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NCSEA



June 6, 2011

Ms. Renee Vance
Chief Clerk
North Carolina Utilities Commission
4325 Mail Service Center
Raleigh, NC 27699

RE: Docket No. E-100, Sub 128

Enclosed please find the original and thirty (30) copies of comments from the North Carolina Sustainable Energy Association to be filed in the above-referenced docket. All parties of record have been served.

Thank you for your attention to this matter.

Very truly yours,

Kurt J. Olson

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**BEFORE THE STATE OF NORTH CAROLINA UTILITIES COMMISSION**
**RALEIGH, NORTH CAROLINA**
**DOCKET NO. E-100, SUB 128**



| | | |
|---|---|---|
| **In the Matter of** | ) | |
| **Integrated Resource Planning In** | ) | **COMMENTS** |
| ***North Carolina -- 2010*** | ) | |

In accordance with the May 5, 2011 Order issued by the North Carolina Utilities Commission (the "Commission") in the above referenced docket, the North Carolina Sustainable Energy Association ("NCSEA") hereby submits the following comments.

## NCSEA'S COMMENTS

**1.** NCSEA is a not-for-profit corporation formed under the laws of North Carolina, with individual members and member businesses located across the state. NCSEA's mission is to promote a sustainable future through the use of renewable energy resources and energy efficiency programs. NCSEA's interest in electric utility integrated resource planning involves evaluating those plans to assure that renewable energy and energy efficiency receive the appropriate consideration in those long term plans.

With the imminence of carbon legislation, highly publicized problems with nuclear energy and the massive instability in the middle east making $250 a barrel oil a real possibility, renewable energy and energy efficiency need to be viewed as

more than just an element of planning required by North Carolina's Renewable Energy and Energy Efficiency Portfolio Standard ("REPS law"). Renewable energy and energy efficiency represent real, low-impact resource options that with time, and certainly within the planning horizon covered by the IRPs, will reach parity with other resource options in terms of reliability and costs, and will exceed the viability of other choices when externalities are considered, assuming that is not the case already.

Rule R8-60(e) requires that as part of the integrated planning process, each utility shall "assess on an on-going basis the potential benefits of reasonably available alternative supply-side energy resource options." This requirement is separate from the obligation in similar rules requiring utilities to consider and incorporate in its IRP the obligation to comply with the REPS law. Consequently, planning involving alternative supply-side energy resources should not be limited to meeting the requirements of the REPS law alone. Rather, long range planning also should investigate the role of alternative supply side energy resources in meeting the main stream requirements of predicted future load. The IRPs in front of the Commission in this proceeding limit an evaluation of alternative supply side energy resources to meeting the REPS, lack a necessary foresight and as such, fail to anticipate a construct that will represent a least cost, most efficient option in the future.

**2.** Rule R8-60(i)(2) requires utilities to provide certain specified data in their IRPs on existing and planned electric generating facilities, excluding cogeneration and small power production. The exclusion of cogeneration from the IRP planning process ostensibly originates with the Public Utilities Regulatory Policy Act ("PURPA") and the historic place of cogeneration and small power production as being outside the control of the utilities. With recognition that renewable and natural gas generation must be increased to replace existing coal generation being phased out, NCSEA submits that utility owned and customer owned cogeneration now have a clear place in the IRP planning. Cogeneration will enhance the performance of power systems. It also presents a very effective component in REPS compliance plans.

Attached hereto as Exhibit A is a statement from the U.S. DOE Southeast Clean Energy Application Center ("Southeast RAC") on cogeneration/combined heat and power ("CHP") and how that generation fits into the long range planning in North Carolina. NCSEA does not necessarily support or endorse cogeneration over other alternatives but sees tremendous value in the following respects:

a. Cogeneration is a mature technology with many operational similarities to the existing utility fleet of centralized generation plants. It has significant potential to beneficially impact ratepayers, and provide a potentially low cost mechanism for RPS compliance from either fossil based energy

efficiency or RECs from renewable generation while simultaneously maintaining a reliable and dispatchable source of baseload power to meet utility generation obligations.

b. Cogeneration's levelized cost of power can compete under the current retail prices with cost ranging from $0.0504 - $0.0681 per kWh after taking into account fuel costs, operation and maintenance, and debt service.

c. While new natural gas combined cycle plants improve fuel efficiency to nearly 50%, cogeneration systems use 33% less fuel by way of fuel efficiencies of 75% and greater. This efficiency is possible through the recovery of normally wasted heat from power generation, which is used to meet thermal energy needs such as for industrial process steam. The higher efficiencies of cogeneration units translate to reduced fuel purchases, lowering the fuel procurement and logistics expenses and presenting an avenue to reduce the fuel expenses passed though to rate payers.

d. The reduced total fuel requirement from a cogeneration versus a comparable electric only facility provides a degree of price insulation from the historically volatile natural gas market by decreasing the volume of natural gas that the utility, and ultimately the rate payer, must procure.

e. Cogeneration provides multiple direct income streams in the form of electrical and thermal energy for facility operators. Customer sited

cogeneration can purchase the lower value thermal energy from the generation facility for use in processes or for heating and cooling. Under centralized generation, this thermal energy is discarded to the atmosphere in favor of increased electrical generation – a substantial portion of which is then turned back into thermal energy upon reaching the industrial end user. Thus, from the initial generation of heat and electricity though the transmission losses and subsequent conversion of electricity back to thermal energy creates a situation in which a larger, more capital intensive centralized electrical plant is required to deliver the same amount of final energy (thermal and electrical) that an onsite congregation unit would provide.

f. Cogeneration located on customer sites also eliminates transmission losses. These lines losses can typically amount to around 4% of power generated, and times of peak line congestion are correlated to highest transmission losses.

