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REPORT OF THE

NORTH CAROLINA UTILITIES COMMISSION

TO

THE GOVERNOR OF NORTH CAROLINA, THE ENVIRONMENTAL REVIEW COMMISSION AND THE JOINT LEGISLATIVE UTILITY REVIEW COMMITTEE

E-100 SUB 116

REGARDING

AN ANALYSIS OF RATE STRUCTURES, POLICIES, AND MEASURES TO PROMOTE RENEWABLE ENERGY GENERATION AND DEMAND REDUCTION IN NORTH CAROLINA

THE GREAT SEAL OF THE STATE OF NORTH CAROLINA
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September 1, 2008

September 1, 2008

Honorable Michael F. Easley, Governor
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Raleigh, North Carolina 27611

Dear Sirs:

Pursuant to Section 4(c) of Session Law 2007-397 (Senate Bill 3), the Utilities Commission hereby presents its report to the Governor of North Carolina, the Environmental Review Commission and the Joint Legislative Utility Review Committee regarding an analysis of whether rate structures, policies, and measures, including decoupling, in place in other states and countries that promote a mix of generation involving renewable energy sources and demand reduction should be implemented in North Carolina.

I understand that legislative counsel will distribute copies to the members of the Environmental Review Commission and the Joint Legislative Utility Review Committee. Thank you for your assistance.

Very truly yours,

Edward S. Finley, Jr.
Chairman

ESF/LSW

Copies of the Report of the North Carolina Utilities Commission Regarding an Analysis of Rate Structures, Policies, and Measures to Promote Renewable Energy Generation and Demand Reduction in North Carolina have been mailed or hand delivered to the following:

The Honorable Beverly Perdue, Lieutenant Governor

The Honorable Marc Basnight, President Pro Tem of the Senate

The Honorable Joe Hackney, Speaker of the House of Representatives

Members of the Environmental Review Commission

Members of the Joint Legislative Utility Review Committee

Mr. Robert P. Gruber, Executive Director
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Ms. Margaret A. Force, Assistant Attorney General
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Mr. Larry E. Shirley, Director, Energy Division
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Progress Energy Carolinas, Inc.

Duke Energy Carolinas, LLC

Dominion North Carolina Power

North Carolina Electric Membership Corporation

ElectriCities of North Carolina, Inc.

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EXECUTIVE SUMMARY

In Section 4(c) of Session Law 2007-397 (Senate Bill 3), the North Carolina General Assembly required the Commission to

> prepare an analysis of whether rate structures, policies, and measures, including decoupling, in place in other states and countries that promote a mix of generation involving renewable energy sources and demand reduction should be implemented in this State.

In preparing its analysis, the Commission not only reviewed available literature but also sought data and comments from electric power suppliers and other interested stakeholders. After reviewing initial recommendations regarding the scope of its analysis, the Commission identified a list of eighteen rate structures, policies, and measures for further consideration and sought (1) further comment from utilities and other stakeholders on whether the rate structures, policies, and measures should be implemented in North Carolina, and (2) specific information from utilities regarding the extent to which the rate structures, policies, and measures had already been implemented.

The Commission did not attempt to analyze every policy that might promote renewable energy or energy efficiency, perform an energy efficiency study, or identify potentially cost-effective demand-side management programs or energy efficiency measures that might or should be implemented by electric power suppliers. Rather, the Commission focused on those structures, policies, and measures, like decoupling, which are related to electric utility rates, either specific rate schedules or issues regarding rate design. The Commission notes that the General Assembly may wish to consider studying subjects outside of the purview of the Commission, such as tax policy and building codes, that would also impact the development of renewable energy or energy efficiency in North Carolina.

Decoupling

Decoupling is a ratemaking concept and regulatory tool designed to "break the link" between a utility's revenues (or profits) and its sales, or energy consumption by its customers. It is intended to remove the disincentive that a utility would have to reduce sales (and profit) by promoting conservation, including the implementation of energy efficiency measures, and non-utility owned distributed generation.

Decoupling for electric utilities is very controversial, as evidenced by the disparity of views expressed to the Commission in preparing its analysis. In an attempt to accomplish a similar purpose as decoupling, the General Assembly adopted several specific measures in Senate Bill 3 last year intended to encourage utilities to promote conservation and energy efficiency. Pursuant to G.S. 62-133.9(d), a utility may recover its costs associated with new energy efficiency measures outside of a general rate case; it may capitalize and earn a return on its costs as it would with investment in supply-side resources; and it may receive an additional incentive based upon a sharing of the savings, a percentage of avoided costs, or any other means determined by the Commission to be appropriate. Having only issued its rules implementing Senate Bill 3 earlier this year, the Commission believes that it is premature to adopt new major changes to electric utility rate structures before it has been determined whether the incentives under Senate Bill 3 serve their intended purpose and are sufficient. The Commission, therefore, recommends that additional decoupling tactics not be adopted for electric power suppliers in North Carolina on a generic basis at this time.

Time-differentiated rates

Time-differentiated rates, including time-of-use (TOU), critical peak pricing (CPP), and real-time pricing (RTP) rates, encourage reduced energy usage when a utility's variable production costs are high by offering different rates for different months of the year or hours of the day. The rates may be set in advance and averaged over many hours or many months, as with TOU rates, or may be set dynamically (a single day or hour ahead), as with CPP and RTP rates.

The Commission recommends that utilities make efforts to increase the promotion and utilization of time-differentiated rates by all customers. For example, utilities are encouraged to inform new customers about the TOU rate option when they apply for electric service. As demonstrated by the utility data submitted in this docket, the level of participation in TOU rates among residential customers, in particular, continues to be quite low. Two reasons offered for this lack of participation include the additional metering cost imposed on TOU customers and the uncertainty regarding the savings that will actually be achieved. Although the Commission does not believe it is in the public interest to mandate participation for all customers in time-differentiated rates, the Commission encourages utilities to investigate opportunities to better educate their customers, to examine existing time-differentiated rates to ascertain whether design improvements could be made, and to reduce the cost of participation in TOU rates as the cost of more advanced metering falls. Lastly, the Commission encourages utilities to increase choices for their customers and to investigate alternatives to current time-differentiated rates, such as multi-tier TOU and CPP rates.

Demand increasing rates

Demand increasing rates, including declining block, business recruitment, fuel switching, all-electric, and security lighting rates, encourage additional energy consumption by discounting the price of electricity for certain customers or applications. The Commission was urged to consider in its analysis not only new rate structures, policies, and measures that might be adopted in North Carolina, but also the discontinuance of such demand increasing rates that are already in place that might inappropriately encourage increased consumption and peak demand.

The Commission recommends that utilities reconsider the appropriateness of declining block rates, particularly for residential customers. The Commission would caution, however, those that believe that inclining block rates offer a preferred solution for all customers by pointing out other effects that such rates might have. Inclining block rates may be effective at encouraging reduced energy usage for those that have the means to do so, but such rates also have the potential to drastically increase bills for those customers who cannot. Like many other rate structures discussed herein, inclining block rates, too, have the potential to result in increased per-unit electricity rates if they successfully reduce consumption. The Commission, therefore, encourages utilities to carefully consider the implications and potential impact on customers when designing increasing block rates.

Similarly, the Commission notes that some utilities have undertaken efforts to phase out all-electric rates and recommends that the remaining utilities also reconsider the appropriateness of continuing such rates. The Commission does not believe that other discounted rate schedules, such as business recruitment rates and fuel-switching rates, are necessarily inappropriate demand increasing rates. The Commission will continue to monitor the effectiveness of such rates in the future. With regard to security lighting, the Commission encourages utilities to continue to monitor improvements in lighting so that future installations use the most cost-effective energy efficient lighting technology available.

Customer-owned generation rates

Although many of the other rate schedules and structures considered in this analysis would affect both a customer's decision to implement conservation and energy efficiency and to install its own generation to offset purchases from the utility, costs incurred under standby rates and the availability of net metering directly impact those customers that either have installed, or are considering the installation of, their own generation.

The Commission previously considered standby rates in its investigation of small generator interconnection standards, Docket No. E-100, Sub 101, and notes that many utilities have eliminated standby rates for small customer-owned generation. Neither Duke nor Progress, for example, imposes a standby charge on residential customers. Utilities should not be required to eliminate standby rates if doing so would simply shift costs from customer-generators to the utility's remaining customers. The Commission, therefore, will continue to monitor the imposition of standby rates and take further action, if necessary.

The Commission recommends that no action be taken by the General Assembly at this time with regard to net metering. In Senate Bill 3, the General Assembly required the Commission to consider whether it is appropriate to allow generators up to one megawatt to participate in net metering. On June 9, 2008, the Commission issued an Order in Docket No. E-100, Sub 83 establishing a procedural schedule to receive verified written direct and rebuttal expert testimony and exhibits addressing this issue. In its Order, the Commission indicated that it would consider not only whether solar photovoltaic (PV), wind-powered, micro-hydro, or biomass-fueled electric generating facilities up to one megawatt or some smaller size should be allowed to net meter, but also whether additional types of generating facilities should be allowed to net meter and whether the terms and conditions under which generating facilities are currently allowed to net meter should otherwise be changed. The deadline for persons to intervene and file direct testimony and exhibits in this docket was August 29, 2008; parties may file rebuttal testimony and exhibits on or before October 24, 2008. Hearings also have been scheduled in Charlotte and Raleigh to allow members of the public an opportunity to testify orally before the Commission.

Advanced metering and demand response

The scope of "demand response" is potentially very broad. In the context of this analysis, demand response refers to those rate structures, policies, and measures implemented by utilities that allow customers to agree in advance to having their load reduced, or curtailed, during periods when variable production costs or electric demand are high. Thus, while TOU rates could generally be considered demand response rates in that customers respond to price signals to reduce load, customers are not required to agree in advance or to commit to reduce load as is required under demand response rates and direct load control programs. Advanced metering – including automated, or remote, meter reading (AMR); interval, or demand, metering; and automated metering infrastructure (AMI), or smart grid, technologies – is the infrastructure that supports increased demand response and many of the other rate structures, policies, and measures included in this analysis. As a result, any implementation of AMI should be accompanied by the development of innovative rates that allow customers to benefit from the enhanced information provided by new technology.

Most utilities in North Carolina have just engaged in upgrading their metering infrastructure to AMR so that many, if not most, customer meters may be read remotely. The Commission believes that it would not be cost-effective to remove large numbers of relatively new meters and replace them with more advanced technology. At some point, however, existing residential meters will approach the end of their useful lifespan and need to be replaced. The Commission, therefore, encourages utilities to continue to evaluate AMI and looks forward to receiving reports from Duke and Dominion on the results of their ongoing pilot programs. Ultimately, the utilities and the Commission may wish to consider installing smart meters for all residential customers along with the development of rates that take advantage of such advanced metering. This increased deployment of AMI should lead to lower unit costs for these meters and increased participation in time-differentiated rates. At that point the utilities may find it appropriate to consider making AMI technology the standard meter technology for residential use.

Lastly, the Commission recommends that utilities aggressively pursue opportunities for increased demand response, both in conjunction with, and, if possible, prior to, deployment of smart meters and AMI. Demand response programs have a tremendous potential to impact peak demand and should be fully utilized by utilities.

BACKGROUND

In August 2007, North Carolina enacted comprehensive energy legislation, Session Law 2007-397 (Senate Bill 3). Among other things, Senate Bill 3 is intended to promote the development of renewable energy and energy efficiency. Section 4(c) of Senate Bill 3 provides as follows:

> The Utilities Commission shall prepare an analysis of whether rate structures, policies, and measures, including decoupling, in place in other states and countries that promote a mix of generation involving renewable energy sources and demand reduction should be implemented in this State. The Commission shall submit this analysis to the Governor, Environmental Review Commission, and the Joint Legislative Utility Review Committee no later than 1 September 2008.

In preparing its analysis, the Commission not only reviewed available literature but also sought data and comments from electric power suppliers and other interested stakeholders. Although the Commission has jurisdiction only over the rates of electric public utilities in North Carolina, the Commission's analysis encompasses all electric power suppliers in North Carolina, including electric membership corporations and municipal electric suppliers, because Senate Bill 3 encompasses, and the General Assembly has jurisdiction over, all electric power suppliers in this State.

By Order dated February 15, 2008, the Commission initiated a proceeding in Docket No. E-100, Sub 116 to receive information from electric power suppliers and the public relevant to its analysis. In that Order, the Commission first sought assistance in identifying the rate structures, policies, and measures to be included in the Commission's analysis. As discussed below, numerous companies, organizations, and individuals filed comments with the Commission relevant to this analysis. A complete list of participants in the Commission's docket is attached as Appendix A.

The purpose of the Commission's docket, as noted in its June 2, 2008, Order on Clarification, was to allow the electric power suppliers in this State and other interested persons an opportunity to inform the Commission of their views with regard to the rate structures, policies, or measures under consideration and to assist the Commission in responding to the General Assembly's request, not to exercise jurisdiction over otherwise unregulated entities. No entity was required to participate, and the Commission stated that no rate structures, policies, or measures would be implemented without further proceedings.

Scope of Analysis

In its analysis, the Commission was directed to consider "rate structures, policies, and measures, including decoupling, in place in other states and countries that promote a mix of generation involving renewable energy sources and demand reduction." Demand reduction encompasses a broad variety of potential options, including demand response, energy efficiency, distributed generation, and dynamic or time-based rate options. Demand response refers to short-term or long-term actions by consumers, usually as a result of price signals, to reduce or shift energy usage from higher to lower-cost periods of time. The adoption of appropriate regulatory policies will ideally result in both a delay in the need for new expensive, and often controversial, electric generation and transmission projects and a reduction in emissions, including greenhouse gases, by electric power suppliers while maintaining adequate, reliable electric service.

Seventeen persons, entities, or organizations submitted comments in response to the Commission's February 15, 2008 Order. Those comments provided more than thirty discrete recommendations regarding rate structures, policies, and measures that could promote or hinder a mix of generation sources and demand reduction in North Carolina.

