

**PURPA Standards Testimony  
Okefenoke REMC  
Time-Based Metering and Communication Standard**

**I. INTRODUCTION**

**Q. PLEASE STATE YOUR NAME, TITLE, AND BUSINESS ADDRESS.**

A. My name is Robert Duval, I'm a Vice President with EnerVision, and my business address is 2100 East Exchange Place, Tucker, Georgia 30084.

**Q. BRIEFLY DESCRIBE YOUR EXPERIENCE AND QUALIFICATIONS FOR SUBMITTING THIS TESTIMONY.**

A. EnerVision is a utility consulting firm that specializes in providing business and marketing services to electric utilities. EnerVision primarily focuses on providing consulting services to electric cooperatives, such as Okefenoke REMC. I graduated in December 1982 from the Georgia Institute of Technology (Georgia Tech) with a degree in Mechanical Engineering. I am a registered Professional Engineer and have been certified as a Certified Energy Manager from the Association of Energy Engineers. I have worked in the utility industry for approximately 23 years and have specialized in designing and implementing utility programs. I began my career with Florida Power and Light (FPL) in April 1983 and worked in the Marketing Department as a field engineer. During my career at FPL, I conducted energy audits for over 1,500 homes and 200 businesses, worked with large industrial customers on generation projects, and developed marketing programs to serve FPL's 2,500,000+ customers. I was actively involved in developing FPL's load management programs for both residential and commercial customers. In 1992, I left FPL and went to work for Southern Company as the Program Manager for the national Good Cents™ program. The Good Cents program is an energy efficiency program used by over 275 utilities from across the country to promote energy conservation and load management. I left Southern Company in 1997 and joined EnerVision as a Vice President. EnerVision provides consulting services to utility clients in over 25 states and specializes in power

supply analysis, technical services, developing marketing and energy efficiency programs, diversification strategies, strategic planning, market research, and other utility services.

**Q. PLEASE DESCRIBE THE PURPOSE OF THIS DIRECT TESTIMONY.**

A. The purpose of this testimony is to clearly state, explain and provide supporting information and documentation for Okefenoke REMC's staff position relating to implementation of time-based rates and smart metering.

**Q. WHAT IS THE POSITION OF OKEFENOKE REMC STAFF ON PURPA'S TIME-BASED METERING AND COMMUNICATION (SMART METERING) STANDARD?**

A. Okefenoke REMC currently does not have any time-based rate options for its residential or commercial/industrial (C/I) customers. However, some of Okefenoke REMC's rate schedules do include seasonal variations in pricing and demand charges (C/I) which reflect the cost of generation and transmission. To implement time-based rates for all customer classes, Okefenoke REMC would incur significant expense with rate design, smart metering equipment, system integration issues, and operational procedure changes. In addition, Okefenoke REMC's wholesale rate structure does not provide the proper pricing signals to promote time-based rates. Lastly, customer participation rates are normally less than 1% for utilities that offer time-based rates. Implementing time-based rates and smart metering for all customers would not be cost effective for Okefenoke REMC or its members. This testimony will show that the costs of implementing this option at this time are greater than the benefits. Okefenoke REMC, however, does support the offering of time-based rates to customers where cost-effective, and will continue to evaluate such rates in conjunction with its cost of service studies and rate making process. Okefenoke REMC will also consider using its 2-way automatic meter reading (AMR) system to facilitate additional time-based rate options if and when it becomes cost effective to do so.

## II. OVERVIEW

### Q. DESCRIBE THE SMART METERING STANDARD REFLECTED IN THE PURPA LEGISLATION?

A. The Energy Policy Act of 2005 amended PURPA by requiring all utilities with annual sales exceeding 500,000 MWhs to consider implementing five (5) new standards: net metering; time-based metering and communications (smart metering); fuel sources (fuel diversity); fossil fuel generation efficiency; and interconnection (DG interconnection). Okefenoke REMC meets the energy sales criteria and therefore must make a determination pertaining to each of the five areas including time based rates and smart metering as defined by PURPA. The bill states the following:

- **Time-Based Metering and Communications:** Not later than 18 months after the date of enactment of this paragraph, each electric utility shall offer each of its customer classes, and provide individual customers upon customer request, a time-based rate schedule under which the rate charged by the electric utility varies during different time periods and reflects the variance, if any, in the utility's costs of generating and purchasing electricity at the wholesale level. The time-based rate schedule shall enable the electric consumer to manage energy use and cost through advanced metering and communications technology.

