



Combined Heat and Power In North Carolina

Why do we need to support additional CHP in our energy mix?

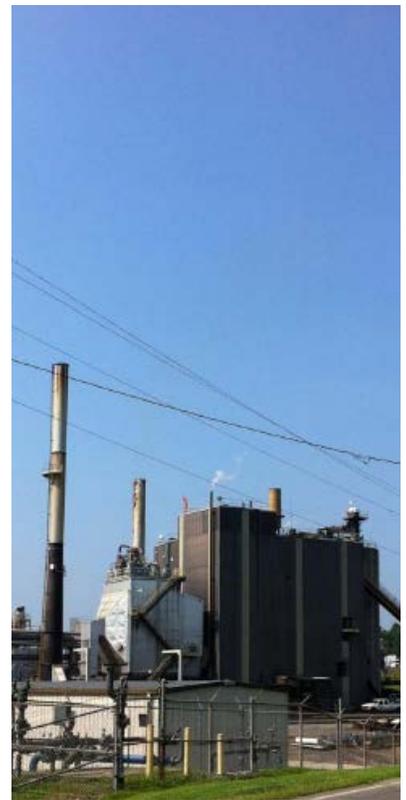
According to the North Carolina Department of Commerce¹, the state's manufacturing sector employs 11% of the state's non-farm workforce. Combined Heat and Power (CHP) and Waste Heat to Power (WHP) technologies can help this important sector become more competitive and grow by controlling energy costs and improving efficiency. In addition, CHP & WHP projects represent sound investment opportunities for outside capital to develop clean and reliable energy infrastructure to replace aging power generation and meet the energy needs of industry, which is expected to increase by almost 8% by the year 2021².

By generating power where it is needed, and recovering the thermal energy for process or facility needs, or by recycling existing thermal waste heat, a CHP or WHP system can save the end-user a great deal of money. The Southeast Clean Energy Application (SE-CEAC) has calculated that a 10 megawatt natural gas fueled CHP system can save an industrial facility as much as \$3.4 million, or 35% in annual utility costs per year by reducing power and steam expenses. WHP technology is capable of harnessing heat left over from existing processes, converting it to useable electricity with no additional fuel or emissions.

Despite the benefits of CHP & WHP – high operating efficiencies, reduced facility energy costs, reduced emissions, reduced grid congestion, peak demand management, and a wide range of baseload power applications, significant opportunity remains to increase investment in these technologies in NC. This policy brief provides a look at simple, yet effective, policy solutions that can help the state achieve these benefits.

CHP supports NC's overall energy policy goals by:

- Increasing the productivity of energy in North Carolina
- Reducing energy costs for industry and businesses
- Bolstering existing industry jobs and supporting new jobs
- Supporting a more reliable and efficient modern electric system
- Utilizing renewable biomass in the most efficient manner
- Producing lower emissions than conventional generation



*The traditional method of separately producing usable heat and power has a typical combined efficiency of 45 percent, CHP systems can operate at fuel efficiency levels as high as **80 percent***

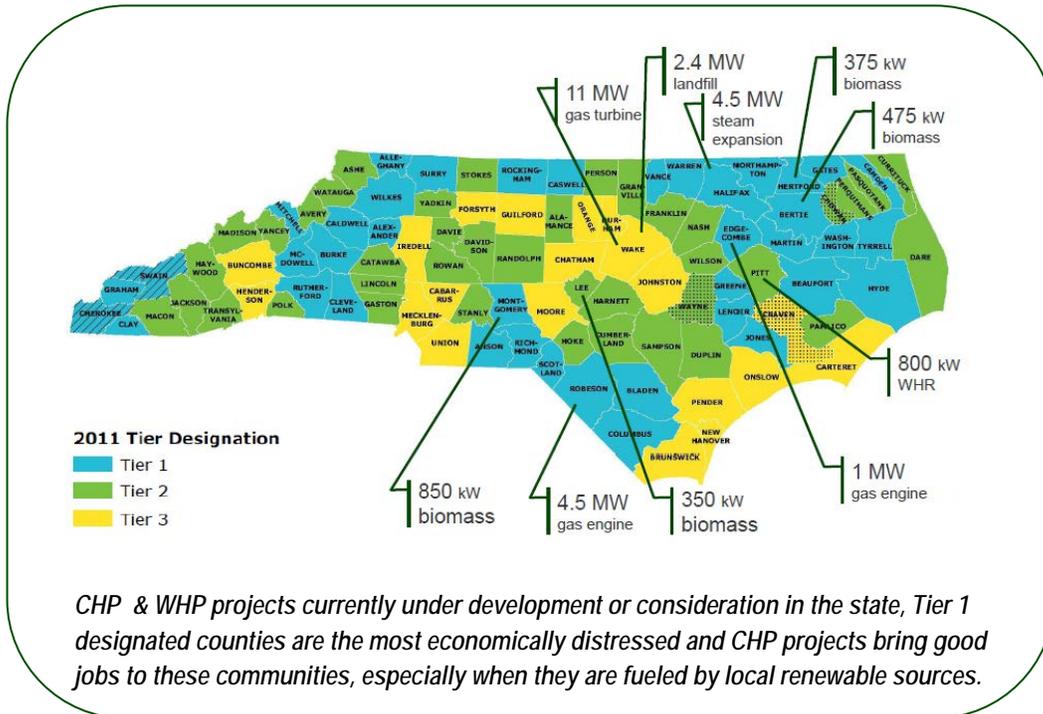
¹ North Carolina Department of Commerce, *2011 NC Economic Index*, <http://www.nccommerce.com/research-publications/industry-economy>