For the reasons outlined, NCSEA recommends that future IRPs include an evaluation of cogeneration, be it utility owned or third party, as a resource option. Cogeneration has moved beyond the days of merely being an artifact of PURPA and its many significant benefits to rate payers and IOU generators need to be recognized on their own. There are compelling reasons to include cogeneration in

the IRPs and we request the Commission to provide guidance to the IRP process to evaluate the true benefits that cogeneration assets have to offer in North Carolina. Further, it is timely and appropriate for the Commission to require utilities to thoroughly evaluate cogeneration as an option so that the maximum value of this resource can be obtained as soon as possible.

**3.** R8-60(c) requires that each utility consider supply-side and demand-side resources, including alternative supply-side energy resources, in the context of providing reliable electric utility service at least cost. This assessment has generally been relegated to the REPS compliance plans and consequently, the investigation into alternative supply side energy resources have taken on a feature of doing what's necessary to comply with the REPS law and not necessarily evaluating alternative supply side energy resources more broadly.

Within this construct, three distinct approaches to achieving compliance with the REPS law have emerged. With limited exceptions, Duke Energy Carolinas, LLC ("Duke") has essentially broadened its business profile into the renewable energy arena. Renewable energy certificates to comply with the solar set-aside and the general REPS obligation will be generated for the most part by Duke owned renewable energy facilities or existing Duke generation sites using renewable fuels.

In contrast, Progress Energy Carolinas, LLC ("PEC") plans to comply by purchasing RECs and electricity from third-party renewable generators and to a

much lesser extent than Duke, through the use of renewable fuels at existing generation facilities and company owned renewable generation facilities. Dominion North Carolina Power ("DNCP") plans to comply by the acquisition of out-of-state RECS.[1]

The contrast in compliance strategies, particularly between Duke and PEC, should set the stage for ultimately providing Commission substantial insight into what constitutes the least cost method of achieving compliance with the REPS. The results in the respective approaches to compliance should demonstrate whether Duke's extension of its business profile into the renewable energy arena results in greater incremental costs of compliance or less costs than PEC's reliance on third party providers, assuming of course that within each approach there are no factors distorting the results. Early results, particularly in the case of solar RECs, suggest that Duke's reliance on company owned solar generation is not the least cost way of achieving compliance. NCSEA also believes that the company owned approach adopted by Duke, although allowed under the law, does not fully meet the objectives the General Assembly sought when it enacted the REPS law. It does not foster private investment, does not create the diversity sought, and will in

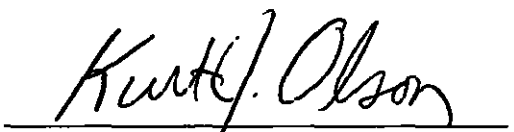
[1] NCSEA agrees with the Public Staff's position that to the extent DNCP has contracted to meet the REPS obligation for an electric membership corporation (the Town of Windsor), DNCP may not take advantage of the exceptions in the REPS law that allow it to meet its REPS obligations entirely from out-of-state RECs but rather must adhere to the 25% limitation on such RECs and other requirements applicable to an in state EMC.

NCSEA's view stifle grow in renewable energy and energy efficiency to the minimum needed to comply with the REPS.

NCSEA request the Commission to closely evaluate the respective approaches to compliance adopted by Duke and PEC and determine whether there is a significant difference in the cost of compliance between the two distinct choices. If that turns out to be the case, NCSEA requests that appropriate changes in the IRPs be made.

**4.** In Docket E-48, Sub 6, the Commission recently issued several key rulings related to approaches to compliance under N.C. Gen. Stat. § 62-133.8(c). Among other rulings, the Commission found that only energy efficiency or demand side management programs implemented after the REPS law was enacted could result in the creation of renewable energy certificates ("RECs") eligible for use in compliance. The Commission also found that in determining the incremental costs of an EE or DSM program it was not appropriate for a partial requirements utility to use the avoided costs of the wholesale supplier but that a determination of actual avoided costs was required. These and other rulings were issued after compliance reports and compliance plans by the electric membership corporations and the umbrella organizations were submitted in this proceeding and to the extent necessary those plans and reports should be reconciled with those rulings.

Respectfully submitted, the 6th day of June, 2011.