In addition, the act also specifies the types of time-based rate schedules that may be offered by an electric utility. These include the following:

1. **Time-of-Use Pricing** – Electricity prices are set for a specific time period on an advance or forward basis, typically not changing more often than two or three times a year, based on the utility's cost of generating and/or purchasing wholesale power. Prices paid for energy consumed during these periods is pre-established and known to consumers in advance.
2. **Critical Peak Pricing** – Time-of-Use pricing is in effect most of the time except for certain days, when prices may be higher (typically on peak days) and customers may be charged a higher rate as an additional incentive for reducing load during these critical peak times.
3. **Real Time Pricing** – Electricity prices are set for a specific time period on an advance or forward basis, reflecting the utilities' wholesale power costs, and may change as often as hourly.

4. **Billing Credits** – These are typically credits to customers who agree to pre-established load reductions when called on by the utility. Common applications include interruptible rates, curtailable rates, and load control credits.

**Q. WHAT IS PURPA TRYING TO PROMOTE BY HAVING UTILITIES CONSIDER THE SMART METERING STANDARD?**

- A. Smart meters, in conjunction with time-based rates, can provide an opportunity for customers to better control electric costs by shifting loads in response to price signals from the utility. Reducing load at certain times, typically on hot summer days, can reduce wholesale power costs for Okefenoke REMC by potentially reducing peak demand costs. Smart meters can also provide customers with more detailed billing information, such as daily usage patterns which can assist customers in better controlling their energy costs. Some smart metering systems also include the capability of providing customers with real-time data and information through in-home displays, although these systems are rare and generally more expensive than more conventional smart metering systems. It is important to note that the benefits of smart meters and time-based rates will only be realized if customers respond to price signals and change their consumption patterns.

While considering time-based rates and smart metering, Okefenoke REMC needs to bear in mind that any decision should be made in light of the three (3) purposes for which PURPA was enacted: to encourage (1) the conservation of energy supplied by electric utilities; (2) the optimization of the efficiency of use of facilities and resources by electric utilities; and (3) equitable rates to electric consumers.

**Q. WHAT TECHNOLOGY IS REQUIRED TO SUPPORT IMPLEMENTATION OF A TIME-BASED RATE SCHEDULE?**

- A. In order to implement time-based rate schedules, special metering equipment will be required to record the time-based consumption information. While time-based meters are available, they are more expensive than conventional meters. For a typical residential application, the additional cost of the meter can range from \$100 - \$125 (above the cost of a conventional meter) depending on the level of functionality and sophistication of the

meter. In addition to the metering equipment, the hand-held meter reading, billing systems and even the printed bill may have to be modified to accommodate the time-based rates. For more sophisticated time-based rates, such as critical peak pricing plans, communication equipment may also be needed to provide the customer with notification of the critical price times. These devices can include two-way thermostats, home-based display units, or paging units that receive notification signals for the utility.

**Q. WHAT COSTS ARE INVOLVED IN IMPLEMENTING THE ENABLING TECHNOLOGIES?**

A. There are several factors which determine the cost of electric meters including smart meters. Some of these include voltage level, meter base type, number of phases (three-phase vs. single-phase), on-board memory, and other factors. For a typical residential single-phase meter, the cost premium for a smart meter over a conventional meter is approximately \$100 - \$125. The actual price differential is dependent on the number of time periods being metered and the amount of on-board memory. For three-phase commercial meters, the price premium is approximately \$150 - \$300 and can vary significantly based on the actual meter type and manufacturer. As previously stated, more sophisticated rates may require customer communication equipment and those costs can vary significantly based on the technology selected.

**Q. IS AUTOMATIC METER READING (AMR) TECHNOLOGY REQUIRED?**

A. No, automatic meter reading systems are not required to implement time-based rates. However, these systems can help facilitate time-based rates by collecting interval metering data and eliminate the need to purchase separate metering equipment. Okefenoke REMC has installed a TWACs 2-way AMR system and could utilize this system, with some programming changes, to offer more time-based rates.

**Q. WHAT HAS BEEN THE EXPERIENCE IN THE UNITED STATES WITH RESPECT TO THE ADOPTION OF SMART METERING AND TIME-BASED RATES?**

- A. There has been limited adoption of smart metering and time-based rates by utilities in the United States. According to a February 2006 report by the Department of Energy (DOE) to the US Congress, “Benefits of Demand Response in Electricity Markets and Recommendations for Achieving Them”, demand response potential in the US was about 20,500 MW or 3% of the total US peak demand. Actual delivered peak demand reduction was about 9,000 MW or 1.3% of the total peak (NERC 2005). Time-based rates are typically considered a form of price-based demand response and are included in the DOE study results.

**Q. WHY HAS THE PENETRATION RATE FOR PROGRAMS BEEN SO LOW, PARTICULARLY WITH RESIDENTIAL CUSTOMERS?**

- A. Residential customers represent a special challenge for time-based rates and smart metering. Most residential customers lack information on their electricity-using appliances and equipment and are not familiar with technologies that can facilitate effective energy management. In order for customers and utilities to benefit from time-based rates, customers need to shift usage from “on-peak” to “off-peak” periods. Without a significant financial incentive, most customers will not make significant lifestyle changes in order to benefit from the time-based rates. In addition, certain major appliances, such as refrigerators and freezers, typically cannot be controlled or shifted to off-peak times.

