, et al., *Energy Conversion and Management*, Volume 49, Issue 8, August 2008) [More Details](#)

First and second law analysis of diesel engine powered cogeneration systems

"In this article, the thermodynamic analysis of the existing diesel engine cogeneration system is performed. All necessary data are obtained from the actual diesel engine cogeneration plant located at Gaziantep, Turkey. The exergy analysis is aimed to evaluate the exergy destruction in each component as well as the exergetic efficiencies." (Abusoglua and Kanoglu, *Energy Conversion and Management*, Volume 49, Issue 8, August 2008) [More Details](#)

Design and performance evaluation of an innovative small scale combined cycle cogeneration system

"This paper deals with an innovative natural gas (NG) combined cycle cogeneration system (150-kWe, 192 kWt). The system is made up of a combination of two interconnected combined heat and power (CHP) systems: a reciprocating internal combustion engine cogenerator (ICE CHP) as the topping cycle and a Rankine cycle cogenerator (RC CHP) which operates as the bottoming cycle on the exhaust gases from the ICE." (M. Badami et al., *Energy*, Volume 33, Issue 8, August 2008) [More Details](#)

Upcoming Events

[CHP for Reliability and Premium Power](#)

November 18, 2008

Downey, CA

[Greenbuild International Conference and Expo](#)

November 19, 2008

Boston, MA

[EPA Clean DG Policy and CHP Webinar: CHP Opportunities and Incentives in the Utility Sector](#)

November 20, 2008

[Green Career Conference 2008](#)

November 22, 2008

UC Berkeley, CA

[EPA Clean DG Policy and CHP Webinar: TBA](#)

December 18, 2008

[Regional Energy Forum: Making Energy Work](#)

February 3, 2009

Raleigh, NC

[DistribuTECH 2009](#)

February 3-5, 2009

San Diego, CA

[Renewable Energy Technology Conference and Exhibition](#)

February 25-27, 2009

Las Vegas, NV

About Us

The Southeast CHP Application Center (CHPCenterSE) was established in 2004 for the US Dept. of Energy. Its mission is to provide application assistance, technology information, and educational support for CHP in the Southeastern U.S. The CHPCenterSE is co-located at [Mississippi State University](#) and [North Carolina State University](#). We encourage you to visit our website, www.chpcenterse.org, for more information.
