



Progress Energy

April 2, 2012

FILED

APR 02 2012

Clerk's Office
N.C. Utilities Commission

Ms. Gail Mount
Deputy Clerk
North Carolina Utilities Commission
4325 Mail Service Center
Raleigh, North Carolina 27699-4325

RE: Docket No. E-2, Subs 926, 931 and 1002

OFFICIAL COPY

Dear Ms. Mount:

Enclosed for filing in the above-referenced dockets are the original and 30 copies of Progress Energy Carolinas, Inc.'s response to the Commission's February 27, 2012, Order Requiring Revised Annual Report and Revised M&V Schedule, along with 30 copies of PEC's revised Annual DSDR Implementation Report to be filed in Docket No. E-2, Sub 926, and revised DSM/EE EM&V schedule to be filed in Docket No. E-2, Sub 1002.

PEC worked with the Public Staff to develop responses to the Commission's questions, as well as the updated annual report and EM&V plan. PEC intends to continue to collaborate with the Public Staff to develop reports and information to be provided to the Commission and Public Staff as the DSDR program transitions from implementation activities to operation later this year.

Sincerely,

Len S. Anthony
General Counsel
Progress Energy Carolinas, Inc.

LSA:mhm

Attachment

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VERIFICATION

STATE OF NORTH CAROLINA

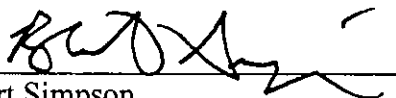
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DOCKET NO. E-2, SUB 926

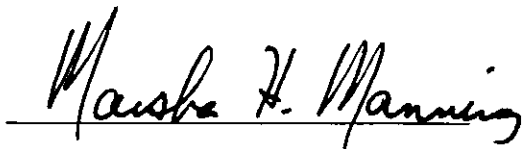
NOW, BEFORE ME, the undersigned, personally came and appeared, Robert Simpson, who first duly sworn by me, did depose and say:

That he is Robert Simpson, Major Project Manager-Distribution of Carolina Power & Light Company, d/b/a Progress Energy Carolinas, Inc.; he has the authority to verify the foregoing Progress Energy Carolinas, Inc.'s Distribution System Demand Response Program Implementation Status Report; that he has read said Report and knows the contents thereof are true and correct to the best of his knowledge and beliefs.



Robert Simpson
Major Project Manager-Distribution
Progress Energy Carolinas, Inc.

Subscribed and sworn to me
this 2nd day of April, 2012.



STAREG2384



STATE OF NORTH CAROLINA

UTILITIES COMMISSION
RALEIGH

DOCKET NO. E-2, SUB 926
DOCKET NO. E-2, SUB 931
DOCKET NO. E-2, SUB 1002

FILED

APR 02 2012

Clerk's Office
N.C. Utilities Commission

BEFORE THE NORTH CAROLINA UTILITIES COMMISSION

DOCKET NO. E-2, SUB 926

In the Matter of

Petition of Progress Energy Carolinas, Inc., for
Approval of Distribution System Demand
Response Program

DOCKET NO. E-2, SUB 931

In the Matter of

Application by Carolina Power & Light
Company, d/b/a Progress Energy Carolinas,
Inc., for Approval of DSM and Energy
Efficiency Cost Recovery Rider Pursuant to
G.S. 62-133.9 and Commission Rule R8-69

**PROGRESS ENERGY CAROLINAS,
INC.'S REVISED ANNUAL REPORT
AND REVISED M&V SCHEDULE**

DOCKET NO. E-2, SUB 1002

In the Matter of

Application by Carolina Power & Light
Company d/b/a Progress Energy Carolinas,
Inc. for Approval of DSM and Energy
Efficiency Cost Recovery Rider Pursuant to
G.S. 62-133.9 and Commission Rule R8-69

BACKGROUND

By Orders dated June 15, 2009, and November 25, 2009, in Docket No. E-2, Subs 926 and 931, the North Carolina Utilities Commission ("the Commission") approved Progress Energy Carolinas, Inc.'s ("PEC" or "Progress") proposed Distribution System Demand Response ("DSDR") program as a new energy efficiency program, and found that, subject to certain restrictions, the DSDR program is eligible to earn a net lost revenues incentive.

The Commission's June 15, 2009, order in Docket No. E-2, Sub 926, also required PEC to work with the Public Staff to develop an annual report for the DSDR program that would provide key operating data from its measurement and verification ("M&V") plan. In response to the Commission's Order, PEC worked with the Public Staff to develop the content of the required DSDR annual report and PEC filed its initial report on November 30, 2009. Subsequently, PEC has met with the Public Staff at least annually to review the status of the DSDR project and the draft annual report for the current year. In each instance, the Public Staff has reviewed the draft annual report and provided comments and suggestions, which PEC has incorporated into the annual reports filed with the Commission on November 30, 2010 and 2011.