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# EXHIBIT A

U.S. DEPARTMENT OF ENERGY
**Southeast Clean Energy Application Center**
*Promoting CHP, District Energy, and Waste Heat Recovery*

Date: 06 June 2011
To: The State of North Carolina Utilities Commission
From: U.S. Doe Southeast Clean Energy Application Center
**Re: The Value of Combined Heat and Power in North Carolina Integrated Resource Planning and Renewable and Efficiency Portfolio Standard Compliance Plans**

The U.S. DOE Southeast Clean Energy Application Center appreciates the opportunity to submit these comments addressing the importance of including cogeneration in the State of North Carolina's 2010 Integrated Resource Plan (IRP) and Renewable and Efficiency Portfolio Standard (REPS) Compliance Plans filings and the potential of industrial distributed generation in the resource planning process.

The U.S. DOE Southeast Clean Energy Application Center supports increased adoption of clean and efficient energy generation through cogeneration / combined heat and power (CHP), district energy, and waste heat recovery. In the state of North Carolina, the Southeast Clean Energy Application Center ("Southeast RAC") provides industrial, commercial and institutional CHP users access to technical expertise and policy information, enabling sound decision making along the path of project development. We also serve the southeastern states of Arkansas, Alabama, Florida, Georgia, Kentucky, Mississippi, South Carolina and Tennessee. The center's activities are jointly conducted by the North Carolina Solar Center at NC State University and the Mississippi State University. Funding for the Southeast RAC is provided primarily by the U.S. Department of Energy's Industrial Technologies program, with cost share funding from the grantees.

We support the IOUs intent to produce power using a balance mix of cost-effective, clean and reliable resources, with recognition that development of new natural gas and renewables generation must be increased to replace existing coal generation that would be prohibitively costly to bring up to the standard of cleaner contemporary resources. As such, we must point out that all of the presented 2010 NC Integrated Resource Plans lack any mention of cogeneration, which fits into both these development categories, and herein present arguments why and how it should play a more substantial role in planning. Indeed, the inclusion of utility owned and customer owned cogeneration will enhance performance of the utilities' power systems for both IRP purposes and NC REPS compliance in a very effective manner. For clarity, cogeneration is the concurrent generation of power and thermal energy on a customer site, and includes topping-cycles such as combustion turbines, or steam turbines, as well as bottoming-cycle waste heat to power conversion.

In the currently presented draft IRPs, the major electric suppliers present development plans for combined cycle natural gas generation as a primary means to provide the required capacity plus reserve while potentially retiring over 3,000 MW of coal generation located in the Carolinas by the year 2015 (Dominion: redacted, Duke Energy: 1,539 MW from Table 3.4, Progress Energy: 1,533 MW from Appendix B).

While these natural gas combined cycle plants improve fuel efficiency to nearly 50%, cogeneration systems use 33% less fuel by way of fuel efficiencies of 75% and greater. This efficiency is possible through the recovery of normally wasted heat from power generation, which is used to meet thermal energy needs such as for industrial process steam. Cogeneration located on customer sites also eliminates transmission losses typically amounting to around 4% of power generated. As a result of fuel efficiency and high output of useful energy, cogeneration saves hundreds of thousands of dollars in energy expenditures where both power and heat are needed. Cogeneration efficiency also results in much lower emissions output, as much as 40% lower than the conventional means of producing power and thermal energy separately.

Evidence that cogeneration is important consideration in the IRP comes from a 2010 ICF International Market Study for North Carolina showed that 2,622 MW of new CHP could be potentially developed by 2025 in NC if cogeneration is prioritized as a resource and given access to the market. This is derived from examination of the technical potential for CHP in existing and future NC industries, which is 10,702 MW by 2025, based on natural gas fired topping cycle CHP with export of surplus power to the grid. This study took into account the 35% investment tax credit for CHP, as well as a value of $5 for the thermal RECs. A copy of the summary tables from this study is attached to these comments (8 pages total).

The ICF study showed a very good levelized cost of power generated by cogeneration systems, ranging from $0.0504 - $0.0681/kWh after taking into account the cost of fuel, operation and maintenance and debt service. This delivered cost is within the range of current retail pricing in the state, however significant financial deterrents exist for privately owned cogeneration systems in the current regulatory framework. Standby charges, interconnection study fees and exit fees make investments in cogeneration less feasible, while cogeneration and small power producer rates for surplus power are a disincentive for cogeneration owners to sell surplus power.

Industrial, commercial and institutional cogeneration systems fall in a 1-100 MW size range, which is driven by the technology used and the steam or thermal load at a site for optimal performance. Cogeneration systems may also be sized with additional electrical generating capacity for peak power potential, a strategy currently employed at NC facilities to shave customer demand peaks and reduce load on the grid (UNC-Chapel Hill Cogeneration Systems, KapStone Paper and Packaging Corporation). Due to cogeneration's superior performance and

reduced operating cost, many precedents exist for customer-owned facilities in North Carolina. Currently, 1,504 MW of cogeneration exists in the state and is used in a variety of industries that employ thousands of persons; forest products and paper industries, chemicals and raw materials processing are a few of the classic CHP opportunities. These cogeneration systems are fueled by a variety of sources, including fossil fuels and renewable fuels, including woody biomass, dry wood scraps, black liquor, landfill gas and/or digester gas.