On May 12, 2008, the Commission issued an Order identifying the following list of eighteen rate structures, policies, and measures to be considered in its analysis and sought further comment on whether these rate structures, policies, and measures should be implemented in North Carolina:

- Decoupling;
- Time-of-use rates;
- Real-time pricing;
- Inclining block rates;
- Declining block rates;
- Business recruitment rates;
- Fuel-switching rates;
- All-electric home rates;
- All-electric HVAC/appliance rates;
- Security lighting rates;
- Net metering;
- Standby rates;
- Demand-response rates, including the ability for customers to aggregate load from various sites/accounts;
- Direct load control;
- Programmable thermostats, including programmable communicating thermostats;
- Automated/remote meter reading;
- Advanced/interval metering; and
- Automated metering infrastructure, including two-way communications, advanced metering and related software.

In addition, the Commission sought specific information from the electric power suppliers with regard to the availability and use of the identified rate structures, policies, and measures.[1]

The Commission did not, however, attempt to analyze every policy that might promote renewable energy or energy efficiency. In determining the list to be considered, the Commission focused on those structures, policies, and measures, like decoupling, which are related to electric utility rates, either specific rate schedules or issues regarding rate design.

The Commission, therefore, did not consider in this analysis a number of policies that obviously impact the development of renewable energy or energy efficiency but are not related to rates or rate design, such as system benefit charges or other "grid fees," building codes, tax credits, supply procurement practices, "carbon adders" for fossil generation when comparing resource options, interconnection procedures, energy efficiency portfolio standards, independent third-party energy efficiency administrators, or mechanisms that would pass through to consumers energy efficiency benefits other than from retail electric rates.[2] The Commission notes that the General Assembly may wish to consider studying subjects outside of the purview of the Commission, such as tax policy and building codes, that would also impact the development of renewable energy or energy efficiency in North Carolina.

In addition, the Commission did not attempt to perform an energy efficiency study as part of this analysis or identify potentially cost-effective demand-side management programs or energy efficiency measures that might or should be implemented by electric power suppliers. An evaluation of such measures is currently required to be undertaken by electric public utilities and electric membership corporations as part of the integrated resource planning process. Also, a number of electric power suppliers have recently undertaken such studies because of the inclusion of energy reductions through the implementation of energy efficiency measures to comply with the Renewable Energy and Energy Efficiency Portfolio Standard (REPS) adopted in Senate Bill 3.

Retail Electric Suppliers in North Carolina

Electric consumers in North Carolina are served by one of the following types of electric power suppliers: investor-owned utilities (IOUs), university-owned utilities, electric membership corporations (EMCs), and municipally-owned

[1] The information submitted by the electric power suppliers as well as all of the comments received by the Commission in preparing its analysis are available on the Commission's Internet web site, http://www.ncuc.net (search for Docket No. E-100, Sub 116).

[2] For example, in 2001, California implemented a "20/20" program under which consumers that reduced their energy consumption by 20% from the prior year received a 20% rebate on their summer electric bills.

utilities. The Commission does not regulate the retail electric rates of EMCs or municipally-owned utilities.

Between 1997 and 2000, North Carolina considered, but ultimately decided against, restructuring its electric industry and allowing for retail electric competition, as had been done in California and many other states. The North Carolina General Assembly passed legislation during the 1997 session establishing the Study Commission on the Future of Electric Service in North Carolina (Study Commission). The Study Commission was charged with examining the cost, adequacy, availability, and pricing of electric service in North Carolina to determine whether legislation was necessary to assure an adequate and reliable source of electricity and economical, fair, and equitable rates for all consumers of electricity in North Carolina. Although the Study Commission approved final recommendations in April 2000, including the adoption of fully competitive retail electric service for all consumers in North Carolina, no implementing legislation was ever introduced.

There are three IOUs and two university-owned utilities operating in North Carolina subject to the jurisdiction of the Commission. The three IOUs are Carolina Power & Light Company, doing business as Progress Energy Carolinas, Inc. (Progress), whose corporate office is in Raleigh; Duke Power Company, LLC, doing business as Duke Energy Carolinas, LLC (Duke), whose corporate office is in Charlotte; and Virginia Electric and Power Company, whose corporate office is in Richmond, Virginia, and which does business in North Carolina under the name Dominion North Carolina Power (Dominion). Duke serves over 1,730,000 customers located in North Carolina, and Progress more than 1,250,000. Each also has customers in South Carolina. Dominion serves over 118,000 customers in North Carolina. The main portion of Dominion's corporate operations, however, is in Virginia, where it does business under the name of Dominion Virginia Power. The two remaining electric utilities subject to the Commission's jurisdiction are university-owned: New River Light and Power, located in Boone, and Western Carolina University, located in Cullowhee.

There are 31 EMCs serving more than 968,000 customers in North Carolina, including 26 that are headquartered in the state. Twenty-five of the EMCs are members of North Carolina Electric Membership Corporation (NCEMC), an umbrella service organization. NCEMC is a generation and transmission services cooperative that provides wholesale power and other services to its members.

Lastly, there are 74 municipal and university-owned electric distribution systems serving over 568,000 customers in North Carolina. These systems are members of ElectriCities of North Carolina, Inc. (ElectriCities), an umbrella service organization. ElectriCities is a non-profit organization that provides many of the technical, administrative, and management services required by its municipally-owned electric utility members in North Carolina, South Carolina, and Virginia.

New River Light and Power and Western Carolina University, North Carolina's two smallest regulated utilities, are members of ElectriCities. ElectriCities is a service organization for its members, not a power supplier. Fifty-one of the North Carolina municipals are participants in one of two municipal power agencies, which provide wholesale power to their membership: North Carolina Eastern Municipal Power Agency (NCEMPA) and North Carolina Municipal Power Agency No. 1 (NCMPA1). The remaining members of ElectriCities buy their own electric power at wholesale.

Traditional Ratemaking Methodology in North Carolina

Before discussing alternative rate structures, policies, and measures, it is helpful to understand basic rate design under traditional ratemaking methodology in North Carolina.

In North Carolina, an electric utility's rates are based upon its cost of providing service to its customers. A utility's costs are divided into "fixed" costs and "variable" costs. Fixed costs are those that do not vary with the amount of energy produced. Such costs include depreciation on investments in generation, transmission, and distribution facilities as well as customer billing and account management costs. While these costs may vary with the number of customers and the total electric demand, reducing sales of energy does not reduce the amount of fixed costs. Variable costs, on the other hand, increase or decrease with changes in energy consumption. Such costs include, for example, fuel and other operation and maintenance expenses.

The total revenue allowed to be collected by a utility is determined by adding the utility's actual expenses, including depreciation, during an historical test year and a return on its investment, or utility plant in service (rate base), based upon the utility's cost of capital (weighted average cost of debt and equity). The test year expenses are used to estimate the utility's normal expenses in future years, and may be adjusted to account for extraordinary weather or expenses incurred during the test year.

The total revenue requirement is allocated to groups of customers, or customer classes, based upon the cost of service to customers in each class. These classes group together similar customers based upon customer size (i.e., electric demand), and are typically divided into residential, commercial, and industrial classes. Some utilities divide non-residential customers into small, medium, and large service classes based on the size of the customer's electric load.

Rates for the customers in each customer class are filed with the Commission as tariffs, or rate schedules. More than one rate schedule may be available to customers within a class. All rate schedules are reviewed and approved by the Commission during a general rate case proceeding. Outside of a general rate case, the Commission may approve rate riders that adjust customer rates based upon, for example, changes in the cost of fuel, incremental costs associated with the purchase of renewable energy, or investment in new demand-side management programs or energy efficiency measures.

An individual customer's monthly bill is comprised of three main rate components: a customer charge, a demand charge, and an energy charge. In determining rates for electric utilities, however, not all of the fixed costs are included in a fixed charge to the customer. As explained below, some of the fixed costs are included in the variable energy charge, which helps to keep basic electric service affordable for customers with lower usage.

The customer charge is typically designed to recover non-production related fixed costs, such as those associated with transmission, distribution, and customer account management. A customer charge does not vary with usage, but is the same for all customers within the same customer group. Within a group of customers, such as basic residential customers, the costs to serve all customers are averaged and a uniform customer charge applied, even though the cost to serve individual customers may vary, as, for example, between those in more rural and in more urban areas. Each residential customer served by Progress under its basic residential rate schedule is billed a monthly customer charge of $6.75;[3] Duke's basic residential customers are billed a monthly customer charge of $7.87.[4] Non-residential customers and customers that require more advanced metering pay a higher customer charge based upon the higher cost of service to those customers.

The demand charge varies by customer based upon the maximum amount of electricity used by that customer at any particular time during the billing period and is designed to recover fixed production costs, such as depreciation on the utility's investment in generating facilities. A customer's electric demand is measured in kilowatts (kW). Not all customers incur a demand charge. Because a more advanced meter is required to record a customer's demand as well as its overall energy usage, the rates for smaller customers typically do not include a demand charge. Under such rates, the fixed production costs that would otherwise be included in a separate demand charge are recovered through the variable energy charge.

Lastly, the energy charge varies by customer based upon the total energy consumed by that customer during the month. Measured at the electric meter in kilowatt-hours (kWh), the energy charge primarily allows the utility to recover those costs that are incurred as a result of energy production, or variable production costs. As stated previously, however, some amount of the utility's fixed production or non-production costs may also be recovered through the

[3] Progress Rate Schedule RES-10B, Residential Service.

[4] Duke Rate Schedule RS (NC), Residential Service.

energy charge, particularly for smaller customers that are not charged a separate demand charge. This also results in lower minimum monthly bills for small customers with low energy usage. The energy charge is typically lower per kWh for larger customers than for smaller customers. First, as noted above, larger customers typically incur a separate demand charge. Second, larger customers typically have higher load factors than smaller customers. In other words, their usage is spread over larger periods of time rather than only at high-cost peak times, allowing the utility to utilize the capacity of its generating units more efficiently than simply using those facilities to meet the highest peak demand.

Another important factor in understanding utility costs and rates is that electricity cannot currently be easily or cost-effectively stored in large quantities.[5] Thus, electric energy must be produced at the exact time when it is needed. The variable production costs of an electric utility vary from month to month and from hour to hour depending upon the generating units being utilized to produce the energy required to meet electric demand at that time. When electric demand is relatively low, such as during the spring or fall months of a year or the nighttime hours of a day, the utility can supply all the energy needed to meet demand from generating units with lower production costs. During peak periods, however, when electric demand is relatively high, the utility must rely on its facilities with the highest production costs to produce enough energy to meet the electric demand. For purposes of designing rate schedules, this variability in production costs may be eliminated by adopting an energy charge that collects the average costs over the entire year. Under such a flat rate, customers are insensitive to the impact of their energy usage choices on a utility's costs. Both Progress and Duke have adopted seasonal rates, under which the energy charge per kWh varies between the summer months and other months based on the higher cost of meeting energy demand during the summer. Other rate schedules are available which allow customers to respond to changes to a utility's costs on a day-ahead or real-time basis. These rates are discussed in more detail in the following section.

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[5] Pumped-storage hydroelectric generating facilities are used to "store" electricity in a manner analogous to charging a battery. When electric demand is low and electricity is relatively inexpensive, for example, during nights and weekends, a utility can use low-cost power to pump water from a lower elevation reservoir to one at a higher elevation. When electric demand is high and electricity is relatively expensive, the water from the upper reservoir is released and diverted through turbines to generate electricity. It is not practical to build much pumped-storage capacity, and there is none located in North Carolina. Duke owns two pumped-storage facilities located in South Carolina, Bad Creek and Jocassee, with a combined generating capacity of 1,675 MW. Dominion operates a 2,100 MW pumped-storage facility in Virginia.

Chillers, such as that constructed for the downtown Raleigh government complex, provide another limited means to "store" energy similar to pumped-storage by cooling water overnight when electricity rates are low and storing it rather than cooling water when used the next day when electricity rates are higher. Lastly, researchers are investigating new technology for storing electricity. One idea being pursued is to eventually use the batteries in plug-in hybrid vehicles as a distributed energy source to meet peak demand.

ALTERNATIVE RATE DESIGNS

With recent increases in the price of fuel and the cost to produce electricity and with the potential need for new base load generating facilities, considerable effort has been devoted to the issues surrounding renewable energy and demand reduction, including the impact of increased retail electric prices on consumer behavior.[6] All agree that retail electric utility rates and rate structures influence customer consumption, and thus "are an important tool for encouraging the adoption of energy-efficient technologies and practices."[7] Discussed below are a number of alternatives to the current rates and rate structures in North Carolina that might be implemented to promote renewable energy and demand reduction.

Decoupling

Definition

Decoupling is a ratemaking concept and regulatory tool designed to "break the link" between a utility's revenues (or profits) and its sales, or energy consumption by its customers. It is intended to remove the disincentive that a utility would have to reduce sales (and profit) by promoting conservation, including the implementation of energy efficiency measures, and non-utility owned distributed generation.

Discussion

As discussed above, a utility's fixed and variable costs are recovered from customers through fixed and variable charges in rates established in a general rate case. The largest component of a utility's variable production costs is fuel, and utilities in North Carolina are allowed to pass through to consumers increases in the cost of fuel outside of a general rate case through a fuel charge rate rider. Because few of a utility's other costs vary with sales, increased sales results in increased profits for the utility. Conversely, decreased sales results in decreased profits, whether because of mild weather, economic conditions, or the implementation of energy efficiency measures. Thus, once rates are established in a general rate case, a utility has a financial incentive to increase retail sales of electricity beyond that used to establish its rates (and, hence, to allow it to recover its revenue requirement) and to maximize the "throughput" of electricity across its system.

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[6] Similar research and initiatives were undertaken in the late 1970s under similar economic circumstances.

[7] National Action Plan for Energy Efficiency, U.S. Department of Energy and U.S. Environmental Protection Agency, p. 5-1 (2006) (NAPEE).

Numerous methodologies, collectively referred to as decoupling, have been proposed in lieu of more frequent general rate cases to break this link between sales and profits, thus removing a utility's incentive to promote sales and disincentive to promote energy efficiency. Decoupling may be as simple or as complex as the utility and its regulators desire. The following are some ways decoupling could be accomplished:

- Revenue caps – A utility establishes a fixed level of revenue in a general rate case. By periodically adjusting its rates, the utility is allowed to maintain its revenues if electric sales decline from that projected in the rate case.