On February 27, 2012, in the above captioned dockets, the Commission issued its Order Requiring Revised Annual Report and Revised M&V Schedule. The Order requires PEC to:

1. Work with the Public Staff to develop a revised annual report and file the report by April 2, 2012, and
2. Amend its M&V schedule to include DSDR and file it by April 2, 2012.

In addition to the specific filing requirements, the Commission's Order also discussed the reasons behind the Commission's determination that PEC's annual reports are not adequate. The Commission stated that PEC's annual reports do not explain:

1. how energy (MWh) savings will be calculated for the DSDR program;
2. whether and how both energy (MWh) and demand (MW) savings will be used to calculate net lost revenues; and
3. how the concepts of "measurement unit" and "vintage year" will apply to the calculation of net lost revenues for the DSDR program. Given that this program is intended to reduce customer loads at times of peak demand, when electricity production costs are especially high, the Commission seeks clarification as to whether Progress will actually experience any net revenue loss attributable to DSDR. It is unclear from the most recent annual report whether DSDR will be available to reduce the Company's capacity and energy needs during the upcoming summer.

Finally, the Commission noted that PEC's January 31, 2012, M&V Schedule filed in Docket No. E-2, Sub 1002, does not include the DSDR program.

COMMENTS

PEC's comments on the Commission's concerns are as follows:

1. How energy (MWh) savings will be calculated for the DSDR program

Currently for testing purposes, peak load reduction capability (MW) and energy savings (MWh) are calculated using a standard, statistical-based methodology and operational data

obtained during voltage reduction testing of the DSDR components installed and operational at the time of the testing.

- For peak load reduction capability, this methodology is used to estimate the load (demand) with and without voltage reduction applied by performing approximately 15 to 20 demand reduction tests each summer. The average demand reduction (MWs) for these 15 to 20 tests is calculated and normalized to the 2007 system peak load to provide a historical-based estimate of the demand reduction achieved each year.
- The annual energy savings associated with peak load reduction are calculated based upon the peak load reduction (MW) achieved when DSDR is activated, multiplied by the duration (hours) of the activations.
- The energy savings associated with a reduction in line losses is estimated using industry-accepted engineering practices and widely-used modeling tools (CYME Power Engineering Software). Line losses are determined by the physical and electrical characteristics of each individual distribution circuit. The reduction in line losses is estimated based upon the physical and electrical changes made to each feeder as part of the feeder conditioning activities associated with implementation of the DSDR program. Each of PEC's approximately 1,100 distribution feeders is studied individually to determine the line loss reduction benefits resulting from the feeder conditioning activities and improvements implemented as a part of the DSDR program.
- Estimated energy savings for the years 2008-2011 include only the energy savings associated with a reduction in line losses. For 2012 and beyond, once DSDR is fully operational, total energy savings will include energy savings associated with a reduction in line losses plus the energy savings associated with peak load reduction.

A critical component of the DSDR program is the Distribution Management System ("DMS"). When the DMS is placed in service (scheduled for September, 2012), it will be used to determine DSDR program energy savings (MWh) and demand reduction (MW) in real time, replacing the statistical/historical-based methodology associated with the existing voltage reduction system. The DMS will measure and calculate the actual and forecasted energy (MWh) and demand (MW) impacts for both peak load reduction and line loss savings benefits every 15 minutes, using real-time data collected by the various sensors and other devices installed on PEC's distribution system. The DMS is a significant enhancement to the existing distribution system modeling tool. While the existing modeling tool is accurate and widely used (by utilities in over 100 countries), it is a static model based on the distribution system at a point in time. The DMS will measure real time electrical system conditions every 15 minutes, perform a state estimation of the current state of devices, determine the optimum state of these devices, and execute commands using the DSCADA (Distribution Supervisory Control and Data Acquisition) system to change the state of electrical devices remotely to achieve conditions that maximize the peak load reduction capability of the distribution system and minimize the line losses.

As the implementation phase transitions to full operation of DSDR, expected in September 2012, PEC's reporting of DSDR performance will include analysis of the realized peak load reductions and energy savings. Following each summer peak season, PEC intends to provide the Commission and Public Staff each fall information regarding demand and energy impacts during the previous summer. Details of the information to be provided will be developed in collaboration with the Public Staff.

