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**North Carolina:
Promoting Emerging Climate Protection Technologies
with Relatively Limited Resources**

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Background

Founding Advanced Energy

Advanced Energy is a non-profit established in 1980 by the N.C. Utilities Commission. By setting up a single, dedicated non-profit corporation to research and promote energy efficiency and alternative generation efforts, it was anticipated that duplications of effort by individual utilities pursuing similar objectives could be avoided by more collaboration and concentration of purpose.

This was many years prior to establishment of public benefits funds (PBFs) by other states that allocate a certain dollar amount for research and application of energy efficiency innovations and / or renewable generation. With a couple of exceptions, these PBFs were formed primarily in restructured or deregulated states.

Years after Advanced Energy's establishment, it appears that somewhat similar concepts were used to justify the PBFs set up in deregulated states. My understanding is that many deregulated states made the argument that their utilities would not adequately pursue those opportunities given their deregulated situation. North Carolina did not restructure its electric utility industry (ceasing all activity in that regard when California developed concerns) and consequently did not establish the significant PBF as anticipated — one that would be more in line with those adopted by most of the states that went through restructuring. With the state's recent approval of a Renewable Efficiency Portfolio Standard (REPS), the electric utilities are specifically charged with the responsibility of obtaining certain minimum amounts of renewable power and / or energy efficiency.

Today's Budget

Advanced Energy's total budget averages between seven and eight million dollars. Approximately, \$3.8 million comes from N.C. ratepayers through the electric utilities. The remaining funds come from national fee-for-service work and government contracts. Revenue from out-of-state work is utilized in North Carolina, particularly in some of our subsidized housing and other projects.

NC GreenPower

In 2003, at the request of the legislature and the N.C. Utilities Commission, we formed a separate subsidiary (staffed by Advanced Energy) called NC GreenPower, a statewide voluntary program to promote renewable generation. Numerous grants from electric utilities, N.C. State Energy Office and others have helped establish and market the program. As the number of participants grows, NC GreenPower has become more self sufficient in successfully marketing the program through statewide media.

We are proud of the fact that the program is experiencing a growth rate of voluntary contributions of over 20 percent so far this year. For specifics of the program, we pay renewable producers the necessary increment over the avoided cost rate paid by utilities to make their projects feasible. For the residential market, we charge four dollars for a 100 Kwh block of power. Large volume purchasers can buy less expensive blocks. We expect to continue the voluntary NC GreenPower program even in light of the passage of the REPS, given that many customers want to do more than the minimum required of the utilities. Approximately, 19 of the 24 states that have adopted an RPS also have voluntary purchase programs for renewable power.

Collaborative Infrastructure

Advanced Energy is part of a strong, energy-related infrastructure promoting emerging climate protection technologies. The local infrastructure includes active environmental organizations, electric utilities, several major universities and the following:

- a. [Association of State Energy Research and Technology Transfer Institutions \(ASERTTI\)](#)
- b. [Biofuels Center of North Carolina](#)
- c. [North Carolina Department of Commerce](#)
- d. [North Carolina Rural Economic Development Center, Inc.](#)
- e. [North Carolina State Energy Office](#)
- f. [North Carolina Solar Center](#)

However, the amount of funds available to provide grants, investment dollars or loans to companies involved in developing new technologies is minor in North Carolina compared to what a few leading states are doing. We, as a group, have found other ways to partially compensate for the lack of significant funding for this purpose. The new state legislation requiring a minimum amount of renewable power / energy-efficiency in the generation mix may expand the role that the utilities may take but it is too early to tell.

We have a staff of about 55, comprised mainly of engineers and building scientists. We have well equipped testing laboratories. Also, since we are located on N.C. State University's campus, we have access to faculty, students and other labs. We work closely with our member utilities in N.C. and work directly with a variety of customers both in and outside the state to promote energy efficiency for all customer groups along with productivity improvements for our industrial customers. Our NC GreenPower work brings us in close contact with developers and would be developers of renewable generation technologies.