Cogeneration also presents an advanced paradigm for siting of new generating resources, allowing planners to develop a more stable, yet responsive grid. Currently, the grid design for North Carolina utilities includes several major nuclear assets, with intermediate fossil fuel generation placed at remote sites in between to level out the "valleys". These intermediate resources are limited in their placement, often to existing generating sites, due to their large footprints, proximity to natural gas lines and sensitivity to issues of community aesthetics, noise and environmental impacts. Distributed cogeneration provides a further layer of resources that may be placed within the boundaries of existing industrial sites with little appreciable impact. For the grid planner, cogeneration solves several resource siting issues, reducing the distance between sites to tens of miles or less, in some cases relieving congestion on the grid, and of course eliminating or offsetting existing transmission losses. From an economic development perspective, cogeneration allows for energy intensive industries to locate in distressed areas which may not have adequate capacity available.

Reliability is a primary consideration in IRP, and cogeneration has a proven track record of excellent reliability and high operational availability. An Energy and Environmental Analysis, Inc. (2004) report titled "Distributed Generation Operational Availability and Reliability Database" found from a survey of owners of CHP in the range of 20-100 MW, operational availability averaged 93.5%, with only 1.37% of forced outage experienced. The scheduled outages are coordinated with the electric utility and occur during the spring and fall shoulder seasons. This may be compared to the 91.5% average operational availability reported by Progress Energy of their fossil fueled steam fleet for the year ending March 2010 (NCUC Docket E-2 sub 967). CHP also operates at higher than typical capacity factors, in some cases close to 100% when optimally sized, which is a sound strategy to insure the best return on investment.

There are three primary mechanisms for development of the potential CHP capacity in the state; private or institutional investment, utility investment, and third-party developer investment. Private investment has been the typical means for CHP investment, where capital is available, though since 2005, this has slowed nationally, given changes in PURPA, new rules for wholesale markets, natural gas instability and the financial crisis. Utility investment in CHP has precedent in other states, where partnerships with industry and institutions have resulted in win-win scenarios, such as in Charleston, South Carolina, where SC Electric & Gas partnered with Mead

Westvaco on the development of a 99 MW CHP plant that supplies steam to the paper plant, now owned by Kapstone Kraft paper, and electricity to the utility. This type of partnership in development should be used in the state to assist the utilities in creating a more modern and robust grid. The third-party model, where a developer will finance, construct and operate a CHP plant, is an ideal case, where the private market assumes the risk of development, while the benefits still accrue to the customer and to the power grid. This type of investment is constrained however, by the lack of a third-party power sales provision in the state's utility regulations, and such a provision is a desirable situation for companies willing to invest capital in building important industrial CHP infrastructure in this state.

Recent activity in renewable fueled CHP has been seen with the passage of NC REPS legislation, with several projects around 1MW under development in the state. These projects are being developed by industry and in one case, a third-party developer who will own and operate the plant. This activity should be nurtured and encouraged to expand, with potential for larger CHP resources being developed in the coming years. Cogeneration complements the generating profile of solar photovoltaic resources that have and will continue to permeate the electric system in North Carolina, by providing base-load capability and high responsiveness to demand signals. Combining cogeneration and solar PV at industrial sites is a logical fit given the latter's summer peak potential and diurnal generating characteristics.

Under the North Carolina Renewable and Efficiency Portfolio Standard, CHP is an eligible technology for compliance the investor owned utilities obligation to produce renewable power or implement energy efficiency offsets. By the year 2020, the three investor owned utilities operating in the state will be required to offset 12.5% of retail sales with Renewable Energy Credits (RECS) from renewables, such as biomass fuelled CHP, under the NCREPS, with an optional 25% of this coming from efficiency measures, including CHP. Based on projections of approximately 130,000,000 MWh of retail sales in 2020, this translates to a total requirement of 16,250,000 MWh with a possible 4,062,500 coming from efficiency. A 100 MW CHP plant operating at 85% capacity factor is capable of generating 744,600 MWh of power, as well as an equivalent 850,000 MWh in thermal energy. Therefore CHP presents a very sound strategy to achieve REPS requirements at a low cost, with the benefit of providing a significant quantity of baseload and dispatchable power.

Smaller cogeneration units in the form of backpressure steam turbines present a unique opportunity to introduce advanced energy efficiency measures into existing industrial systems. These units may be installed in parallel to bypass pressure reducing valves, converting mechanical power to electricity, with normal sizes ranging from 100kW to 1000kW. While this technology fits into existing incentive programs, these programs are typically designed around more commonplace efficiency measures, such as lighting retrofits and HVAC upgrades that save

power but do not generate like CHP. New incentive programs to support the installation of these units should be investigated using cost effectiveness tests and market study to determine their benefit and appropriate incentives.

Soon to be finalized regulations from EPA know as Boiler MACT (Maximum Achievable Control Technology) will have a large impact on many thermal generation units in the state, a large number of which are fueled with coal or fuel oil. Rather than merely installing costly pollution controls, an opportunity to modernize with cogeneration is strongly indicated here, especially in the case of older units. The Southeast RAC has identified 78 industrial and institutional boiler and process heating units that will potentially be affected across the state of North Carolina. Altogether, these units converted to CHP equal 2,437 MW of electrical power *generation potential, while satisfying existing thermal demands in more cost effective manner* with much lower emissions. This opportunity must be facilitated by the reduction of financial and regulatory barriers to private and third-party development, and we recommend that the Commission study the issues that constrain development of cogeneration.