2. Whether and how both energy (MWh) and demand (MW) savings will be used to calculate net lost revenues

There are two essential metrics associated with Demand Side Management ("DSM") and Energy Efficiency ("EE") programs. The first of these metrics is demand reduction, measured in megawatts ("MW"). Net lost revenues ("NLR") are not tied to demand reduction savings. The second metric involves energy savings, which are measured in megawatt hours ("MWH"). In the case of DSDR, energy savings are segmented into two constituent components: (1) energy savings that occur between the generator and customer meters as a result of a reduction in line losses; and (2) energy savings that occur on the customer side of the meter as a result of DSDR activation. By their very nature, NLRs are only attributable to electric bill savings realized by customers as a result of energy savings on the customer side of the meter. Therefore, only those energy savings that occur on the customer side of the meter are used to determine NLR values. In the case of DSDR, NLRs attributable to customers' energy savings occur only in concert with DSDR activations. The part of DSDR energy savings associated with reduced line losses is not considered when calculating NLR.

PEC forecasts indicate that approximately 37 percent of total DSDR energy savings will occur on the customers' side of the meter based on DSDR activations totaling 80 hours annually, and result in NLR. The estimated annual level of NLR related energy savings assigned to North Carolina is equivalent to approximately 16,000 MWHs. This estimate is derived based upon the estimated peak load reduction (MW) achieved and the number of hours of activation. For example, if DSDR were activated for an aggregate of 80 hours per year and achieved a load reduction of 230 MW for each activation, total annual energy savings would be approximately 18,400 MWH. The portion of those savings allocated to North Carolina would be approximately 16,000 MWH. Using an estimated composite NLR rate of \$46.56 per MWH, the North Carolina portion of NLRs is estimated to be \$750,750 per year. While dependent on the number and duration of DSDR activations, the estimated NLRs for the entire 36-month period eligible for NLR recovery are \$2.25 million. It is important to note that energy savings, eligible for NLR recoupment, will be determined on the basis of actual DSDR activations in accordance with the Commission's November 25, 2009, Order in Docket No. E-2, Sub 951.

The following table provides savings estimates for the initial three 12-month periods in which DSDR is in service:

12 Month Periods	DSDR Total MWH Savings (System) ¹	DSDR MWH Savings Eligible for NLR (System) ²	Percentage of DSDR Savings Eligible for NLR Recoveries ³
Year 1	49,368	18,236	36.9%
Year 2	50,039	18,533	37.0%
Year 3	50,862	18,886	37.1%
Totals	150,269	55,655	37.0%

Table Notes:

1. Total DSDR energy savings, including energy savings resulting from DSDR activations (see note 2) plus energy savings resulting from a reduction in line losses. Estimated energy savings from reduced line losses is determined using industry-accepted engineering practices and modeling tools to assess the reduction in energy losses on each of PEC's approximately 1,100 distribution feeders.
2. Energy savings resulting only from DSDR activations. Excludes energy savings resulting from a reduction in line losses. Estimated energy savings associated with DSDR activations is calculated based upon the peak load reduction achieved (MW) and the duration of the activations.
3. Energy savings from DSDR activations as a percentage of total DSDR energy savings.

Any future PEC request for recovery of NLR, after DSDR is fully operational, will include full documentation and support for the actual energy savings resulting from DSDR activation for which recovery of NLR is requested.

3. **How the concepts of "measurement unit" and "vintage year" will apply to the calculation of net lost revenues for the DSDR program. Given that this program is intended to reduce customer loads at times of peak demand, when electricity production costs are especially high, the Commission seeks clarification as to whether Progress will actually experience any net revenue loss attributable to DSDR.**

Measurement units for the purpose of calculating NLRs are expressed in kilowatt-hours ("KWHs") or aggregated MWHs saved by customers on their side of the meter resulting from DSDR activations. In the absence of these savings, a customer's energy consumption would be greater along with the customer's energy billing (*please refer to the Company's response to item 2 above*).

NLRs resulting from DSDR activations, pursuant to PEC's DSM/EE Cost Recovery Mechanism (*Docket E-2, Sub 931*), are limited to the 36-month period subsequent to DSDR going into service. Consistent with other DSM/EE programs, DSDR's in-service date will reside within Vintage Year One. Since Vintage Years are based on calendar periods, the 36-month recoupment period will likely involve up to four Vintage Years. An illustration of

this relationship, assuming that DSDR is placed into operation upon completion of the DMS in September 2012, is provided below:

Vintage Period	Loss Recovery Period	Recovery Period - Months
Vintage Year 1	Sep 2012 to Dec 2012	4
Vintage Year 2	Jan 2013 to Dec 2013	12
Vintage Year 3	Jan 2014 to Dec 2014	12
Vintage Year 4	Jan 2015 to Aug 2015	8
Totals	Sep 2012 to Aug 2015	36

The increased production costs incurred during times of peak demand are fuel related. The NLR calculation takes in to account the recovery of such increased costs through the annual fuel cost recovery rider. Thus, fuel costs have no impact on the calculation of NLRs. PEC determines its NLR rate by subtracting from the average retail rate for each of its customer classes, among other items, the average cost of fuel (calculated as being equal to fuel revenues), variable O&M costs, and customer charges.