- Average revenue per customer – Between general rate cases, revenues are adjusted based on the number of customers served. This approach has been applied to natural gas utilities and recognizes that a utility's costs primarily change with the number of customers.

- Straight fixed variable rates – All of a utility's fixed costs are recovered in a fixed charge, and only variable costs are recovered in a variable charge. With this rate design, sales levels would not affect recovery of the utility's fixed costs. Reducing the variable charge, however, also reduces the impact of and motivation for energy reductions by customers.

- Formula rates – Certain items such as rate of return are decided in advance, usually during a general rate case. Using a formula established in that proceeding, adjustments are made periodically to reflect changes in the utility's expenses, revenues, or investment.

Another major issue in implementing decoupling is to determine which, if not all, factors affecting a utility's sales and revenues should be considered in establishing the periodic adjustments. Again, a number of alternatives have been proposed, including the following:

- Full revenue decoupling – Any variation in sales, whether due to conservation, weather, economic conditions, or other factors, results in an adjustment to allow the utility to maintain its established level of revenues.

- Net lost revenue adjustment – Net changes in revenues are adjusted only for sales deviations that can be proven to have resulted from utility energy efficiency and load management programs. Revenues may continue to vary based on changes in sales from other causes.

- Performance-based adjustments – Revenue requirements are adjusted based on inflation, changes in productivity, and changes in the number of customers that the utility is serving.

Decoupling advocates argue that it is the most effective way to break the link between utility revenues (or profits) and sales. They are not in agreement, however, with regard to the details of implementation. As described above, some commenters favored full revenue decoupling, while others preferred adjustments based on net lost revenues limited to energy reductions from the implementation of energy efficiency measures by the utility. With a lost revenue adjustment mechanism, the utility is allowed to recover its "lost" profit (margin) and contributions to fixed costs associated with the sales reductions due to its successful implementation of energy efficiency measures or distributed generation. It has been noted, however, that the determination of net lost revenues may be very contentious and that it may still not achieve its objective because utilities still earn increased profits on additional sales.[8] The revenue cap or average revenue per customer mechanisms avoid the need to resolve the amount of lost revenues associated with utility-implemented measures.

Other commenters questioned the appropriateness of implementing decoupling and stated that it would be an unwarranted departure from traditional ratemaking. They argued that decoupling is unnecessary because electric utilities in North Carolina are not experiencing a decline in revenues, and, therefore, there would be no need to adjust rates to maintain a utility's revenues. Additional concerns expressed include that decoupling would: (1) frustrate voluntary efforts of customers to reduce energy consumption by reducing the benefits achieved by customers who reduce consumption; (2) transfer traditional utility business risks to customers; (3) reduce a utility's motivation to be responsive to the needs of its customers; (4) create unnecessary rate volatility and uncertainty, and (5) reduce the utility's incentive to lower costs. Other commenters objected on the basis that decoupling subsidizes a utility for not producing energy, arguing that it is the consumer, not the producer, that should be provided an economic incentive to use less energy. Commenters further noted that decoupling had been rejected or abandoned in several states, including Maine, Oregon, and Washington. If the Commission were to implement decoupling, however, it should first initiate a general rate case for the utility and also lower the utility's allowed return on its investment to reflect the reduced business risk.

The commenters all agreed, however, that even if decoupling removes a disincentive to promote energy efficiency, it alone does not provide a sufficient incentive for the utility to promote energy efficiency. Duke, for example, argued that to make energy efficiency investments profitable when compared to other possible utility investment, performance incentives for efficiency should reward utilities that invest in successful programs by allowing them to earn an equivalent

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[8] NAPEE, at 2-7.

return on those demand-side investments as they do on supply-side investments. Duke believes that its Save-a-Watt proposal currently before the Commission is a better approach to provide this necessary incentive.[9]

Lastly, many of the commenters noted that the General Assembly has provided for incentives in Senate Bill 3 designed to accomplish the purpose sought through decoupling.[10] Under Senate Bill 3, a utility may recover its costs associated with new energy efficiency measures outside of a general rate case; it may capitalize and earn a return on its costs as it would with investment in supply-side resources; and it may receive an additional incentive based upon a sharing of the savings, a percentage of avoided costs, or any other means determined by the Commission to be appropriate. The Commission only issued its rules implementing Senate Bill 3 at the end of February this year. Until the Commission and General Assembly can see how the incentives will work under Senate Bill 3, argued some commenters, it is premature to consider tinkering with rate structures or implementing new policies and measures solely to attempt to promote a mix of generation involving renewable energy sources and demand reduction.

Extent of use in North Carolina

Although decoupling has not been implemented in North Carolina for any electric utility, a decoupling mechanism has been established for Piedmont Natural Gas Company, Inc., one of the natural gas local distribution companies

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[9] In the Matter of Application of Duke Energy Carolinas, LLC for Approval of Save-a-Watt Approach, Energy Efficiency Rider and Portfolio of Energy Efficiency Programs, Docket No. E-7, Sub 831 (filed May 7, 2007). The Commission expresses no opinion with regard to the merits of Duke's Save-a-Watt proposal as the matter is currently before it for decision.

[10] Section 4 of Senate Bill 3, G.S. 62-133.9(d), provides as follows:

> (d) The Commission shall, upon petition of an electric public utility, approve an annual rider to the electric public utility's rates to recover all reasonable and prudent costs incurred for adoption and implementation of new demand-side management and new energy efficiency measures. Recoverable costs include, but are not limited to, all capital costs, including cost of capital and depreciation expenses, administrative costs, implementation costs, incentive payments to program participants, and operating costs. In determining the amount of any rider, the Commission:
>
> (1) Shall allow electric public utilities to capitalize all or a portion of those costs to the extent that those costs are intended to produce future benefits.
>
> (2) May approve other incentives to electric public utilities for adopting and implementing new demand-side management and energy efficiency measures. Allowable incentives may include:
>
> a. Appropriate rewards based on the sharing of savings achieved by the demand-side management and energy efficiency measures.
>
> b. Appropriate rewards based on capitalization of a percentage of avoided costs achieved by demand-side management and energy efficiency measures.
>
> c. Any other incentives that the Commission determines to be appropriate.

operating in the State.[11] The Customer Utilization Tracker (CUT) mechanism automatically adjusts Piedmont's rates every six months to allow the utility to continue to recover an established average revenue per customer. Adjustments protect the utility from reductions in sales due to conservation efforts, variations in weather, economic conditions, and all other factors except for the loss of customers. In its Order adopting the CUT mechanism, the Commission discussed its alternatives:

> While conservation benefits customers and the general public, the practical reality is that it has the potential to do financial harm to the utility and its shareholders. The decoupling of recovery of margin from usage will better align the interests of the Company and its customers with respect to conservation, and this is particularly important today. Reconciling this inherent conflict between the utility and its customers can help open opportunities for conservation of energy resources, savings for customers, and downward pressure on wholesale gas prices, while also helping the utility recover its margin and earn a reasonable return. Other ways to address the conflict include higher fixed customer charges or more frequent rate cases, but fixed charges are unpopular with customers who feel that their bill should be tied to usage, and rate cases are lengthy and expensive proceedings that impose costs on both customers and the utility. The CUT allows for a continuation of a highly volumetric rate structure and lower fixed customer charges.[12]

The Commission recognized, however, that the CUT mechanism reduces the utility's risk.

> Piedmont argues that there is no evidence of reduced risk to shareholders, but the Commission disagrees on the basis of the Company's own case. The CUT will preserve the rate case assumptions as to customer usage and make corresponding rate adjustments. In a period of declining per-customer usage, a mechanism that decouples recovery of margin from usage, without requiring the utility to file frequent rate cases or increase unpopular fixed charges, clearly reduces shareholder risk.[13]

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[11] Order Granting Partial Rate Increase and Requiring Conservation Initiative, In the Matter of Application of Piedmont Natural Gas Company, Inc., North Carolina Natural Gas, and Eastern North Carolina Natural Gas Company for the Consolidation of Their Revenues, Rate Bases and Expenses, a General Increase in Rates and Charges, Approval of Various Changes to and Consolidation of Their Rate Schedules, Classifications and Practices, and Approval of Depreciation Rates, Docket No. G-9, Sub 499 (2005) (implementing CUT mechanism).

[12] Id. at 23.

[13] Id. at 24.

As further recognized in the Commission's Order in that case, however, there are potentially significant differences in circumstances between the natural gas and electric utilities in North Carolina:

> The evidence tends to show that the vast majority of the Company's costs are fixed and do not vary with customer usage, but that the Company's ability to recover its costs is highly dependent on customer usage due to its volumetric rate structure, and that this situation creates an inherent conflict between the interests of the Company and its customers with respect to conservation. Given a general trend toward decreased per-customer usage, this conflict threatens the Company's recovery of its approved margin.[14]

With regard to electric utilities, it is not evident either (1) that the vast majority of the utilities' costs are fixed and do not vary with customer usage, or (2) that the general trend has been toward decreased per-customer usage.

Time-differentiated rates

Utilities in North Carolina have offered rate schedules to their customers since the 1970s in which different rates are applied during different months of the year or hours of the day. Pursuant to G.S. 62-155(d), enacted in 1975, the Commission was required to

> study the feasibility of and, if found to be practicable, just and reasonable, make plans for the public utilities to bill customers by a system of nondiscriminatory peak pricing, with incentive rates for off-peak use of electricity charging more for peak periods than for off-peak periods to reflect the higher cost of providing electric service during periods of peak demand on the utility system.

Such price signals allow consumers to reduce energy consumption in both the short-term and the long-term and encourage investment in energy efficiency. Some options for time-differentiated rate schedules are discussed below.

Time-of-use rates

Definition

To encourage reduced energy usage when variable production costs are higher, time-of-use (TOU) rate schedules incorporate energy (per kWh) or demand (per kW) charges that vary by season or time of day. TOU rates schedules may simply offer separate rates for "on-peak" and "off-peak" months of

[14] Id. at 22.

the year or hours of the day, or may incorporate multiple tiers, such as on-, mid- and off-peak rates.

Discussion

TOU rates provide appropriate price signals to consumers and can result in changes of energy use patterns from higher cost on-peak periods to lower cost off-peak periods. Exposing customers to prices that more closely reflect a utility's marginal costs provides an incentive for more efficient use of resources.[15] TOU rates, therefore, are beneficial in reducing peak load and encouraging reduced usage when it would be most valuable. Changes by consumers are likely to be greater in the long term as they learn to adapt their behavior in response to the pricing structure, purchase timers or other equipment that will help them to shift energy usage, and purchase more efficient appliances.

Seasonal time-of-use rates have been offered by utilities in North Carolina since at least the mid-1970s. In the late 1970s, the Commission ordered electric public utilities to offer voluntary time-of-day pricing rates.[16] Virtually every customer in North Carolina, including residential, commercial, and industrial customers, may elect to receive service under TOU rates.

In its recent review of time-based rates, in Docket No. E-100, Sub 108, the Commission found that few residential customers elected a TOU option. However, no one recommended that TOU rates be made mandatory, in part, due to the expense of installing time-differentiated meters. A number of commenters supported expanding TOU options as advanced metering infrastructure and other consumer technologies are deployed.

Extent of use in North Carolina

Duke stated that the bulk of its commercial and industrial sales are under Rate Schedules OPT-G (NC), Optional Power Service, Time of Use, General Service, and OPT-I (NC), Optional Power Service, Time of Use, Industrial Service, which are both TOU rates that incorporate a significant differential in demand charges by season. In 2007, Duke served 1,859 residential customers,

[15] NAPEE, at 5-3.

[16] In the Public Utility Regulatory Policies Act of 1978 (PURPA), Pub. L. 95-617, Congress required states to determine whether or not it is appropriate to implement "time-of-day rates ... which reflect[] the costs of providing electric service to [classes of] electric consumers at different times of the day." In addition to time-of-day rates, states were also required to investigate the appropriateness of implementing cost-of-service based rates, declining block rates, seasonal rates, interruptible rates, and load management techniques. The Commission undertook the required investigation in Docket No. M-100, Sub 78. In the Energy Policy Act of 2005, Pub. L. 109-58, Congress amended PURPA to require states to consider additional federal standards, including "time-based metering and communications." The Commission undertook the required investigation of this standard in Docket No. E-100, Sub 108.

14,223 commercial customers, and 1,256 industrial customers on TOU rate schedules. This represents slightly more than 0.1% of Duke's residential customers. While it represents only 6% and 24%, respectively, of Duke's commercial and industrial customers, it accounts for nearly 60% and 85%, respectively, of the energy sold to Duke's commercial and industrial customers.

In 2007, Progress served 26,615 residential customers, 17,786 commercial customers, and 1,188 industrial customers on TOU rate schedules. This represents more than 2.5% of Progress's residential customers, nearly 10% of its commercial customers, and more than 33% of its industrial customers.

Dominion reported that in 2007, 660 of its North Carolina customers were served on traditional TOU rates, including 366 residential customers. This represents less than 0.6% of Dominion's total number of customers in North Carolina and less than 0.4% of its residential customers. However, 9.5% of the total energy sold by Dominion in North Carolina was provided under TOU rates, including approximately 21% of its sales to commercial customers and 13% of the energy provided to industrial customers.

NCEMC reported that in 2007 its members served 1,305 residential customers, 1,167 commercial customers, and 3 industrial customers on TOU rate schedules. This represents less than 0.3% of the EMCs' total number of customers and less than 0.2% of their residential customers.

ElectriCities did not provide any details, but indicated that TOU rates are "in use for a limited number of customers." Fayetteville Public Works Commission (PWC) indicated that it served 7 of its 24 industrial customers on TOU rates in 2007.

Dynamic pricing rates

Definitions

Dynamic rate schedules are TOU rates that incorporate variable energy charges to reflect time periods when production costs are high. Unlike traditional TOU rates, which have fixed on-peak periods, dynamic rate schedules do not include a predetermined time period when higher energy charges will be incurred. Rather, high cost periods are designated on relatively short notice for a limited number of days per year, such as the day before. Dynamic rate schedules typically incorporate TOU rates for most pricing periods. Prices under a dynamic rate schedule, however, are typically considerably higher than traditional TOU on-peak rates.