Inclusion of CHP in the utilities' IRPs for 2010 will send the correct market signal and potentially result large scale private and utility investment in this cogeneration, strengthening the electric and industrial infrastructure critical to the state's future. Considering the information presented in this filing, we would expect that the state's investor-owned franchise utilities will include cogeneration in their current and future integrated resource planning, and seriously investigate and report on the potential for utility-owned, and private power producer cogeneration plants in North Carolina. To realize the potential for cogeneration in the state, we suggest the Commission provide guidance in the process directed towards consideration of this technology's potential and value to the state's utility customers and resolve to take actions that will promote adoption and development of cogeneration in the private and utility market.

Respectfully Submitted,

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U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

# ICF International Market Analysis of

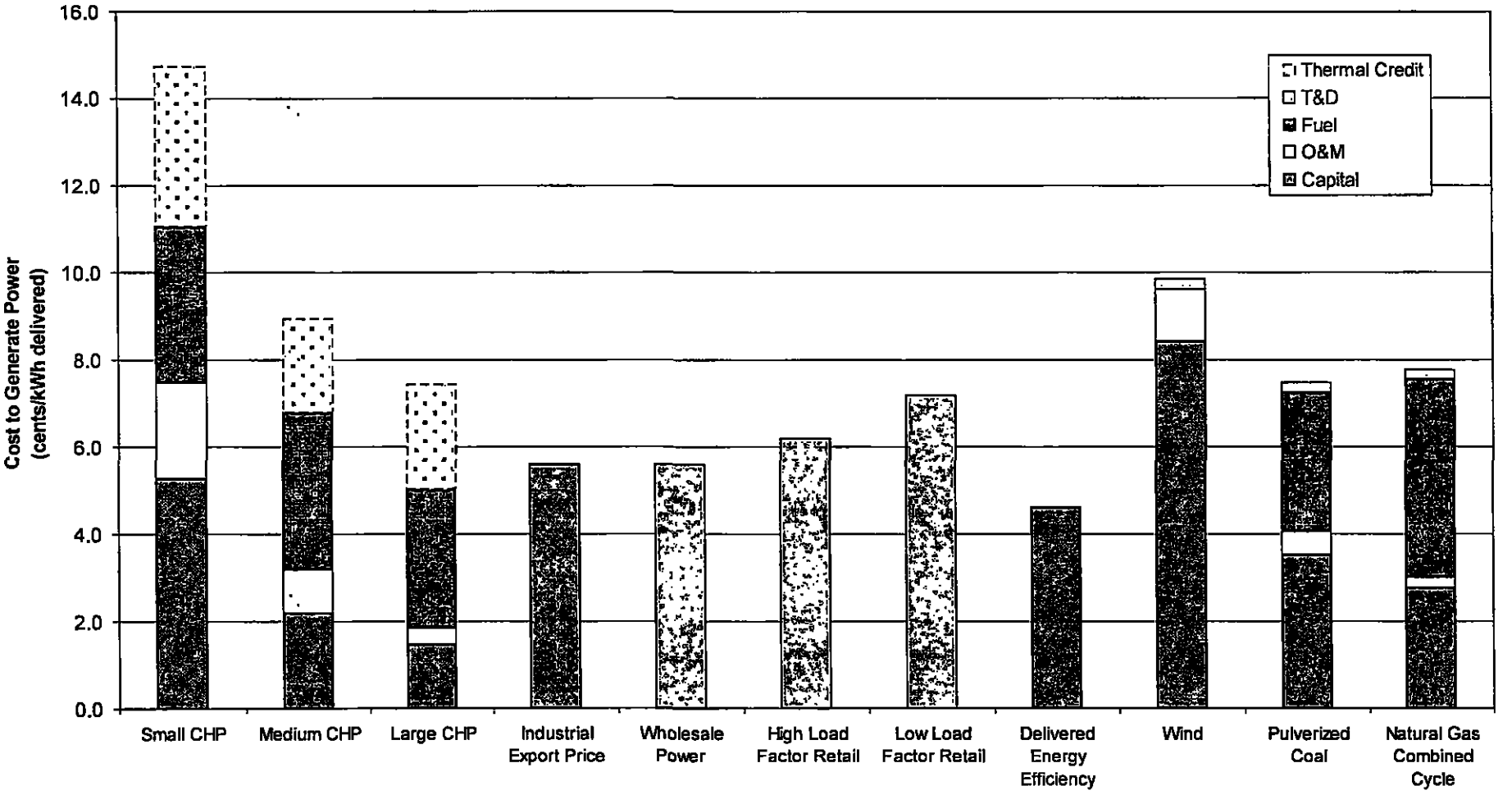
# North Carolina

## Combined Heat and Power Potential

# CHP Represents a Competitively Priced Electricity Resource in NC

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

**Cost of Delivered Electricity - North Carolina**



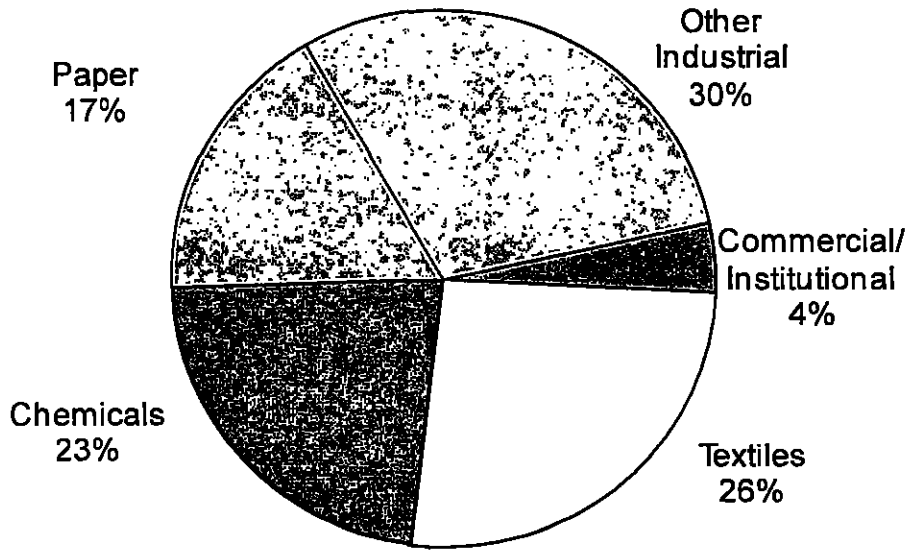

Source: ICF 6 State Scenario Analysis, Oct 2010

# Existing CHP in North Carolina



| Application Class | Sites | MW |
|---|---|---|
| Industrial | 43 | 1,442 |
| Commercial/ Institutional | 15 | 62 |
| Other (EOR, mining, agriculture, etc) | 1 | 0.1 |
| **Total** | **59** | **1,504** |

**Existing CHP Capacity in NC**




Source: ICF 6 State Scenario Analysis, Oct 2010

# North Carolina CHP Potential



- Existing CHP
  - –1,504 MW
- CHP Technical Potential in North Carolina
  - – 7,800 MW no export,
  - – 10,700 MW with export
- CHP Market Penetration through 2030 - Base Case (reflects current market conditions)
  - – 170 MW no export,
  - – 600 MW with export
- Evaluated Impact of key policy proposals on market penetration to inform RAC priorities