PEC has consistently used the aforementioned methodology, for the determination of NLRs in each of its DSM/EE cost recovery proceedings (*Docket Nos. E-2, Sub 931; E-2, Sub 951; E-2, Sub 977; and E-2 Sub 1002*). PEC's NLR methodology was specifically addressed by the Commission in its November 25, 2009, Order in Docket No. E-2, Sub 951. In this Order, the Commission determined that PEC's NLR methodology was reasonable and as such was approved.

4. It is unclear from the most recent annual report whether DSDR will be available to reduce the Company's capacity and energy needs during the upcoming summer.

As noted in PEC's last DSDR Program Implementation Status Report, filed with the Commission on November 30, 2011, the DSDR system is expected to be completed and placed into operation in September, 2012. Even though DSDR will not be complete and operational by this summer, the DSDR components and related improvements implemented thus far will be capable of reducing capacity and energy needs during the upcoming summer. The revised DSDR Implementation Status Report being filed concurrently in Docket No. E-2, Sub 926, indicates an expected peak load reduction capability of 160 MW to be available late this summer. In addition, the reduction in distribution system line losses is expected to result in 6 MW of loss savings. Thus, the aggregate capacity impact of the DSDR components is expected to be approximately 166 MW by late this summer. When completed and placed into operation by the end of this year, the DSDR program is expected to result in a summer peak load reduction capability of 236 MW, including the 6 MW of capacity savings associated with a reduction in distribution system losses.

With regards to the energy impacts available this summer, the testing of the DSDR components this summer will result in a reduction in energy needs (MWh) commensurate with the peak load reduction (MW) achieved. The actual energy savings achieved depends on the number of times the testing is conducted, the duration of each test, and the system load at the time of each test.

In addition, the feeder conditioning improvements made to-date will result in additional energy savings associated with a reduction in line losses. The reduction in line losses is not dependent upon testing events, but occurs all the time. However, the actual line loss energy savings are proportional to system load, so the savings are greatest when load (demand) is highest.

5. Finally, the Commission noted that PEC's January 31, 2012, M&V Schedule filed in Docket No. E-2, Sub 1002, does not include the DSDR program.

To date, PEC has not included the DSDR program on its filed EM&V schedule for two reasons.

First, the focus to date has been on building and implementing the components of the DSDR program, not on operation. PEC had planned to address EM&V for DSDR once the program is completed and operational

Secondly, the characteristics of the DSDR program are different from the other DSM/EE programs included on the EM&V schedule to date, and will require a different approach to measure, verify and evaluate the results achieved by DSDR. EM&V for most DSM/EE programs involves a measurement of impacts resulting from customer actions, and the associated behaviors and incentives involved. For DSDR, the focus will be on measuring the peak load reduction impact observed at PEC's Energy Control Center and Distribution Control Center, and does not involve explicit customer action, behaviors or incentives. Therefore, PEC is developing a customized EM&V protocol specifically for the DSDR program, which will be implemented early this fall, to more efficiently and effectively gauge its performance. PEC will collaborate with the Public Staff on development of the EM&V report.

As explained further below, in order to better inform the Commission of its plans, PEC is adding the DSDR program to the DSM/EE EM&V schedule filed with the Commission.

The following comments relate to the ordering paragraphs of the Commission's February 27, 2012, Order:

1. Progress shall work with the Public Staff to develop a revised DSDR annual report and file the report by April 2, 2012.

As instructed, PEC has worked with the Public Staff to develop a revised DSDR annual report, attempting to address the issues raised by the Commission. The revised report is being filed in Docket No. E-2, Sub 926.

The annual reports to date have focused on implementation of the DSDR system, including design, engineering, development, procurement, installation and testing activities.

Once the implementation activities are complete and the full DSDR system is placed into operation, the annual reports will transition from reporting on implementation activities to

reporting on results achieved from operation of the completed system, including the peak load reduction and associated energy savings achieved due to operation of the system, as well as the reduction in distribution system line losses resulting from the distribution feeder improvements made as a part of the DSDR project.