Response to Questions

What were the drivers in your state that led you to take a role in advancing clean energy technologies?

I believe that such a role is implicit in our charters for both Advanced Energy and NC GreenPower. However, it is a limited role in respect to awarding grants or making investments in companies involved in developing such technologies.

NC GreenPower financially helps renewables by subsidizing renewable developers and people installing such equipment. For example, we pay 18 cents per kWh for solar power delivered to the grid. This is in addition to the approximate five cents per kWh that is paid to them by the respective utility. I should add that this is for installations up to 10 KW. Larger installations must bid into RFPs.

What were the primary barriers that your program addressed? Have you been successful? What additional challenges remain?

In regard to developing a substantial plan to encourage clean energy technologies, there are and were several barriers. Some of them may be alleviated somewhat with the passage of the REPS this summer.

Our state has relatively low electric rates. For example, Duke Energy prints the statement on its billing envelopes that its rates are 27 percent below the national average. They have just agreed to another reduction which will take them to about 30 percent below. Low rates make it more difficult to justify expenditures for the more expensive energy efficiency products and / or renewable generation.

North Carolina has been consistently rated the number one state in the country for a favorable business climate and amenities for enjoyable living. As a result, we are experiencing very substantial population growth with new industries and companies relocating here at a constant rate. With these positive things happening, it probably makes it less likely that the legislature will enact anything that would provide a large fund for a broad spectrum of emerging technology. However, they did pass legislation setting up a Biofuels Center with five million dollars in funding this session.

Also, the N.C. legislature may feel it has done or is doing a lot already. In 2002, it passed legislation — going beyond federal government requirements — to require our utilities to clean up power plant emissions. In 2005, a Climate Commission was established to investigate what should be done to combat global warming. (The Commission and subcommittees will report in 2008.) Lastly, North Carolina became the first state in the Southeast to adopt a portfolio standard this summer.

Have we been successful in promoting the development of clean emerging technologies? This is difficult to answer. We have been successful given the constraints under which we operate, but I think we could do much more. We have been successful in several endeavors as a result of bringing partners together.

In regard to what challenges remain, we cannot predict how the utilities will respond to the portfolio standard. For example, Duke Energy has bought a wind company and reportedly is interested in buying a solar company.

What criteria do you apply in selecting among promising technologies to support?

We have considerable in-house expertise to determine which technologies will be viable, and meet the claims of the individuals or companies involved. If it passes our initial review and / or tests, we also bring in utility engineers when it concerns a technology they might employ.

We are careful to maintain our recognition and reputation as being an independent testing facility by not becoming an equity partner in any one company's product where there are or may become competing products in the same technology. We bring utilities and other potential investors in to evaluate products we tested or think might have merit. In the plug-in hybrid electric school bus project, we brought many partners together nationwide but none took an equity interest in the school bus manufacturer.

We did make an exception for Microcell (www.microcellcorp.com), a fuel cell company started by Advanced Energy employees. However, we do not do independent testing of fuel cells.

What planning and analysis tools exist to assist in promoting emerging technologies?

We have no formal procedure since this is a relatively small part of our overall business. We may test a product or help with a demonstration pilot program to help determine its viability.

Has your state attempted to document the GHG or other benefits of these programs?

There have been efforts to document GHG emissions in general and try to determine any savings coming from various actions of industries. More efforts are being planned on this broader scale.

In regard to NC GreenPower, we do estimate the CO₂ emission reductions from that program. Also, for the individual emerging technologies that we work with, either the companies or we usually try to estimate the CO₂ savings involved with their products.

Examples of Technologies

Examples of Emerging Climate Protection Technologies with which Advanced Energy has Worked

1. Large ice storage project for farm cooling produce
2. Plug-in hybrid electric school bus
3. Microcell Fuel Company
4. Concentrating solar PV
5. Advanced variable speed pump for swimming pools
6. HVAC control and monitoring panel
7. Sensor detector to count people in a room
8. Various lighting and cooking equipment