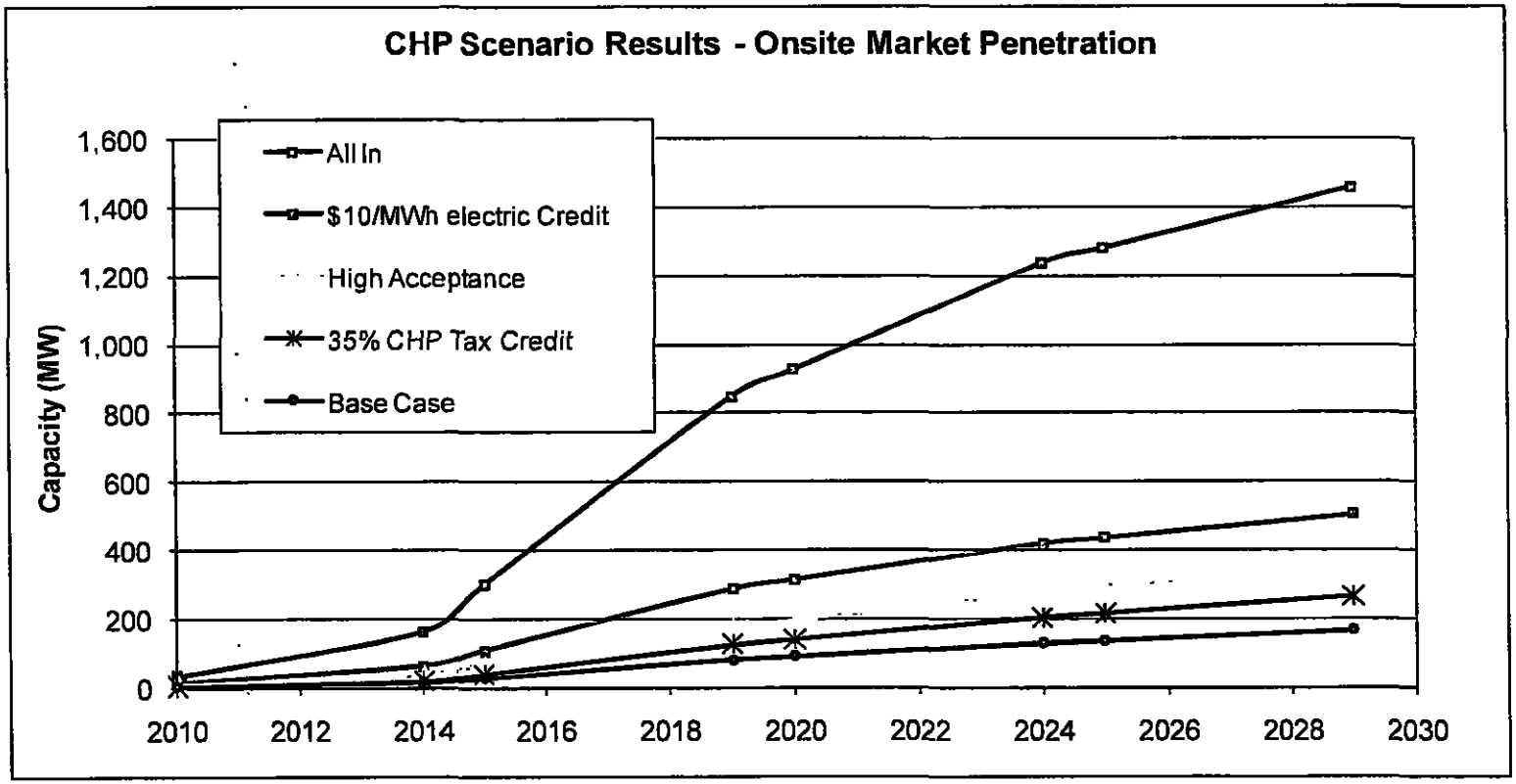
# Target Policy Scenarios



- Scenario analysis evaluated CHP market penetration in response to different policies.
  - Base case with and without export
    - Export price based on what would otherwise have been built -- combined cycle gas turbine (CCGT)
- Policy scenarios were chosen based on the goals of the RACs efforts - with and without export