2. Progress shall amend its M&V schedule to include DSDR and file it by April 2, 2012.

PEC has revised its EM&V schedule to include DSDR, and is filing the revised schedule in Docket No. E-2, Sub 1002.

The revised schedule shows testing of DSDR during the third quarter of 2012. While implementation of DSDR will not be complete at that time, testing will be conducted on the installed components of the system. The results of that testing will be used to update the peak load reduction achieved to-date, and the expected peak load reduction capability of DSDR when completed. Those results will be included in the annual DSDR implementation report filed with the Commission in fourth quarter of that year.

Once the DSDR system is complete and placed into full operation, around September 1, 2012, PEC will transition from testing DSDR components to collecting impact data from actual operation of DSDR. The EM&V schedule shows data collection from actual operation of DSDR during the third quarter (summer) of 2013, followed by an EM&V report based on the collected operational data during the fourth quarter. That EM&V report is planned to include actual results achieved from full implementation of the completed system as well as an evaluation of the effectiveness of the DSDR program, and will address actual peak load reduction capability, energy savings associated with operation of DSDR to achieve peak load reduction, and the reduction in distribution system line losses achieved resulting from the distribution system improvements made as a part of the DSDR project.

**Progress Energy Carolinas, Inc.
Distribution System Demand Response (DSDR) Program
Implementation Status Report
NCUC Docket No. E-2, Sub 926**

Introduction

The purpose of this report is to provide the North Carolina Utilities Commission ("Commission") with an annual update on the implementation of Progress Energy Carolinas, Inc.'s ("PEC") Distribution System Demand Response ("DSDR") Program.

As stated in the initial annual report, the implementation of the DSDR Program will cover a five year period and conclude in 2012, when the DSDR system is fully operational. Because the DSDR system is not yet complete and operational, this report focuses on the status of implementing the program. After the systems are installed and the program is placed in operation, the focus of reports will be on operating data consistent with Measurement and Verification ("M&V") activities.

Implementation Initiatives

As explained in the previous report, the implementation of the DSDR Program consists of four interdependent initiatives:

1. **Feeder conditioning:** flatten voltage profile by installing voltage regulation equipment (regulators, capacitors, load balancing) on 1,162 feeders
2. **Grid System Design:** install sensors & intelligent controls on equipment (regulators, capacitors) & T/D substations (regulators, Remote Terminal Units) to retrieve system data & enable remote control commands
3. **IT Systems & Integration:** data architecture – data sharing, data applications, and data historian, Distribution Supervisory Control and Data Acquisition (DSCADA) upgrade/replacement, Distribution Management System (DMS) – data processing, power flow analysis, MW capability assessment, execute commands to control equipment to deliver MWs
4. **Telecom:** connect sensors, controls, and DMS with two-way communications

The initiatives build upon each other from one year to the next and therefore are managed against a sequence of annual milestones. The milestones are listed in the table below and have been updated to reflect the progress made to date.

2007	<ul style="list-style-type: none">• Established a baseline demand reduction capability using the existing voltage reduction system• Developed methodology to measure dynamic load response
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Progress Energy Carolinas, Inc.
Distribution System Demand Response (DSDR) Program
Implementation Status Report
NCUC Docket No. E-2, Sub 926

2008	<ul style="list-style-type: none"> • Developed a standard and statistically valid test method for measuring the megawatt reduction response of DSDR • Demonstrated magnitude and sustainability of demand reduction • Identified DMS design parameters • Began conditioning distribution feeders to flatten voltage profile
2009	<ul style="list-style-type: none"> • Confirmed statistical validity of standard test method and improved measurement methodology • Demonstrated sustainability and magnitude of demand reduction • Began DMS design • Began construction in substations of gateways and IP communications equipment • Began implementation of new telecom system to communicate with DSDR devices in the substation and along distribution feeders • Continued conditioning distribution feeders to flatten voltage profile
2010	<ul style="list-style-type: none"> • Continued to confirm statistical validity of standard test method and measurement methodology • Demonstrated sustainability and magnitude of demand reduction • Completed upgrade of new DSCADA system • Continued the DMS design • Began installation of sensors on distribution feeders • Continued installation of equipment in substations • Continued installation of new telecom system • Continued conditioning distribution feeders to flatten voltage profile
2011	<ul style="list-style-type: none"> • Continued to confirm statistical validity of standard test method and measurement methodology • Demonstrated sustainability and magnitude of demand reduction • <i>Completed Factory Acceptance Testing (FAT) of the DMS</i> • <i>Completed construction in substations of gateways and IP communications equipment</i> • Continued installation of sensors on distribution feeders • Continued installation of new telecom system • <i>Continued conditioning distribution feeders to flatten voltage profile</i>