Critical peak pricing (CPP) rate schedules are dynamic rate schedules that impose an additional energy charge during the relatively few hours during the year when conditions are deemed to be "critical" and there is a need to send participating customers a very strong price signal. Customer notification of critical peak pricing periods is typically relatively short and may be as little as two hours. In a variable CPP rate structure, multiple critical prices are pre-established, and those prices can be implemented as necessary to reflect marginal production costs.

Real-time pricing (RTP) rate schedules include energy charges that vary hourly to reflect changes in wholesale energy prices or the utility's marginal production costs. Energy prices may be announced a day ahead or an hour ahead. Such rates may apply only to a portion of a customer's load.

Discussion

Dynamic rate structures, such as CPP rates, with their higher critical peak pricing, have the potential to be even more successful than TOU rates in reducing electric demand during peak periods. Like TOU rates, CPP rates provide consumers with more control over their electric bills and provide an increased incentive to shift peak load. In an economic sense, CPP rates are an improvement over TOU rates because the energy charges seen by consumers more closely reflect the utility's actual marginal production costs. CPP rates, however, have a higher implementation cost than flat or TOU rates. Also, while effective at reducing peak demand, CPP rates will not likely result in significant overall energy reductions.

RTP rates are effectively dynamic TOU rates with 24 hourly pricing blocks. In this way, RTP rates de-average the costs embedded in other rate schedules. RTP rates reflect actual changes in the cost of service to customers based on a number of factors influencing electric demand during any given hour, including weather. Thus, RTP rates would be lower than other TOU rates during hours designated as peak in which demand is, in fact, low. Proponents of expanding the use of RTP cite studies that show RTP to be a highly effective form of pricing that elicits consumer response and has the capability to moderate extreme spikes in market prices, increase reliability, and reduce the need to build additional generation.

RTP rates are typically available as an option only to large industrial customers due to the cost of metering and administration on the part of the utility as well as the sophisticated power control and other equipment that must be employed by the customer. The implementation of RTP rates requires the ability for the utility to communicate price changes as often as hourly to customers and for customers to adjust their consumption based upon that information. It is unlikely that RTP rates would be cost-effective for smaller customers.

Extent of use in North Carolina

Dominion serves 31 customers under three dynamic rate schedules, representing approximately 35% of its total 2007 energy sales and over 84% of the energy it provides to it industrial customers.[17] Dominion is conducting a residential CPP pilot program in Virginia that it expects will be useful in the design of more dynamic rate options that provide more appropriate price signals to its customers.

In 2007, Duke served 29 commercial and industrial customers under its RTP rates, representing 2.5% of its total energy sales.

Progress serves 85 industrial customers on its RTP rate, LGS-RTP-8, representing slightly more than 11% of its total energy sales in 2007.

Dominion reported that it does not have any North Carolina customers on an hourly RTP rate.

NCEMC reported that its members have no customers on RTP rates. RTP rates may not be an effective means of promoting conservation among EMC customers given the primarily residential and small business nature of the their loads.

The Commission is not aware of any municipally-owned utilities that offer RTP rates.

Demand increasing rates

The Commission was urged to consider in its analysis not only new rate structures, policies, and measures that might be adopted in North Carolina but also the discontinuance of rate structures that are already in place that might inappropriately encourage increased consumption and peak demand. For electric public utilities, each of these programs has been previously considered and approved by the Commission. The concern expressed is that the electric industry has changed and that programs that might have been in the public interest at one time are no longer so.

[17] Dominion has three dynamic pricing schedules available in North Carolina: (1) Schedule 10 – Large General Service, which is available to commercial and industrial customers and offers day-ahead notification of high cost, moderate cost, or low cost days; (2) Schedule 6VP – Large General Service Variable Pricing, which offers the same day type designation as Schedule 10 and is coupled with a CPP feature; and (3) Schedule NS, which is a contract rate applicable to Nucor Steel that includes dynamic and CPP rate attributes.

Declining and inclining block rates

Definitions

Declining block rates refer to rate schedules that impose a lower energy charge as consumption increases.[18] Declining block rate schedules may have two or more blocks, or tiers, with different energy charges. The first block is typically designed to encompass a relatively low monthly usage level – an amount that will likely be exceeded by most customers. Such a rate design can provide significant cost recovery certainty to the utility because a large proportion of the fixed costs will be collected through this first, higher-priced energy block. Usage beyond that level will be set at a lower rate that at least reflects average energy costs.

Inclining block rate schedules, on the other hand, incorporate increasing per-unit energy or demand charges for each successive block, or tier, in the rate schedule. Inclining block rates are also referred to as inverted block rates or lifeline rates.

Discussion

Advocates of increased energy efficiency and conservation argue that declining block rates should be eliminated. They argue that by providing a discount for increased usage, declining block rates promote the wasteful use of energy. Nor do most declining block rates recognize the cost differences to produce energy during peak and off-peak periods. At a minimum, the impact of conservation and energy efficiency efforts will be reduced because the effect is to reduce consumption in the lower-cost blocks of energy. Thus, the incentive to invest in energy efficiency is less than if the price of energy avoided was at a higher rate. Lastly, declining block rates send the wrong price signal to consumers if, in fact, a utility would be required to produce the next unit of energy using relatively expensive natural gas or to build additional generating capacity.

Declining block rates are supported by cost-of-service studies if marginal energy costs, or the cost to produce the next unit of energy, are less than average energy costs. The original support for this rate design was a declining cost environment and a desire to incentivize improvements in load factor. Thus, for example, where any portion of the fixed production costs are recovered through the energy charge, increasing the utilization of generating capacity actually lowers rates by spreading the fixed costs over more kilowatt-hours. In the absence of a demand charge to recover these fixed production costs, as in rates for residential and small commercial customers, some form of declining

[18] For example, a residential customer might be charged one rate for the first 350 kWh of energy consumed during a month and a lower rate for all energy consumed above that level, as in Duke's Rate Schedule ES (NC), Residential Service, Energy Star.

block structure may be appropriate in that the initial, higher-priced block is designed to include the capacity charge as well as an energy charge. Customers who use large amounts of energy, such as apartment building owners or large industrial customers, currently benefit from declining block rates and would be concerned about higher bills that might result from the elimination of such rates. Even the most ardent defenders of declining block rates, however, acknowledge that they may no longer be appropriate given the electric industry cost structure today.

Inclining block rates may be more appropriate when a utility's long-run marginal costs exceed its average costs. Such rates will be more effective than flat rates or declining block rates at encouraging overall reductions in energy usage by sending a clear signal that usage above a certain level has a higher cost. The level of conservation can be impacted by the size of the increasing rate differential in succeeding blocks. Inclining block rates, unlike TOU rates, are designed to encourage overall conservation rather than a shifting of peak demand. A well-designed inclining block rate is intended to encourage conservation and energy efficiency while protecting low-income customers that cannot afford to pay higher electric bills. If the initial block size is set too low, the rate structure can become punitive for low-income customers. Conversely, if the initial block size is set too high, it could provide a perverse incentive for low-use customers to use more electricity. Inclining block rates may be designed in various ways, including the use of seasonal differences in the block sizes and the inclusion of TOU pricing.

In considering whether to implement inclining block rates, however, it is important to note the potential impact to customers and utilities. For example, it is not necessarily true that low-income customers are low-usage customers or that high levels of usage are wasteful and low levels are inherently efficient. Additional factors beyond efficiency, such as the number of household occupants, will affect usage. Lastly, expanding the use of inclining block rates may tend to produce more volatile, and possibly lower, revenue streams for a utility as compared to rate structures that recover most of the fixed costs in the lowest block of usage.

Extent of use in North Carolina

In 2007, Duke had a number of rate schedules that included declining block rates, some of which incorporated a declining block rate structure only during part of the year. In 2007, Duke had 229,667 non-residential customers taking service under rate schedules which included declining block rates over the entire year, and these customers accounted for about 1,943 MW of winter peak demand and 2,626 MW of summer peak demand. Energy use under these rates accounted for 17.8% of Duke's total energy sales in 2007. Duke also had 609,306 residential customers taking service under rate schedules with declining block rates during only the non-summer months. Energy use for these residential customers accounted for 15.5% of Duke's total energy sales in 2007. While many of these rates were changed as a result of Duke's 2007 rate case, only Duke's Rate Schedule ES (NC), Residential Energy Star, which previously incorporated a declining block structure for all-electric customers during non-summer months, now offers a declining block rate structure for all customers for the entire year. Duke currently has approximately 1300 residential customers on this rate schedule. Duke also reported that in 2007 it had 891,972 residential customers on rate schedules incorporating inclining block rates during the entire year. These customers accounted for approximately 2,059 MW of winter peak, 3,589 MW of summer peak, and an additional 20% of Duke's total energy sales in 2007. Currently, Duke's Rate Schedule RS (NC), its standard residential rate schedule, incorporates an inclining block rate structure during the entire year.

As of June 30, 2008, Progress had 150,400 commercial and industrial customers taking service under its four rate schedules which incorporate declining block rates. Energy use for these customers accounted for 14% of Progress's total energy sales in 2007. Progress has no residential rate schedules which incorporate declining block rates, nor does it have any rate schedules that incorporate inclining block rates.

Dominion's residential rate schedules do not include declining block rate pricing attributes; however, four of its non-residential rate schedules do. In 2007, 15,164 commercial, 30 industrial and 1,105 government customers in North Carolina were served on these rates, and these customers used 699,925 MWh of electricity. Dominion supports phasing out declining block rate schedules and phasing in inclining block rate structures to send the proper price signal to customers, as recommended in the National Action Plan for Energy Efficiency,[19] but expressed concern about addressing the potential for more volatile and possibly lower revenue streams that may result.

Many of the State's EMCs offer declining block rate schedules. In 2007, the members of NCEMC served 247,811 residential, 40,757 commercial, 254 industrial and 443 "other" customers on declining block rate schedules, for a total of 289,265 customers representing 30% of total energy sales and a demand of 443 MW. The EMCs also reported serving 98,231 residential customers with a demand of 386 MW on inclining block rates, accounting for nearly 13% of residential energy sales. Although the number of customers and load served on declining block rates declined from 2006 to 2007, the EMCs prefer to retain the flexibility to use inclining or declining block rates as circumstances warrant because of demographic or other considerations unique to each cooperative.

Without providing any specific details, ElectriCities reported that its member municipal utilities are using declining block rates in "limited instances," but they are being phased out. Fayetteville PWC reported that in 2007, it served

[19] NAPEE, at 5-14.

8,084 commercial and all 23 of its industrial customers on declining block rates, for a peak demand of 274 MW (out of a total peak demand of 477 MW). The Commission is not aware of any municipally-owned utilities that use inclining block rates.

Business recruitment rates

Definition

Business recruitment, or economic development, rates are electric rate riders offered to new businesses as an incentive to locate or expand in a given locality. These rate riders typically discount the energy (kWh) and/or the demand (kW) charge component of the standard commercial or industrial electric rate for a period of years.

For example, for a new business with a large energy demand that will add at least 75 full-time jobs or invest at least $400,000 in capital improvements, a utility may offer discounts under an economic development rider decreasing from 20% to 5% of the total bill over a four-year period. Similarly, an economic redevelopment rider provides a discount to a new customer with a smaller energy demand that begins operations in an existing facility that has been unoccupied for a period of months and, for example, that adds at least 35 full-time jobs or invests at least $200,000 in capital improvements.

Discussion

Advocates of increased energy efficiency and conservation argue that economic development rates should be eliminated because the reduced rates lower the business's incentive to invest in energy efficiency or distributed generation and, instead, encourage increased consumption. They further argue that such rates are not appropriate when a utility must build new generating capacity to serve the new load. Where the resulting discounted rates are below the utility's average costs, the new businesses served on such rates are subsidized by the utility's remaining customers. Some argue that the need to offer such rates could be offset by the implementation of a strong energy efficiency program by utilities or by remedying improper allocations of costs between customer classes. One suggestion was that economic development rates should be further conditioned upon the affected businesses implementing energy efficiency, using green building methods, or installing renewable energy generation.

Other commenters, including the utilities, believe that economic development rates, which are conditioned on job creation or capital investment, continue to be in the public interest and provide a valuable tool for recruiting new businesses to North Carolina. While the cost of utilities is typically not a primary driver of site location, reasonable utility discounts of a short-term nature that do not promote long-term subsidization by other customers as a part of a total package of benefits have the potential to impact site location decisions. States that allow such rates will have a slight competitive advantage in job creation and the attraction of capital projects relative to states that do not. To insure that other customers are not financially harmed by making an economic development rate available to attract a new business, the traditional practice is for such rates to only be approved and offered when the utility's marginal costs are below its average costs. However, even when such a relationship does not exist (as is currently the case), the utilities urge the Commission to keep open the option of approving an economic development rate when it can be demonstrated that it is in the public interest.

Extent of use in North Carolina

Duke offers both economic development and economic redevelopment riders as generally described above. In 2007 Duke had four general service customers and seventeen industrial customers on either Rider EC or ER. Energy use by customers on these riders in 2007 totaled 912,092,000 kWh, representing only 1.6% of Duke's total energy sales. Duke, however, added four customers under these riders in 2007 and increased energy usage by 22% over 2006.

Progress also offers both economic development and economic redevelopment riders, and its terms are similar to those of the riders offered by Duke. In 2007 Progress had sixteen industrial customers on its business recruitment rates, Riders ED and ERD, with 55 MW of peak demand and 406,409,000 kWh of energy use. This represents just over 1% of Progress's total energy sales in 2007. Progress also added four customers under its riders in 2007, increasing the amount of peak load served by 42% and the amount of energy usage by 14.6% over 2006.

Dominion does not offer a business recruitment rate rider in North Carolina.

NCEMC reported that its members have used business recruitment rates as a means of promoting economic development. In 2007 they served ten industrial customers on these rates, with 1,909 kW of demand and 81,056,157 kWh of energy usage, accounting for 7% of all industrial energy sales and 0.5% of total energy sales, consumed by these customers. NCEMC favors allowing cooperatives to assess the appropriateness of business recruitment rates on a case-by-case basis, rather than imposing a centralized mandate or prohibition.