  - 35% ITC applied to reduce capital costs up to $2.5MM/project
  - CHP eligible for EECs
  - Increase customer acceptance of CHP to achieve greater market penetration

# Scenario Results



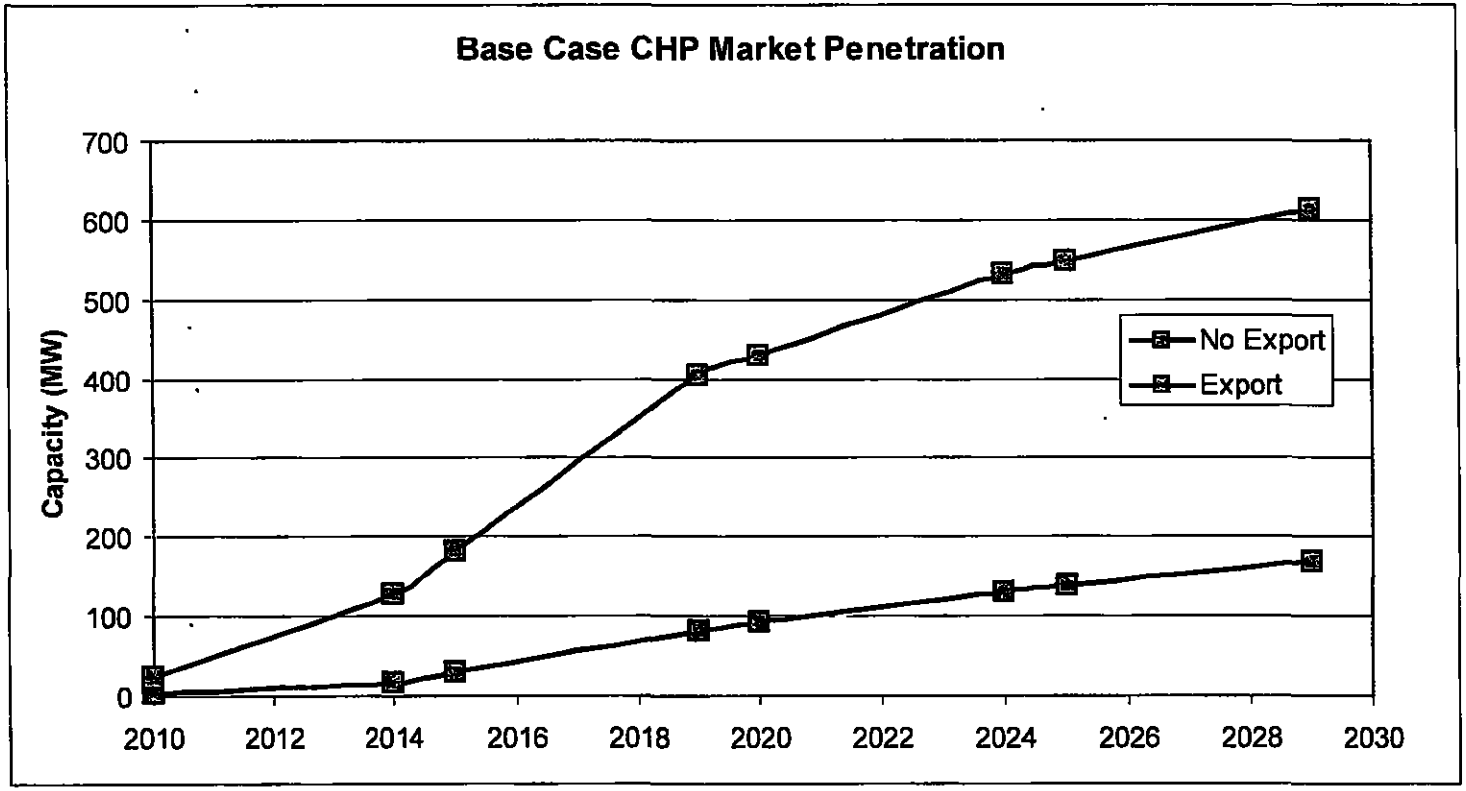



*All In case includes the $10/MWh electric credit, 35% CHP Tax Credit, and high customer acceptance factor.