**Progress Energy Carolinas, Inc.
Distribution System Demand Response (DSDR) Program
Implementation Status Report
NCUC Docket No. E-2, Sub 926**

2012	<ul style="list-style-type: none"> • <i>Begin installation of Power Quality Meter (PQM) equipment in substations¹</i> • Complete installation of sensors • Complete installation of new telecom system • Complete conditioning of distribution feeders • Complete integration testing of the DMS • Put DMS into commercial operation and implement the DSDR program
2013	<ul style="list-style-type: none"> • <i>Complete installation of PQM equipment in substations</i> • <i>Provide initial post implementation support of the DMS</i> • <i>Complete all DSDR project closure activities</i>

Note that three annual milestones were added in 2013 to cover post-DSDR implementation requirements and due to vendor delays in the development of a new PQM product. In addition, the annual milestone for the completion of the distribution feeder conditioning was moved from 2011 to 2012 due to construction crew resource constraints. The revised schedule for this milestone does not delay the projected completion and full implementation of the DSDR program. All the milestones shown for the years 2007-2011 have been met.

Achievements-to-date

The following individual achievements have been made within each initiative as of December 31, 2011:

- **Feeder Conditioning**
 - Developed a Feeder Analysis and Conditioning Tracking System (FACTs)
 - Developed a statistical model to estimate future infrastructure improvements associated with feeder conditioning
 - **1,100** out of 1,162 **(95%)** feeders have been completed and the following actions taken:
 - **582 (99%)** capacitors have been added
 - **2,177 (95%)** voltage regulators have been added
 - **4,844 (98%)** distribution taps have been changed to improve load balance
 - **194 (94%)** miles of new lines have been added to improve load balance*
- *Correction from November 30, 2011 report due to changes in planned and actual line miles added*

¹ This work is required due to the replacement of legacy RTU equipment with new IP Gateways, which are a necessary component of the DSDR program.

Progress Energy Carolinas, Inc.
Distribution System Demand Response (DSDR) Program
Implementation Status Report
NCUC Docket No. E-2, Sub 926

- **Grid System Design**

- **2,526 (95%)** new intelligent capacitor controls have been installed on the distribution feeders
- **2,477 (82%)** new intelligent regulator controls have been installed on the distribution feeders
- **339 (100%)** new Gateways have been installed replacing older Remote Terminal Units in the T/D substations
- **1,295 (89%)** medium voltage sensors have been installed on the distribution feeders

- **IT Systems & Integration**

- Developed PGN Common Information (semantic) Model (CIM) for DSDR substation and feeder device data integration between applications in 2008-2009
- The new DSCADA system was implemented in July of 2010
- ***Completed Factory Acceptance Testing (FAT) of DMS and upgraded DSCADA.***
- ***The initial DMS design has been completed and implementation is planned for 3rd quarter 2012 with additional enhancements by 4th quarter 2012***
- Continued design and development of interfaces between DMS and existing systems

- **Telecom**

- Implemented a core isolated grid wide area data network (WAN) for IP-based communications to all substations and feeder devices in 2009
- Two-way communications construction completed on approximately **319 (100%)** T/D substations, utilizing a combination of PEC owned fiber optics and leased data lines.
- Two-way communications has been established to approximately **6,190 (87%)** distribution feeder devices via leased cellular service.
- An evaluation of two-way communications to distribution feeder devices using a new PEC-owned and licensed private radio system was completed. ***Based on the evaluation and consideration of our PGN EnergyWise enterprise telecommunications strategy, the decision was made not to pursue the private radio solution at this time. Commercial cellular will be leveraged for 100% of the feeder devices.***

**Progress Energy Carolinas, Inc.
Distribution System Demand Response (DSDR) Program
Implementation Status Report
NCUC Docket No. E-2, Sub 926**

Impact Measurement Method

PEC has established a standard, statistical-based test methodology that can accurately demonstrate the dependability of DSDR as a peak load reduction tool. Testing of the methodology has successfully confirmed the magnitude of peak demand reduction achieved by voltage reduction, as well as its sustainability over a 6 hour period. It has also enabled the validation of planned demand reduction benefits associated with many of the DSDR Program implementation initiatives.