ElectriCities reported that a "limited number" of their member cities offer business recruitment rates, but provided no specific details. Fayetteville PWC served one industrial customer on a business recruitment rate in 2007; that customer's peak demand was 1,670 kW and energy use 8,494,400 kWh.

Fuel-switching rates

Definition

Fuel-switching rates may be designed to serve one of two purposes. First, such rates may be used as a form of demand response allowing a utility to curtail service to customers who have an alternate fuel source. For example, a customer with both an electric heat pump and a back-up heating source may qualify for a reduced rate during the winter months and give the utility the right to curtail electric service to the heat pump, if necessary, to meet peak demand. Secondly, fuel-switching rates may be rates designed to encourage consumers to replace an appliance or end-use equipment that uses one energy source with equipment that uses a different energy source. For an electric utility, such rates would encourage customers to switch from natural gas to electric appliances.

Discussion

Fuel-switching rates as a demand-side management option were generally endorsed by all stakeholders. These rates allow customers to participate in reducing a utility's peak load and the need to build additional generating facilities. A customer who installs redundant energy sources or systems and who is willing to switch fuel sources at a utility's request acts, in effect, as an additional capacity resource for the utility and should be compensated through the rate structure. Such programs could be expanded, for example, by offering rebates to encourage customers to install geothermal heat pumps or dual-fuel water heaters.

The use of fuel-switching rates as an enticement for customers to switch to electricity from other fuel sources is akin to the all-electric rates discussed below. While some believe that fuel-switching rates allow an electric utility to compete with alternative sources of energy, it also unquestionably results in increased electric usage and the potential need for additional generating capacity.

Extent of use in North Carolina

Only Dominion reported having customers on a fuel-switching rate. Dominion served 1,322 residential customers using 3,967 MWh in 2007 on Schedule 1DF, Dual Fuel Service. Under this rate schedule, the energy charge is reduced from 7.227 cents/kWh to 4.026 cents/kWh from November through March for customers with a separately metered electric heat pump and a back-up heating source available in cold weather.

Neither Duke, Progress, NCEMC, nor ElectriCities indicated any plans to implement fuel-switching rates.

All-electric discount rates

Definitions

An all-electric home rate schedule provides a price break for a customer who has an "all-electric home," in which electricity is the main source of energy for water heating, cooking, clothes drying, and environmental space conditioning.

An all-electric HVAC[20]/appliance rate schedule provides a price break for a customer who uses electricity for a major end use, such as water heating and environmental space conditioning. Such rate schedules sometimes allow the utility to curtail the specific end use during peak periods.

Discussion

Although promotional discounts for all-electric homes were once popular, many now question the appropriateness of such rates. These rates are designed to reward customers, through lower rates, for choosing the exclusive use of electricity in situations where alternative and competing energy sources are available. They have the effect, however, of also subsidizing residential customers who have no choice other than electricity, such as areas with limited natural gas or propane service.

All-electric home rates are similar to declining block rates in that they offer a lower rate for an all-electric service, and this typically increases sales for the utility. However, these rates are not necessarily inconsistent with cost-of-service ratemaking principles because the fixed costs incurred to provide service can be spread over a higher usage per customer. Thus, to the extent the rates result in capturing additional base load uses, the overall efficiency of the electric system is improved. Utilities may also require that a home meet specific efficiency standards or requirements in order for the customer to qualify for an all-electric rate.

Natural gas utilities have consistently argued that the use of natural gas for heating, cooking, and clothes drying is more efficient than the use of electricity; electric utilities, however, disagree. In addition, some commenters argued that not only do the discounted rates offered to such customers encourage the use of electricity for these applications, they reduce the incentive to reduce consumption through conservation and energy efficiency. Lastly, some commenters argued that all-electric rates provide a disincentive for customers to invest in renewable energy fuel sources, such as solar hot water systems, but that does not appear to be the case in North Carolina.

[20] Heating, ventilating, and air conditioning.

Extent of use in North Carolina

In 2007, Duke had 609,306 residential customers (41% of all its residential customers in North Carolina) on Rate Schedule RE (NC), Electric Water Heating and Space Conditioning, which is available to residential customers who use electricity for all water heating, cooking, clothes drying and space conditioning (solar or other non-fossil sources may be used as supplemental fuel sources). Duke also had 25,393 non-residential customers on its Rate Schedule GA (NC), General Service, All-Electric, and on the all-electric provisions of Rate Schedule I (NC), Industrial Service, which are available to customers that use electricity for all their heating and cooling. Consistent with the stipulated settlement approved in Duke's last rate case, Docket No. E-7, Sub 828, Duke is phasing out the "all-electric" aspects of these non-residential rates effective January 1, 2009.

Progress does not offer an all-electric discount rate.

Dominion does not currently have an all-electric home rate in North Carolina. It has a total of 2,221 customers on all-electric HVAC/appliance rates, including 1,322 residential customers on Rate Schedule 1DF, Residential Dual Fuel; 17 residential customers on Rate Schedule 1W, Time-Controlled Storage Water Heating; 108 non-residential customers on Rate Schedule 7, Electric Heating (closed to new customers in 1981); and 774 government customers, including schools, on Rate Schedule 42.

NCEMC's members had 158,381 all-electric home customers in 2007, accounting for about 63 MW of demand and slightly more than 5% of residential energy sales. One cooperative had 4,774 customers on an all-electric HVAC/appliance rate in 2007.

ElectriCities reported that its Participant Members currently have some all-electric home rates in limited instances, but that no customers are served under all-electric HVAC/appliance rates. Fayetteville PWC does not have any all-electric rates.

Security lighting rates

Definition

Security lighting rates are unmetered rates specific to the costs of outdoor lighting used for security. Under these rate schedules, utilities install and maintain standard light fixtures on utility-owned poles. The lights burn from approximately one-half hour after sunset until approximately one-half hour before sunrise. Since the operating characteristics of the lights are known, the average monthly usage for each fixture can be estimated very accurately.[21]

Discussion

No commenter opposed the continuance of security lighting rates as long as they appropriately recover the utility's costs. The utilities have discontinued the installation of mercury vapor lighting due to recently enacted national limitations on the manufacturing and importation of mercury vapor ballasts. As existing mercury vapor lights fail, they are generally replaced with high pressure sodium vapor fixtures, the most efficient, cost-effective lights currently available. Some utilities offer metal halide light fixtures, which are more efficient than mercury vapor but less efficient than high pressure sodium lights. Utilities are also analyzing the use of light-emitting diode (LED) lighting, but it is cost-prohibitive and not as efficient as high pressure sodium at this time. The utilities intend to continue to monitor improvements and implement more efficient lighting technologies as they become available. It was suggested that the State should encourage the development and deployment of solar-powered street lighting as an alternative to current lighting.

Extent of use in North Carolina

In 2007, Duke served 275,619 security light customers, including public street lighting, private outdoor lighting and flood lighting accounting for 52.6 MW of winter peak demand and 684,227 MWh of energy usage. Security lighting does not contribute toward Duke's summer peak demand.

Progress did not have data readily available relative to the number of customers taking service under its lighting rate schedule or the amount of use.

In 2007, Dominion served 12,505 customers in North Carolina on a variety of security lighting rates, using 24,701 MWh of electricity.

Although it was not able to capture all street lighting details in its reported data, in 2007, NCEMC's member cooperatives served 336,117 customers on street lighting rates using 161,944 MWh of electricity (1% of total energy sales) and representing 14.7 MW of peak demand.

ElectriCities stated that security lighting rates are prevalent among participating municipalities, but did not provide any specific details. Fayetteville PWC reported that in 2007, it served 28,598 security lighting customers using 28,975,888 kWh.

[21] For example, a 9,500 lumens high pressure sodium vapor light fixture would cost a Duke customer as little as $9.00 per month. Duke Rate Schedule OL (NC), General Service, Outdoor Lighting Service.

Customer-owned generation rates

Although many of the rate schedules and structures discussed above would affect both a customer's decision to implement conservation and energy efficiency and to install its own generation to offset purchases from the utility, the following policies – standby rates and net metering – directly impact those customers that either have installed, or are considering the installation of, their own generation. A further rate design potentially influencing a customer's decision to install generation for back-up is included in the discussion of demand response rates.

Standby rates

Definition

Standby rate riders impose demand charges on utility customers who own their own generation to compensate the utility for maintaining generating capacity in reserve with which to serve the customer in the event the customer's generator is unavailable.

Discussion

Utilities noted that customers that operate their own generation to offset purchases from the utility may, from time to time, require standby power, such as during periods of maintenance or breakdown of the customer-owned generator. Standby rates, like all rates, should reflect the cost to serve customers that own distributed generation facilities and should not be promotional rates that rely on subsidies from other customer groups. Distribution-related costs, such as transformers, metering and other dedicated facilities, should be fully recovered from the customer-generator that uses those facilities. Other costs incurred by the utility to serve the customer-generator should be priced at average embedded rates and reserved by the customer based on the expected load to be imposed on the utility should the customer's generation fail to operate.

Advocates for increased distributed generation argue that standby rates were originally designed for large cogeneration facilities and are inapplicable to small distributed generation systems. Such large systems were designed to operate almost continuously, and the utility could plan its transmission, distribution, and generation systems with the expectation that the customer-generation would be operating. This rationale does not apply with regard to smaller generators fueled by intermittent renewable resources, such as solar or wind power. In addition, these commenters argue that weather is a greater contingency for a utility than the potential aggregated load of renewable generation, and that standby charges serve merely as punitive charges to discourage the installation of renewable generation by increasing the operating costs.

Customers currently paying standby rates also argue that such rates should be eliminated, noting that today's wholesale power market provides an additional means of serving customers' standby needs. Commenters urge the utilities to develop optional cost-based standby rates designed to recover the full market cost of replacement power plus a reasonable margin with no fixed demand charges.

Extent of use in North Carolina

Duke does not provide a separate standby service, but does have seven customers with generators on its Rate Schedules HP (NC), Hourly Pricing for Incremental Load, and PG (NC), Parallel Generation, that pay a standby charge based on the size of their generator.

Progress does not impose a standby charge on residential customers, and does not require non-residential customers to contract for standby service under Rider SS 31A as long as the customer's generation output is: 1) less than 10% of the contract demand and 2) 500 kW or less. As a result, Progress serves only four commercial customers under its Standby Service rate schedule.

Dominion reported that it does not have any North Carolina customers taking service on a standby rate schedule, but also noted that it has implemented a number of large general service rate schedules that provide reasonably priced standby service for customers with generation. While the intent of these tariffs was not specifically designed to provide standby service, their dynamic, time-based rate design achieves that result, and Dominion has many customers operating behind-the-meter generation on these tariffs.

NCEMC's member cooperatives serve 138 commercial customers on standby rates.

The Commission is not aware of any municipally-owned utilities that serve any customers on standby rates.

Net metering

Definition

Net metering allows an electric customer that owns and operates a small-scale renewable energy generating facility, such as a solar photovoltaic (PV) system, to offset its purchases from the utility and to receive a billing credit against the remaining metered consumption for any metered excess generation delivered to the utility. Energy generated by the customer in excess of its demand at any time is exported to the utility grid for use by other customers, and the customer-generator may use this credit to offset future electric consumption. Net metering in its simplest form may be implemented by allowing a standard watt-hour meter to spin forward and backward to reflect the net consumption by the customer-generator.

Discussion

The Commission initiated a proceeding, Docket No. E-100, Sub 83, in November 1998 at the request of the North Carolina Sustainable Energy Association (NCSEA) to consider whether electric public utilities should be required to allow customers to net meter. On October 20, 2005, the Commission issued an Order requiring the electric public utilities to file tariffs or riders to allow net metering effective on or before January 1, 2006. On July 6, 2006, the Commission issued an Order on Reconsideration modifying net metering tariffs and riders.

Net metering rates are intended to encourage customers to invest in renewable generation by increasing the flexibility of a customer-generator to economically offset all or part of its electric consumption. Net metering advocates argue that net metering, as currently implemented in North Carolina, is not an attractive option for potential customer-generators. First, a customer-generator with a small (less than 10 kW) solar PV system can receive a higher payment from NC GreenPower,[22] the voluntary state-wide green power pricing program, than the retail electric rate that would otherwise be avoided under net metering. Because the premiums paid by NC GreenPower are based upon metered generation only, a customer-generator will elect to sell the entire output of its generator to the utility rather than net meter in order to maximize its payments. Second, net metering advocates argue that the treatment of renewable energy certificates and the requirement that the customer be on a TOU rate schedule further reduce the attractiveness of net metering in North Carolina and fail to fully compensate customer-generators.

Other commenters believe that net metering has the potential to subsidize individual projects beyond the value brought to the utility and its other customers. The Commission has an open docket to address issues related to net metering, and a thorough evaluation for cost-effectiveness should be performed in that proceeding prior to any significant changes to net metering in North Carolina.

[22] For additional information on NC GreenPower, see Annual Report of the North Carolina Utilities Commission Regarding Long Range Needs for Expansion of Electric Generation Facilities for Service in North Carolina (2007) and Final Report of the North Carolina Utilities Commission to the Study Commission on the Future of Electric Service in North Carolina and the Environmental Review Commission Regarding Investigation of Voluntary "Green" Check-Off Program and Other Efforts to Stimulate Renewable Energy Production in the State (2003), each of which are available on the Commission's Internet web site, http://www.ncuc.net.

Extent of use in North Carolina

Duke, Progress and Dominion currently offer net metering to a customer that owns and operates a solar PV, wind-powered, micro-hydro, or biomass-fueled electric generating facility. The facility may have a capacity of up to 20 kW for a residential customer-generator and 100 kW for a non-residential customer-generator and is required to interconnect and operate in parallel with the utility's distribution system. Each utility was ordered to make net metering available to customer-generators on a first-come, first-served basis in conjunction with its approved small generator interconnection standard up to an aggregate limit of 0.2% of the utility's North Carolina jurisdictional retail peak load for the previous year. The Commission's Orders specified that net metering customers must be on a TOU demand rate schedule and that the utility may not charge the customer-generator any standby, capacity, metering or other fees or charges other than those approved for all customers under the applicable TOU demand rate schedule. The kilowatt-hour credit, if any, is applied to the following monthly billing period, but is reset to zero at the beginning of each summer billing season. Any renewable energy certificates associated with this excess generation are also granted to the utility when the excess generation credit balance is zeroed out.