**Q. WHAT CHARACTERIZES THOSE PROGRAMS THAT HAVE BEEN SUCCESSFUL?**

- A. The most successful programs have been those that are targeted to large commercial and industrial customers and include options such as real-time pricing (RTP) and interruptible rates. These large customers typically have greater flexibility in their operations and can modify equipment and shifts to take advantage of time-based rates. However, many of these large customers are served by investor-owned utilities (IOUs) and electric distribution cooperatives, like Okefenoke REMC, primarily serve residential customers and therefore have limited potential with these large customers.

### **III. OKEFENOKE REMC CURRENT SITUATION**

**Q. BRIEFLY DESCRIBE OKEFENOKE REMC'S WHOLESALE POWER COST SITUATION.**

- A. Okefenoke REMC gets its wholesale power from Oglethorpe Power Corporation (OPC), a generation and transmission (G&T) cooperative based in Tucker, GA and through wholesale power contracts with Southern Power. OPC is owned by 39 electric distribution cooperatives, including Okefenoke REMC, and provides wholesale power to its owners. This type of arrangement is very common with electric distribution cooperatives. Electric distribution cooperatives formed G&Ts in order to gain economies of scale when purchasing generation resources and negotiating power purchase agreements. Okefenoke REMC is currently contractually bound through power purchase agreements to purchase all of its power from OPC and Southern Power. In addition, Okefenoke REMC gets transmission service from FPL to its substations located in Florida.

**Q. HOW DO OKEFENOKE REMC'S WHOLESALE COSTS FOR ELECTRICITY VARY DURING DIFFERENT TIME PERIODS.**

- A. Okefenoke REMC's costs for purchased electricity vary during different time periods as a function of the cost of energy and as a function of the cost of capacity to meet its peak load requirements. The cost of energy varies as a function of fuel costs as well as the cost of energy in the hourly market. For example, as Okefenoke's load increases, a higher percentage of its energy is produced by gas fired resources. However, the spread between on-peak and off-peak energy costs does not vary greatly on average. The maximum spread in the summer between the on-peak and off-peak hours is slightly greater compared to other times of the year. Therefore, from an energy cost perspective the variance is not likely to result in changes in customer behavior if conveyed through a retail price signal. On the other hand, Okefenoke's capacity costs going forward are associated with a well defined time period. Through its contract with Southern Power, Okefenoke's cost for generation capacity will be based on aggregate customer load during the Southern Company's highest 10 hourly demands – usually occurring during July and August.

Therefore, rates that convey a price signal tied to those 10 hours and that provide customers with the information to control load during those hours could be effective time-based rates. Okefenoke is currently evaluating direct load control as a means to help reduce costs during those 10 hours.

**Q. HOW MIGHT A TIME-BASED RATE PROGRAM BE CONSTRUCTED THAT COULD IMPACT OKEFENOKE REMC'S WHOLESALE COST OF ELECTRICITY?**

- A. In terms of generation costs, the only effective time-based rate program would be one that reduces summer peak demand charges during Southern Company's top 10 hours. During the summer, peak times typically occur on hot summer afternoons. Okefenoke REMC can also reduce transmission costs from Georgia Transmission Company (GTC) by reducing peak demand during the top 5 hours, which also occurs in the summer. In designing a time-based rate schedule, Okefenoke REMC would want to provide price incentives to reduce usage at the time of system peak for each summer month. One example would be a residential time-of-use rate that would charge customers a higher rate during the hot summer afternoons. In addition, Okefenoke REMC is considering direct load control for its members which could also help to control peak demand in the summer. Direct load control can be a more effective tool for reducing load at critical times compared to time-based rates.

**Q. PLEASE DESCRIBE THE TYPES OF METERS AND METERING TECHNOLOGY IN PLACE AT OKEFENOKE REMC?**

- A. Okefenoke REMC has approximately 32,500 members and 36,300 connected meters. There are three primary meter types to record consumption data. These meter types include: Mechanical Single Phase Meters, Electronic Single Phase Meters, and Electronic Three Phase Meters. These meters operate at various voltages (typically 120, 208, 240, 277, 480 volts) and are provided by numerous meter manufacturers. Okefenoke REMC has installed TWACs AMR meter modules in all of its meters to automatically record consumption information. This information is read over the power lines and has eliminated the need for manual meter readings.

**Q. WHAT DOES THE CURRENT STATUS OF METERING AT OKEFENOKE REMC SUGGEST IN TERMS OF THE COST/BENEFIT OF IMPLEMENTING AN EFFECTIVE SMART METERING PROGRAM?**

A. In order to implement time-based rates and smart metering programs, Okefenoke REMC would have to invest in upgrades to their AMR system, make changes to their billing and customer information system, market the time-based rates to customers, and design a rate that reflects the variations in their wholesale power cost. The chart shown below illustrates some of costs and benefits of implementing time-based rates and smart metering.