The 2011 voltage reduction testing demonstrated an annual increase in peak demand reduction of 8 MW, which resulted from the completion of additional Feeder Conditioning, Grid System Design, and Telecom work. The cumulative reduction in electrical losses gained through Feeder Conditioning improvements implemented year to date was also evaluated and determined to be approximately 5 MW. The forecast of the reduction in losses has been revised based on the updated test results and the remaining implementation schedule for Feeder Conditioning. Based upon testing results to-date, the estimated total peak demand reduction capability of DSDR, when fully operational, is 236 MW as summarized in the table below.

		2008	2009	2010	2011	2012	2013
September 15, 2011	Incremental MW Reduction at Summer Peak				8	60	70
Cumulative	MW Reduction at Summer Peak				100	160	230
	Loss Savings (MW) ²				5	6	6
	Total	27	48	95	105	166	236

Cost Projections

The current estimated cost of the DSDR program by year, including the actual costs through December 31, 2011, is provided in the table below. The estimated total cost of the program continues to be slightly less than the total cost estimate provided in the April 29, 2008 program filing. ***Costs reflected in 2013 are related to project closeout activities and post-DMS implementation support.***

² The reduction of distribution system electrical losses due to DSDR Feeder Conditioning improvements

Progress Energy Carolinas, Inc.
Distribution System Demand Response (DSDR) Program
Implementation Status Report
NCUC Docket No. E-2, Sub 926

Expenditures as of December 31, 2011 (Projected for 2012-2013)

	2008	2009	2010	2011	2012	2013	Total
O&M	\$1.5M	\$4.4M	\$3.5M	\$4.2M	\$2.2M	0.3	\$16.0M
Capital	\$8.0M	\$44.4M	\$57.5M	\$63.6M	\$36.5M	\$16.2	\$226.2M
Total	\$9.5M	\$48.8M	\$61.0M	\$67.8M	\$38.7M	\$16.5	\$242.2M

Post-Implementation Operation

- **EM&V**

A critical component of the DSDR program is the Distribution Management System ("DMS"). When the DMS is placed in service (scheduled for September 1, 2012) it will be used to determine DSDR program energy savings (MWh) and demand reduction (MW) in real time. The DMS will measure and calculate the actual and forecasted energy (MWh) and demand (MW) impacts for both peak load reduction and line loss savings benefits every 15 minutes, using real-time data collected by the various sensors and other devices installed on PEC's distribution system. The DMS is a significant enhancement to the existing distribution system modeling tool and will replace it when DSDR is placed into service later this year. The DMS will measure real time electrical system conditions every 15 minutes, perform a state estimation of the current state of devices, determine the optimum state of these devices, and execute commands using the DSCADA (Distribution Supervisory Control and Data Acquisition) system to change the state of electrical devices remotely to achieve conditions that maximize the peak load reduction capability of the distribution system and minimize the line losses.

Evaluation, Measurement and Verification ("EM&V") activities related to the DSDR program will focus on measuring the peak load reduction impact observed at PEC's Energy Control Center and Distribution Control Center, using data from the DMS. PEC is developing a customized EM&V protocol specifically for the DSDR program, which will be implemented early this fall, to efficiently and effectively gauge its performance. EM&V activities for the year 2012 include additional testing during the summer. EM&V activities in 2013 will employ the customized EM&V protocol and utilize the DMS impact reports. The status of the 2013 EM&V activities will be included in the 2013 annual DSDR report provided to the Commission.

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- **Calculation of Net Lost Revenues**

There are two essential metrics associated with Demand Side Management ("DSM") and Energy Efficiency ("EE") programs. The first of these metrics is demand reduction, measured in megawatts ("MW"). Net lost revenues ("NLR") are not tied to demand reduction savings. The second metric involves energy savings, which are measured in megawatt hours ("MWH"). In the case of DSDR, energy savings are segmented into two constituent components: (1) energy savings that occur between the generator and customer meters as a result of a reduction in line losses; and (2) energy savings that occur on the customer side of the meter as a result of DSDR activation. By their very nature, NLRs are only attributable to electric bill savings realized by customers as a result of energy savings on the customer side of the meter. Therefore, only those energy savings that occur on the customer side of the meter are used to determine NLR values. In the case of DSDR, NLRs attributable to customers' energy savings occur only in concert with DSDR activations. The part of DSDR energy savings associated with reduced line losses is not considered when calculating NLR. PEC forecasts indicate that approximately 37 percent of total DSDR energy savings will occur on the customers' side of the meter based on DSDR activations totaling 80 hours annually, and result in NLR.

Measurement units for the purpose of calculating NLRs are expressed in kilowatt-hours ("KWHs") or aggregated MWHs saved by customers on their side of the meter resulting from DSDR activations.