Duke indicated that it has 19 residential and two commercial customers that take service under its net metering or small customer generation riders, Riders NM (NC) and SCG (NC).

Progress serves only one net metering customer.

Dominion reported that it has 23 customers in Virginia that are net metering, but that it has not received any requests to participate in net metering in North Carolina. Dominion attributes this result to the greater financial benefit offered by participation in NC GreenPower.

Although not subject to the Commission's net metering rule, at least one of NCEMC's member cooperatives offers net metering to its customers. In the aggregate, 18 EMC residential customers and one commercial customer participate in net metering.

ElectriCities's members, like the EMCs, are not subject to the Commission's net metering rule. The Commission is unaware of any municipally-owned utility that offers net metering to its customers.

Advanced metering and demand response

The scope of "demand response" is potentially very broad. In a number of states which allow retail electric competition, demand response is designed to allow customers to compete with generators to meet or, alternatively, reduce electric demand during peak periods. In a competitive market, customers are allowed to bid in a price at which they are willing to curtail their own load. These bids will be considered along with bids from generators to determine the most cost-effective combination of supply-side and demand-side resources to meet demand.

In the context of this analysis, given that North Carolina has retained its traditional electric utility industry structure, demand response refers to those rate structures, policies, and measures implemented by utilities that allow customers to agree in advance to have their load reduced, or curtailed, during periods when variable production costs or electric demand are high. Thus, while TOU rates could generally be considered demand response rates in that customers respond to price signals to reduce load, customers are not required to agree in advance or to commit to reduce load as is required under the following programs.

Demand-response rates

Definition

Demand response rates compensate customers that commit to reduce their electric demand on a utility's system at the utility's request, such as when the utility's marginal production costs are high, when wholesale electricity prices are high, or when system reliability is jeopardized.

Discussion

Demand response rates are an important resource in allowing a utility to manage peak demand and to delay, or eliminate, the need to build additional generating capacity. Such rates allow a utility to substitute committed load reductions for generating capacity and are included in the utility's calculation of reserve margins. Customers that are willing to curtail their load or switch to back-up generation, including that fueled by renewable energy resources, upon request by the utility are typically rewarded through credits, rebates, or discounts.

In order for the utility and its other customers to realize the benefit of demand response rates, however, they must be utilized. Otherwise, the bulk of the utility's customers are subsidizing a few large customers for no apparent purpose. While some utilities have actually called upon their demand response rate customers to curtail load, others have indicated that they are reluctant to call on this resource.

One commenter suggested that the aggregation of demand response load through curtailment service providers (CSPs) should be explored further and, if feasible, aggregation should be implemented in tandem or in competition with utility demand response programs. The CSPs' potential benefit lies in their ability to provide demand response from a variety of customers that might not otherwise be able to participate in traditional demand response, as well as streamlining demand response by requiring the utility to operate through a handful of CSPs, rather than providing demand response programs to a large number of customers. It was suggested that demand response opportunities be modified to permit such competition, which can increase efficiency and lower costs.

Commenters further encouraged utilities to expand the availability of existing demand response rate schedules and to develop additional options, such as requiring customers to shed load in response to a specific price trigger, to increase the amount of curtailable load that may be utilized.

Extent of use in North Carolina

Duke has approximately 100 non-residential customers on its Rider IS (NC), Interruptible Power Service Rider, representing 300 MW of demand reduction. Duke has filed for approval of a new program, Power Share, in Docket No. E-7, Sub 831, as a successor to Rider IS and is exploring other demand-response options, but has not made any definitive decisions regarding future offerings at this time.

In 2007, Progress had 19 commercial customers and 35 industrial customers on demand response rates, which had a 143.6 MW impact on peak demand.

Dominion estimated that in 2007 the load response from commercial and industrial customers under its Curtailable Service rates, Rate Schedules 6C (NC) and CS (VA), totaled 81 MW in the summer and 77 MW in the winter. Customers on these curtailable service rates were asked to curtail 22 times in 2007. Dominion's Rate Schedule SG, Standby Generator, that compensated customers for transferring load from the utility to the customers' own generation, was closed to new customers in North Carolina in 1997. Dominion is conducting a distributed generation pilot in Virginia that will use the results of a wholesale market capacity auction to determine a capacity incentive payment.

NCEMC stated that in 2007, its member cooperatives had 3,123 customers on demand response rates, with a demand impact of 54.3 MW.

ElectriCities reported that virtually all Participant Members provide coincident peak billing rates for commercial and industrial loads, and that these rates encourage peak demand reduction. Fayetteville PWC indicated that it has one industrial customer on a demand response rate, which had a 2.3 MW impact on peak demand in 2007.

Direct load control

Definition

Direct load control programs are utility demand-side management programs that allow a utility to interrupt, or partially interrupt, a customer's service during times of high demand, high prices, or system reliability problems. The customer is typically rewarded via lower prices or a monthly credit on its electric bill.

Discussion

Commenters expressed general support for the continuance or expansion of voluntary load control programs, such as hot water heating and air conditioning programs. Many commenters recommended increasing customer payments for load control to encourage additional participation. Such payments should, nevertheless, be based upon the actual costs and benefits achieved through the program. Load control programs are not cost-effective, however, unless they are actually used. Commenters recommended, therefore, that utilities be required to activate these programs more often than is now being done in order to reduce peak demand and the need to build additional generating facilities.

Utilities do not believe that direct load control equipment should be installed on all water heaters, furnaces and air conditioners at the time a new residence or building is built. They stated that participation in load control programs should be voluntary, and customer acceptance is not known during construction. Thus, installed equipment could fail to actually be used. Moreover, the utilities argue that mandating such installation would require that these costs be borne by all customers. Lastly, load control equipment is rapidly evolving and becoming less intrusive to install. Therefore, the need to install the equipment at the time a customer elects to participate in a load control program is much less an issue than in the past.

Extent of use in North Carolina

In September of 2007 Duke had 143,429 residential customers on its Rider LC (NC), Residential Load Control, down from 145,234 in September of 2006. Customers on this rider receive an $8 monthly credit from July through October in exchange for allowing Duke to interrupt service to the customers' central air conditioning. Duke has not apparently used this program, other than for tests, in the last two years. A significant number of devices failed to activate during an August 2007 test. Duke has filed for approval of a new program, Power Manager, in Docket No. E-7, Sub 831, as a successor to Rider LC and is exploring other direct load control efforts, but has not made any definitive decisions regarding future offerings at this time.

Progress does not currently have an active direct load control program for residential customers; however, it recently filed for approval in Docket No. E-2, Sub 927 of a new voluntary program that would let Progress install direct load control switches on air conditioning units (and water heaters and strip heating in Progress's Western Region).

Dominion is conducting four pilot programs in Virginia to test direct load control technology and customer response relative to: 1) residential air conditioning, 2) programmable thermostats that allow Dominion to cycle the customer's central air conditioning system during peak periods, 3) programmable thermostats with automated metering infrastructure and critical peak pricing, and 4) distributed generation/back-up generators for use during peaks. Dominion does not currently have any customers on comparable programs in North Carolina; its Rider RLC, Residential Water Heater Load Control Service, was closed to new customers in 1997.

NCEMC's member cooperatives had 122,321 customers on direct load control in 2007, with a demand impact of 58 MW. A radio-based load management system installed by a majority of the EMCs in the early 1980s is nearing the end of its life, and it is no longer supported by the vendor. The EMCs continue to maintain the system and operate it several times a year for system resource support.

ElectriCities reported that most of its Participant Members use direct load control. These technologies are operated on a monthly basis to control coincident peak and aggregate peak demands. Accordingly, verification occurs on a monthly basis via actual operation. Fayetteville PWC stated that it does not currently have any customers on direct load control.

Programmable thermostats

Definitions

A programmable thermostat is a device that can automatically change a building's inside temperature as maintained by the heating, ventilating, and air conditioning (HVAC) system according to a preset schedule, thus reducing the energy usage when a building is unoccupied or when occupants are asleep.

A programmable communicating thermostat can additionally receive price or electric system reliability signals and can automatically change a building's inside temperature as maintained by the HVAC system upon receipt of such signals.

Discussion

According to the United States Department of Energy, heating and cooling account for 40 to 60 percent of the energy used in commercial and residential buildings.[23] Small changes, therefore, in thermostat settings can have a tremendous impact on energy usage. Both consumers and utilities benefit from reduced loads and demands when these systems are used efficiently.

Properly installing and using a programmable thermostat is one of the easiest ways for consumers to efficiently manage their heating and cooling systems. Programmable thermostats allow customers to pre-set temperature preferences based on the time of day and day of week according to when the premises will be occupied or to coincide with on-peak and off-peak rates. Rebate programs could be implemented by utilities as part of their energy efficiency plans.

Additional demand response could be implemented through the use of programmable communicating thermostats. With these thermostats, the inside temperature could be changed dynamically upon receipt of price or other signals from the utility, similar to an interruptible rate. Commenters suggested that to be cost-effective, utilities would have to entice large numbers of customers to participate or that the installation of such devices be mandated through revised building codes, as has been done in California.

Some commenters question whether programmable thermostats alone would produce energy savings since the temperature setting remains within the control of the consumer. To be most effective, these devices should be coupled with "smart grid" technology that enables communication between the device and the utility. This technology allows the utility, at the customer's request, to manage the thermostat, helping the consumer to manage its energy usage while intelligently reducing consumption across large numbers of devices so that no one customer sees a significant reduction in comfort or convenience. This view, however, appears more akin to direct load control than demand response, whereby consumers respond to price or other signals and make rational economic choices.

Extent of use in North Carolina

The Commission is not aware of any utility that currently offers programmable thermostats as part of its energy efficiency activities. Most utilities indicated, however, that they were evaluating the future use of programmable communicating thermostats. As part of its Virginia pilot programs described above, Dominion is testing programmable communicating thermostat technologies and customer response.

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[23] "Heating, Ventilating, and Air Conditioning," U.S. Dep't of Energy, http://www1.eere.energy.gov/buildings/commercial/hvac.html.

Advanced metering and smart grid technology

Definitions

Automated, or remote, meter reading (AMR) technology allows a utility to read a meter without visually inspecting the meter. This technology communicates data in one direction only, from the customer meter to the utility, often to a utility vehicle driven past the premises.

Interval, or demand, metering technology collects usage data at time-stamped intervals, thereby allowing the utility to apply rate schedules with prices that change based on the time of day or day of week. Energy consumption is measured at regular intervals so that usage for a set period of time, which establishes a customer's electric demand, can be determined.

Advanced interval metering refers to interval meters that are capable of being read remotely, typically via telecommunications technology.

Automated metering infrastructure (AMI), or smart grid technology, utilizes two-way communication, advanced metering, and related software to provide price signals and additional information to the utility's customers; to provide additional operational information to the utility; and to provide additional load control capability to the utility. AMI, for example, allows utilities to verify load-management control commands, remotely read meters, verify outages, assist with the restoration of power, and perform remote power-quality monitoring at the distribution and substation levels. AMI, or smart grid technology, allows for flows of information from a customer's meter in two directions: both inside the house to thermostats, appliances and other devices, and from the house back to the utility. Smart grid technology includes, but is not limited to "smart" meters capable of two-way communication.

Discussion

Metering technology more advanced than traditional watt-hour meters is required to facilitate most of the rate structures, policies, and measures discussed in this analysis and being considered by utilities for future implementation. Ultimately, enhanced use of demand response, such as enabling more consumers to respond to real-time prices, will require the installation of AMI, or smart grid technology. Duke, in particular, states that it is a proponent of smart grid technology and believes that the installation of smart meters can create significant benefits for utilities and their customers. The installation of more advanced metering, however, will require the implementation of appropriate rate structures, as discussed herein, in order to be effective.

The installation of advanced interval meters is likely the next step in implementing smart grid technology. Such meters are capable of supporting the expanded use of TOU and other time-differentiated rates. Interval meters are also required for customers on rate schedules that impose a separate demand charge. To reduce the cost of this upgrade, some commenters encouraged the utilities to convert existing automated metering to interval meters where possible and to begin stocking and installing advanced interval meters in order to promote time-differentiated rate schedules. Commenters further suggested that a study be conducted to determine the cost of implementing AMI.

In 2007, in Docket No. E-100, Sub 108, the Commission considered a proposed federal standard regarding time-based metering and communications pursuant to the Energy Policy Act of 2005. After concluding that the regulated utilities in this State had already complied with the proposed federal standard by offering a range of time-differentiated rates to their customers, the Commission discussed the issue of metering necessary to support such rate policies.

> However, the Commission does not want to underemphasize the importance of advanced metering for the future of the electric industry in North Carolina. AMI, as witness Allan pointed out, is a very promising technology. It enables utilities to dispense with on-site meter reading – not only direct observation of the meter reading on the customer's premises, but also radio-based meter reading from a meter vehicle – and to read meters directly from the home office. Because AMI allows electronic meter reading, meters can be read at frequent intervals, enabling the utility to measure a customer's usage in particular time intervals. AMI also enables a utility to connect and disconnect service remotely and to identify easily, from the home office, which of its customers have lost service during a storm. Because AMI enables a utility to communicate with its customers, the utility has the ability to implement rates that are adjusted in real time based on system conditions, with the customer receiving a signal showing the rate in effect at any given time.
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> As several of the witnesses pointed out, however, the level of participation in TOU rates among residential customers is currently quite low. Two reasons offered for this lack of participation include the additional metering cost imposed on TOU customers and the uncertainty regarding the savings that will actually be achieved. At some point, the utilities and the Commission may wish to consider installing smart meters for all residential customers. This increased deployment of AMI should lead to lower unit costs for these meters and increased participation in residential TOU rates.
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> As witness Allan noted, in recent years the State's major electric utilities have replaced old-fashioned dial meter technology

with AMR technology throughout their systems. In some instances, the changeover has been made very recently, and the AMR meters are in the early years of their lifespan. It would not be cost-effective to remove large numbers of relatively new meters and replace them with more advanced technology. At some point, however, all of the utilities will reach the point where their existing residential meters are approaching the end of their useful lifespan and need to be replaced. At that point the utilities may find it appropriate to consider making AMI technology the standard meter technology for residential use.[24]

Extent of use in North Carolina

Duke currently uses radio frequency devices read by computer in a drive-by van for nearly all of its North Carolina customers. Duke has about 800 commercial and industrial customers on advanced interval meters for billing purposes, and it has another 2,454 such meters distributed among all customer classes to collect data for research purposes. Duke has 4,345 residential and 267 commercial customers participating in a pilot of advanced metering involving the use of two-way communication. At this time the pilot does not involve billing.