² US DOE Energy Information Administration, *2011 Electric Power Annual*, http://www.eia.gov/cneaf/electricity/epa/epa_sprdshts.html

CHP Potential in North Carolina

Current status of CHP in NC

North Carolina has over 1,500 megawatts of CHP capacity currently operating in the state, installed at 63 sites. This represents 5.1% of the total summer generating capacity in the state. Industries that use CHP include agriculture, furniture, textiles, rubber, pulp and paper, hospitals, universities and grocery store and include some of North Carolina's most notable corporations and organizations, such as Sara Lee, Abbott Laboratories, Weyerhaeuser Company, Food Lion, UNC Chapel Hill and Fort Bragg. Some of these CHP systems have been operating for more than 50 years and most were installed before the year 2000. Since then, however, investment in this technology has dropped off, due to economic uncertainty, volatile fuel prices and suppressed electrical prices.



Wellons Energy Solutions, a third-party developer in North Carolina, owns three renewable biomass fueled combined heat & power projects, totaling 1.1 megawatts in electric capacity and capable of supplying up to 150,000 pounds per hour of steam to industry, adding 15 new operations jobs and supporting approximately 10 jobs in the local renewable biomass supply chain by the end of 2012

CHP Potential in NC

A recent US Department of Energy funded study by ICF International looked at both the technical and economic potential for CHP in North Carolina and, using current financial incentives, estimated a viable potential of over 1,200 MW new CHP by 2025. Currently, the state's low utility avoided cost rates act as a disincentive to producing and exporting electricity from CHP facilities. By acknowledging the economic and public benefits of CHP through various policy mechanisms, however, the potential for new CHP in NC could increase to over 2,600 MW by 2025.

Industrial electric rates in NC have risen by 34% over the period 2001-2010³, and based on this continuing trend and lower natural gas prices that are expected to persist, the economics of CHP development have recently improved. CHP systems from 100 kW to 20 MW and more in capacity are being considered in industry as a way to manage energy costs, at times with third-party developers entering the market to fill the demand with outside capital. Utilities are seeing CHP as a viable business strategy and are investigating both utility incentive programs for industrial CHP and their role in fulfilling the potential for larger CHP systems through utility asset ownership. Both utility incentives for CHP and utility asset ownership will bring a much needed infusion of capital to the market.

Another area where CHP can be considered is at industrial, commercial and institutional facilities that have boilers and process heating units that may be affected by proposed Emissions Standards for Major Source Industrial, Commercial and Institutional Boilers and Process Heaters⁴ released by the US Environmental Protection Agency (EPA), commonly

³ Ibid.

⁴ US Environmental Protection Agency, <http://www.epa.gov/airquality/combustion/actions.html>

referred to as the Major Source Boiler MACT. Many of these facilities that use coal or fuel oil in their units may consider new natural gas fired CHP in meeting the new emissions standards, while greatly increasing their productive output. The SE-CEAC has identified over 180 such facilities in the Southeast US with nearly 2,500 megawatts of new potential power generating capacity. DOE has joined EPA in an effort to help ensure that these facilities burning coal and oil have information on cost-effective clean energy strategies for compliance. The SE-CEAC, as one of DOE's regional Clean Energy Application Centers, will provide site-specific technical and cost information on clean energy compliance strategies, including CHP, to these major source facilities when the EPA rule is finalized.

CHP Policy Activity

Current Incentives and Policies for CHP

North Carolina offers a unique array of policies and regulations that support the development of CHP (see table below).

One of these policies is the North Carolina Renewable and Efficiency Portfolio Standard (REPS), which includes CHP as both a renewable and efficiency technology. The NC REPS requires the state's investor-owned utilities to offset 12.5% of retail electricity sales in the year 2020 with renewable energy or energy efficiency. As many as ten new renewable CHP facilities are under development in the state today due to this successful energy policy. New CHP facilities could achieve a 3-4% share of the REPS because they present a relatively low cost, high impact option; representing the potential development of 500-600 MW of new utility and private CHP by 2021.