NLRs resulting from DSDR activations, pursuant to PEC's DSM/EE Cost Recovery Mechanism (*Docket E-2, Sub 931*), are limited to the 36-month period subsequent to DSDR going into service. Consistent with other DSM/EE programs, DSDR's in-service date will reside within Vintage Year One. Since Vintage Years are based on calendar periods, the 36-month recoupment period will likely involve up to four Vintage Years. An illustration of this relationship, assuming that DSDR goes into service during the month of September 2012 is provided below:

Vintage Period	Loss Recovery Period	Recovery Period - Months
Vintage Year 1	Sep 2012 to Dec 2012	4
Vintage Year 2	Jan 2013 to Dec 2013	12
Vintage Year 3	Jan 2014 to Dec 2014	12
Vintage Year 4	Jan 2015 to Aug 2015	8
Totals	Sep 2012 to Aug 2015	36

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The calculation of NLR will be addressed in more detail at the time PEC seeks recovery of NLR in a future DSM/EE cost recovery proceeding.

Conclusion

Implementation of the DSDR Program is on track to meet the original completion date of 2012 and expected demand reduction capability is on target. Estimated total costs are within budget estimates. However, some project costs will be incurred in 2013.

PEC DSM/EE Programs - EM&V Schedule

As of March 15, 2012

TIMEFRAME:	Program Name										
	Home Energy Improvement Program (Docket No. E-2, Sub 936)	Energy Efficiency for Business (Docket No. E-2, Sub 938)	Home Advantage (Docket No. E-2, Sub 928)	Appliance Recycling Program (Docket No. E-2, Sub 970)	Commercial Demand Response (Docket No. E-2, Sub 953)	Res Lighting (Docket No. E-2, Sub 950)	EnergyWise (Docket No. E-2, Sub 927)	Neighborhood Energy Saver (Docket No. E-2, Sub 952)	Residential Energy Efficiency Benchmarking (Docket No. E-2, Sub 989)	Solar Water Heating Pilot Project (Docket No. E-2, Sub 937)	Distribution System Demand Response (Docket No. E-2, Sub 926)
	HEIP	EEB	HA	ARP	CIG DR	RLP	EW	NES	REEB	SHWH	DSDR
2012											
1st Quarter	PROC	PROC		REP ^{(2010) (a)} PROC / IMP	REP ^{(2010) (a)} IMP	IMP				REP ^(d)	
2nd Quarter	REP ^(2010 & 2011)	REP ^(2010 & 2011)				REP ^(2010 & 2011)	REP ^(Summer 2011) IMP	REP ⁽²⁰¹⁰⁾ PROC / IMP	PROC		
3rd Quarter			REP ^(2010 & 2011)	REP ⁽²⁰¹¹⁾	REP ⁽²⁰¹¹⁾		REP ^(Winter 2011/2012) IMP		IMP		Testing
4th Quarter					PROC / IMP	PROC/IMP		REP ⁽²⁰¹¹⁾	REP ^(b)		Annual Report ⁽²⁰¹²⁾
2013											
1st Quarter	IMP	IMP		PROC / IMP	REP ⁽²⁰¹²⁾		REP ^(Summer 2012)				
2nd Quarter	PROC	PROC				REP ⁽²⁰¹²⁾		PROC / IMP	PROC		
3rd Quarter	REP ⁽²⁰¹²⁾	REP ⁽²⁰¹²⁾	REP ^(2012 & 2013)	REP ⁽²⁰¹²⁾				REP ⁽²⁰¹²⁾	IMP		IMP
4th Quarter								REP ^(c)			REP ⁽²⁰¹³⁾

LEGEND	
PROC	Process surveys/interviews (customers or other) for purposes of report that follows
IMP	Impact data collection (onsites, billing data) and analysis for purposes of report that follows
REP	M&V Report

(a) - Submitted on 01/03/12.

(b) - 12 months ending June 2012

(c) - 12 months ending June 2013

(d) - Submitted on 02/20/12.

NOTE: THESE DATES ARE SUBJECT TO CHANGE

**BEFORE THE
NORTH CAROLINA UTILITIES COMMISSION**

DOCKET NO. E-2, SUBS 926, 931 AND 1002

In the Matter of

Docket No. E-2, Sub 926 - Proposed)	
Distribution System Demand Response)	CERTIFICATE OF SERVICE
Program)	

I, Len S. Anthony, hereby certify that the filing of Carolina Power & Light Company d/b/a Progress Energy Carolinas, Inc.'s Revised Annual Report and Revised M&V Schedule for the DSDR program have been served on all parties of record either by e-mail, hand delivery or by depositing said copy in the United States mail, postage prepaid, addressed as follows, this the 2nd day of April, 2012:

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