<b>Costs</b>	<b>Benefits</b>
<ol style="list-style-type: none"> <li>1. Development of new rate schedules</li> <li>2. Investment in new meters and support infrastructure</li> <li>3. Meter reading and data collection</li> <li>4. Billing system and CIS upgrades to handle new rate schedules</li> <li>5. Consumer education</li> <li>6. Costs to consumers in terms of inconvenience and price risks</li> </ol>	<ol style="list-style-type: none"> <li>1. Potential to reduce wholesale power costs</li> <li>2. Environmental Benefits</li> <li>3. Provide price signal for customers to reduce peak demand</li> <li>4. Potential cost savings for customers</li> </ol>

The costs to provide time-based rates to all customers would require an investment to upgrade the AMR system, CIS programming, marketing materials, and the development of new rate options. Considering Okefenoke REMC’s demographic mix (primarily residential customers), the lack of time or seasonal variations in Okefenoke REMC’s wholesale energy price, and the difficulty in changing consumer behavior, these costs could not be recovered over a reasonable time frame without significantly increasing customer rates.

**Q. ARE ANY TIME-BASED RATES IN PLACE AT OKEFENOKE REMC CURRENTLY?**

A. Okefenoke REMC only offers a time-based rate for schools (Rate Schedule SM). This rate is designed to reduce peak demand during summer afternoons and winter mornings.

**Q. ARE ANY TIME-BASED RATES BEING CONSIDERED IN CONJUNCTION WITH THE NEW AMR SYSTEM?**

- A. Okefenoke REMC intends to evaluate time-based rates for all customer classes as part of its next cost of service study and rate design project. The new AMR system will support the metering requirements for time-based rates. While the AMR system is primarily used for meter reading and outage management at this time, Okefenoke REMC intends to explore options to better utilize the system capabilities, including time-based rates.

**Q. IF A TIME-BASED RATE OPTION IS OFFERED, WOULD NON-PARTICIPATING CUSTOMERS/MEMBERS SUBSIDIZE THE COSTS TO IMPLEMENT THE RATE?**

- A. No. Okefenoke REMC would design a time-based rate program such that any costs associated with the rate would be recovered through the participating customers.

**IV. SUMMARY AND CONCLUSION**

**Q. MAY WE CONCLUDE THAT OKEFENOKE REMC STAFF IS ONLY CONSIDERING IMPLEMENTING TIME-BASED RATE SCHEDULES FOR SELECTED CUSTOMERS/CUSTOMER CLASSES AT THIS TIME?**

- A. Okefenoke REMC will continue to evaluate time-based rates in conjunction with its cost of service studies and rate making process. Based on Okefenoke REMC's limited experience with time-based rates and the cost to implement these rates, Okefenoke REMC will not offer additional time-based rates to any of its customers at this time but will consider time-based rate options as part of its next rate study. If customers request time-based rates or there are changes in wholesale power supply costs that will better facilitate time-based rates, Okefenoke REMC will also reconsider time-based rates at that time.

**Q. WHEN MIGHT OTHER CUSTOMERS BE OFFERED TIME-BASED RATE SCHEDULES?**

A. Customers will be offered time-based rates if and when they become cost effective for Okefenoke REMC to offer them. As stated above, the current wholesale power rate does not have a significant variation in the time-based energy component, the cost for implementing time-based rates would have to be recovered by participating customers, and customers have not been requesting time-based rates.

**Q. DOES THE POSITION OF OKEFENOKE REMC STAFF MEET THE THREE PURPOSES OF PURPA?**

A. The three purposes of PURPA are: to encourage (1) the conservation of energy supplied by electric utilities; (2) the optimization of the efficiency of use of facilities and resources by electric utilities; and (3) equitable rates to electric customers. While implementing time-based rates and smart metering could potentially meet these three purposes, PURPA is requiring utilities to consider implementing “a time-based rate schedule under which the rate charged by the electric utility varies during different time periods and reflects the variance, if any, in the utility’s costs of generating and purchasing electricity at the wholesale level.” Okefenoke REMC’s wholesale power rate does not vary by time periods, so it would be difficult to design time-based rates that reflect the wholesale cost variances. In addition, the cost to implement time-based rates and smart metering are greater than the benefits. As a result, to effectively implement and promote time-based rates, Okefenoke REMC would have to increase cost to non-participants which would not meet the intent of PURPA. Okefenoke REMC will continue to evaluate time-based rates and smart metering and will consider implementing these options when it makes good business sense for Okefenoke REMC and its customers.

**Q. DOES THIS CONCLUDE YOUR TESTIMONY?**

A. Yes