The table below provides an overview of CHP supportive policies and incentives currently available in North Carolina⁵.

State of NC Incentive or Policy	Summary of CHP Eligibility
Renewable and Efficiency Portfolio Standard	In 2007 North Carolina enacted a Renewable and Efficiency Portfolio Standard (NC REPS) of 12.5% by 2021. This standard includes CHP & WHP as eligible technologies in meeting the standard through both renewable and fossil fueled systems. While renewable CHP or WHP can satisfy all of the REPS requirements for Renewable Energy Credits (RECs), including significant carve-outs dedicated to poultry waste and swine waste energy systems, up to 25% of the utilities obligation may be met through CHP as energy efficiency (45% after 2021).
Energy Efficiency Resource Standard	Included in the REPS above
CHP Investment Tax Incentive	North Carolina also has one of the highest tax credits in the country for renewable energy and CHP, at 35% of eligible investment. This tax credit, capped at a \$2.5M for commercial systems, remains in effect until the end of 2017.
State Sales Tax Exemption	None currently available
Integrated Resource Planning	CHP & WHP are not included as contributing resources.
Interconnection Standards	The state has established interconnection procedures with three tiers of review and no cap on system size limit. Only investor owned utilities are required to follow these standards.
Net Metering Provision	The state requires investor-owned utilities to offer net metering for CHP systems up to 1 MW.
State Grant Program	None currently available
State Loan Program	None currently available
Electric Utility Incentive Program	Under development by Duke Energy
Natural Gas Utility Incentive Program	None currently available
Output Based Emissions Standards	None currently available, though considered under Title V permits

⁵ Database of State Incentives for Renewables & Efficiency, custom feed at <http://www.southeastcleanenergy.org/policy/database.aspx>

Policy Initiatives Currently Underway

As one of the most effective and competitively priced renewable and efficiency options available to NC, it is important that this technology be increased in the state's energy mix. In addition to the previous policy accomplishments, policymakers, regulators and energy efficiency advocates in North Carolina are continuing to work on measures that would further promote market access for CHP.

- Introduced in 2011, Senate Bill 694 proposed to allow third party sales of electricity from renewable energy systems up to 2MW, potentially opening the door to allowing 3rd party PPAs for qualifying CHP systems.
- The North Carolina Utilities Commission can consider requiring CHP & WHP be included as a key resources in the Integrated Resource Planning (IRP) process for the state's investor owned utilities⁶.
- As the largest investor owned utility in the state, Duke Energy is investigating the potential for utility incentive programs for new CHP installations and utility asset ownership possibilities.
- Finally, the North Carolina CHP Initiative (NCCHPI) was formed in December 2010, and has involved over twenty-five industrial and business interests who are championing the expansion of CHP capacity in the state.

CHP Policy Development Opportunities

Since the passage of the NC REPS, CHP applications have received an increased amount of regulatory and legislative attention, including the addition of CHP to the state's renewable energy investment tax credit in 2010. Despite this success for the industry, there remain several barriers to CHP that can be addressed. Standby fees and interconnection study fees make startup investments in CHP less feasible. Additionally, CHP and small power producer rates for exported power are a disincentive for CHP owners to sell excess power. Below is an overview of the policy measures that could overcome barriers to CHP implementation.

- Establishing standby rates for customer owned CHP generation that accurately reflect the high reliability of CHP and actual costs for coincident peak standby capacity
- Requiring utilities to adhere to interconnection timelines and limit additional engineering studies, especially in cases of limited export
- Requiring municipal and electric cooperatives to adopt standards interconnection for CHP already in place for investor owned utilities
- Clarifying the valuation of CHP as an energy efficiency option in the NC REPS to open the door for utility incentive programs and asset ownership of CHP
- Allowing third-party sales of electricity from renewable fueled CHP systems and WHP systems that use little to no incremental fuel
- Including CHP in utility Integrated Resource Planning and Transmission & Distribution Studies as resource and benefit

For more information visit: www.southeastcleanenergy.org

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⁶ North Carolina Utilities Commission Docket E-100 Sub 128, *Investigation of Integrated Resource Planning 2010*, <http://www.ncuc.net/>

Proven Technology

Thomas Edison used CHP as early as 1882 in America's first power plant, selling both electricity and the waste heat produced as a by-product. Industrial facilities that require process heat or steam have long benefited from cogeneration systems that supply both electrical and thermal energy. More recently, owners and managers of commercial buildings have discovered that cogeneration can be a cost-effective source of reliable energy as well as heating and cooling - the single most expensive operating expense in typical buildings.

-California Efficiency Partnership