Source: ICF 6 State Scenario Analysis, Oct 2010

# Export Represents a Significant Resource in North Carolina



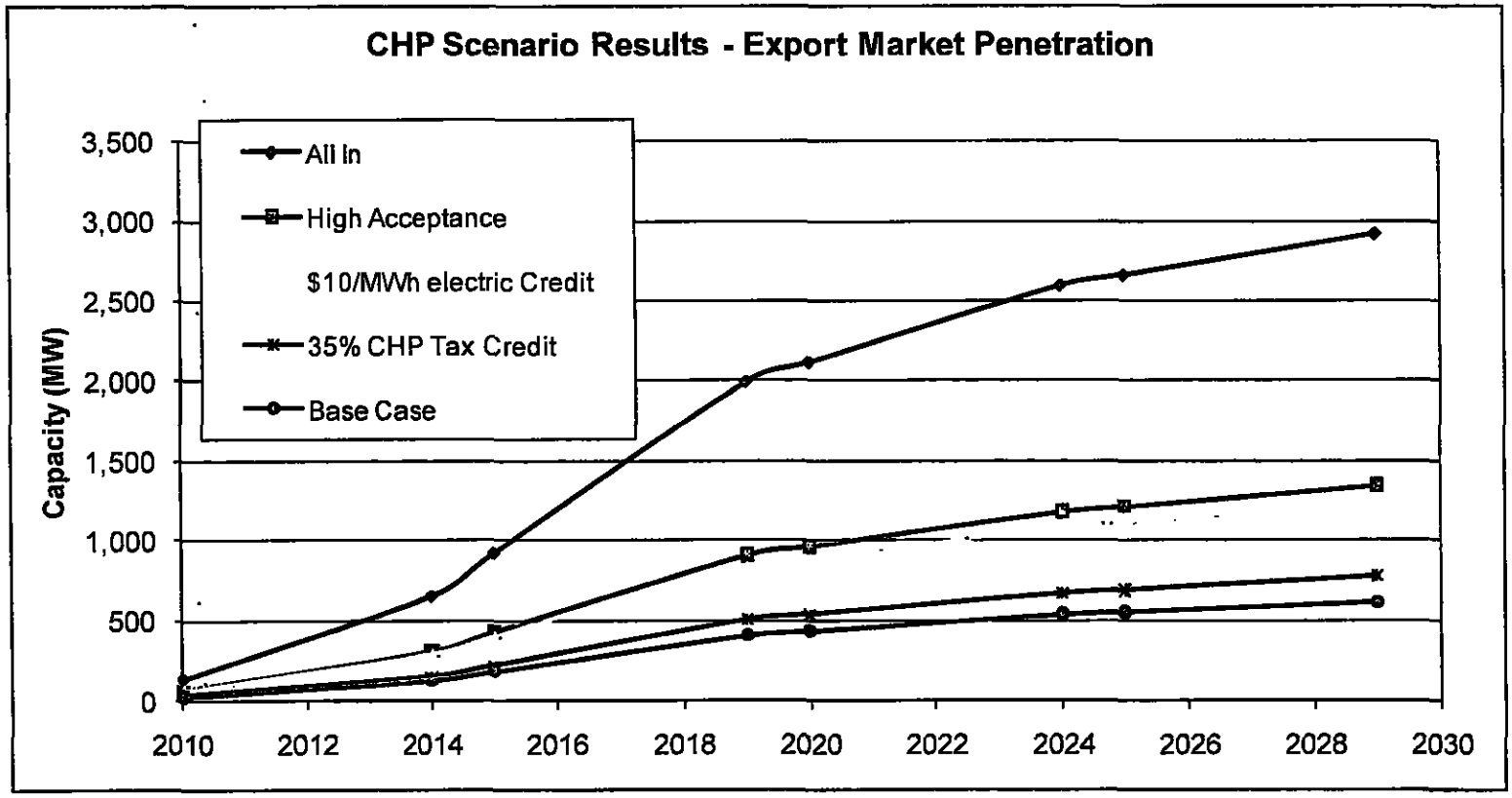



*Export - CHP sized to on-site thermal needs, excess power sold to grid*

**Source: ICF 6 State Scenario Analysis, Oct 2010**

# Scenario Results – with Export






*All In case includes the $10/MWh electric credit, 35% CHP Tax Credit, and high customer acceptance factor.

Source: ICF 6 State Scenario Analysis, Oct 2010

## CERTIFICATE OF SERVICE

I hereby certify that all persons on the docket service list have been served true and accurate copies of the foregoing pleading or document and any attached exhibits by hand delivery, first class mail deposited in the U.S. mail, postage pre-paid, or by email transmission with the party's consent.

This the 6th day of June, 2011

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