Progress has essentially all residential customers and many business customers on automated meter reading (AMR); has about 42,000 customers, mostly commercial accounts, on interval meters that cannot be read remotely; and has about 1,000 customers, mostly industrial, on advanced interval meters. Progress plans to maintain its current approach to AMR and is considering expanding it to include time-of-use and interval meters. Progress is monitoring the evolution of AMI technology and evaluating future implementation. Progress has filed for approval of a proposed Distribution System Demand Response Program in Docket No. E-2, Sub 926 that could provide some of the backbone infrastructure for AMI. With the installation of widespread upgrades to its distribution system, including new communications software, Progress states that it will be able to conserve energy during peak periods by lowering distribution system voltage.

Dominion uses Itron software to schedule and read most of its customer meters. In North Carolina, 10,490 meters are read visually and 113,738 are read by mobile drive-by technology. In 2007, Dominion had 764 North Carolina customers using interval meters for time-of-use rates and industrial rate schedules, spanning all customer classes. Dominion is conducting several pilots in Virginia utilizing AMI and smart meters that will provide valuable information regarding customer acceptance of conservation programs and help establish

[24] Order Declining to Adopt Standards, In the Matter of Consideration of Certain Standards for Electric Utilities Relating to Fuel Sources, Fossil Fuel Generation Efficiency, and Smart Metering Pursuant to the Energy Policy Act of 2005, Docket No. E-100, Sub 108, at 20-21 (2007).

Dominion's long-term strategy for enhancing its distribution system. Dominion believes that this strategy will include deployment of "smart grid" technologies that will help deliver superior customer service and operational performance, such as real-time outage management and power quality monitoring, advanced metering infrastructure to enable conservation, peak pricing and demand response programs and improvements to the distribution system to meet storm reliability needs.

NCEMC reported that its members had 263,154 customers being served with remotely-read meters (AMR) and 18,068 customers on advanced interval metering in 2007. Fifteen of NCEMC's members have an AMI backbone in place or have begun deployment, with another three or four planning to do so in the next couple of years. EMCs are just beginning to deploy functions that allow two-way communications with their 134,581 AMI customers. For example, they have 6,000 customers who pre-pay for service and can monitor the amount of "remaining use" at any given time. NCEMC anticipates that additional two-way communication features will be implemented to facilitate customer conservation as part of the EMCs' strategy for REPS compliance.

ElectriCities reported that virtually all of the Participant Members provide AMR. Most Participant Members provide coincident peak demand billing, which requires interval billing data, but such billing is currently limited to a few large commercial or industrial customers served under coincident peak rates. None of the Participant Members provides two-way communications at this time, but at least one is considering it. Fayetteville PWC indicated that it had 22 commercial and 9 industrial customers using advanced interval metering in 2007, with a peak demand of 92.7 MW.

RECOMMENDATIONS

It is clear from the comments received in preparing this analysis that not all stakeholders agree on the goals or objectives of electric utility rate design. One point of agreement is that utilities should manage peak electric demands in order to defer or eliminate the need for additional generating capacity. In addition, traditional regulatory theory emphasizes the importance of having customer rates reflect the cost of providing utility service and the avoidance of unreasonable discrimination. A conflict arises, however, between those who believe rates should encourage efficient use of a utility's generating resources, resulting in the most affordable rates, and those who believe rates should primarily encourage reduced energy use, resulting in reduced emissions, including greenhouse gases, from existing generating resources.

It is not true, however, that reduced energy usage necessarily leads to reduced electricity rates. While monthly electric bills may be lowered for those customers that actually reduce their energy consumption, one or more components of the customers' rates are likely to increase in order to allow the utility to continue to recover its fixed costs.

In approving cost-of-service rates for regulated electric public utilities, the Commission attempts to balance a number of interests in implementing State policy, as provided in G.S. 62-2(a):

(1) To provide fair regulation of public utilities in the interest of the public;

(3) To promote adequate, reliable and economical utility service to all of the citizens and residents of the State;

(3a) To assure that resources necessary to meet future growth through the provision of adequate, reliable utility service include use of the entire spectrum of demand-side options, including but not limited to conservation, load management and efficiency programs, as additional sources of energy supply and/or energy demand reductions. To that end, to require energy planning and fixing of rates in a manner to result in the least cost mix of generation and demand-reduction measures which is achievable, including consideration of appropriate rewards to utilities for efficiency and conservation which decrease utility bills;

(4) To provide just and reasonable rates and charges for public utility services without unjust discrimination, undue preferences or advantages, or unfair or destructive competitive practices and

consistent with long-term management and conservation of energy resources by avoiding wasteful, uneconomic and inefficient uses of energy; [and]

(5) To encourage and promote harmony between public utilities, their users and the environment.

Thus, rate design, by its nature, involves complex analyses and trade-offs between competing interests, and is most appropriately undertaken by the Commission in the context of its regulatory proceedings.

With the foregoing State policies in mind, the Commission makes the following recommendations regarding whether rate structures, policies, and measures, including decoupling, in place in other states and countries that promote a mix of generation involving renewable energy sources and demand reduction should be implemented in this State.

Decoupling

Decoupling for electric utilities is very controversial, as evidenced by the disparity of views expressed to the Commission during the preparation of its analysis. In addition, if successful in reducing consumption, decoupling has the potential, as previously discussed, to result in an increase in per unit electricity rates.

In an attempt to accomplish a similar purpose as is sought to be achieved by decoupling, the General Assembly adopted several specific measures in Senate Bill 3 last year that are intended to encourage utilities to promote conservation and energy efficiency. Pursuant to G.S. 62-133.9(d), a utility may recover its costs associated with new energy efficiency measures outside of a general rate case; it may capitalize and earn a return on its costs as it would with investment in supply-side resources; and it may receive an additional incentive based upon a sharing of the savings, a percentage of avoided costs, or any other means determined by the Commission to be appropriate. Having only issued its rules implementing Senate Bill 3 earlier this year, the Commission believes that it is premature to mandate new major changes to electric utility rate structures before it has been determined whether the incentives under Senate Bill 3 serve their intended purpose and are sufficient. The Commission, therefore, recommends that additional decoupling tactics not be adopted for electric power suppliers in North Carolina on a generic basis at this time.

Time-differentiated rates

The Commission recommends that utilities make efforts to increase promotion and utilization of time-differentiated rates by all customers. For example, utilities are encouraged to inform new customers about the TOU rate option when they apply for electric service. As demonstrated by the utility data submitted in this docket, the level of participation in TOU rates among residential customers, in particular, continues to be quite low. Two reasons offered for this lack of participation include the additional metering cost imposed on TOU customers and the uncertainty regarding the savings that will actually be achieved. Although the Commission does not believe it is in the public interest to mandate participation for all customers in time-differentiated rates, the Commission encourages utilities to investigate opportunities to better educate their customers, to reexamine existing time-differentiated rates to ascertain whether design improvement that increase the attractiveness of such rates to customers should be made, and to reduce the cost of participation in TOU rates as the cost of more advanced metering falls. Lastly, the Commission encourages utilities to increase choices for their customers and to investigate alternatives to current time-differentiated rates, such as multi-tier TOU and critical peak pricing rates.

Demand increasing rates

The Commission recommends that utilities reconsider the appropriateness of declining block rates, particularly for residential customers. The Commission would caution, however, those that believe that inclining block rates offer a preferred solution for all customers by pointing out other effects that such rates might have. Inclining block rates may be effective at encouraging reduced energy usage for those that have the means to do so, but such rates also have the potential to drastically increase bills for those customers who cannot. Like many other rate structures discussed herein, inclining block rates, too, have the potential to result in increased per-unit electricity rates if they successfully in reduce consumption. The Commission, therefore, encourages utilities to carefully consider the implications and potential impact on customers when designing increasing block rates.

Similarly, the Commission notes that some utilities have undertaken efforts to phase out all-electric rates and recommends that the remaining utilities also reconsider the appropriateness of continuing such rates. The Commission does not believe that other discounted rate schedules, such as business recruitment rates and fuel-switching rates, are necessarily inappropriate demand increasing rates. The Commission will continue to monitor the effectiveness of such rates in the future. With regard to security lighting, the Commission encourages utilities to continue to monitor improvements in lighting so that future installations use the most cost-effective energy efficient lighting technology available.

Customer-owned generation rates

The Commission previously considered standby rates in its investigation of small generator interconnection standards, Docket No. E-100, Sub 101, and notes that many utilities have eliminated standby rates for small customer-owned generation. Neither Duke nor Progress, for example, imposes a standby charge on residential customers. Utilities should not simply be required to eliminate standby rates if doing so would shift costs from customer-generators to the utility's remaining customers. The Commission, therefore, will continue to monitor the imposition of standby rates and take further action, if necessary.

The Commission recommends that no further action be taken by the General Assembly at this time with regard to net metering. In Senate Bill 3, the General Assembly required the Commission to consider whether it is appropriate to allow generators up to one megawatt to participate in net metering. On June 9, 2008, the Commission issued an Order in Docket No. E-100, Sub 83 establishing a procedural schedule to receive verified written direct and rebuttal expert testimony and exhibits addressing this issue. In its Order, the Commission indicated that it would consider not only whether solar PV, wind-powered, micro-hydro, or biomass-fueled electric generating facilities up to one megawatt or some smaller size should be allowed to net meter, but also whether additional types of generating facilities should be allowed to net meter and whether the terms and conditions under which generating facilities are currently allowed to net meter should otherwise be changed. The deadline for persons to intervene and file direct testimony and exhibits in this docket was August 29, 2008; parties may file rebuttal testimony and exhibits on or before October 24, 2008. Hearings also have been scheduled in Charlotte and Raleigh to allow members of the public an opportunity to testify orally before the Commission.

Advanced metering and demand response

Most utilities in North Carolina have just engaged in upgrading their metering infrastructure to AMR so that many, if not most, customer meters may be read remotely. The Commission continues to believe that it would not be cost-effective to remove large numbers of relatively new meters and replace them with more advanced technology. At some point, however, existing residential meters will approach the end of their useful lifespan and need to be replaced. The Commission, therefore, encourages utilities to continue to evaluate AMI and looks forward to receiving reports from Duke and Dominion on the results of their ongoing pilot programs. Ultimately, the utilities and the Commission may wish to consider installing smart meters for all residential customers along with the development of appropriate rates that take advantage of advanced metering. This increased deployment of AMI should lead to lower unit costs for these meters and increased participation in residential TOU rates. At that point the utilities may find it appropriate to consider making AMI technology the standard meter technology for residential use.

Lastly, the Commission recommends that utilities aggressively pursue opportunities for increased demand response, both in conjunction with, and, if possible, prior to, deployment of smart meters and AMI. Demand response programs have a tremendous potential to impact peak demand and should be fully utilized by utilities.

APPENDICES

A. List of Commenters, Docket No. E-100, Sub 116

B. Order Initiating Investigation and Requesting Comments, Docket No. E-100, Sub 116 (February 15, 2008)

C. Order Requesting Information and Further Comments, Docket No. E-100, Sub 116 (May 12, 2008)

D. Order On Clarification, Docket No. E-100, Sub 116 (June 2, 2008)

List of Participants
Docket No. E-100, Sub 116

Comments were received from the following organizations and individuals:

Apartment Association of North Carolina
Carolina Industrial Group for Fair Utility Rates I, II, and III (CIGFUR)*
Carolina Utility Customers Association, Inc. (CUCA)*
Dominion North Carolina Power*
Duke Energy Carolinas, LLC*
Electric Power Supply Association*
ElectriCities of North Carolina, Inc.*
Environmental Defense Fund*
Fayetteville Public Works Commission
National Resources Defense Council*
North Carolina Electric Membership Corporation*
North Carolina Sustainable Energy Association (NCSEA)*
North Carolina Waste Awareness and Reduction Network, Inc. (NC WARN)*
Nucor Steel-Hertford*
Piedmont Natural Gas*
Progress Energy Carolinas, Inc.*
Public Staff – North Carolina Utilities Commission*
Southern Alliance for Clean Energy*
Southern Environmental Law Center*
Wal-Mart Stores East, LP*
Individuals:
David E. Barbee
Robin Cape
Avram Friedman*
Abigail Ann Gage*
David Johnson

In addition, the following organizations intervened as parties of record without filing comments:

Attorney General's Office*
North Carolina Farm Bureau Federation, Inc.*

* Indicates organizations and individuals that petitioned, and were allowed, to intervene as formal parties of record in Docket No. E-100, Sub 116.

STATE OF NORTH CAROLINA
UTILITIES COMMISSION
RALEIGH

DOCKET NO. E-100, SUB 116

BEFORE THE NORTH CAROLINA UTILITIES COMMISSION

In the Matter of Investigation of Rate Structures, Policies and Measures that Promote a Mix of Generation and Demand Reduction for Electric Power Suppliers in North Carolina	))))	ORDER INITIATING INVESTIGATION AND REQUESTING COMMENTS

BY THE CHAIRMAN: In August 2007, North Carolina enacted comprehensive energy legislation, Session Law 2007-397 (Senate Bill 3), that, among other things, establishes a Renewable Energy and Energy Efficiency Portfolio Standard (REPS) for this State and a revised procedure for cost recovery of demand-side management and energy efficiency expenditures. Additionally, Section 4.(c) of Senate Bill 3 requires the Commission to undertake the following study:

> The Utilities Commission shall prepare an analysis of whether rate structures, policies, and measures, including decoupling, in place in other states and countries that promote a mix of generation involving renewable energy sources and demand reduction should be implemented in this State. The Commission shall submit this analysis to the Governor, Environmental Review Commission, and the Joint Legislative Utility Review Committee no later than 1 September 2008.

The Chairman notes that significant work has been undertaken nationwide in this area and that an extensive amount of literature is publicly available on this topic. Therefore, to begin this study, the Chairman finds good cause to invite comments by interested persons on the "rate structures, policies, and measures, including decoupling, in place in other states and countries that promote a mix of generation involving renewable energy sources and demand reduction" that should be considered by the Commission in preparing its analysis. The Chairman notes that this approach has been successful in the past and appreciates the interest and input of all parties to this proceeding.

Comments by the parties should focus on rate structures, policies, and measures applicable to electric utilities. Since Senate Bill 3 encompasses all electric power suppliers in North Carolina, including electric membership corporations and municipal electric suppliers, the Chairman believes that the Commission's analysis should similarly encompass all electric power suppliers. The Commission will proceed, as appropriate, to seek additional input and complete its analysis after receipt of these comments.

IT IS, THEREFORE, ORDERED as follows:

1. That a generic proceeding should be, and hereby is, initiated to investigate and prepare an analysis of whether rate structures, policies, and measures, including decoupling, in place in other states and countries that promote a mix of generation involving renewable energy sources and demand reduction should be implemented in this State;

2. That Carolina Power & Light Company d/b/a Progress Energy Carolinas, Inc.; Duke Energy Carolinas, LLC; Virginia Electric and Power Company d/b/a Dominion North Carolina Power; North Carolina Electric Membership Corporation; and ElectriCities of North Carolina, Inc., are hereby made parties of record in this proceeding;

3. That other persons desiring to become formal participants and parties of record in this proceeding shall file petitions to intervene in accordance with the applicable Commission rules on or before Friday, March 14, 2008;

4. That parties may file comments as provided herein on or before Friday, March 14, 2008;

5. That the Chief Clerk shall mail a copy of this Order to all parties of record in Docket No. E-100, Sub 113; and

6. That the Commission will proceed, as appropriate, to seek additional input and complete its analysis after receipt of these comments.

ISSUED BY ORDER OF THE COMMISSION.

This the 15th day of February, 2008.

NORTH CAROLINA UTILITIES COMMISSION

Gail L. Mount

Gail L. Mount, Deputy Clerk

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STATE OF NORTH CAROLINA
UTILITIES COMMISSION
RALEIGH

DOCKET NO. E-100, SUB 116

BEFORE THE NORTH CAROLINA UTILITIES COMMISSION

In the Matter of Investigation of Rate Structures, Policies and Measures that Promote a Mix of Generation and Demand Reduction for Electric Power Suppliers in North Carolina	))))	ORDER REQUESTING INFORMATION AND FURTHER COMMENTS

BY THE CHAIRMAN: In response to the Commission's April 4, 2008 Order Initiating Investigation and Requesting Comments in this docket, seventeen parties submitted comments. Those comments provided more than thirty discrete recommendations regarding rate structures, policies and measures that could promote or hinder a mix of generation sources and demand reduction in North Carolina. While some of the recommendations were outside the scope of this proceeding (e.g., system benefit charges, building code changes, tax credits and supply procurement practices, which do not relate to electric utility rates), most were responsive.

To complete the analysis required by the General Assembly in Session Law 2007-397 (Senate Bill 3), the Chairman, therefore, finds good cause to request additional information regarding the rate structures, policies and measures set forth in Appendix A, including data regarding their current implementation and plans for future development, and responses from electric utilities and other parties to specific questions.

IT IS, THEREFORE, ORDERED as follows:

1. That, on or before June 6, 2008, all parties comment and provide supporting data on whether the rate structures, policies and measures set forth in Appendix A should be implemented, expanded or phased-out.

2. That, on or before June 6, 2008, all parties respond to the following specific questions and submit supporting data:

i. Would decoupling revenues from earnings cause utilities to more aggressively pursue conservation and energy efficiency?

ii. What type of performance incentives for demand reduction through the implementation of conservation and energy efficiency measures, if any, should be provided to utilities?

iii. Should utilities earn a higher rate of return on investments in renewable generating facilities than the return on fossil or nuclear plants?

iv. To what degree, and how, do utilities currently work with energy service companies? Should the utilities work with energy service companies differently than they do now?

v. Would it be effective for utilities to pay customers directly for conserving energy via "white tags," or renewable energy certificates (REC) earned for reducing energy consumption through the purchase of energy efficient appliances or the implementation of other energy efficiency measures? Why or why not?

vi. Should utilities be required to install direct load control on *all* water heaters, furnaces and air conditioners at the time a new residence or business is being built?

3. That, on or before June 6, 2008, all electric utilities respond to the following specific questions and submit supporting data:

i. Does the utility have any data regarding whether existing time-of-use rates cause customers to shift use to off-peak hours, versus simply rewarding them for their established use patterns? If yes, please summarize the findings.

ii. What technology does the utility use to directly control customer loads? How recently did the utility verify the operability of such technology? What were the findings? What actions were taken as a result? What are the utility's plans for future verifications?

iii. How often did the utility initiate demand response and direct load control programs during 2006 and 2007? What amount of peak reduction was achieved each time? What was the triggering event for initiating the program's use on each day that it was used? To what degree, if any, has the utility's use of the program caused customers to drop out of the program?

iv. Does the utility have any on-going effort to review bills of commercial and industrial (C&I) customers for aberrant use, e.g., demand spikes, to inform its customers, and to work with its customers to eliminate such use?

v. Has the utility considered establishing a loan program whereby customers could borrow the funds for installing efficiency measures and re-pay the loans on their monthly electric bills? What are the implications of developing and implementing such a program?

vi. Do the utility's wholesale sales contracts allow or encourage purchasing load-serving entities to promote load reduction programs? If not, would the utility be willing and/or able to re-negotiate those contracts to add such provisions?

vii. Is the utility willing to purchase renewable energy certificates (REC) from residential or small business customers? Does the utility anticipate setting a standard price for such RECs?

viii. Has the utility denied any interconnections to small renewable generators? If so, for what reasons? Were any denials due to congestion on a portion of the utility's system? Have any renewable generators declined an offer of interconnection due to the cost?

4. That all parties file reply comments on or before June 27, 2008.

5. That, on or before June 27, 2008, all electric utilities provide the following information:

i. For each of the rate structures, policies and measures set forth in Appendix A, provide the number of customers (residential, commercial, industrial, other, total) served, associated energy sales, and impact on peak demand for calendar years 2006 and 2007; and any information regarding future plans to promote the concept with customers.

ii. The number of customers (residential, commercial, industrial, other, total) served, energy sales, and peak demand for calendar years 2006 and 2007.

6. That North Carolina Electric Membership Corporation and ElectriCities of North Carolina, Inc., work with their members to provide the above data and responses sought of all electric utilities in Ordering Paragraphs 3 and 5.

ISSUED BY ORDER OF THE COMMISSION.

This the 12th day of May, 2008.

NORTH CAROLINA UTILITIES COMMISSION

Gail L. Mount

Gail L. Mount, Deputy Clerk

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Rate Structures, Policies, and Measures

Pursuant to Section 4(c) of Session Law 2007-397 (Senate Bill 3), the Commission "shall prepare an analysis of whether rate structures, policies, and measures, including decoupling, in place in other states and countries that promote a mix of generation involving renewable energy sources and demand reduction should be implemented in this State." The following rate structures, policies, and measures have been identified for review and analysis:

1. Decoupling;
2. Time-of-use rates;
3. Real-time pricing;
4. Inclining block rates;
5. Declining block rates;
6. Business recruitment rates;
7. Fuel-switching rates;
8. All-electric home rates;
9. All-electric HVAC/appliance rates;
10. Security lighting rates;
11. Net metering;
12. Standby rates;
13. Demand-response rates, including the ability for customers to aggregate load from various sites/accounts;
14. Direct load control;
15. Programmable thermostats, including programmable communicating thermostats;
16. Automated/remote meter reading;
17. Advanced/interval metering; and
18. Automated metering infrastructure, including two-way communications, advanced metering and related software.

APPENDIX D

STATE OF NORTH CAROLINA
UTILITIES COMMISSION
RALEIGH

DOCKET NO. E-100, SUB 116

BEFORE THE NORTH CAROLINA UTILITIES COMMISSION

In the Matter of		
Investigation of Rate Structures, Policies and Measures that Promote a Mix of Generation and Demand Reduction for Electric Power Suppliers in North Carolina	))))	ORDER ON CLARIFICATION

BY THE CHAIRMAN: In Section 4(c) of Session Law 2007-397 (Senate Bill 3), the General Assembly directed the Commission to undertake the following study:

> The Utilities Commission shall prepare an analysis of whether rate structures, policies, and measures, including decoupling, in place in other states and countries that promote a mix of generation involving renewable energy sources and demand reduction should be implemented in this State. The Commission shall submit this analysis to the Governor, Environmental Review Commission, and the Joint Legislative Utility Review Committee no later than 1 September 2008.

On April 4, 2008, the Commission issued an Order inviting comments intended to identify the "rate structures, policies, and measures, including decoupling, in place in other states and countries that promote a mix of generation involving renewable energy sources and demand reduction" that should be considered in the Commission's analysis. After reviewing these comments, the Commission issued an Order on May 12, 2008, setting forth a list of 18 specific "rate structures, policies, and measures" for review and analysis; requesting information from the retail electric suppliers in this State regarding their current implementation, if any, of these rate structures, policies, and measures; and requesting further written comments and reply comments on whether these rate structures, policies, and measures should be implemented, expanded or phased out. Specifically, Ordering Paragraph 6 of the May 12, 2008 Order provided as follows:

> That North Carolina Electric Membership Corporation and ElectriCities of North Carolina, Inc., work with their members to provide the above data and responses sought of all electric utilities in Ordering Paragraphs 3 and 5.

On May 28, 2008, ElectriCities of North Carolina, Inc. (ElectriCities), filed a Motion To Be Dismissed From Docket And Alternative Requests For Clarification Of Order of May 12, 2008 And Alternative Motion For Extension Of Time. In its Motion, ElectriCities states:

> Implicit in the [General Assembly's] mandate is the concept that any such rate structures, policies and measures, if implemented, would be implemented by the Commission under its retail rate jurisdiction. Neither ElectriCities nor its member municipalities are subject to the retail rate jurisdiction of the Commission, and thus, any rate structures, policies or measures implemented as a result of the analysis prepared by the Commission would not have any effect on ElectriCities or its member municipalities. ... The costs in additional personnel and in institutional time required to meet the Commission's directive in the [May 12, 2008] Order will be material to ElectriCities, and considering that any rate structures, policies or measures implemented as a result of the Commission's analysis will not have any effect on ElectriCities or its member municipalities, ElectriCities respectfully requests that the Commission dismiss ElectriCities from this Docket.
>
> If the Commission does not dismiss ElectriCities from this Docket, ElectriCities respectfully requests that the Commission clarify that ElectriCities is obligated under the Order to respond to Ordering Paragraphs 3 and 5 only for its Participant Members, or to extend the time for ElectriCities to respond to Ordering Paragraphs 3 and 5 on behalf of its Associate Members to on or before September 2, 2008.

The purpose of this docket is simply to allow the retail electric suppliers in this State and other interested persons an opportunity to inform the Commission of their views with regard to the rate structures, policies or measures under consideration and to assist the Commission in responding to the General Assembly's request, not to exercise jurisdiction over otherwise unregulated entities. No party is required to participate, and no rate structures, policies or measures will be required to be implemented by any entity without further proceedings. Further action with regard to any rate structure, policy or measure identified in the Commission's analysis would be undertaken in a separate docket.

Moreover, while the Chairman agrees that the Commission has limited jurisdiction over ElectriCities and its member municipalities, the Commission, in its April 4, 2008 Order, stated its belief that the analysis requested by the General Assembly applies more broadly than to just those utilities over which the Commission has retail rate jurisdiction:

> Since Senate Bill 3 encompasses all electric power suppliers in North Carolina, including electric membership corporations and municipal electric suppliers, the Chairman believes that the Commission's analysis should similarly encompass all electric power suppliers.

Thus, all of the retail electric suppliers in this State were made parties to this docket and offered the opportunity to comment.

To the extent that clarification is necessary, the Chairman reiterates that no party to this docket is required to file comments or reply comments with regard to the identified rate structures, policies or measures or the specific questions posed by the Commission. The May 12, 2008 Order primarily established a procedural schedule for comments and reply comments so that the Commission could meet its September 1, 2008, deadline set forth in Senate Bill 3. The Chairman is hopeful, though, in order to provide a more comprehensive response to the General Assembly's request, that as many parties as possible will avail themselves of this opportunity to inform both the Commission and the General Assembly of their thoughts with regard to this issue.

As a part of its analysis, the Commission intends to provide data to the General Assembly regarding the current implementation of each of the identified rate structures, policies and measures and any plans for future development for each electric power supplier in North Carolina. The Commission recognized that this information can only be obtained from the electric power suppliers, including electric membership corporations and municipalities, that serve retail load, and that many of these entities were not parties to this docket. Thus, the Commission's Order requested that the state-wide organizations to which the cooperative and municipal retail electric suppliers are members work with their members to obtain such information so that it may be included in the Commission's analysis and report to the General Assembly. The Chairman, therefore, finds good cause to clarify Ordering Paragraph 6 of the May 12, 2008 Order to request that North Carolina Electric Membership Corporation and ElectriCities work with their members to provide, to the extent possible, the data and responses sought of all electric utilities in Ordering Paragraphs 3 and 5 of the May 12, 2008 Order.

As the clarification provided above satisfies the primary concerns ElectriCities articulates in its Motion, the Chairman finds good cause to deny ElectriCities' request to be dismissed from this docket.

IT IS, THEREFORE, SO ORDERED.

ISSUED BY ORDER OF THE COMMISSION.

This the 2nd day of June, 2008.

NORTH CAROLINA UTILITIES COMMISSION

Gail L. Mount

Gail L. Mount, Deputy Clerk

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